School of Management

Analysis of the effectiveness of government policy at the local, provincial and regional levels on enabling environment for smallholder farmers in agribusiness supply chains in regions of South Sulawesi, Indonesia

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Declaration

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgement has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma at any universities.

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Abstract

This research aims to analyse the effects of development policy at the local, provincial and regional levels to enhance the enabling environment for agribusiness supply chains in the South Sulawesi province of Indonesia. The research utilised a mixed methods approach. In-depth interviews and focus group discussions were used to explore the elements of enabling environment delivered by institutional policy and procedures, and their effect on the industrial players in the agribusiness system of the two industries. Surveys were used to investigate the situation of smallholder producers in achieving access to the resources of the enabling environment.

The study developed a model which can be used as guide by the government to create an effective program and policy intervention to enhance the enabling environment at the micro level. First, the "pivotal elements" which consist of farm inputs, linkage to potential buyers and farm road infrastructure. The second-order policies were the "importance elements" including: farm research, tenure security and property rights program and credit programs. Lastly, the "useful elements" as the supporting policy condition, but not priority, as follows: marketing contract, marketing standards and simplify business regulation.

The study found that policy implementation by the different levels of government, from local to national, that affects the enabling environment was poorly coordinated in terms of roles and functions. Growth of a competitive agricultural sector was also limited by weaknesses in the private sector, particularly with respect to the challenges faced by smallholder farmers in accessing markets.

The study suggests some policies and recommendations for the government to enhance the enabling environment include investment of rural infrastructure, enhancing research and development, encouraging linkage to market, improving accessibility to the credit scheme, making the input supply available close to farm, enhancing the extension worker capacity, and proper regulation in the right places.

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Acronyms and Abbreviations

ACIAR	=	Australian Centre for International Agricultural Research
ADB	=	Asian Development Bank
AIAT	=	Assessment Institute for Agricultural Technology
AST	=	Agribusiness Sub Terminal
BAPPENAS	=	Badan Perencanaan Pembangunan Nasional
BAPPEDA	=	Badan Perencanaan Pembangunan Daerah
BDS	=	Business Development Services
BPS	=	Biro Pusat Statistik
BPR	=	Bank Perkreditan Rakyat
BNI	=	Bank Nasional Indonesia
BRI	=	Bank Rakyat Indonesia
BPD	=	Bank Pembangunan Daerah
BPN	=	Badan Pertanahan Nasional
BTS	=	Base Transceiver Station
BIPP	=	Balai Informasi dan Penyuluhan Pertanian
BPPL	=	Balai Latihan Penyuluh Pertanian
BPSBTH	=	Balai Pengawasan dan Sertifikasi Benih Tanaman Pangan dan Hortikultura
BWTP	=	Banking With The Poor Network
CG	=	Central Government
CDMA	=	Code Division Multiple Access
CTF-E	=	Food Security and Energy Credit
ECA	=	Economic Commission for Africa
DEPTAN	=	Department Pertanian
DAFF	=	Departement of Agriculture, Forestry and Fishery
FAO	=	United Nations Food and Agriculture Organization
GOK	=	Government of Kenya
GDP	=	Gross Domestic Product

IAARD	=	Indonesian Agency for Agricultural Research and Development
IDR	=	Indonesian Rupia Rate
IFAD	=	International Fund for Agricultural Development
IFC	=	International Finance Corporation
ITRB	=	Independent Telecommunications Regulatory Agency
IRRI	=	International Rice Research Institute
ISPs	=	Internet Service Providers
KADIN	=	Kamar Dagang dan Industri
KPMG	=	Klynveld PeatMarwick Goerdeler
KUD	=	Koperasi Unit Desa
KUR	=	Kredit Usaha Rakyat
KAPET	=	Kawasan Pengembangan Ekonomi Terpadu
LDSS	=	Livestock Department of south Sulawesi
LG	=	Local Government
LFAs	=	Less-Favoured Areas
LIPI	=	Indonesian Institute of Science
MoA	=	Ministry of Agriculture
MVA	=	Mega Volt Ampere
MSME	=	Micro Small Medium Enterprise
MW	=	Mega Watt
NPPKP	=	Nomor Pengukuhan Pengusaha Kena Pajak
NPWP	=	Nomor Pokok Wajib Pajak
NGO	=	Non-Government Organization
OECD	=	Organisation for Economic Co-operation and Development
PG	=	Provincial Government
PLN	=	Perusahaan Listrik Negara
PLTD	=	Pembangkit Listrik Tenaga Diesel
P4MI	=	Program Peningkatan Pendapatan Petani Melalui Inovasi
PPL	=	Petugas Pertanian Lapangan
RENSTRA	=	Rencana Strategis Pembangunan Daerah
R & D	=	Research and Development
RG	=	Regional Government
SASIX	=	South African Social Investment Change
SIUP	=	Surat Izin Usaha Perdagangan
SNI	=	Indonesia National Standard
TDP	=	Tanda Daftar Perusahaan
USAID	=	United States Agency for International Development
USD	=	United States Dollar
UNICEF	=	United Nations Children's Fund
WTO	=	World Trade Organisation

Chapter 1. Introduction

1.1 Background

Global economic reform, industrialization and urbanization have contributed to changes in market structures that require agro-industrial development to be more competitive in getting the market right (Reardon and Barrett 2000). In line with the perceived importance of these rapid changes, most developing countries have concentrated on creating an enabling environment by initiating macro-economic reform, and reforming policy, to enhance the competitiveness of agribusiness and agro-industry developments (Christy et al. 2009; Tanic 2006). Developing competitive agribusiness and agro-industries is essential to create effective value chains, to improve product quality and safety, and to facilitate efficient food flow from production to consumption (Konig, Da Silva and Mhlanga 2013). One of the positive aspects of agribusiness and agro-industries development is that there is a rapid increase of value adding in production to realise market opportunities from primary production, particularly in developing countries (Da Silva et al. 2009). The case of small farmers delivering products to the supermarket in South Africa, for instance, creates a mutual integration between agribusiness firms and smallholder farmers to meet market requirements (Louw et al. 2006). Agribusiness players are increasing the demand for farmers' production in dynamic markets, but this requires collective action between agribusiness and exporters to provide the services to accelerate productivity and technical capacity-building to enhance product quality. Agro-industries also need to enhance market innovation through supply chain and distribution networks (Vorley, Fearne and Ray 2007).

The full potential of agro-industrial development as an engine for economic growth, however, are not automatically implemented effectively by all market stakeholders. The rapid change in the agrifood system creates particular risks for farmers, traders, processors, retailers and marketers. Smallholder farmers find it difficult to meet the quality and food regulation standards. Small processors have to compete with large-scale food manufacturers, which requires capital resources, information and processing technologies. Similarly, traders and other market players can be squeezed by the necessity to fulfil rigorous procurement and certification standards (Tanic 2006). This implies the growth of agribusiness and agro-industry requires attention to a set of policies and strategies to create a conducive business, or enabling environment, to promote investments in agro-enterprises and agro-industry development based on value chains.

Smallholder farmers in Enrekang Regency (an administrative region of South Sulawesi, Indonesia) are also affected by the rapid changes to agribusiness and agro-industries development, as the region seeks to increase economic growth, reduce poverty and increase

food security. Smallholder Enrekang farmers are being assisted by extension workers to have the capability to improve their farm production to take opportunities to supply competitive emerging markets, both domestic and international. Their current informal market transactions, which often deliver unfavourable conditions, can then be reduced in importance. Ruben, Slingerland, and Nijhoff (2006) suggested that working collaboratively with stakeholders in supply chains can be a solution to improve access, market profitability and timely responses to market demand.

1.2   Problem statements

Geographically, Enrekang regency is located ± 235 kilometres north of Makassar (the capital city of South Sulawesi province). The main source of livelihood is primarily the agricultural sector, which contributes the largest GDP at around 50 per cent, and is the main source of income, jobs and food supply (Bappeda 2009). Likewise, Winoto and Siregar (2008) revealed that one of the major contributions of the agricultural sector to GDP is as a source of employment for the rural population. Tambunan (1998) suggests that the agricultural sector in Indonesia provides millions of low-skilled, or non-skilled labourers, with jobs. ADB (2006) reported that the agricultural sector is still a major contributor to economic growth in Indonesia. The structure of economic growth in Indonesia could potentially be changed from agriculture to an industrial base by giving priority investment to the agricultural sector (Saragih and Bayu 1993). One of the priority investments to foster a competitive agricultural sector is for government to provide public facilities and investment services that can help smallholders utilise their resources productively (Kuyvenhoven 2004).

The upland areas of Anggareja, Baraka, Buntu Batu, Bungin, Malua, Masalle, Baroko, and the Curio sub-districts (BPS 2013) have a comparative advantage in terms of geographic area and climate, such as higher rainfall of about 1669 mm per annum, higher soil fertility, and good altitude which is from 47 – 3293 m above sea level (Badan Pusat Statistik 2013). Growth in the dairy sector is mostly concentrated in four sub-districts: Cendana, Enrekang, Anggeraja and Alla. The highest population of dairy cattle is in the sub-district of Cendana, with 45% of the total population in Enrekang (BPS 2013). According to Baba et al. (2011), one of the advantages of the Cendana sub-district is that it is located in the watershed area where the farmers can grow grass as a source of forage. Enrekang regency has the highest population of dairy in the south Sulawesi province (LDSS 2013).

To increase agricultural production of smallholder producers, the government has carried out several programs. The Enrekang Government established the Centre for Agricultural Extension Information *(Balai Informasi Penyuluhan Pertanian, BIPP)* in each sub-district as the central office, to both organise and manage extension workers giving advice to farmers.

They allocated vehicles, facilities and operational costs to accelerate extension worker's service to farmers. Case studies in various subjects were designed to strengthen the capability of extension workers in delivering their knowledge to farmers (Dinas Pertanian dan Perkebunan 2009). Regular meetings were compulsorily conducted every week to create and to evaluate programs in order to obtain an appropriate method to solve problems arising in farmers' fields (Dinas Pertanian dan Perkebunan 2009). The government also actively engaged in coordinating with other research institutions to create partnership programs in developing research based on local resources. However, existing conditions, such as inadequate local experts, limited skills of extension workers to transfer research innovations, inadequate budget to support the operational research, and lack of coordination with other public sector organisations make agricultural research difficult to implement at a practical level. As stated by Fuglie and Piggott (2006), in rural areas, research and development is poorly implemented. Most agricultural research in Indonesia has generally been constrained with regards to creating and developing new technological innovations to accelerate the growth of agriculture, due to restricted budgets from the government. Therefore, World Bank (2010) and Fuglie (1999) reported that the private sector contribution in Indonesia is required to respond to financial constraints by the public sector for research and development. Similarly, Pray and Umali-Deininger (1998) reveal that significant efforts will be required by the public and private sectors to generate the productivity-enhancing knowledge and technologies needed to fulfil the great challenges facing the agricultural research sector. Stads, Haryono and Nurjayanti (2007) also add that partnerships working among government agencies, universities, non-profit organisations and the private sector are required to create a better performance of agricultural research. Rural infrastructure and irrigation are also essential invested by private sector to accelerate the growth of agricultural production (World Bank, 2010).

Realising the importance of infrastructure as an instrument to encourage economic activities to stimulate investment and to accelerate distribution of goods to market through this region, the construction of physical infrastructures, such as roads, telecommunication, electricity and irrigation were prioritised by the government. Under a national government project, a national highway of 123 kilometres and 49 bridges was built from Makassar to Parepare (Daniel 2011). This road has provided good access and increased accessibility for agricultural trading from Enrekang to Makassar. However, at the district level, which was directly related to farm activities, infrastructure was limited; most farm roads were of poor quality construction and were generally unpaved. This increases the cost of transport to reach the market and distribute inputs to the farm gate. Similarly, Telkom and Indosat, the main telecommunications operators, constructed cellular networks and built base transceiver

stations (BTS) for mobile communication (GSM) to provide cellular networks in each sub-district to serve the costumers. However, accessibility of telecommunications in some villages was still poor. This can be found in the sub-district of Baroko and Masalle, which produce cabbage, potato, onion leaves, chili and carrots, where farmers have to visit other places to access a mobile network connection. Likewise, for dairy farmers, there were some villages in the sub-district of Cendana, which was a main producer of milk production, that could not access cellular telephone networks. This led to access to a telecommunication network becoming more expensive, and also to poor network quality (Telkom 2009).

To support marketing activities, the agribusiness sub terminal (AST) in the Sudu wet market was constructed with the aim to assist farmers to gain easy access when selling their products directly to buyers, and to get competitive prices for their products (Dinas Pertanian dan Perkebunan 2009). Ideally, the AST could provide logistic and market infrastructures, such as cold boxes and cold storage, in order to respond to market requirements in terms of quality and guaranteed supply (Sukmadinata 2001), but these facilities are inadequate (Dinas Pertanian dan Perkebunan 2009). Consequently, most transactions and distribution of products to markets have poor logistic infrastructure. Farmers also have difficulty getting market information from the institutional authority, with most prices determined by traders (Anugrah 2004).In addition, as the region lacks a permanentirrigation infrastructure, the yield potential and capability to respond to market demand mostly depends on the seasonality of rainfall. This means that the potential for high intensity cropping is generally during the rainy season, from November to June, due to the advantages of having more water available from the hills and from ground water. During the dry season, from August to July, most farmers are constrained in production capacity due to limited water availability (Bappeda 2009). There is a chance to obtain water by constructing individual irrigation systems, but this requires extra costs for the equipment and for the cost of fuel to pump water from rivers, and not many farmers have the necessary capital resources. Therefore, it is important to introduce crops into this area that are suitable to the climate condition, in addition to constructing permanent irrigation.

To assist farmers to register their land easily for property rights and tenure security, the National Land Agency (BPN) was established in Enrekang. Farmers who have registered their land and obtained a certificate, as collateral guarantee, have better access to financial institutions to apply for credit and invest in their land, and to be more productive (WorldBank 2005). On the other hand, those who have not registered their land have limited accessibility to credit schemes through the banks. The problem with obtaining certificates generally related to complicated procedures, and the costliness and length of time taken to obtain the land certificate (USAID 2007).

The presence of the Indonesian State Bank *(Bank Negara Indonesia, BNI)* and the People's Bank of Indonesia *(Bank Rakyat Indonesia, BRI)* facilitates smallholder producers' accessibility to credit services close to the site of production at the sub-district level. Both the BNI and the BRI offer financial assistance, such as the Food Security and Energy Credits *(Kredit Ketahanan Pangan dan Energy, KPPE)* and the People Business Credits *(Kredit Usaha Rakyat, KUR)* programs to assist farmers to enhance production capacity and to conduct better farm management (Sabirin 2001). Farmers need capital inputs to improve the capacity of their production, so access to credit to purchase seeds and chemical inputs for vegetables and heifers, and pen construction for dairy, is important. However, many of them could not access banks due to a lack of capacity to fulfil credit requirements. Consequently, vegetable farmers often used seeds from the previous harvest, and also reduced fertiliser for their crop, while dairy farmers have problems improving milk production due to expensive heifers. In addition, complicated procedures and limited authority of the banks at the sub-district levels are also other factors that make it difficult for smallholder producers to obtain credit. As investigated by ADB (2000), lack of capability to provide the physical collateral, low profitability, and incapacity to repay the loans are factors that impede farmers from meeting the requirements of formal financial institutions when accessing credit. In rural areas, collateral guarantee is mostly from land ownership, but a majority of farmers do not have legal title to their land or house (Schaluter 2008). The limited outreach to rural areas, political policy by government, and lack of awareness of microfinance institutions are also factors that impede smallholder producers in gaining access to formal financial institutions (Bramono et al. 2005; Banking With Poor Network 2009).

Vegetable products are mainly dominated by non-perishable (e.g., red onion, potato, carrot, red bean, soybean) and perishable crops (e.g., red chili, scallion, bean, cabbage, tomato and mustard green), with total production of around 13,720 tonne or 49% of the total production of South Sulawesi. Most production is sold in the regional and inter-island markets. Moreover, the dairy sector also has one of the highest populations of dairy cattle in South Sulawesi province. In 2014, there were around 1145 dairy cattle, or 78 percent of the total population in South Sulawesi (BPS 2013). The large production of vegetable and dairy mean there are opportunities for smallholders to create market linkages with potential buyers. However, currently, the products are only sold at the local wet markets and it is difficult to compete domestically and internationally. At the same time, farmers complain about the lack of linkage to potential buyers. It is clear that there is an issue in the agribusiness system.

Production problems might be related to lack of capacity to supply to market continuously, and to the poor standard of production. Inadequate and expensive inputs, such as seeds and heifers at the local level, might be one of the factors that make it difficult for farmers to

compete economically. Most products do not follow the procedural standards on quality control, such as taste, chemical residues and food safety. Packaging is also poor, with gunny sacks for non-perishable crops and wooden boxes for perishable crops, while the local food, which is called the *dangke* product from dairy, is packaged in banana leaves. High risks in production, such as disease attack and crop failure, might be other challenges that inhibit farmers. Many farmers who grow both perishable and non-perishable crops have low and poor quality yield due to pests and diseases. Dairy farmers also face problems in increasing milk production capacity. They have limited skills and technical knowledge on conducting artificial insemination, such as early detection of infertile bulls and testing of semen quality. They also have limited knowledge of feed management. They often give forage fodder for their dairy from agricultural waste and grass field which are a low quality standard. To solve the problem, it is clear that farmers require advice, skill and sufficient information from extension workers. As observed by Anderson and Feder (2004), the role of the extension worker is to accelerate technology transfer to help farmers in eliminating the differences between potential and actual yield, and to educate farmers to be productive in farm management. However, there is evidence that a majority of smallholder farmers, particularly those in rural remote areas, are not reached by any advice and technological diffusion from the extension workers (Haug 1999).

Due to these existing problems that impede smallholder producers, the policy environment to remove the worst of the biases towards agricultural growth, and to open the way for a more successful functioning market, is needed. The government has to play a major role in providing solutions. Thus, an in-depth study into the enabling environment to obtain effective programs to enhance the competitiveness of smallholder producers is urgently required. The research problem this thesis will focus on is: what are the key elements to enhancing the enabling environment for agribusiness supply chains at the local, provincial and regional levels for South Sulawesi, Indonesia.

1.3   Objectives

The objective of this study is to describe and analyse the effects of government policy at the local, provincial and regional levels to enhance the enabling environment for agribusiness supply chains in the region of South Sulawesi, Indonesia. The specific objectives are:

1.   Explore and develop a conceptual framework as a guide to identifying government policy initiatives to enhance the enabling environment for farmers.
2.   Describe and analyse the interconnection of government policy at the local, provincial and regional levels on the enabling environment.
3.   Explain and analyse the role of the private sector in the enabling environment.

4. Identify and suggest changes to government policies at the local, provincial and regional levels to enhance the enabling environment.

1.4 Conceptual framework

The global agribusiness system is complex and dynamic which obliges farmers and firms to compete within vertically integrated food and fibre systems globally (McGregor 2002). Globalisation has led to the demand for products by consumers that incorporate attributes, such as quality standards, food safety, more choice, more information and competitive prices (Baines 2002). Transnational competition created by these changes is accelerating the trend to fewer and larger farm input suppliers and services, credit facilities, primary processors and manufacturing firms, wholesalers, retailers, and food service firms (Murray-Prior et al. 2004). Similarly, changes in consumer demand is leading to integrated supply chains that can deliver the desired products quickly, and be responsive, flexible and efficient (Burch and Goss 1999).

Drilon (1971) describes the agribusiness system as a vertically integrated structure that consists of a wide range of activities from farm input suppliers, producers, processors, wholesalers, retailers and consumers, which are categorised as the main actors, and this requires supporting services from the government and other institutions. Downey and Ericson (1987a) identify three main sectors: farm inputs, farms, and output, whereas Wills (1979) includes those businesses that deliver service facilities to the agriculture sector, such as financial services, infrastructure facilities and insurance.

Howard et al. (1990) suggests that agribusiness systems require integrated knowledge and increasing coordination between the agricultural sectors and business firms to improve management and economic efficiency. The success of an agribusiness system is highly influenced by effective government policy, such as arrangements for the efficient operation of markets for output and inputs, tariff, market and agrarian policies (Downey and Ericson 1987b). Indeed, the most common example of a government's contribution to the agribusiness system is providing technical services, establishing infrastructure, commercial and marketing services, encouraging research, and development and financial services (Davis and Goldberg 1957).

The enabling environment includes institutional policies and procedures that function to deliver assistance and services to enhance the capacity of smallholder producers in accessing and utilising resources. For example, connecting farmers to extension workers can increase farmers' level of skills and knowledge which enables them to engage in better farm management and improves their capacity to respond to market demands (Margono and Sugimoto 2011). Similarly, by improving their ability to access financial services,

smallholder producers have a greater opportunity to purchase and, hence, use recommended farm inputs to improve yields (GOK 2002). Providing physical infrastructures, such as roads, irrigation and electricity, leads to improving access to markets, reducing transportation costs and encouraging economic activities, both agricultural and non-agricultural (Ifzal and Pernia 2003).

Meeting market requirements are a main requirement of smallholder producers to be able to participate in competitive markets. Having access to markets will help them to increase accessibility to sources of input and credit. This can lead to increasing income as a way to reduce poverty (de Paulo Correia 2014). However, unfavourable environments create particular challenges for smallholder producers to participate in competitive markets (Christy et al. 2009; Thapa and Gaiha 2011). For instance, in rural areas, issues concerning agro-infrastructure are one of the most prominent challenges that impede farmers in increasing production and improving productivity (KPMG 2009). Small-scale farmers are often challenged to expand their production to achieve higher food prices due to limited access to inputs and credit, and also marketing services (Thapa and Gaiha 2011). Some farmers also face problems in registering their land to obtain tenure security and property rights through the institutional land authorities due to complicated procedures, costliness and time consuming land registration (Lamba 2005). Consequently, they are less capable of meeting financial credit requirements due to inadequate collateral without land title (ADB 2000).

Collaborative actions among stakeholder markets seem to be an effective way to overcome the multiple constraints, and, to be successful, the government has to play an important role by providing enabling policies or a comprehensive set of influential environmental factors, such as investments in infrastructure, financial assistance, research and development and extension, thus enhancing the role of business and strengthening other sectors to achieve a well-functioning market in rural areas (Brinkerhoff 2004; Gandhi, Kumar and Robin 2001). In other words, creating an enabling environment is one effective strategy to foster competitiveness which requires policy intervention for sustainable development, particularly attention to market policy (Christy et al. 2009; Kuyvenhoven 2004). The design of a conceptual framework needs a comprehensive understanding of the enabling environment in determining the point at which the boundary is drawn and what themes need to be inside and outside in relation to the agribusiness system, as illustrated in (Figure 1.1)
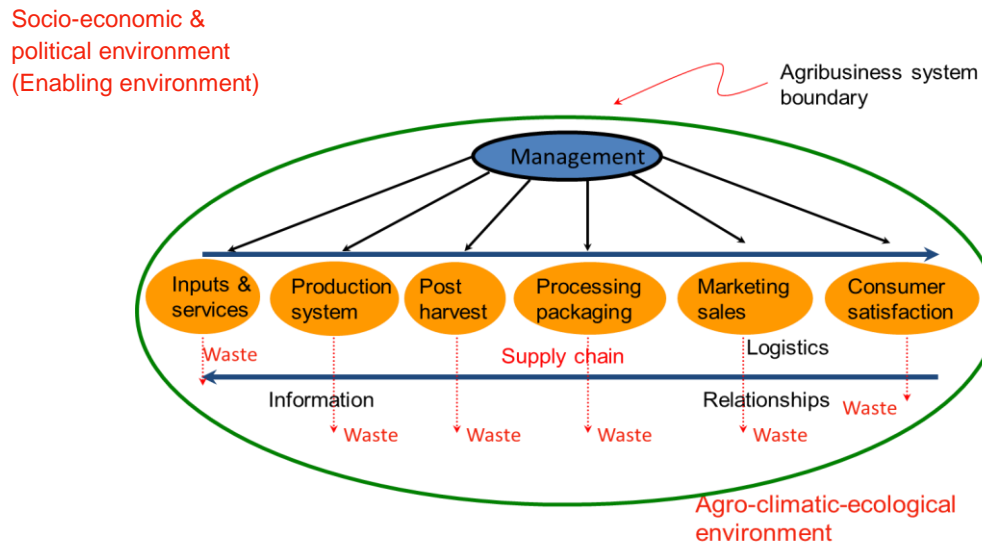
Figure 1.1: The initial framework for analysis of the enabling environment for agribusiness system.

Source: Adapted from Murray-Prior et al. (2004)

Considering the initial framework for analysis of the enabling environment for agribusiness systems (Figure 1.1) as the basic model, the key themes for investigating and developing enabling environment based on need and geographic scale is explored (Table 1.1). Christy et al. (2009) categorised the enabling environment into three main parts: "Essential enablers", which consists of the elements of trade policy, infrastructure, land tenure and property rights; "Important enablers," where the public policy maker encourages financial services, conducts research and development, and the application of standards and regulations; and "Useful enablers," which are categorised as necessary, but not sufficient conditions; namely, business linkages, business development services and ease of doing business.

Bryant (1989) also classified the enabling environment through the conceptual framework of a geographic scale into macro (national/international), meso (regional) and micro (local). Each locality is expected to have a unique characteristic in delivering information because of different geographical locations and the involvement of stakeholders. This requires a description of each element and, therefore, the challenges and the expected solutions can be identified. Thus, identifying the roles and responsibilities of each stakeholder will assist to identify what resources they have and how they utilise these resources.

Table 1.1: Framework of enabling factors for South Sulawesi Indonesia based on need and geographic scale

Enabling factors	Micro (local)	Meso (regional)	Macro (national / international)
Essential Enablers			
Trade policy			CG
Infrastructure	PG/LG	RG	CG
Land tenure and property rights			CG
Important Enablers			
Financial services	P /LG/PG	P	P/CG
Research and development, extension worker	P/LG/PG	P/RG	CG
Standards and regulations	P		P/CG
Useful Enablers			
Business linkages	D		
Business development services	D		
Ease of doing business	D/PG		CG

CG- Central Government, RG-Regional Government, PG-Provincial Government,
LG Local Government, P- Private, D-Development Organization.
Source: Adapted from Hualda (2010, p.5)

As shown in this table, as the public institution, the government predominantly delivers the enabling factors at each level of geographic scale. This intervention is dedicated to create a favourable environment to achieve growth of agriculture. The combination of government and the private sector can be viewed in the elements of financial services, research and development, extension worker, standard and regulation. Development organizations mostly work in the useful enablers at the micro level and their main contribution is to facilitate the effective implementation of enabling factors at a practical level. Partnerships with development organisations, such as NGOs, is key to the better targeting of programs for poverty reduction, particularly in facilitating eligible beneficiaries and identifying the appropriate location (ADB 2006). Identifying the roles of each stakeholder at each different level is important to deciding how these resources enable problems to be solved and how stakeholders can collaborate with each other in delivering their functions to create the enabling environment (Hualda 2010).

1.5 Research Paradigm

A paradigm is 'a broad view or perspective of something' (Taylor, Kermode and Roberts 2006, p. 5). Guba and Lincoln (1994, p. 105) describe it as 'the basic belief system or worldwide view that guides the investigations'. Weaver and Olson (2006, p. 60) suggest a 'paradigm is a pattern of belief and practice that regulates inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished'. Meanwhile Laudan (1977, p. 81) defines a paradigm as 'the set of general assumptions about

the entities and processes in a domain of study, and the appropriate methods to be used for investigating the problems and constructing the theories in that domain'.

1.5.1 Selection of paradigm

Positivism and interpretivism paradigm

The selection of a paradigm leads to the way in which a researcher considers the research problem and research methology, and construes the output that is obtained from investigation. A number of classifications of research paradigms are offered by various scholars (Creswell 2003; Crotty 1998; Denzin and Lincoln 1998; Lincoln, Lynham and Guba 2011). However, most of those classifications state that positivism and interpretivism are most commonly used in social research (Akbar 2011; Tanaya 2010).

These two classifications differ in three ways. First, ontologically, positivism supposes the objectivity of reality and the independence of social actors. Human interaction can be interpreted in a causal deterministic manner, has a mechanistic quality, and social actors are manipulatable and controllable. Walsham (1995) also considers fact to be different from values in positivism, and facts, but not values, contribute to scientific knowledge. Conversely, interpretivism highlights that the subjectivity of reality is constructed from human interaction. Human interaction is designed, intentional, creative and productive. Indeed, it can be interpreted and explained, but cannot be predicted. Social actors create their own reality. Brennen (1992) closely relates this paradigm to qualitative research and Patton (1991) closely relates it to naturalistic enquiry.

Secondly, epistimologically, positivists believe that credible data and facts arise only from observations and experimentation of phenomena and is constructed based on the certainty of sense experience. Guba and Lincoln (1994) also assert that,with positivism, the results of the research is free from researchers' influences. By contrast, intrepretivism believes that credible data and facts arise from experimentation and is constructed based on empathetic communication with the research subjects. Concentrating on the details of a situation, a reality arises behind these details, and subjective meanings motivate actions.

Third, methodologically, positivists point out that data collection techniques are highly structured, use large samples and measurement, and are mostly quantitative; whereas, in intrepretism, the method of data collection uses smaller samples and, generally, in-depth interviews in qualitative investigations. In positivism, analysis is usually done by fragmenting objects into their smaller, analysable parts (reductionism). A clearly defined research problem, a set of hypotheses, and a clear sampling technique (Denzin and Lincoln, 1998), which corresponds with the scientific approach, are methodologies usually employed in positivism. Interpretivists need to involve themselves in social interactions and human

investigations in order to understand the meaning. Examples of methods are in-depth interviews and focus group discussions (Malhotra, et al. 2008). Collinson (2012) and Klein and Mayer (1999) also declare that interpretative research tries to understand the lifewords through the understandings and meanings of people from their perspective,without any specific dependent and independent variables.The focus is on the human interaction in a specific context.

Due to the nature of the study, this research will adopt the approaches of both positivism and interpretivism. The positivism approach is used because it uses statistical methods in analysing smallholder producers in accesing the resources of the enabling environment (Chapter 5), and intepretivism is applied because it addresses the exploratory investigation to understand the human interaction and problem situation in accessing the enabling enivironment (Chapter 4).

A pluralistic approach

A meta-methodology is also used in the study because of its inherent capacity to solve and classify the problem which exists in the complex situation. Jackson (1999) suggests a meta methodology is an appropriate approach to manage complex problems in management science. According to Jackson (1999, p. 20), 'by employing the meta methodology, it creates maximum advantage of the benefits to be gained is created from using methodologies premised upon alternative paradigms together, and also encourages the combined use of diverse methods, models, tools and techniques, in a theoretically informed way, to ensure maximum flexibility in an intervention'.

Mingers and Brocklesby (1997) also argue that this approach utilises a wide range of methodologies, partly or fully, with many from different paradigms. The authors find there are several reasons in favour of using multi-methodologies. Firstly, the real-world problem situations are complex systems and require multi perspective approaches. Different paradigms need distinct approaches to deal with mixing methods, techniques and models to achieve the full richness of the real world. Secondly, responding to a complex situation does not usually happen at one time; rather, it is commonly conducted in several steps. Multi-methodology seems to be a more effective approach to managing these steps than other methods, therefore combining them is required. Integrating various approaches can result in a better result, even if methodologies have functions that are alike. Third, because the combination of methodology has been done for a while, further evaluation needs to be conducted, philosophically and theoretically.

McGregor, Rola-Rubzen, and Murray-Prior (2001, p. 63) suggest that 'more progress can be made by using more than one methodology, even though their assumptions may be

incompatible and their results imply different solutions to the problem. The dialogue created by this diversity will provide better solutions than a reliance on one paradigm and its associated methodologies'. This means that by using only one paradigm, only a limited view of the problem situation is obtained; for example, only to that which can be solved with a quantitative measurement, or only to subjective meaning with a qualitative method (Mingers and Gill 1997). McGregor, Rola-Rubzen, and Murray-Prior (2001) also argue that using single disciplinary research has not been able to solve intricate problems, especially in transitional economies.

Furthermore, for analysing the complexity of systems, the selection of methodologies from different paradigms should address the main issues and problems. Hard systems and soft systems, and other methodologies, should be combined to provide greater flexibility and to achieve the full richness of the real world from different issues and different viewpoints (Jackson 1999; Jackson and Keys 1984; Murray-Prior et al. 2012)

1.6   Selection of methodology

Based on the arguments above, a mixed method research approach will be applied to understand the complexity of the agribusiness system in enhancing the enabling environment, and to respond to the objectives of the study. Mixed-method research incorporates the combined use of qualitative and quantitative research to solve intricate problems (Creswell 2003; Greene 2007; Johnson and Onwuegbuzie 2004; Onwuegbuzie and Leech 2005; Tashakkori and Creswell 2007; Tashakkori and Teddlie 2003b). Johnson et al. (2007, p.123) argue that mixed method research is "the type of research in which a researcher combines elements of quantitative and qualitative approaches for the broad purpose of breadth and depth of understanding or corroboration". Tashakkori and Creswell (2007, p.4) define mixed method research "as a procedure for collecting, analyzing and mixing or integrating both qualitative and quantitative data at some stage of the research process within a single study for the purpose of gaining a better understanding of the research problem". These definitions clearly provide a deep understanding. Moreover, mix method is a method which applies to more than one approach in research, where they can be applied simultaneously or consecutively (Heyvaert, Maes and Onghena2013).

The combination of qualitative and quantitative approaches enables the advantages of both approaches to support the analysis, in order to arrive at a more comprehensive and reliable result (Tashakkori &Teddlie 1998; Green & Caracelli 1997; Miles & Huberman1994; Green et al. 1989). The combination of qualitative and quantitative data, instead of using a separate data set, can result in an understandable link between qualitative and quantitative results, to build a new concept and theory (Teddlie & Tashakkori 2009). According to Green and

Caracelli (1997), mixed method research can be designed into Component design and Integrated design. Component design combines qualitative and quantitative approaches at the stage of interpretation and drawing conclusions, not at the earlier stages. On the other hand, Integrated design combines elements of qualitative and quantitative approaches in sequence, and can be done in various ways (Carvalho and White 1997; Cresswell 2003). Fist, defining a person or a group of people based on quantitative survey data to be studied qualitatively. Second, interview protocol for qualitative survey is constructed based on quantitative survey. Indeed, quantitative survey can show important points which need to be researched through a qualitative approach. Third, determining the levels of the quantitative sample based on the qualitative result. Fourth, designing a quantitative survey questionnaire based on the result of qualitative research. Research analysed by a qualitative approach can provide ideas about the points that need to be included in the questionnaire of quantitative research. Fifth, preliminary data from a quantitative survey questionnaire can be taken from a qualitative approach.

Strategies for mixed-methods research were given by Cresswell (2006) involving sequential procedures, in which the researcher elaborates the findings of one method with another, starting with qualitative methods though the exploratory phase and following with quantitative approaches involving large samples, so the results can be generalized to a population. Another is concurrent procedures which involves the researcher combining analysis of quantitative and qualitative data, with the aim of gaining a comprehensive understanding of the research problem. The researcher collects the qualitative and quantitative data at the same time and then converges the information in the interpretation. Transformative procedures involve the use of different theoretical frameworks to focus on the topic, data collection methods, and outcomes.

Ivankova et al. (2006) provide the steps to be taken in mixed method of sequential explanatory design. First, an important issue, both or either qualitative or quantitative, is prioritized in the data collection and analysis stages (Morgan 1998; Creswell 2003). Sequential explanatory design generally prioritizes the quantitative approach because quantitative data is collected first and covers most of the aspects in the process of collecting data. However, qualitative data collection and analysis can be prioritized (Morgan, 1998) or both, to match with the goals, the coverage of the quantitative and qualitative research questions, and the types of the design of each stage. Second is implementation, meaning that the data collection and analysis of qualitative and quantitative can be done in turn, or at once (Green et al. 1989; Morgan 1998; Creswell et al. 2003). Sequential explanatory design requires a period of time to collect data which is conducted in two stages, one following another. Third is integration, which refers to the time when the qualitative and the

quantitative methods are mixed. (Green, Caracelli and Graham 1989; Tashakkori and Teddlie 1998; Creswell et al. 2003). The time can start from the initial phase of the study, the writing of the purpose and the qualitative and quantitative research questions (Teddlie and Tashakkori 2003), until the interpretation phase which mixes both findings (Onwuegbuzie and Teddlie 2003)

Furthermore, according to Heyvaert, Maes and Onghena (2013), the main advantages are that mixed methods can result in findings which are more complete, real, and can overcome the intricate research questions. Mixed methods, rather than a single method, can also ensure the acceptance, or rejection, of a theory in a wider context (Risjord et al., 2002).

1.7   Thesis structure

This thesis consists of eight chapters.

Chapter 1 is an introduction to the thesis and covers the background of the study to provide general information on the specifications of the problem, including the research objectives, problem statement, conceptual framework and research paradigm.

Chapter 2 describes the research site, Enrekang regency in general, and the two focal commodities in the study.

Chapter 3 presents a literature review on the enabling environment for agribusiness supply chain. The chapter covers relevant theories and concepts for this study. In particular, it focuses on elements of an enabling environment and whether these elements influence the effectiveness of agribusiness system for both vegetable and dairy farmers.

Chapter 4 provides the research methodology used in this study, including qualitative and quantitative research methods

Chapter 5 is devoted to qualitative results. The chapter concentrates on the qualitative finding of the vegetable supply chain and dairy supply chain. The key elements of the enabling environment delivered by institutional policy and procedures based on local conditions in the research siteis also presented.

Chapter 6 describes quantitative results. The chapter focuses on the investigation and analysis of the smallholder producers in achieving access to the resources for an enabling environment.

Chapter 7 discusses the enabling environment for agribusiness supply chains. The main issues presented in the enabling environment are based on the local perspective in Enrekang regency. A detailed discussion of the elements of the enabling environment is highlighted, followed by the problems and challenges faced.

Chapter 8 presents the summary, conclusion and recommendations of the study. Theoretical, methodological and practical contributions of this study are presented. Limitations of the study and areas for further research are also discussed.

Chapter 2.   Overview of the research site

2.1   Introduction

This chapter describes information related to the Enrekang regency in general, and the factors associated with the enabling environment for agribusiness supply chains. Most of the information in this chapter is secondary data gathered from the Department of Agricultural and Plantation, the Department of Livestock and Fishery, the Central Bureau of Statistic of Enrekang, and the Regional Development Planning Agency.

This chapter is divided into several sections which starts with a description of Enrekang regency, including information about its geographic position, population and sources of income, topography and climate. This is followed by a brief description of the agricultural systems, and development of the agricultural sector and agribusiness systems in Enrekang regency. The institutions involved in agricultural growth in this region will also be described.

2.2   Description of the Enrekang Regency

2.2.1   Geographic position of Enrekang regency

Enrekang regency is a regency in south Sulawesi province. It is located ± 235 kilometres to the north of Makassar (the capital city of south Sulawesi province). The regency lies between Latitude 3° 14′ 36″to 3° 50′ 00″ south and 119° 40′ 53″ East. Administratively, Enrekang regency consists of 12 sub-districts, 108 villages, with an area of 1,786.01 km², and is bordered by Tana Toraja regency in the north, Sidrap regency in the east, Pinrang regency in the west, and Luwu regency in the south. The total area of Enrekang regency is ± 2.86% of the area of South Sulawesi Province (Bappeda 2009).

2.2.2   Population and source income

According to data provided by the Central Bureau of Statistics of Enrekang, the total population in 2012 was 193,683, distributed in 12 sub-districts, with the highest population in the Enrekang sub-district of about 31,069 people, with the smallest in the Bungin sub-district with 4,498 people. The annual growth rate is 1.01% and the average population density is 106.5 people per km² (BPS 2013).

The agricultural sector is the main sector in Enrekang, particularly for food, job employment and source of income for poor people in Enrekang. In 2012, the agricultural sector provided the highest economic output (46%), followed by services (29%), trading sector (9.2%), industrial processing (2.8%), construction (5.1%), financial services (4.2%) and other sectors (3.4%). In Enrekang, the agricultural sector consists of five sub-sectors, including food crops, livestock sub-sector, plantation sub-sector, forestry sub-sector, and fishery sub-sector.

In addition, the highest growth of the agricultural sector is supported by food crop sub-sectors, with the average growth above 36% per year.

Figure 2.1: Map of the Enrekang regency

Source: Bappeda 2009

2.2.3 Topography and climate

The topography in this region consists of a plateau located on the West, East, and North, and includes the sub-districts of Alla, Curio, Anggeraja and Malua, while the lowland area is located in the South at sub-district of Maiwa. Generally, the regency includes mountains, hills, valleys and rivers, with a height of 47 - 3293 meters above sea level, and has no coastal areas. Hills and mountains dominate about 85% of the area, whereas flat areas comprise only 15% (BPS 2013).

Enrekang regency has two seasons - the rainy season and the dry season. The rainy season often occurs from November to July, and the dry season is usually in the months of August to October. This region has one of the higher rainfalls in the south Sulawesi provinces, with an average rainfall of 1669 mm per annum. The highest rainfall occurs mostly in the north and in the east where the soils are a heavy loan. With physical conditions where most of the land is steep (82%), the rain that falls in the hills flows as surface water. With no irrigation

infrastructure, rainfed farming systems are used, especially for growing crops (Dinas Pertanian dan Perkebunan 2009).

2.3   Agriculture in the Enrekang regency

Agriculture is essential for economic growth in Enrekang regency. Approximately 50% of the population depends on agriculture as main source of income. This sector has also the potential to contribute towards job employment and food supply (Bappeda 2009).

2.3.1   Production systems in Enrekang

Land usage

The land area in Enrekang that is suitable for development of the agricultural sector is around 96,181 ha. Of this land, only 23% is utilised by perishable and non-perishable crops, and around 26% is used for plantation crops. The estimated area planted for perishable crops is 16,825 ha which is dominated by cabbage, tomato, eggplant and chili crops. Thus, non-perishable crops are estimated at around 4,673 ha which is commonly planted with red onion, read bean, soybeans and potato crops. Other crops, which are known as plantation crops, include clove, cacao, coffee, hazelnut, coconut, vanilla, pepper and others, and are estimated at around 25,533 ha (BPS 2013). Most farmers used traditional farming systems, without conservation or land terracing systems, and, therefore, the rainy season leads to a decrease in soil fertility (Suryatmojo 2002).

Vegetable production

Agricultural crops cultivated by farmers in Enrekang are classified into three categories: food crops, vegetable crops and fruit crops. The food crops are mainly rice paddy, field maize, soybean peanut, green bean, cassava and sweet potato; the horticulture or vegetable crops include red onion, potato, tomato, red bean, bean, cabbage, chinese cabbage, pepper, scallion, carrot, chili, eggplant, cucumber, squash, kale, green bean, spinach, and cauliflower; and fruit crops include avocado, olive, star fruit, durian, orange, mango, jackfruit, pineapple, papaya, banana, and passionfruit. Farmers are more likely to grow vegetable crops because of the market demand. For instance, farmers in the sub-districts Baraka, Anggeraja, Malua and Baroko grow red onion, chili and cabbage intensively due to having a high demand from regional and inter-island traders (Dinas Pertanian dan Perkebunan 2009).

Enrekang regency is one of the central vegetable production areas in the south Sulawesi province, and has the capacity to supply vegetables to the regions in the south Sulawesi province, and several islands in the eastern part of Indonesia (ACIAR 2009). Vegetable products are distributed regularly four times a week from the agribusiness sub terminal at Sudu wet market, or are collected from the farm gate by regional and inter-island traders.

However, poor logistics and packaging mean vegetables are prone to damage and diminishing quality (Dinas Pertanian dan Perkebunan 2009).

The majority of crops are grown in upland areas with a high intensity of rain and good soil fertility. The upland areas in this region consists of Anggareja, Baraka, Buntu Batu, Bungin, Malua, Masalle, Baroko, and Curio sub-districts (BPS 2013). These type of crops are classified as non-perishable and perishable crops (Table 2.1)

Table 2.1: The production of the non-perishable crops in Enrekang regency from 2008 to 2012.

Type of crops	Production(tonnes) in year				
	2008	2009	2010	2011	2012
Red onion	12610	10943	17115	34469	33017
Carrot	3267	2805	4526	4417	3381
Potato	1451	821	811	1313	1134
Soybean	283	1233	426	525	645
Red bean	1675	1176	2702	1472	454

Source: Central Board Statistics of Enrekang Regency, 2013

For non-perishable crops, the highest volume of crops produced in the last five years are red onions. In 2011, for example, production was almost 35,000 tonnes, followed by carrots with nearly 5,000 tonnes; however, production fluctuates every year. Potato, red bean and soybean are also produced by farmers, but the quantity of these crops was less than red onion in the last five years.

Table 2.2: The production of perishable crops from 2008 to 2012

Type of crops	Production(tonnes) in year				
	2008	2009	2010	2011	2012
Cabbage	23610	24599	38795	40139	42682
Red chilli	2335	1970	1666	3977	1896
Tomato	14074	8600	10226	1225	13934
Scallion	3341	3550	5922	5732	5725
Bean	2789	3341	2804	3788	3452
Mustard green	1903	2016	3224	924	1097
Long bean	508	305	473	526	465

Source: Central Board Statistics of Enrekang Regency, 2013

In terms of perishable crops, cabbage is the largest with regards to volume produced in the last five years. Cabbage production also increased regularly every year, with the highest

production in 2012 of about 42,682 tonnes. This is followed by tomato, although it had its largest production in 2008. Other perishable crops such as scallion, bean mustard green, and red chili are also planted by farmers, albeit at lower quantities (Table 2.2).

To increase production and to assist farmers to obtain better quality of seed, the government established the crop breeding centre to produce potato and red onion seeds. However, these programs were poorly implemented due to insufficient budget and lack of local experts who could manage the program (Dinas Pertanian dan Perkebunan 2009).

In the field of infrastructure services, the government provided a significant budget for areas categorized as centres of production. Roads connecting villages to sub-districts were constructed to support distribution to market. Reducing isolated villages by establishing more farm roads is a main target of the government to help smallholder producers get inputs. Nonetheless, the investments of infrastructure do not reach the majority of agricultural production areas. Indeed, most of the investments are concentrated in the villages with high population density (Dinas Pekerjaan Umum 2009).

Livestock

Livestock are important for economic growth in Enrekang. Apart from being a source of family income, livestock supports food security, mainly for the nutritional needs which are derived from animal protein (Deptan 2009). Livestock are also important resources in rural villages. If farmers need cash for emergencies, such as education costs for their children, or wedding party and funeral ceremonies, they can sell their livestock (Correia 2014). The main types of livestock grown in this area are Bali cattle, buffalo, layer chicken, broiler, goat and dairy cattle (Renstra 2009c). In Enrekang, the two main farming systems for livestock are traditional farms and commercial farms.

Traditional farm

Traditional household farms have small land areas, so the number of livestock is limited. They are also characterized by lack of farm management and subsistence. For instance, they hold two to four cattle in a household. Their cattle graze during the day and are kept around the house in the afternoon. Some of them have fattening systems, especially for goats, with small pens constructed around the house. They provide food in the afternoon, and collect manure for their crops. Household waste, grass and other plants are sources of food (Rohani et al. 2011). Animal health problems are usually treated based on their experience (Dinas Peternakan dan Perikanan 2009). In Enrekang, small-scale livestock farms are mostly in upland areas in Alla, Baroko, Curio, Anggeraja, Malua, Bungin, and Baraka sub-districts (BPS 2013).

Commercial farm

For commercial farming, market orientation and sustainable profit are the main targets. The main farm types are: breeding farms, industrial food farms, feed lots and ranch farm (Rohani et al. 2011). Geographically, commercial farms are found in the south, typically with flat land in Cendana and Maiwa sub-districts (Dinas Peternakan dan Perikanan 2009). Most of the livestock are grown using intensification systems, mainly for beef cattle and poultry. For example, smallholder producers of beef cattle, who have more than 2 ha of land, run breeding farms with, usually, about 15 to 50 cattle per household. Some of them are also involved in a group, particularly when the cattle are provided from government assistance. Market demand for cattle is usually from other regencies, such as Sidrap and Pinrang, that border Enrekang, but they are also sometimes exported to other provinces, such as Kalimantan and Papua province. The grassland and climate are the main factors that influence farmers to raise livestock (Dinas Peternakan dan Perikanan 2009)

Poultry farms are industrial scale. Many farmers in Maiwa sub-district cooperate with the formal financial sector to obtain credit for poultry production (Dinas Peternakan dan Perikanan 2009). With this collaboration, their businesses can grow and supply urban markets in Makassar and other markets in Sulawesi Island. Other favourable conditions through this collaboration are that there is a strong partnership and support from banks due to the ability of farmers to pay credit regularly. The high demand of production from local market and other market destinations in the region of south Sulawesi bring positive impacts to the increasing number of farmers engaged in this business (Dinas Peternakan dan Perikanan 2009). The involvement of the private sector in input services in the form of business partnerships is also contributing to the increase in poultry production (Renstra 2013). Indeed, BPS (2013) reported that industrial poultry farms in the Maiwa sub-district had about 90% of the total poultry population in Enrekang.

Dairy cattle sector

Recently, dairy cattle farming has become an income source for the small-scale farmers in Enrekang. Dairy farming started in 1981 through the crash program by the *Dinas Peternakan dan Perikanan* and New Zealand (Dinas Peternakan dan Perikanan 2009).The government sought to increase the population of cattle by providing heifers, assisting in better use of concentrates and forage, partnering with a bank to provide credit, and through a collaboration program with the central government to implement artificial insemination extensively. In addition, the people's business credit, or the food security and energy credit programs with low interest rates, were available to farmers. As a result, the dairy population increased dramatically from 2008 to 2009, however, over the next year, dairy population decreased until 2012 (Figure 2.2). The problems included poor management in terms of

looking after the dairy cattle, unhealthy standards, food input supply and reproduction system (Firman 2009).
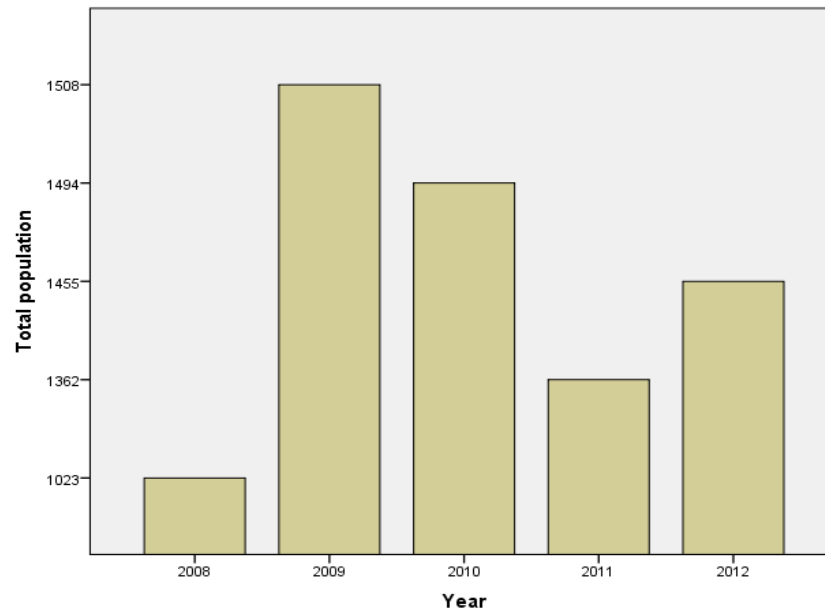
Figure 2.2: Dairy cattle population from 2008 to 2012 in Enrekang regency
Source: Central Board Statistics of Enrekang Regency, 2013

The growth of dairy is mostly concentrated in the four sub-districts of Cendana, Enrekang, Anggeraja and Alla, although the highest population is in the sub-district of Cendana which has 45% of the Enrekang population (BPS 2013). According to Baba et al. (2011)one of the advantages of the Cendana sub-district is that it is located in a watershed area where the farmers can grow grass as fodder. Other major crops, such as corn, rice and groundnut, are grown by farmers and are used as fodder. Local climate is the main livelihood, and the level of knowledge of the farmers also contributes to the increase in dairy population.

Dairy business in Enrekang regency has different characteristics to other areas in Indonesia, such as Java (Baba et al. 2011). Dairy farmers do not sell fresh milk, as all milk production is used as raw material for making *dangke* and crackers. *Dangke* is one of the local traditional food cheeses made exclusively by people in the Enrekang regency. *Dangke* is produced by heating fresh milk and adding a papaya latex solution to separate the milk into curds and whey. Curds and whey are separated using a coconut shell as a filter, and, after that, packed by banana leaf (Hatta 2013).

Dangke production depends on the population of dairy cattle, with the highest production in Cendana, followed by the Enrekang and Anggeraja sub-districts (Baba et al. 2011). Dairy cows produce from 8 litres to 15 litresof milk per day and a piece of *dangke* needs 1.5 litres to 2.0 litres of milk, with the price of *dangke* around Rp 15,000 per piece (Hatta 2013).

Fisheries

The fishery sub sector does not make a significant contribution to the economy in Enrekang. As a highland area, fishery production can only be developed through fish farming in the paddy fields, and artificial ponds and fish breeding in public waters. In 2012, production of fish was only 446 tonnes with the total area of 1,116 ha. The majority of production was gold fish (BPS 2013).

To fulfil demand, fish are mainly imported by traders from other regencies. The distribution of various types of fish is organized through the wet market on market days. Supplying fish to villages is undertaken by local traders called *Pagandeng,* who usually use a motorcycle (Dinas Peternakan dan Perikanan 2009).

Plantation crops

The plantation sector is important for the Enrekang economy. The plantation crops, such as clove, coffee, cacao, coconut, vanilla and hazelnut are the main crops grown by farmers in this region. The total area of plantation crops in 2012 was about 25,533 ha, with production of around 17,316 tonnes. However, the potential for growth of plantation crops is not significant for livelihood improvement of farmers in this district. Most of the crops are very low production; for example, clove area was 1,981 ha with a total production of 1,340 tonne and productivity of 0.67 tonne per hectare. This is because plantation management is conventional, with poor farm management practices, lack of fertilizer inputs and use of local seeds (Table 2.3). Consequently, farmer profit is very low and there is no value added (Dinas Pertanian dan Perkebunan 2009).

Table 2.3: Plantation crops production in Enrekang in 2012

Crop	Area planted (ha)	Total production (t)	Productivity (t/ha)
Coffee	12014	8312.6	0.69
Cacao	8104	6986.8	0.86
Hazelnut	2368	453.4	0.2
Clove	1981	1340.5	0.67
Coconut	809	203.2	0.25
Vanilla	258	20.5	0.1

Source: Central Board Statistics of Enrekang Regency, 2013

2.4   Agricultural marketing and transportation

2.4.1   Vegetable marketing

Most farmers in Enrekang engage traditional farming systems and lack of marketing opportunities. The products are mainly sold to the wet markets or directly to traders. The wet

market is the place of transaction between buyers and sellers in rural areas. The products marketed consist of various daily necessities, such as clothing, foods, vegetables and livestock. The construction and management of the wet market are fully organized and controlled by the local government. The construction of buildings is characterized by semi-permanent buildings with electricity and water (Sutami 2012). However, in this region, most facilities are poorly maintained and often cannot be used. Most sub-districts have a wet market and are open once a week (12 in the sub-district), although there is one big wet market at Sudu, which is open four times per week. In addition, like other wet markets in Indonesia, tents, stalls, booths and other equipment are generally used by people for their small-scale business.

Furthermore, to support the marketing, the local government in Enrekang created the Agribusiness sub-terminal Station in Alla sub-district in 2004, with the total area of 21,953 m². The objective of this station was to consolidate the supply of products from the farmers to distribute to other markets, mainly for the regions of south Sulawesi and eastern parts of Indonesia. It also assists smallholder producers to create trading partnerships (Dinas Pertanian dan Perkebunan 2009).

Traders are the main actors organising vegetable marketing to the consumers. They can be categorised as local, regional and inter-island traders. The local traders typically live around the source of production and also have close relationships with the farmers. As local traders, they a part of the market chain with regional and inter-island traders. They purchase products by cash directly from the farmers early in the morning and then sell to regional or inter-island traders. Some of them function as collectors where they obtain funds to purchase vegetable products, either from regional or inter-island traders. Regional and inter-island traders conduct transactions in the wet market and at the farm gate. Traders who visit farms mainly have a business relationship with farmers, such as providing capital or suppling inputs. Farmers selling to them cannot sell to other buyers as they are engaged in a contract with traders and the payment system is organised by the traders. This system is common with regional and inter-island traders (Yunus 2012).

2.4.2   Dairy marketing

In Enrekang, dairy products have a simple marketing chain, mainly dominated by local traders who understand the characteristics of the *dangke* market (Ridwan 2005). They visit farmers early in the morning by motorcycle to obtain the product and take these to the wet markets operating that day. They use a motorcycle because some villages cannot be reached by public transport and also because they purchase small quantities of *dangke*, around 15 - 25 pieces per day (Rahman and Rauf 2013). Some farmers sell directly to buyers, and the

buyers often order one day before it is produced. This type of transaction is common when farms can be accessed by public transport and have a mobile phone connection. Furthermore, most transactions involve cash payment. *Dangke* gives sustainable profit for dairy farmers, as farmers sometimes cannot meet demand. As a traditional chain, the system is dominated by families conducting farm management, from production to marketing to consumers (Kasim and Sirajuddin 2011).

Another product from milk processing is *dangke* crackers. The product has the same taste as *dangke* cheese, but the product is more durable, and is packaged and graded by local entrepreneurships. It has potential market opportunities in modern markets, but its ability to supply to the markets is a challenge for farmers. This is because the number of farmers who have the capacity to produce this product is still very limited as it requires specific processing skills, and farmers prefer to produce *dangke,* which is easier to market locally (Hikmah and Hikman 2015).

2.5   The institutions in Enrekang

2.5.1   Public institutions

As an agricultural-based country, institutions are important to accelerate agricultural growth. The government has established institutions to support the growth of this sector and to facilitate the implementation of policies from central to local levels. At the central level, the Ministry of Agriculture is responsible for agricultural industry development, sustainable self-sufficiency, food security and nutrition diversification, export orientation, and livelihood improvement for farmers. In encouraging research and development, for instance, the Ministry of Agriculture created the Indonesian Agency for Agricultural Research and Development (IAARD) (MoA 2009).

At the regional level, the Assessment Institute for Agricultural Technology (AIAT) is the central government agriculture institution which has the responsibility of assisting both provincial and local governments in conducting research, assessment, and assembling agricultural technology (Sudana 2005). The (AIAT) is also a research institution that has the authority to assess and provide recommendations for specific locations (Witjaksono 2011).

At the provincial level and under authority of the governor, the Department of Agriculture and Livestock (*Dinas Pertanian dan Peternakan*) assists the central and regional government to communicate with local government to arrange planning strategies and monitoring systems for agricultural programs. Additionally, the provincial government is also responsible for assisting local government in proposing programs to the central government for budget allocation, especially for strategic projects that enhance the growth of agriculture, and also have a multiplier effect in other sectors.

At the local level, the Regent or the *Bupati*, as the leader of the local government, has an important role in aiding agricultural growth. In running and managing agricultural policy, the *Bupati* has program priorities based on strategic development planning for the short, medium and long term. In Enrekang, the *Bupati* is assisted by several departments to stimulate economic growth: The Department of Agriculture and Plantation *(Dinas Pertanian dan Perkebunan)*, whose focus is encouraging seeding activities, increasing vegetable production and protecting crop production (Renstra 2009a); the Department of Livestock and Fisheries *(Dinas Peternakan dan Perikanan)*, whose focus is improving livestock and fishery production, increasing population and managing the health standard of livestock and fisheries (Renstra 2009c); the Department of General Infrastructure (*Dinas Pekerjaan Umum)* which concentrates on providing regional infrastructure and maintaining facilities (Renstra 2009d); and the Department of Industry and Trading *(Dinas Perindustrian dan Perdagangan)* which is responsible for encouraging small-scale business that produce products for competitive markets (Renstra 2009b). The Agricultural Extension Institution's (*Badan Penyuluhan Pertanian*) function is to encourage research and development and manage the extension system for farmers. Operationally, the *Badan Penyuluhan Pertanian* has an extension coordinator at each sub-district whose function is to organise, control and evaluate the job of extension workers who work with farmers (Zakaria 2003).

2.5.2   Private sector

Formal financial institutions have a fundamental position in supporting the development of agriculture in this region. The state-owned banks are dominated by the Indonesian People's Bank (BRI) which has a branch office in the capital city and five sub-units in the sub-districts: the BRI of Maroangin, the BRI of Enrekang, the BRI of Anggeraja, the BRI of Baraka and the BRI of Belajen, which provide financial assistance to smallholder producers. Another state bank is the Indonesian's National Bank (BNI) which is only located in the capital city of Enrekang. Another government bank, the *Bank Sulawesi Selatan dan Barat* which is located in the capital city of Enrekang, also allocates loans for the agricultural sector (BPS 2013).

Village cooperatives, or *Koperasi Unit Desa (KUD),* are also in this region, with 10 cooperatives still operating (BPS 2013). The functions of these institutions are to distribute farm inputs and to facilitate meetings with potential buyers for their members (Karni 2011). However, most farmers purchase inputs and sell their products without the assistance of cooperatives. Vegetable and dairy farmers commonly sell their products directly to traders. Poor management, lack of quality staff, the inability to compete with other market players, and dependency on government projects, are factors leading to non-productive cooperatives

(Sipayung 2003). Consequently, several KUD have collapsed, with only a few still operating, however their core business is limited in supporting farm production.

2.6   Summary

The agricultural sector is the main sector for economic growth in Enrekang. Vegetable products have the capacity to supply to the market among the regions in the south Sulawesi province and several islands in eastern part of Indonesia. Dairy cattle farming has also become one of the main areas that potentially provides income for rural farmers. Farmers are able to produce *dangke* which has a high market demand. However, the potential demand for these products could only be sold in the wet market.

To increase agricultural production of smallholder producers, several policies were carried out by the government, including establishing the crops breeding centre to assist farmers to obtain better seed quality, introducing artificial insemination to improve milk production of dairy, and actively engaging in coordinating with the banks to provide cheaper credit to farmers. In addition, construction of rural roads was also prioritised by the government to reduce isolated areas and to accelerate distribution of goods to the market in this region. However, as a rural area, the Enrekang regency still faces critical challenges. Most agricultural research could not run properly due to a shortage of skilled human resources and restricted budgets. Farmers have to deal with low production capacity, inadequate inputs and poor supplies and services. In addition, limited and poor road construction makes it difficult for farmers to deliver the product on time, and in good quality, to market.

Successful development of the agricultural sector in this region will require support from the government and the private sectors. Therefore, creating an enabling environment is an important strategy to remove the worst of the biases to agricultural growth, and to open the way for more successful functioning of markets

The next chapter presents a review of the literature to provide a theoretical background to the understanding of the enabling environment framework for agribusiness supply chains.

Chapter 3.   Literature review

3.1   Introduction

This chapter is part of a literature review carried out to provide a theoretical background to understand and explore the enabling environment framework for agribusiness supply chains.

As the agricultural sector is the collective business that comprises several activities to transform products from the farm to consumers, it is a key player for generating employment and income opportunities, especially in developing countries (Wilkinson and Rocha 2009).Developments in agribusiness have contributed to agricultural development, boosted from a traditional orientation to a comprehensive system that emphasises more coordination and integration of the agrifood chain, with the creation of value chains (FLO 2007).

As an engine for economic growth, the agribusiness sector and institutions related to the sector require the attention of policy programs and intervention strategies that aim to enhance the competitiveness of agriculture, and to promote agricultural investment based on value chain development (Konig, da Silva and Mhlanga 2013). Vorley, Fearne, and Ray (2007) found that agribusiness reforms have affected smallholder producers and livelihood structures in rural areas, and farmers, government institutions and the private sector had to adapt to the new agribusiness systems and take concrete action to make the system work properly. However, most of the business activities are still traditional systems, with unreliable programs which do not create a conducive business climate, and poor market infrastructure (Konig, da Silva and Mhlanga 2013). Therefore, a comprehensive solution requires a deeper understanding of the factors that contribute to enhancing the enabling environment to improve the competitiveness of agribusiness development and value chains (Christy et al. 2009). Improving internal organisation and enhancing managerial capacity are also essential strategies for developing a new agribusiness system (Vorley, Fearne and Ray 2007).

The enabling environment is a concept that highlights the integration of all external factors to business institutions, including 'the policy, legal, and regulatory framework; governance and institutions; physical security, the social and cultural context of business, macroeconomic policies, access of firms to financial and business services, and the availability of physical and social infrastructure services' (White and Peter 2004, p.8). White and Peter (2004) propose that the enabling environment is a means for the government to create policies and regulations to encourage a conducive business climate, market performance, capital investment, and also reduce the cost of business. Government has an important role to create effective policies to achieve agricultural competitiveness,

particularly for smallholder producers that are usually recognised as having fewer opportunities in accessing the enabling environment, and mostly unsustainable implementation in developing countries (Christy et al. 2009). One strategy to foster the competitiveness of agro-industry is for government to provide public facilities and investment services that can help smallholders utilise resources productively (Kuyvenhoven 2004). This chapter is dedicated to providing a review of the literature of the enabling environment for agribusiness supply chains. It describes the agribusiness system, particularly in relation to the challenge for smallholder producers in accessing inputs and services. Linking smallholder producers to market is also addressed to get information for enhancing the enabling environment. The concept of an enabling environment, and its elements, characteristics and challenges that are incorporated in the system, are presented later in the chapter.

3.2   The agribusiness system

The concept of agribusiness was first presented by Davis in 1956 who noted that agribusiness is defined as all activities in relation to the production and distribution of products (Fusione 1995). This definition was refined to become the much quoted 'the sum total of all operations involved in the manufacture and distribution of farm supplies, production operations on the farm, and the storage, processing and distribution of farm commodities and items made from them' (Davis and Goldberg 1957, p.2). The agribusiness system starts with farm inputs, and involves farmers who control the land and manage the production. The outputs from the farm are collected by agribusiness firms through transportation and storage facilities; the commodities are packaged by considering the quality standards before being marketed to consumers at a final destination. Davis and Goldberg (1957) theorise that the concept of an agribusiness system consists of the agricultural input suppliers, the agricultural commodity producers and the organisations that organise the marketing system for food and fibre production.

Davis and Goldberg (1957) add that the agribusiness system needs leadership to organise the labour, along with appropriate technology and financial assistance to utilise the potential resources, and to create new products. Market facilities and physical services are also required to encourage agribusiness activities within the system. Goldberg (1974) also suggests that the general mission of the agribusiness system is to offer information to the private sector and policy makers to create strategies to provide food efficiently, while highlighting the nutrition standards and considering social impacts. Davis and Goldberg (1957) argue that the agribusiness system requires new disciplines that emphasize the increasing coordination between the agricultural sectors and business firms to improve management, and progress economically.

Additionally, various studies emphasise the importance of coordination between agriculture and business activities. For instance, Baruah (2008) and Lee (1976) found that agribusiness is a complex system, referring not only to the farm activities, but also people and companies in the system. A sequence of activities in relation to this is the procurement of all farm materials and managing the services to get high yields and quality, and transporting them to the market, while maintaining quality. Furthermore, Lee (1976) identifies the inputs, such as seeds, fertilisers, insurance, power and fuel energies, feed and financial assistances, and market connections with the purpose of transforming farm products into the forms that are preferred by market. As examples, vegetable crops, meat, animals and milk are processed prior to bringing them to the consumers. Thus, grading, storing, processing, packaging, transporting, pricing, and merchandising are required to complete the marketing functions.

Likewise, De Oliveira Wilk and Fensterseifer (2003) add that coordination between producers, agribusiness firms and stakeholder institutions is important to achieve value in the chain of production of the agribusiness system. This can be started by involving the manufacturing industries to produce agrochemicals and machines to support effective industrial processing. Products will then be promoted by wholesalers, supermarkets, restaurants and other agents to potential buyers. Services provided by financial institutions, public services, market facilities, equipment distribution and logistics, telecommunication infrastructure and other facilities would also contribute to the sustainability of production and to market competitiveness. To achieve this system, De Oliveira Wilk and Fensterseifer (2003) emphasise that government has an important role to play in encouraging research and development, establishing market regulations, and supporting the financial sector. Satisfaction of consumers in the value chain is also essential to obtain sufficient demand for the products.

In addition to the need for coordination as discussed above, subsystems within the agribusiness system also needs to properly integrate in order to function effectively. Furthermore, Saragih (1998) explains that the agribusiness system comprises several sub-systems and each sub-system needs to integrate to function effectively. At the beginning of this system is the upstream sub-system which consists of activities of provision and supply of inputs to the farm. This involves the provision of seeds and replacement animals, such as crop seeds, cattle, poultry and fish fingerlings. Fertilizer, pesticides and vaccines from the agro-chemical industries, and equipment from agricultural machinery dealers, are also a part of the inputs provided in this system. Next is the on-farm sub-system that involves the activities to obtain the vegetable, livestock, fish and other products. The following sub-system is the process of manufacturing industries as a step in order to get the final products. During this stage, packaging and quality standards are mostly highlighted before distributing

to market. Exhibition of products, marketing intelligence, market research and assessing information about prices of products are also conducted. The final sub-system is the institutions that provide services to support all the sub-systems in the agribusiness system. The services include: credit schemes, transportation, communication facilities and insurance.

To gain a comprehensive understanding of the agribusiness system in enhancing the enabling environment, further discussion of the smallholder producers, which highlights the conditions of smallholder farmers in engaging farming and access to resources of the enabling environment, will follow.

3.3   Smallholder producers and the challenges

In the context of economic liberalisation of the agricultural sector, the private sector controls the delivery of goods and services following political reform by the government. The public sector and private services are important to facilitating research and development to farmers, managing input purchases, market provisions, organising the potential resources for local development, and responding to the collective voice of farmers for better development (Chirwa et al. 2005). As the key cornerstone of economic development in rural areas, most small-scale farmers in developing countries engaged in the agriculture sector are poor (Govereh, Jayne and Nyoro 1999; Salami, Kamara and Brixiova 2010), and categorised as small farms with having less than two hectares of land (Hazell 2007).

Salami, Kamara, and Brixiova (2010) categorise small-scale farmers in rural areas with three main characteristics: the agro-ecological zones in which farmers conduct the farming, the typical land holding and the arrangement of farm agreements, and the annual income from farming activities. More specifically, in regions with a high population, farmers generally have less than one hectare of land. Cultivating more than one hectare is common in less densely populated areas and semi-arid conditions, and often includes at least 10 livestock (Dixon, Tanyeri and Wattenbach 2003). The farming system for small scale farmers is generally based on the family system in terms of planning, decision-making and implementation (Dixon, Tanyeri, and Wattenbach 2003). Social networks at the community level are also usually considered when organising activities, although the majority of labour and enterprises are derived from the family (Lipton 2005). Farms are relatively small and lack technology (Hazell 2007). Under these conditions, small-scale farmers have a comparative advantage in utilising the natural resources with a lower transaction cost of labour, and they can substitute labour for capital equipment in running the farm activities, such as land clearing, seed planting, and harvesting (Binswanger and Rosenzweig 1986; Lipton 1993)

Even though smallholder producers have contributed to increasing total value for agricultural foods in many countries, they are still poor and face many problems (Hilda 2008). Small-scale farmers are facing a wide range of challenges to produce agricultural products in a sustainable manner, as well as obtaining a high value for their products. Many of them grow agricultural commodities only for their basic needs and only bring surplus production to the market for additional income for household needs in the short term (Thapa and Gaiha 2011). Thapa and Gaiha (2011) add that small-scale farms are mostly in unfavourable conditions with respect to financial institutions and market competitiveness. Small-scale farmers find it difficult to take advantage of competitive product prices and expand the production because it is difficult to access the inputs and services required. Likewise, small-scale farmers are also at a disadvantage when new technology needs higher capital inputs, access to financial services, supply of inputs and market information. Salami, Kamara, and Brixiova (2010) also state that declining productivity is one of the main challenges of smallholder producers, and this condition is generally caused by inadequate input supply (seeds, fertilizer, pesticides), credit assistance and supporting technology. Otherwise, it can be stated that low input, low output and low income are the existing conditions of small-scale farmers in many regions in developing countries (Lundy et al. 2004).

Furthermore, in many places, marginalisation of small-scale farmers including limitations in accessing land and property rights still exist in many rural areas (Lipton 1993). Lipton (1993) notes that providing opportunities to small-scale farmers to access land is more important to achieving equity than it is for large farms. This is because the small-scale farmers can more productively utilise natural resources. However, political decisions on land reform have not provided favourable outcomes for small-scale farmers in many regions in developing countries (IFAD 2008). Scarcity of agricultural land has increased, due to increasing urbanisation reducing the availability of land for farming activities (Cassman et al. 2003).

Small-scale farmers also often face difficulties accessing price information. Price information is mainly delivered by the traders and sometimes does not follow the price standard provided by local government (Galtier and Egg 2008). The transaction of commodities is generally conducted with informal systems without any documents or contracts. Indeed, small-scale farmers are usually in a poorer bargaining position in every transaction. Consequently, they are unfavourably placed to obtain competitive prices and non- payment for products which contributes to the loss of income agreements (Shepherd 1997).

Because of these conditions, many developing countries have reformed the policy environment by removing the worst of the biases to agricultural growth and opening the way

for more successful agricultural investments (Hazell 2007). Public private partnerships and development organisations are needed to support the market for obtaining the output, and financial services are also needed to solve market failure (Hazell et al. 2010). Reforming trade liberalization and foreign direct investment have also contributed to expanding the quantity and value of agricultural foods entering the global and domestic markets, and these conditions affect the competitiveness of small-scale farmers in developing countries (Gulati et al. 2007).

Further discussion will now focus on input and services. Exploring the theoretical background of input and services will assist in gaining a clear picture of the nature of input and services, and the challenges that impede the smallholder farmers.

3.4 Inputs and services

In rural areas, the main challenges for small-scale producers are the availability of agricultural inputs, and access to farm services. The provision of these elements, and other supporting factors, may contribute to achieving a higher quality and quantity of agricultural foods in a sustainable manner.

3.4.1 Agricultural inputs and their contribution

Understanding the concept of agricultural inputs, including their characteristics and size, is important for public policy makers to create strategic decisions for interventions, not only to achieve agricultural growth within the sector, but also to encourage the main goal of agricultural development at a national scale (Krausova and Banful 2010). Agricultural inputs comprise a wide range of materials that contribute to increasing yields and production. The most important of these materials which can increase yield are fertilizers and better quality seeds (Baltzer and Hansen 2011; Krausova and Banful 2010). Fertilizer and other inputs are the key factors that contribute to increased productivity, particularly among small-scale farmers (Mazvimavi et al. 2011; Minde et al. 2008). Bunemann, Schwenke, and Van Zwieten (2006) also add that mineral fertilisers, organic amendments and microbial inoculants are the external inputs used to improve soil fertility in order to gain maximum productivity.

Reardon et al. (1997) identified that expenditure on agricultural inputs for fertilizer and seed can be classified as incentive function and capability of purchasing. According to Crawford et al. (2003,p.286):

> Incentive function is determined by the net returns of the input expenditure (e.g., yield, output prices and input costs), relative returns such the profitability of the expenditure relative to the returns estimated from alternative farm and nonfarm opportunities, the riskiness of the expenditure, both in absolute terms and relative to the riskiness of alternative opportunities.

The capability of purchasing the agricultural inputs generally depends on land ownership at the household scale, financial capacity and availability of labour (Crawford et al. 2003).

From this perspective, many smallholder producers in developing countries have limited capacity to purchase agricultural inputs, and the use of fertilizer and good quality seed remains stagnant (Crawford, Jayne and Kelly 2006). Low agricultural inputs can be characterised in terms of the demand side and supply side. On the demand side, use of fertilizers might not be assumed to be beneficial for the farmers as a whole, or it might be beneficial but has a high cost in terms of financial capacity. Thus, on the supply side, poor access to inputs, the high cost of inputs, lack of financial services, poor infrastructure, high transaction costs, lack of competitive suppliers, policies and programs do not make the market competitive in the private sector (Crawford et al. 2003; Denning et al. 2009).

In response to the challenges of smallholder producers in obtaining inputs and, consequently, increasing productivity of agriculture in developing countries, various studies have investigated the input subsidies programs implemented by governments (Baltzer and Hansen 2011; Denning et al. 2009; Dorward, Hazell and Poulton 2007). Dorward, Hazell, and Poulton (2007) state that the input subsidies programs involve government control of both the inputs and marketing systems, and farmers who get the agricultural inputs frequently obtain more subsidised credit. In many Asian countries, these programs increase yield and production. However, in other cases, the programs are costly; implementation of the programs tend to only provide benefits to farmers who have better connections. Furthermore, the growth of agriculture depends on what the governments provide, which contributes to a lack of competitiveness in the input and product markets. Thus, input subsidies programs create administration costs, entail centralised decisions from the government, with consequent political manipulation (Banful 2010). Morris (2007) argues that involving the government in procuring and distributing inputs creates an unfavourable business climate for the private sector. Instability of macroeconomic conditions, lack of a regulatory system, taxes and illegal fees also impedes the activities of the private sector and investment (Morris et al. 2007).

3.4.2   Agricultural services and their contributions

Rural services are defined as the type of services offered to families and households conducting activities in rural areas. Public services are the services provided by government to the communities, such as financial assistance and training services (Nederlof, Wennink and Heemskerk 2011). As pointed out by Birner et al. (2009), access to services depends on the service type, the service connection, timeliness and service location, the quality of partnership relationship and the productivity of the service provided. Albert (2000) suggests

that services in rural areas can be differentiated according to: financial source (public and private institutions, or a combination of those sectors), service providers (national, farmer organisations, non-government organisation entrepreneurships, or business teamwork), substance (series activity, effort and result), or the type of technical approach (advising and facilitating or training). One type of service which is common in rural areas is agricultural service.

Agricultural services consist of various activities that have interconnection for each activity; services can arise from extension services, public services or other institutions that are involved in providing the service. The meaning of agricultural services is often unstated, or there is no consensus for a general definition of the term (Albert 2000). In the agricultural sector, services can assist small scale farmers in supporting agricultural activities, both upstream and downstream. They provide 'access to and use of production factors (land, labour, capital, knowledge and inputs), technologies, 'soft' and 'hard' infrastructure, support market access and opportunities, and inform on policies and regulations' (Nederlof, Wennink and Heemskerk 2011, p.10). The target of agricultural services can be farmers, labourers and institutions (Nederlof, Wennink and Heemskerk 2011). Albert (2000) also identifies the type of services in agriculture as: research and development, rural financial assistance (e.g., saving, credit and insurance), agricultural marketing and promotion, services for production inputs (e.g., seeds, agro-chemical, and infrastructure), and services for animal production (e.g., genetic materials, fodder, livestock products, water supply and machines infrastructures). Other types of agricultural services are the regulatory services that are facilitated by governments, such as seed certification and administration standards for product quality. Lastly, services for technical support include the activities which connect to the procurement of agricultural infrastructure, such as distribution and equipment facilities (Albert 2000).

In organising the services, the context of the geographical area or economic sector should be considered in judging the effectiveness of the services provided. As an example, the services can be distributed within a particular supply and value chain or they can be organized by local authority (Albert 2000; Gadrey 1996; Nederlof, Wennink and Heemskerk 2011). In order to enhance rural people's utilisation of agricultural services, the services must have particular characteristics, such as '(1) availability, which mean they are ready to use when needed; (2) affordable, which refers to having the financial means to use it effectively; and (3) socially inclusive, i.e., they should be useful for the majority of poor' (Nederlof, Wennink and Heemskerk 2011, p. 8). In relation to these criteria, Albert (2000) adds that the performance of agricultural services in rural areas should be judged by their effectiveness, defined as the capability to meet the target; efficiency, the effective way to meet the final

goal; accountability, the responsiveness of institutions to achieve effectiveness; equity, consistency in giving assistance to target recipients; and enforceability, which can be stated as ensuring benefits achieve the target.

Given their role in agricultural development, agricultural services can strengthen the economic structure in rural areas for both small scale and large farms (Poulton, Dorward and Kydd 2010). It particular, they can contribute to the adoption of agricultural innovations and enhance the livelihoods of the rural poor (IFAD 2001). However, diverse challenges impede delivery of services to the rural poor. The service providers do not formulate in detail the requirements of the users. This is a problem in the government sector, particularly when delivering the services without considering the distribution costs for extension services at distant destinations (Nederlof, Wennink and Heemskerk 2011; Poulton, Dorward and Kydd 2010). Next, the public good attributes to some services, such as market information and extension services, which leads to market failure and, consequently, it is not profitable for the private sector to target some users (Smith and Thomson 1991). Another challenge encountered in the agricultural services provision is that of disadvantageous prices for farmers and unresponsiveness to producers' requirements because of monopoly power, either from the public sector or the private suppliers. Lastly, limited education of farmers and geographical dispersion, and poor market infrastructure, hamper the sustainability of delivering the agricultural services (Ahmad et al. 2015).

3.5   Linking smallholder producers to market

In general, agricultural markets have not worked productively for poor smallholder producers in many places in developing countries (DAFF 2012). Agricultural markets for smallholder producers are recognised as involving a lot of intermediaries between producers and the consumers, lack of appropriate access and poor marketing information, small quantities of products of sufficient quality offered by individual farmers, and poorly structured market systems. Poor market linkages represent a significant impediment to market access, especially for poor smallholder producers. Indeed, the lack of market linkages increases transaction costs and post-harvest losses considerably. Thus, the majority of transactions involve various middlemen; each stage of the transaction takes a margin, with price instability and erratic timing (Kirsten and Sartorius 2002).

Many researchers on market access emphasise the pervasive incompetence of structural markets in developing countries (De Janvry, Fafchamps and Sadoulet 1991). Inadequate information on prices, lack of implementing technology, poor connection to create marketing partnership, lack of input and output markets, and poor capacity to obtain the credit facilities mean smallholder producers find it difficult to benefit from market opportunities (Poulton,

Dorward and Kydd 2010). Smallholder producers are often challenged when addressing the quality standards to fulfil the requirement of niche markets, such as organic certification. In accessing these markets, smallholder producers often face expensive costs, which seem to be the main obstacle for smallholder producers to participate (Barrett et al. 2001).

According to Shepherd (2007), the opportunity for smallholder farmers to increase their income from agricultural production and other potential natural resources depends on the ability of the products to access markets. In response to this, a priority attention from stakeholders, such as research and development, should be provided to build up the capability of farmer production to reach the potential market (Shepherd 2007). USAID (2004) reported that to successfully link to markets, government intervention on enabling environment should focus on implementing policies that enhance better agriculture production, invest in infrastructure that can assist markets to work profitability, encourage research institutions that encourage smallholder producers, and enable them to adopt relevant technologies.

Concurrently, global markets for agricultural products present new challenges and opportunities to smallholder producers. Increasing income and urbanisation leads to an increasing demand for agricultural products (Gehlhar and Regmi 2005), and a need for higher levels of marketing linkages between producers and buyers (Rhodes 1993; Royer 1995). This could provide opportunities to smallholder producers to supply markets that require increasing supply to meet consumer demand every year (Baines 2002). However, addressing the requirements for food safety and certification procedures is a challenge for them, especially for products delivered to modern markets (Reardon, Timmer and Berdegué 2005). Indeed, fresh food needs to be checked for perishability and safe handling, including cultivation and packaging techniques, certification procedures, whether from institutional authority or not, and logistic services. All of these procedures need greater capital investment, research and development budgets and marketing research, which small-scale producers do not have enough resources to implement (Kirsten and Sartorius 2002).

Linking smallholder producers to markets is one effective strategy for assisting smallholder producers and helping them improve profitability of their products. Accessibility to potential markets, source of input and credit facilities can be also obtained by smallholder producers through the linkage. This linkage will contribute to the increasing income of smallholder producers and is a way to reduce poverty (de Paulo Correia 2014). As stated by Shepherd (1997), one effective approach for linking smallholder producers to markets is by providing market information. Through market information, smallholder producers are able to decide on effective production levels, to obtain the advantage of new market opportunities, and increase the spatial distribution of their produce. Information about alternative locations of

sales along the market chains including cost, labour and marketing time can also be achieved through the marketing information.

According to Shepherd (2007), linking smallholder producers to the market creates potential relationships between smallholder farmers and buyers. In many cases in rural areas, buyers provide agricultural inputs and credit to support the continuity of production supply (Batt and Cadilhon 2007; and Shepherd 2007). By involving buyers, traders and companies in advance cooperation, and often following with a contract, the smallholder producers have potential buyers to ensure the products will be absorbed in the market and can often include a price agreement. In some contracts, the companies emphasize quality and give additional premiums to smallholder producers. Through this linkage, smallholder producers are enabled to meet with the formal financial sector to obtain credit. Having markets and agreement for products with buyers assists the smallholder producers to meet credit requirements (Hudson 2000; Simmons 2003; and Little 1994).

The literature in relation to agribusiness systems has been explored above, and the discussion will now turn to a consideration of the enabling environment, particularly the developing theoretical background of what the enabling environment is, especially its behaviour and hierarchy, and place in the context of agribusiness systems.

3.6 The enabling environment

The fundamental issues of the enabling environment were recognised through a comprehensive workshop of agribusiness and agro-industry undertaken by FAO in Eastern Europe, Central Asia and Africa in2006. The aim of this workshop was to get a reference to future activities to support the decision-making process and related policy reform, as well as create a framework to strengthen the institutions for competitiveness of agribusiness and agro-industrial development. Through this workshop, the sets of policies and support services that constitute the enabling environment were investigated, and recognised as key elements of the enabling environment (Tanic 2007). Tanic (2007) highlights that access to capital and financial services; risk management and related legal frameworks; food quality and safety standards and compliance; and policies, institutions and support services for improved market access and leverage of producers and agribusinesses in the value chains are the priority issues that should be performed in the enabling environment to achieve competitive agribusinesses and agro-industries, particularly in developing countries.

Recently, many developing countries have concentrated on accelerating economic growth by reforming the macro economy, transforming state-owned enterprises to private sector enterprise, or allowing entry of domestic markets to the global market in agricultural products. One effective strategy to achieve competitiveness as part of economic development

is by creating an enabling environment that will foster competitiveness in both domestic and international markets (Christy et al. 2009). Kuyvenhoven (2004) suggests that creating an enabling environment is one of the most serious concerns for less-favoured areas (LFAs) to realise sustainability and pro-poor development agendas. One effective approach was to facilitate socio-economic integration of LFAs into the national and international economy, and investments in physical infrastructure, such as roads, electricity and telephones, are required to improve labour productivity and to reduce the burden on women and children. Moreover, investments in social infrastructure, such as health, education and drinking water are also needed (Kuyvenhoven 2004). Thus, to enhance coordination and collective action, institutional and legal reforms are required to develop and spread appropriate technologies, recognizing specific local and regional options and constraints of LFAs, and to strengthen agricultural research and extension systems. To add greater value, improvements in storage, trade, and processing facilities should also be provided. Furthermore, Kuyvenhoven (2004) also highlight that engagement in non-farm activities can be facilitated through education and training programs, and enhancing investments and reducing risk to poor households can be obtained by providing rural financial services.

Based on the comprehensive issue of enabling conditions in the LFAs, Kuyvenhoven (2004) identify three broad categories of policy conditions that require intervention to foster development in less-favoured areas (LFAs): (1) price and market policies with focus on trade and domestic policy reforms, output pricing and input delivery, market structure and channels, market failures, and environmental services; (2) public services and investment that concentrate on public investment, agricultural research, policy interaction, and diversification; and (3) institutions and governance which focus on risk mitigation and safety nets.

3.6.1 Defining the enabling environment

The enabling environment can be thought of as a concept that highlights the integration of all external factors to business institutions, including: 'the policy, legal, and regulatory framework; governance and institutions; physical security, the social and cultural context of business, macroeconomic policies, access of firms to financial and business services, and the availability of physical and social infrastructure services' (White and Peter 2004, p.8).

In the context of the macro economy, creating enabling environments is key to encouraging investments of multinational companies and domestic firms, and stimulating the conducive environment for investment is essential to reinforcing the enabling environment (World Bank 2004). In business terms, an enabling environment can be defined as a set of policy instruments, institutions and service facilities, and other situations, which collectively

enhance, or perform, a setting for business in general where entrepreneurs and business activities are able to work, improve and expand (Konig, da Silva and Mhlanga 2013). To be conducive for business, the enabling environment is highly connected to the condition where the firms, both domestic and foreign, are able to operate and expand their businesses through an evolving set of institutions that provide better policies and supporting services. Such favourable business climates enhance the business competitiveness within the market (Konig, da Silva and Mhlanga 2013).

Concentrating on agribusinesses and agro-industries, Christy et al. (2009) identify nine enablers that are generally known as the key ingredients for enabling environments to achieve competitiveness (Figure 3.1). The enabling environment consists of three main parts. First, "essential enablers" which focus on making possible opportunities for the functioning of markets and enterprises. It consists of the elements of trade policy, infrastructure, land tenure and property rights. Second, "important enablers" where the public policy maker encourages financial services, conducts research and development, and the application of standards and regulations. Third, "useful enablers" complement the other enablers and include business linkages, business development services and ease of doing business.
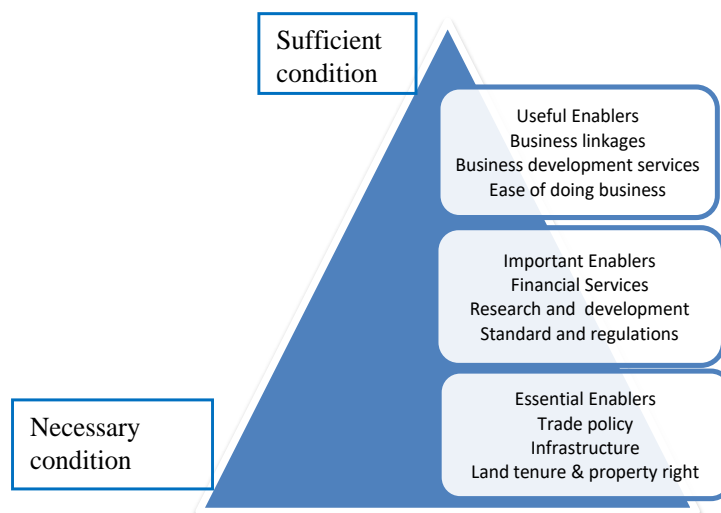
Figure 3.1: Hierarchy of enabling needs for agro-industry competitiveness

Source: Christy, et al. (2009)

According to Konig, da Silva, and Mhlanga (2013), the enabling environment concept is closely related to development of the private sector and is typically addressed to creating friendly business conditions in the right place to drive attractive investment for the private sector. To address the favourable conditions for the private sector, Thirtle, Lin, and Piesse (2003) state that the government has an important role to promote competitive and efficient markets by highlighting several forms of market failure and dealing with unexpected social environments that cause ineffective markets. In other words, strengthening the enabling

environment is a key issue to improving the quality of policy making for sustainable development.

Another approach to classifying the enabling environment was taken by Bryant (1989) through the conceptual framework of the macro-environment system on a geographic scale, with factors manifested at different levels. At the macro scale (international arena/national) enablers include price adjustment to changing supply and demand conditions, technological change, government policy and regulation, corporate restrictions and agricultural supply industry and interest rate charges. Meso (region) scale enablers include forces influencing individual decision taking, namely marketing boards, urban development and cooperative structures. The micro (local, individual farm, individual household) scale enablers include local government policy, farm, family and personal characteristics.

Altenburg and von Drachenfels (2008) characterise the enabling environment through a business approach that distinguishes two different assumptions about the characteristics of successful private sector development; namely, the neoclassical and the neo-structuralist approach. The neoclassical approach offers a distinction between a narrower concept, which is known as the regulatory business environment, and the broader concept, which is called the investment climate. The regulatory business environment emphasises the importance of regulations that offer conducive environments to the private sector with several policy instruments, such as deregulating the starting, operation and closing of a business, simplifying customs, improving credit facilities, facilitating contact enforcement, and market deregulation. The term investment climate consists of all the components of the regulatory business environment and adds specific local factors that contribute to a favourable investment climate for the firm, including education level, the rule of law, stable politics and security, functioning financial markets, rules and standards for international trading.

Alternatively, a neo-structuralist approach emphasises the function of additional contributing factors in responding to the dynamism in the private sector, particularly the capability to set up and create knowledge based on competitive advantages. According to Porter (1990) an effective approach to achieving competitive advantage to reach possible opportunities for private sector investment is the emergence of technology innovation and research development, and these will contribute to market competitiveness. Altenburg and von Drachenfels (2008, p. 9) provide four main reasons for building a competitive private sector:

> More complex and knowledge-intensive industries are likely to generate greater knowledge; industries increasingly depend on complementary manufacturing and service facilities; information becomes more important; and values and visions of society are important determinants of competitiveness.

Likewise, Ferroni and Castle (2011) also state that the role of the private sector is mainly dedicated to support the agricultural research and deployment of innovative solutions that provide concrete results for sustainable growth and meet the market standard. Thus, to achieve productive investment in the private sector, investment of rural infrastructure facilitating local business development and funds research with local relevance are urgently required, and these can be delivered through the public sector (Ferroni and Castle 2011, OECD 2010).

A part of classification of the enabling environment is the relationship between government policy and the macro-environment system, as outlined by Bryant (1989)and Christy et al. (2009) They categorise and identify the role of institutions and the relationship among factors based on a micro, meso and macro systems view of geographic scale in a country.

3.6.2   The role of institutions for the enabling environment

One of the most important roles for government is to foster economic progress in the global market. Government has a large responsibility in investing in infrastructure and other public services to make markets function efficiently (Christy et al. 2009). In agricultural research, well-functioning and collaborative private-public partnerships and development organisations are required to respond to the effectiveness of research and development at a practical level (Pray and Umali-Deininger 1998). To improve the agricultural credit market for smallholder farmers, incentives from the government, such as credit subsidy through the financial sector, is required (GOK 2002). Standards and regulations need intervention from the government and private sector in making necessary investments for upgrading quality and safety, and for solving the technical barriers for food standards (Reardon et al. 2000).

Considering the characteristics of the enabling environment, government, private and development organisations have different responsibilities for each level. Trade policy, infrastructure, land tenure and property rights, financial services, research and development, standards and regulation, and ease of doing business can be covered by government at the macro level (Christy et al. 2009). In Indonesia for example, the central government has delegated decision authority to the local governments at both provincial and local levels to manage several polices in the field of infrastructure, land tenure administration, and trading system in utilising the potential economic advantages arising from local resources (Pepinsky and Wihardja 2011).

Under the Ministry of Agriculture (MOA) and at the macro level, the central government has the responsibility to organise agricultural development by connecting programs with meso (regional) and micro (provincial and local) level institutions. Erwidodo and Suryana (1996) state that creating a policy environment to foster development of the private sector, funding

public services such as research, extension and rural infrastructure, and adopting policies to correct market failures, reduce poverty and address food security are the main policies that should be implemented by government to encourage the competitiveness of agribusiness and increase agro industrial development.

At the regional level, the Assessment Institute for Agricultural Technology (AIAT) is the agricultural institution from central government to assist both provincial and local governments in conducting research, assessment, and assembling of specific agricultural technologies (Sudaryanto, Simatupang and Kariyasa 2005). The main objective of this organization is to develop research and to create appropriate agricultural technologies for specific provincial locations. In implementing the objectives, several functions are set: identify the needs of agricultural technology based on specific location; research, assess and assemble appropriate agricultural technology based on specific location; technological development and dissemination of results of the assessment as well as supporting material; cooperation, information and documentation, as well as dissemination of results, of agricultural technology development (Minister of Agriculture 2009).

As a part of the government structure, extension workers also function at the macro, meso and micro levels. Structurally, at the macro level, the Minister of Agriculture has the responsibility to manage and facilitate implementation of programs for the provincial and local governments. At the meso and micro levels, there are agricultural departments, both at the provincial and local level, with extension officers to implement agricultural programs and respond to technical problems. Since the move to regional autonomy, the provincial and regency governments have authority from the central government to manage the agricultural extension systems and programs, and, for further decentralization, it is given to the village community and farmer groups to implement the extension activities. Structurally, the top leadership of agricultural extension at the level of the province is the governor, and at the level of regency is the *Bupati* (Zakaria 2003)

3.7   Essential enablers

This section focuses on essential enablers. It introduces the concept of trade policy, infrastructure, land tenure and property rights which contribute to enhancing the enabling environment where the elements can work, or face challenges, and how they contribute to create the competitiveness of agro industrial development.

3.7.1   Trade policy

The expansion of the global trade market has become one of the most important manifestations of economic globalization. Trade is a powerful engine for economic growth and poverty reduction; however, in order to run the engine, access to rich-country markets is

needed by poor countries (Spencer and Loader 2000). Improving market access can assist countries to increase economic development on the one hand, while bringing new opportunities to poor people on the other hand (Kym 2004; Roe.Terry and Shane 2003). Ann and Straub (2005) note that trade acts as an accelerator for economic development, and can be achieved by stimulating investment, allocating potential resources efficiently, and opening market access for those goods so that the firms can produce in the most competitive manner. Similarly, AusAID (2007) state that trade assists economic development in many ways: it stimulates production within areas where they can minimize the cost over other economies; trade expands the markets which can be accessed by local producers so that they have opportunities to produce the goods at a more efficient scale by reducing the costs; it encourages innovation and ideas, improving skill levels for local workers and productivity of managers; removes tariffs on imports, decreases consumer prices, increases the purchasing power and standards of living, and allows producers to obtain cheaper input prices, hence improving competitiveness by reducing production costs. In industrial diversification, for example, exports of goods and services contribute to increasing incomes of poor people, as well as government incomes.

The liberalization of world trade through the General Agreement on Tariffs and Trade (GATT) negotiations and the establishment of the World Trade Organization (WTO), has given an opportunity to developing countries to be better incorporated in the global market and to expand their comparative advantages on both regional and national scales (Erwidodo and Hadi 1999; Spencer and Loader 2000). Several researchers have investigated whether developing countries have enough resources to access developed countries' markets for agricultural commodities and food production (Edwards 1992; Murphy and Shleifer 1997). Traditional commodities, such as spices, groundnuts, fruits and coffee, and non-traditional products, such as vegetables, cut flowers and fish are the main products sent to developed country markets from developing countries (Biggs 1996; Marsden 2005). However, the capability of developing countries to keep and improve their share of the global trade in agriculture will mainly depend on their capacity to respond to the demands of the global trading system, not only with competitive prices, but also to meet the standards and regulations of these markets (Spencer and Loader 2000)

Improved market access can be achieved by reforming several instruments of trade policies. In general, FAO (2006, p. 9) identify the major instruments of trade policies that should be reformed to help developing countries reach the global market, for example:

Exchange rate regime liberalization; foreign exchange liberalization; elimination of restrictions on foreign exchange earnings: ratification of quantitative restrictions on imports and removal or reduction of import licensing requirements; lowering of tariffs and reduction of their dispersion; reduction or elimination of the use of export prohibitions, licensing requirements and other export restrictions; reductions of export taxes and surcharges; loosening of controls on interest rates and, generally, an increase in real lending rates: reducing the rate of expansion of the money supply through instruments of monetary policy: increasing the government's revenue base, strengthening tax collection efforts, and raising tax rates, especially tariffs on public services; reducing real government outlays.

According to Oxfarm (2002), the priority areas that should be reformed in developing countries are: access on duty free and quota-free for all developing country markets; tariff reduction to developing country exports to less than five per cent; restriction on export subsidies and farms subsidies reform to consider the social environment instead of just increased production, and also by acknowledging the right of developing countries to protect their systems of agriculture for food security goals. Gibbs (2007) supports these conditions, suggesting they would create an enabling environment to accelerate economic growth and lead to value added creation in developing countries.

More specifically, Bernard et al. (2001) and Oxfarm (2002) explored the highest barriers of trade policy that have significant impacts on market access for developing countries, namely: tariff, tariff escalation, non-tariff barriers, standards of products, and antidumping actions. Oxfarm (2002) suggests that tariffs are taxes on product imports into a country. Government revenue is also supported by tariffs. Furthermore, increasing the price of imported goods on domestic markets protects domestic producers of similar goods from competition with foreign companies. They suggest many developing countries still used specific tariffs and tariff quotas to protect many agricultural products. However, the World World Bank (2003a) and Gibbs (2007) reported that specific tariffs and tariff quotas are still mainly used in many countries to give protection to agricultural products, mainly for fiscal objectives. However, these tariffs often lack transparency, can penalize cheaper products from developing countries, and can create disincentives for efficiently using resources. Tariffs are also escalated along the production chain, discouraging processing in developing countries and essentially creating a tax on development.

Another barrier is tariff escalation. Oxfarm (2002) note that tariff escalation, which increases with processing level, creates unfavourable conditions for developing countries' markets. They can act as barriers for investment aimed at enhancing local value, while at the same time discouraging diversification. This can create unstable markets for primary commodities from many developing countries and can lead to low and declining world market prices. Eliminating tariff escalation provides opportunities to developing countries to obtain a

greater share of the export's value domestically. In addition, it increases the chances for the local workforce and investment.

Considering the non-tariff barriers, Bernard et al. (2001) and Oxfarm (2002) note that the mechanism of non-tariff barriers is often a greater obstacle to developing country exports than tariffs. Some mechanisms for the non-tariff barriers consist of quotas for import, and licenses and monopoly rights to import and origin rules. If these mechanisms are kept in place without being based on health and safety reasons, they become the most malicious of trade barriers and are detrimental to reducing poverty. The main reason for this is because non-tariff barriers foster competing lobbying for licenses to import, which wastes valuable resources through competing lobbying activity. Oxfam (2002)also observe that non-tariff barriers are less tranparent.

The implementation of product standards results in various problems for developing countries due to the lack of the capability to conform. The product standard rules are very complex and require specific legal skills and knowledge to be understood. Product standards address a wide range of activities, such as packaging, to avoid contamination and freedom from chemical residues, which require a level of scientific and technical expertise to monitor and enforce compliance with these standards, which are often lacking in developing countries. The cost of complying with legislative requirements, such as testing and certification to meet the standards, are also expensive (Henson and Humphrey 2010). WTO (1998) also reported that the form and level of certain standards is lacking or inadequate in many developing countries. Moreover, Spencer and Loader (2000) state that the nature of decision-making processes within the standards organizations, and the ability of developing countries to represent themselves effectively given their limited financial, scientific and technical resources, are the main barriers to developing countries addressing agricultural food standards.

Anti-dumping is an instrument of trade policy that puts duties on imports which are sold at a lower price than the exporting country's home market (Spencer and Loader 2000). It is designed by the WTO to protect member countries from unfair competition from dumped products. Its objectives are to curb countries and firms from getting unfair benefits through selling product with the lowest prices possible due, for example, to government incentives and subsidies. Inconveniently, this agreement is sufficiently unclear to allow countries to take anti-dumping actions, and poor countries become the main target (Oxfarm 2002)

Although these tools are basic reforms to stimulate easier access to markets (Bernard et al. 2001) and to create competitive agriculture in most developing countries (Christy et al. 2009), Bigman (2002), Knudsen and Lindert (1995) and Meerman (1997) state that many

countries are not content with the impact of trade and policy reforms on agricultural growth, exports and poverty alleviation. The reason is that these reforms are only a small part of what is required to allow local producers, particularly small-scale farmers, to actively compete in global markets.

Trade policy in Indonesia

The national policy for agricultural development in a country cannot be detached from external influences in this era of globalization, which is characterized by economic openness and freer trade. In Indonesia, the national agricultural development policy is influenced by external factors, including, among others, International agreements, Agricultural trade policies of Indonesia's trading partners, and International institutions that provide assistance to Indonesia, especially in times of crisis (Pranolo 2000).

As a member of the WTO, Indonesia must open its domestic market for products from other countries and accept all of the consequences of the implementation of free trade, such as increasing competition in export and domestic markets. The ratification of the WTO's Agreement on Agriculture highlights three main pillars: 1) market access barriers, 2) domestic subsidies, and 3) export subsidies (Malian 2004; Swastika and Nuryanti 2006; Sawit 2003). Market access highlights the importance of reducing trade barriers and tariff, and non-tariff barriers should be switched into tariffs for easy measurement and control. Domestic support includes reducing policies whereby countries allocate assistance for farmers to encourage more production and increase their capacity to respond to export markets. Finally, export subsidy emphasizes the reduction of export subsidies and bans. This is particularly for registered commodities and requires the country to reduce domestic subsidies and subsidized exports (Swastika and Nuryanti 2006).

Broader market access brings opportunity for Indonesia to increase exports of agricultural products. However, this opportunity is constrained due to high bound tariffs for some commodities (Malian 2004; Swastika and Nuryanti 2006). Countries such as the United States of America, European Union, Japan and South Korea still have high protection against some agricultural commodities produced by developing countries of between 116 to 463 per cent (Gibson et al. 2001). In contrast, developing countries apply lower tariffs (Malian 2004; Swastika and Nuryanti 2006). As investigated by Sawit (2005), agricultural products in Indonesia, such as soybeans, rice and milk, have tariffs much lower than the tariffs allowed by the AoA-WTO agreement.

Another barrier is that developed countries have high capital resources to allocate to domestic support and domestic subsidies to encourage exports and surplus of farm production, which worsens the competitiveness of the same commodities that are produced

from developing countries (Malian 2004; Swastika and Nuryanti 2006). The Indonesian government lacks the capability to allocate significant domestic support and domestic subsidies to farmers to Green box interventions (exempt as cause of minimal disruption, e.g., agricultural research and development, plant protection, marketing services and extension services) and the Amber box interventions (reduced because linked to production, e.g., public services, direct payment to produce, income insurance, food stocks, and social safety networks) (Sawit 2005).

Due to protection and subsidies given by some developed countries to their farm industries, they can sell their agricultural production to global markets at lower prices. Consequently, food prices in the global markets are distorted. This has negative consequences for poor farmers in developing countries who lack the resources to compete, both in the global and domestic markets (Sawit, Setiyanto and Purba 2005).

Sawit and Rusastra (2005)and Swastika and Nuryanti 2006) suggest that several policy programs should be encouraged by the Indonesian government, including: encouraging research and development to produce and promote new high yielding varieties; improving better farm management through empowerment of extension services capacity; improving global trade policy by meeting development needs; improving the marketing system for food in domestic markets through strengthening the institutional market and providing infrastructure; and, finally, facilitating farmers to get access to, and adopt, new technology that is expected to increase production and income sufficiency.

3.7.2   Infrastructure

Most researchers suggest infrastructure has a strong effect on improving livelihoods in rural areas, especially for smallholder producers (Torero 2011). Increasing agricultural production is an effective means to enhance economic growth and poverty alleviation, both in the agricultural and non-agricultural sectors, and only can be achieved comprehensively through access to good infrastructure (Anderson and Shimokawa 2006). Christy et al. (2009) declare that the majority of empirical studies revealed that when infrastructure is provided, it increased economic growth dramatically for macro-economic stability or industry wide variables. However, this condition seems to be a challenge in developing countries, as a majority of them have deficient rural infrastructure. Lack of investment in transportation, energy and the telecommunication sectors lead to poorly functioning markets, uncompetitive price transmission and lack of international competitiveness (Anderson and Shimokawa 2006).

In this research, defining infrastructure and the role of infrastructure, and understanding the current status of infrastructure conditions, are essential to understanding which institutional

policies and procedures will assist smallholder producers by enhancing the enabling environment.

Defining infrastructure

Infrastructure can be defined as the amount of capital accumulation that can be embodied in roads and railway networks, water irrigation, airport, and other sources of transportation facilities, information services and public service facilities on health and education (Todaro 1977). A broader definition of infrastructure is delivered by Fosu et al. (1995) who differentiate between 11 components of agricultural infrastructure: health and education services; credit and financial institutions; land conservation services; communication and information services; agricultural research and extension services; public services; processing infrastructure; commercial infrastructure; storage services; instrument of transportation and irrigation and public access to water.

Another comprehensive definition by Idachaba (1985) classifies infrastructure into three main components: rural physical infrastructure, rural social infrastructure and rural institutional infrastructure. Rural physical infrastructure is dedicated to availability of transportation facilities, storage facilities, processing facilities, irrigation facilities and social conservation facilities. Rural social infrastructure refers to instruments for health and education facilities, and rural utilities. Rural institutional infrastructure includes cooperative societies, financial institutions, agricultural research facilities, agricultural extension and training facilities (Deininger and Okidi 2003; Fosu et al 1995 and Wharton 1967)

Ahmed and Donovan (1992) assert that agricultural infrastructure is an instrument which has been important to accelerate economic development and can be identified based on its function in agricultural research, extension workers, the financial sector and hard infrastructure, such as roads and irrigation. Moreover, Wharton (1967) categorises agricultural infrastructure into three uses: capital intensive infrastructure covering roads and bridges; extensive infrastructure emphasizing extension services on vegetable and animal sanitation services; and institutional infrastructure, such as formal and informal institutions.

The Institution of National Planning in Indonesia (*Bappenas*) defines infrastructure based on its economic function. Bappenas (2003)maintains that infrastructure has a direct connection with economic activity by considering three aspects: economic activities which consist of road availability, bridges, electric and telephone networks creating economic transactions; infrastructure as part of input production, and also an instrument that supports the process of industrialisation; and, finally, access to infrastructure determines the level of peoples' prosperity, in this case the availability of drinkable water and clean sanitation, transportation and electric services, which are basic needs of modern society.

Given the several definitions of infrastructure, it is important to assess how infrastructure can contribute to assist smallholder producers to reduce poverty. There are two essential instruments to consider from an enabling environment perspective: physical infrastructure, including information technology, roads, ports, water, and irrigation which gives smallholders access to markets; and the role of institutions that reduce the risk of marketing and transaction costs transaction which often occur between producers and consumers in the process of exchange. So, linking farms to markets through infrastructure could reduce their transaction costs, minimize risks and help them to participate in the market. In other words, enhancing the enabling environment might be a possible solution to mitigating risks of smallholder producers and improving their outputs to achieve profitability (Maximo 2011).

The role of infrastructure

Several studies have extensively investigated the linkage between poverty reduction and infrastructure in rural areas (Jimenez 1995; Lipton and Ravallion 1993; World Bank 1994). The majority of their findings revealed that infrastructure significantly accelerated economic growth and income in rural areas (Binswanger, Khandker and Rosenzweig 1989; Howe and Richards 1984).

The macroeconomic and microeconomic impacts of infrastructure have been identified by Javier (2005) in terms of which type of infrastructure contributes to rural market development, and to livelihood improvement for the rural poor. At the level of macroeconomics, improved access to new infrastructure increases the marginal rate of return for public and private sector investments. On the other hand, at the microeconomic level, investment in infrastructure can change specific market linkages, or change specific household behaviours. In this case, specific market changes can be associated with decreased transaction costs (Gannon and Liu 1997b) or improved market integration, with improved market efficiency for rural households, and the relative price structure for rural poor will be adjusted.

From a macroeconomic perspective, Krugman (1991) showed that investment in infrastructure affects total factor productivity growth in the economy from market expansion, and growing the agglomeration economies. Thus, whether investments in infrastructure can influence income growth in the rural area or not, it is an empirical condition that will not only depend on investment resources from government but also other necessary components that may improve, or reduce, unfavourable effects.

Fan, Fang, and Zhang (2001) found that infrastructure investment by the public sector, particularly irrigation facilities, road access, electricity and telecommunication networks contributed significantly to the growth of agricultural production, but also poverty reduction

and regional economic disparity. The marginal returns to infrastructure investment by the public sector to accelerate production and poverty alleviation differ among regions, mainly depending on geographic factors, and, crucially, the poorest areas tend to have the higher marginal returns.

Similarly, Anderson and Shimokawa (2006) also found that physical infrastructure makes a broad contribution to economic development and to reducing poverty in developing countries. They add that good infrastructure, well-functioning domestic markets, appropriate institutions and access to appropriate technology are factors that contribute to increasing agricultural productivity and to achieving market competitiveness. KPMG (2009) report that the physical infrastructure for the competitiveness can be identified through support for on-farm production, such as irrigation, energy, transportation, pre- and post-harvest storage, while trading and exchange facilities are addressed to telecommunication and covered markets.

Authors such as Christy et al. (2009) investigated several necessary conditions that should be considered to obtain impacts of infrastructure in the macroeconomic perspective of economic growth. First, the macroeconomic environment must be conducive to achieving resource efficiency. Second, to have sustained benefit in production and consumption, infrastructure investments should create better services and appropriate facilities that are preferred by users. Lastly, infrastructure is more economically profitable and achieves better impacts, if users are charged for its use.

On the microeconomic perspective, several studies have documented the impact of rural infrastructure investment. Gannon and Liu (1997b) suggest that rural infrastructure investments contribute significantly to improving the livelihoods of poor people. Reducing production costs and cutting down transaction costs increase the profits and income of smallholder producers. Rural infrastructure investments also increase trading networks and make possible the division of labour and specialization. Block and Webb (2001) found that higher levels of road density contibute to specialisation and encourage farmers to be more intensive in conducting agricultural actvities by connecting with modern inputs.

Similar studies conducted by North (1990) and Williamson (1979) higlight that transaction costs often determine the condition in which transactions are conducted. Even though the institutional environment and institutional arrangements are the two main factors that determine the costs of transacting, and the risk from transaction failure, the presence of suitable infrastructure are also important in facilitating, as well as in obstructing, market change. North (1990) and Williamson (1979) added that inadequate infrastructure, such as roads, telephones and irrigation, increase transaction costs and make each transaction

excessively costly. The absence of infastructure services not only increases the costs of transactions but also affects market development. Likewise Javier (2005) asserts that improving spatial market integration can be achieved by reducing production and transaction costs,and this can be achieved by rural infrastructure investment. Market integration becomes profitable when transportation and transaction costs are reduced, otherwise autarchy will apply. Javier (2005) adds that affordable access to public infrastructure facilities affects farm activities and invidual characteristics, leading to increases in productivity through technological innovation, input utilisation, availability of various crops and labour efficiency, both in the agricultural and non agricultural activities.

Recently, a number of authors have investigated the effect of infrastructure investment on increasing productivity through the contribution of technology infrastructure. For example, Ann Hollifield et al. (2000) shows that investment in telecommunication infrastructure in rural areas contributes to increasing smallholder producer adoption of technology. Anderson and Shimokawa (2006)) state that smallholder producers' willingness to adopt technological innovations to enhance productivity and integrate with the market mostly depends on infrastructure conditions. According to Haggblade, Hazell, and Dorosh (2007), one possible solution to achieve this is the government and private sector should cooperate to build the technology infrastructure. The government can act as a trigger to provide a better climate for investment that allows the private sector to construct the infrastructure network efficiently. However, insufficiency of investment in the field of technology infrastructure is one of the key constraints for smallholders to utilise potential resources and to achieve market competitiveness (Anderson and Shimokawa 2006).

The current status of Indonesian's rural infrastructure
In Indonesia, the successful growth of farm and non-farm products is strongly related to access to good infrastructure when compared with enterprises which do not have access to this infrastructure (Willoughby 2004). Ifzal and Pernia (2003) reveal that investment in rural infrastructure provides a great contribution to farm and nonfarm activities; it reduces unemployment, while at the same time it increases both income and access of wage goods. As evidence of the functions of infrastructure, World Bank (2006) states that the use of technology infrastructure can improve productivity through using high-quality power supplies, and technology infrastructure investment contributes to rising employment and the income of poor people, as well as poverty reduction (Balisacan, Pernia and Asra 2003). In addition, Fan and Zhang (2004) note that agricultural infrastructure investment aims to encourage smallholder producers to access input and output markets, to boost the rural economy, both in farm and non-farm agriculture, to improve the level of consumer demand, and to facilitate the collaboration of rural areas with the regional, domestic and international

economies. The efficiency of input and output distribution is significantly linked to accessibility to the transportation system.

Recently, infrastructure is a main focus of the government to increase market development, enhance income generating opportunities and enhance economic growth within the nation (Firmanzah 2012). Firmanzah (2012) adds that infrastructure is provided not only to support the domestic market within the inter-island market, but it is also highlighted to competitiveness in international markets, especially since Indonesia is a part of the investment grade zones.

To achieve the main focus of the government above, the central government encourages quality and expands infrastructure, such as electricity, roads and telecommunications by allocating capital expenditure equivalent to Rp193.8 trillion or 11.8% of the national budget of Rp1,658 trillion. Meanwhile, expenditure is projected by *Bappenass* from budget allocated for regional infrastructure of around Rp96 trillion, state owner enterprise contribution of about Rp 77 trillion, and private sector expenditure of around Rp 60 trillion. Therefore, the budget for infrastructure development in aggregate is about Rp 457 trillion or 4.9% of the GDP target in 2013 of Rp9,300 trillion (1 trillion U.S. dollars) (Ministry of Finance 2012). Furthermore, the national budget was allocated to several program priorities including construction of roads, ports, provision of river transport service, lakes, construction of new airports and the rehabilitation of 120 airports; the construction of more than 380 kilometres of new railway lines, including double tracks, road transport terminal development at 24 locations and 61 piers crossings; and development and management of fishery harbours at 25 locations. In addition, the budget is also allocated to the energy sector, increasing the electricity capacity by 188 megawatts, construction of 3,625 km of transmission lines, construction of main electricity stations 4,740 Mega Volt Ampere (MVA) and construction of both distribution networks and substations for 9,319 km and 213 Mega Volt Ampere (MVA).

According to Firmanzah (2012) government and functioning private and public market institutions in the infrastructure sector are expected to take advantage of market opportunities to sustain distribution of input and outputs, and enhance income-generating opportunities through increased industrialisation. A further goal is to improve welfare and decrease development disparities between islands in Indonesia. However, infrastructure development, such as electricity capacity, telecommunication network, road conditions and irrigation face difficulty reaching national goals; the quality of access to infrastructure such as electricity, roads and telecommunication remains a gap, and, with different policies in terms of budget allocation in many places in Indonesia, the regions outside Java and Bali lack infrastructure development and lag behind in all areas (World Bank 2006).

<u>Electricity infrastructure</u>

During the last 25 years, electricity rollout in Indonesia has increased significantly (Dwi Hidayatika 2007). World Bank (2006) declares that there was an increase in the percentage of the rural population using electricity from under 10 percent in 1980 to over 82 percent in 2001. The national economic survey revealed that the state energy company (*Perusahaan Listrik Negara-PLN*) electricity grid reached 78 percent of rural households, with the other four percent served by non-grid sources. Approximately 82 percent of villages can access electricity, with more than 60 percent of the households legally connected, while the other 34 percent of homes in the villages are illegal connections.

Furthermore, the World Bank (2006) reported that the availability of electricity in Indonesia based on the percentage of rural population which has access to electricity is best in Java and Bali provinces, with more than 90 percent having access; while in Central Sulawesi, only 64 percent have access, which is indicative of the unequal distribution of electricity supply among islands. Electricity outages occur in every area, especially in regions that have a relatively low economic base. There are also some areas that do not have electricity provided by the state electricity station (Muchlis and Permana 2003). As highlighted by Energi Sumber Daya Mineral (2011) and World Bank (2006), the electricity system of Java-Madura-Bali (Jamali) has enough potential energy capacity and reserve margin of about 32 percent which is supplied by several electricity power plants, such as the Gas Electricity Power Plant 6x145 MW Muara Tawar, while the electricity system outside the Jamali only has 5,970 MW capacity, but the availability of power is low, only about 78% of electricity power demand. The World Bank (2004) reports that the quality of the electricity service is generally poorer outside Jamali. The state electricity company (*Perusahaan Listrik Negara-*PLN) observes that there were 14 areas that significantly exceeded the peak load generating capacity. Most of them are in Sumatra, East Kalimantan and West Kalimantan, North Sulawesi, Gorontalo and West Nusa Tenggara areas, with regular blackouts currently required during peak times. The serious problem that happened for some systems outside the other islands, and in most areas, was lack of generating capacity, combined with transmission bottlenecks and limited distribution.

To overcome the crisis that occurs outside the Java, Madura, and Bali system, PLN has been building power plants, especially the construction of hydroelectric power generation in the regions of northern Sumatra and southern Sumatra (World Bank 2004). In anticipating the growth of electricity demand in the medium and long-term developments, some new plants have also been established by utilizing local energy, primarily non-conventional energy plants. In addition, systems of transmission and distribution networks have also been well developed. For the areas outside Java, Madura, and the Bali system, small-scale plants have

been developed by generating the potential of local energy, especially for remote, isolated and border (off-grid) areas (Energi Sumber Daya Mineral 2011). In the field of rural electricity development, there had been as many as 52,127 electrified villages and the ratio reached 79% until the end of 2006. Every year, the government continues to increase the budget and emphasises the construction of mini-and micro-generation plants using non-conventional energy, especially local renewable energy (Energi Sumber Daya Mineral 2011).

Telecommunication facility

Indonesia's telecommunications sector has weathered the economic crisis and the bursting of the global telecommunications bubble moderately well (World Bank 2004). Dramatic growth in the number of mobile subscribers since 1997 has been accompanied by solid increases in numbers of fixed lines in service, public payphones, teleshops (*wartels*) and internet shops (*warnets*), while the number of mobile customers since 1997 has increased significantly (World Bank 2004). World Bank (2004) claims that the Indonesian telecommunications sectors were dominated by two companies: Telkom which was designated as the "organizing body" for basic domestic (local and long distance) telecommunications, and Indosat which was designated as the "organizing body" for basic international services sector.

To meet the demands of industrial telecommunications and global competitiveness of those companies, the Indonesian government created Telecommunications Law No. 36/1999 which sets the guidelines for industry reforms, including industry liberalization, to facilitate new investors and increase transparency and competition in the accelerated provision of telecommunications services and infrastructure (Telkom 2009b, 2011). To organize, monitor and control the telecommunications industry, an Independent Telecommunications Regulatory Agency (ITRB) was formed in 2003. As part of its regulatory function, ITRB was authorized to: (i) carry out the selection or evaluation for licensing of telecommunications networks and services in accordance with policies and communications minister information (MCIT), and (ii) propose to the Minister of Communications the standard operating performance of telecommunications networks and services, service quality standards, interconnection charges and standardization of equipment (Telkom 2009b).

Currently, the communication sector in Indonesia has grown rapidly in the utilization of mobile technology, technology of global system for mobile communications (GSM) and Code Division Multiple Access (CDMA) to provide communication services to the public. Telecommunication service users had switched to cell phones and wireless because it is considered more flexible and able to meet the needs of their high mobility. This leads to the

dominance in the provision of new connections of fixed telephone cables being gradually displaced by wireless and mobile phone (Erlinda et al. 2010).

On the other hand, it also affects the mobile phone market growth for every region in Indonesia (World Bank 2004). However, the infrastructure disparity between rural and urban areas, and between western and eastern Indonesia, is reflected in more than 31 thousand villages that did not have telecommunication and internet facilities. More than 80% of the postal and telecommunications infrastructure is concentrated in Java, Bali, and Sumatra, and Internet Service Providers (ISPs) were concentrated in Java (64 % of 306 ISPs) and 18% in Sumatra by the end of 2008 (Kemkominfo 2010). The infrastructure limitations also lead to provision of telecommunications utilities in remote areas becoming more expensive (Telkom 2009).

Road Infrastructure

Roads play an important role in simplifying the movement of passengers between cities and in connecting people and markets across the country. Road infrastructure is also a key cornerstone to reduce poverty and provide access to social infrastructure, such as education and health services in this nation (World Bank 2012). Ousman and Lukoma (2011) argue that roads connect smallholder producers to both input and their product markets. Kwon (2000), studying the data of road infrastructure in Indonesia, estimates that the growth of infrastructure at provincial level expects to reduce the incidence of poverty by 0.33% from road in good status and 0.09% from road in bad condition. This means that the poverty rate decreases by 0.33% and 0.09% respectively, for every 1% growth at provincial GDP. Thus, the income and work of the poor tend to increase immediately because of the existence of provincial roads, so that a 1% increase in road investment is connecting with 0.3% decrease in the poverty rate for five years. Authors such as Balisacan, Pernia, and Asra (2003) who utilised more disaggregated district scale data (*Kotamadya/Kabupaten*) revealed that road access contributed to increasing average incomes for poor people, with a projected elasticity of 0.05.

To accelerate economic growth between regions, and to increase population mobility, the government has built a network of national, provincial, district and city roads, as well as rural roads with a total length of about 553,852 km. Of this, 34,628 kilometers includes national roads (4.7%), 38,912 kilometers covers provincial roads (7.0%), 223,318 kilometers of district roads (40.3%) and 21,526 kilometers of urban roads (3.9%). The non-state roads, or village roads, cover 243,826 kilometers (44.0%). However, in general, the condition of the national road network is only 37% in good condition, 44% fair, 8% with minor damage, and 11% were severely damaged (Hermanto 2008). The World Bank (2004) considers that the national roads are in the best good condition, while provincial roads are poorly maintained,

and more than half of the extensive network of district roads are in bad condition, although the eastern regions have even worse conditions. However, the road system in Indonesia does not provide optimal support for the country's economic development. Indeed, the road that spreads in various provinces has been overlooked because the construction of a road is usually carried out by the central government (Standard Chartered Bank 2011).

Biemo and Wirahadikusumah (2008) and World Bank (2004) identify that the main obstacle in the development of infrastructure is limited spending for infrastructure development and limited budget allocated for maintaining the quality nationwide. The impact of the budget deficit can be seen in the ability of the government which is only able to provide financing for about Rp 511 trillion of the total budgets required from Rp1,429 trillion dollars for the year 2010-2014. World Bank (2004) reports that the expenditure limitation in infrastructure affects nearly 50% of roads, causing serious impacts for road quality, especially for district roads which are in poor condition. The condition of roads is only able to serve 1.5 km per 1000 population, and spatial road density (190 km per 1,000 km^2) is about average when compared with regional and international benchmarks (World Bank 2012).

Recently, the road systems in Indonesia have increased significantly due to greater attention from the government and private sector. Official road access rose in length by 19.5 % in 2000 (Parikesit 2006). More than 90 percent of rural residents were within 2 km of roads and around 74 % of households in Indonesia can be accessed by asphalt and concrete roads (World Bank 2006). The central government allocates the main financial budget to construct and maintain the roads with part financial support from lower governments, while the private enterprises take part in investment and operation of toll roads (World Bank 2006). The construction and maintenance of national roads and non- provincial roads are the responsibility of regency governments.

In addition, all the government levels (central, provincial and local) have an obligation to construct and maintain roads to improve accessibility. While, the private sector has invested in and operates toll roads, the central government provides a significant budget for road construction and maintenance; however, part of the financial cost is also allocated by the provincial and local governments (World Bank, 2006). Regency governments are responsible for all road functions, not specifically assigned to central or provincial governments, which includes construction and maintenance of all non-national and all non-provincial roads.

Agricultural irrigation

Water is an important factor in agriculture, used by plants for photosynthesis, nutrient transport, transportation and so forth which, in turn, makes the plants produce biomass to

meet the needs of the people (Sigit and Murtiningrrum 2003). Water for agriculture is not the main factor in production, but also largely determines the potential area for planting, intensification productivity and quality of production (Undang 2004). As a tropical monsoon region, rainfall is the primary source of water for agriculture. However, the amount of rainfall varies between regions and tends to be temporary, with the result being that it frequently cannot fulfil the water requirements of plants optimally. Therefore, irrigation plays a significant role in providing the needs of plant water in these seasons (Sigit and Murtiningrrum 2003).

As a whole, Indonesia has relatively abundant supplies of water, with the average annual rainfall varying between 1,000 mm and 5,000 mm. The irrigation system is the best solution to control water use on agricultural land (Douglas et al. 2000). According to Small and Svensend (1992) managing the potential for excessive rainfall to irrigate agricultural land, especially during the dry season, can be beneficial. Similarly, Lombard (1996) and Van Setten van Meer (1979) also state that despite being located in a tropical monsoon area with lots of rain, irrigation is an essential factor in the food supply for Indonesia. Irrigation has become a tool for political power to reinforce the government's position as it influences the livelihoods of many people. In some respects, irrigation has been an important sector to define the growth of an agriculture country at certain points (Sigit and Murtiningrrum 2003).

Currently, the overall area of the irrigation system in Indonesia, is around 7.5 million hectares in 33,210 systems, with 2.9 million hectares in 241 central government systems; 1.4 million hectares in 1,109 provincial government systems; and 32 million hectares in 31,860 district government systems (Ministry of Public Works 2010). Local government has a small proportion of irrigation systems of approximately 1000 hectares (Sigit and Murtiningrrum 2003). Douglas et al. (2000) remark that irrigation is only well constructed in Java and Bali, in contrast to other islands in Indonesia. Almost all the irrigation work is designed to provide water to rice fields, with about 84% of rice irrigated, while the remaining 16 percent is rainfed (Jonn and Meylinah 2013). Operationally in Indonesia, there are three types of irrigation: technical, semi-technical and local people irrigation. Technical Irrigation systems are big projects for permanent use, built and run by a government institution. Semi-technical irrigation systems are small, either permanent or temporary, which were built by the government but run by group of farmers. People irrigation systems are little works with temporary water or without dams, built by farmers themselves (Dirjen Pengairan 1986).

In the eastern part of Indonesia, the majority of farms are under dry land farming systems and upland agriculture; agricultural irrigation uses pumps. River water and ground water are raised to a container by pumping and are then distributed to the planting site by gravity through the conduit or surface irrigation, drip irrigation, sprinkler, or the use of capillary

siphon. With the majority being coarse-textured soils, irrigation sprinkler systems are more efficient (Undang 2004).

3.7.3 Land tenure and property rights

Land is the most important resource base for people who live in remote areas and the urban poor, particularly in poor countries where agriculture is the main source of income (Christy et al. 2009; ECA 2004; IFAD 2006). It is also the base for economic activities and market functions, such as credit access and nonmarket organisations, and involves a network for social relationships in developing countries (World Bank 2003b). Thus, Okoth (2006) argues that land not only contributes to economic, but also political, resources. As a political resource, it is a source of power to encourage relations between and among individual, relatives and social communities under the control of governance systems.

In order to assess land tenure and property rights in an enabling environment, it is essential to understand a working definition of land tenure and property right. Many researchers reveal that land tenure is the conceptual derivative of natural resource tenure, which concentrates more on a particular term and situation through which land can be held, used and transacted (Adams 2001; Bruce 1986; Moyo 2006; Shivji, Moyo and Nucbe 1998). Similarly, the land tenure concept is a social formation, which expresses the interactions between individuals and communities by which rights and obligations are allocated to manage and utilise land (Adams 2001; Ogolla and Mugabe 1996). A simple definition is that 'land tenure can be defined as the mode by which land is held or owned, or the set of relationships among people concerning land or its product' (Payne 2001, p. 2). Thus, the specific definition on land tenure is closely related to the system of administration of freehold, leasehold, statutory allocations and customary systems (ECA 2004, p. 5):

> Freehold emphasizes the absolute right to control, manage, use and dispose of a piece of property; leasehold, in which land belonging to one entity is, by contractual agreement, leased to another entity for a fixed period of time; statutory allocations, a particular form of state land where such land, by virtue of some statutory provision, is allocated for the use of some legally constituted body; and customary systems, in which tenure rights are ostensibly controlled and allocated according to traditional practice.

Land access and tenure security for rural poor people are fundamental to enhancing their livelihood, especially for agricultural activities. They influence decision making on the nature of crops and whether they can be grown for subsistence and commercial aims. They also influence the farmer's capacity for investing in increasing production, encouraging sustainable management, implementing new technologies and introducing innovations (IFAD 2008). Land can be used as collateral to gain credit from formal financial services by referencing with land title (Feder and Noronha 1987; USAID 2007a). In addition, Adams

(2001) suggests tenure security is one of the components influencing the way households use assets. The living standard can be higher, contributing to the household's resources and a better environment for the productive investment if tenure is secure, however the households can be unproductive and the living standard can decrease, if tenure is insecure.

Property rights are essential elements for institutional arrangements. The institutional arrangements are constructed within the regulations which are classified by formal constitutions. The arrangements for property rights in land consist of laws, regulations, associations and contracts. Thus, formal constitutions can be related to the fundamental rules which are concerned with how societies manage the rules for creating the rules (Feder and Feeny 1991).

Payne (2001, p. 2) remarks that 'property rights can similarly be defined as a recognised interest in land or property vested in an individual or group and can apply separately to land or development on it,' and 'rights may cover access, use, development or transfer and, as such, exist in parallel with ownership'. Property rights include two main elements: the rules, and the enforcement mechanism. The rules can be from national law, customary law, social group rules, and other frameworks of regulations. Enforcement of constitutional law is often categorised as a national responsibility under formal laws (Wibke, Bogale and Korf 2008). Furthermore, Berkes et al. (1989) and Feder and Feeny (1991) divide property rights in land based on four basic categories: none or open access where exclusive rights are absent; communal property, where the exclusive rights are managed by an individual group; under state property, where land management is controlled by government; and private property, where the exclusive rights are signed to an individual.

In developing countries, property rights are fundamental to enhancing the sustainability of economic growth. According to Deininger (2003) property rights contribute to economic growth in number of various ways. Secure property rights will improve the household's incentive and influence the society to invest, and will often give them an opportunity to obtain credit access and assure substitute facilities in the event of shocks. It has been recognised that without using agricultural machinery, the distribution of land operationally influences output capacity, indicating that unequal land distribution will decrease productivity. The author adds that secure and well-defined land rights are key to household asset ownership, sustainable development, and making the market attractive. World Bank (2003b) suggests that land tenure security also affects land transfer costs, such as rental and sales, and improves land allocation, while at the same time encouraging financial market development. With inadequate secure rights, landowners are unwilling to rent their land and that can obstruct their capabilities and willingness to become involved in non-agricultural jobs.

Land tenure and property rights in Indonesia

In the past several decades in Indonesia, development policies have concentrated on rapid economic development, without creating a comprehensive strategy to encourage the least powerful groups, for instance landless and marginal land for poor agricultural employment (USAID 2007c). Furthermore, Indonesia does not have an integrated, cross-sectoral land policy that is required to solve the country's controversial and complicated problems relating to land issues (Mitchell, Prosterman and Safif 2004). Thus, the relationship between traditionally developed land rights, tenure systems of local communities, and the national state law is the main issue with regards to the existing land legislation in Indonesia. As evidence of this obstruction, several conflicts emerged in many places as competition over access to the land, particularly in more high density population areas. During the new order regime, conflict over control of cropland often occurred when the government took land from individuals and gave it to open plantations (Wiradi and Suhendar 2002).

Furthermore, access to agricultural land has been a problem for farmers and agricultural employment in Indonesia. The percentage of landless and land-poor agricultural households is unequally distributed between islands and is relatively higher in Java. According to statistical data, an estimated 17.3 million households in Java are farmers, or farm labourers, with 39% (6.7 million families) who do not have rented land or own any cropland, and another 44% (7.6 million families) who rent, or own less than 0.5 hectares (BPS 1993a, 1993b).

In addition, land tenure can be categorised as *hak milik* (right of ownership), which is unrestricted in time and can be shifted and pledged; *hak pakai* (rights of use), rights that are not as permanent, *hak guna usaha* (right to exploit), such as on agricultural commercial lease; and *hak guna bangunan* (right to build) which refers to the right to construct and use for building. Foreigners are not eligible for these land rights, even though some foreigners organise agreement contracts with Indonesians or have companies to hold land rights (Fitzpatrick 1997; Lindsey 1998).

Land tenure administration is officially organized by the National Land Agency (BPN), which has offices in every province and at the district level. This institution has functions to determine land status such as allocating, registering and regulating all land that is categorised as non-forest (Thorburn 2004). However, services are disconnected, as institutions have overlaps in authority, and there is a lack of coordination between institutions. Assignment of judicial authority and sectorial approaches to land management and administration are also unclear, causing inconsistencies in the direction of policy application (World Bank, 2010). For instance, it has been recorded by the National Land Agency (BPN) that approximately 70 million parcels are registered through the fiscal (tax) cadastre, however only 20 million

are recognised in the legal cadastre, or public land register (Mitchell, Prosterman and Safif 2004). Many of the private rights to urban and rural lands lack registration; indeed, most of the rights to land is through inheritance (Thorburn 2004).

To establish the local economic foundation for the land tenure and natural resource rights, improved land administration at the regency level is required, based on a strategy such as local guidelines for implementing expropriation procedures in a more transparent and less arbitrary way. Exploring measures to expand land access to land households to produce agricultural outputs and livestock, and contribute significantly to enhance their income generation, is another strategy (USAID 2007d).

The discussion so far has focused on the essential enablers. Next, the discussion will move onto the model's second level, entitled "Important enablers."

3.8 Important enablers

This section explores the financial services, research and development and extension worker, and the application of standards and regulations in relation to important enablers.

3.8.1 Financial services

The majority of businesses agree that financial services are pivotal. Financial services are important to seize opportunities for investments, and for divergent endowments of wealth (Balkenhol 1991). Financial services can facilitate more productive investment and those with inadequate resources can take advantage, both socially and privately, of profitable alternatives. Similarly, others can obtain a competitive return on deposits from managing their potential resources effectively and making them available to others (Claudio and Graham 1995).

Financial services that are more productive and efficient for households and business firms include postponing consumption, accumulation of assets and investment opportunities (ADB 2000). The services assist in smoothing the pattern of consumption when income flows are unstable. This is essential for the inter-temporal optimization of utility, and to escape the undesirable reduction of productive capital if small-scale producers face short-term income fluctuations (Rosenzweig and Wolpin 1993). Claudio and Graham (1995) add that a more cost-effective management of risk, liquidity, and the accumulation of stores of value for precautionary and speculative purposes are the major tasks of financial services. These services are especially essential for poor people who live near subsistence levels.

Financial services to smallholder producers can be categorised as formal and informal sources. In the formal sector, lenders are organised, registered and regulated based on the system of institution in allocating microfinance service credit, while sources of informal

credit consists of moneylenders, families, friends, neighbourhoods, traders and landlords (ADB 2006a; Yadav, Otsuka and David 1992). Terms and conditions range from cheap, subsidized institutional loans with strict collateral requirements, to usurious loans from moneylenders. The capability to repay the loan based on a selection of administration criteria and collateral references are preferred by formal institutions when deciding about credit allocation. In contrast, in the informal sector, borrowers can more easily obtain credit from lenders without procedural administration and lower transaction costs, however interest rates are much higher (Yadav 1989). In addition, information regarding the capacity of the borrower and willingness to repay loans has already been identified by lenders because of their closer relationship with the borrowers. In some cases, it is easier to enforce repayment through relatives and friends because of the potential threat to the borrower's reputation within the family circle in the event of defaulting (Otsuka, Chuma and Hayami 1989; Schaluter 2008). In addition, Sharma (2001) indicates that semi-formal institutions, such as non-government organisations (NGOs) are also a source of microcredit assistance to smallholder producers, but it mostly depends on the project purposes and budget.

In developing countries, microfinance is important as an effective instrument to improve income generation and to reduce poverty (Jonathan and Haley 2002; McCulloch and Baulch 2000; World Bank 2007a; Wright 2000; Zaman 2000). Access to microfinance services can enable the poor to smooth their consumption, manage their risks better, build their assets, develop their microenterprises, enhance their income-earning capacity, and improve their quality of life (Khandker 1998; UNICEF 1997; Wright 2000). The improvement in resource allocation, promotion of markets, and adoption of better technology are further contributions of microfinance services (ADB 2000; Jacoby 2000; Robinson 1992). For agriculture, facilitating the purchase of costly inputs and the adoption of alternative crops, increasing productivity and decreasing cost inefficiencies are possible benefits from accessing rural financial services (Hazarika and Alwang 2003). However, due to the inherent problems related to providing such services to rural clientele, often with low population density, rural market places, seasonality and highly covariant risk such as widespread regional crop failures and commodity price fluctuations, smallholder producers are often difficult to provide with microfinance services (Jacob 2004; Ortmann and King 2006). As stated by Schaluter (2008), revenues of rural households generally depend on seasonal agricultural and livestock production, where these commodities are often unstable due to fluctuating weather conditions and pests or diseases attacks. According to ADB (2000), formal financial institutions that provide microfinance services are often reluctant to serve smallholder producers because the poor lack the capability to provide the physical collateral, the high cost in small transactions, low profitability and incapacity to repay the loans. Schaluter

(2008) found that many smallholder producers face the risk of credit default, while the majority do not have legal title to their land or house. Because they lack access to the formal financial sector, the majority of small-scale producers continue to rely on self-finance or informal sources of microfinance (ADB 2000).

Furthermore, inadequate investment in physical infrastructure, such as roads, irrigation, electricity facilities, marketing services, business development, and agricultural research and extension increase the risk and cost of microfinance, and, especially, discourages investment from the private sector in the provision of microfinance services (Jacob 2004, Ortmann and King 2006). Schaluter (2008) also comments that financial institutions in rural areas often allocate extra costs for security and controlling liquidity. The additional costs are usually passed on to the creditors; consequently, interest rates are often higher for creditors in rural areas than in urban areas.

A new approach to rural finance is required from policymakers through creating a conducive policy environment and legal and regulatory framework. Factors such as macroeconomic policies, weakly regulated financial sectors, institutional features (legal and regulatory), and specific constraints related to financial intermediation in rural areas should be reformed because they prevent rural financial markets from operating efficiently. Strengthening the supervision and prudential regulations of financial institutions, deregulating interest rates, reducing excessively high reserve requirements, and relaxing credit controls should be adopted by public institutions to promote financial market development (ADB 2006a; Jacob 2004; Schaluter 2008). A system that provides formal procedures for claims against property and enforcement of financial contracts is necessary for lenders. However, information asymmetries and high risk and transaction costs for formal financial lenders in rural areas means they are less willing to lend due to greater uncertainty and expense. (Jacoby 2000; Schaluter 2008).

Some countries allocate funds to smallholder producers by direct connection with private or state owned banks to perform concessionary loans of agricultural assistance, or to encourage semi-private companies to supply agricultural credit (Jacob 2004; Jacoby 2000). For instance, agricultural credit programs are created and subsidized by governments to promote agricultural production and to assist poor people in rural areas to access cheap credit (Adams and Vogel 1986). However, these programs have had little effect at the farm level due to limited outreach and high costs. It has been found that a large proportion of farmers from rural areas are unable to access formal financial services, even though huge resources have been allocated for interventions providing subsidized credit and the rescue from financial difficulties of semi-private agricultural credit institutions (ADB 2006a; Yadav, Otsuka and David 1992).

Therefore, enhancing the transparency and efficiency of court systems; strengthening land and property registries; eliminating government interest rate subsidies for agricultural lending; removing policy biases against the agricultural sector; and investing in communications, physical infrastructure, and services are effective policies for government to improve access to financial services for the poor in rural areas, and to enhance the enabling environment (Pearce 2003).

Financial services in Indonesia

As a developing country, Indonesia is one of the most successful countries to manage sustainable microfinance services at a significant scale (Bramono et al. 2005; Robinson 1992). For example, the Indonesian People's Bank *(Bank Rakyat Indonesia)* network is recognised as the biggest and most profitable rural microfinance network in developing countries (Bramono et al. 2005; Robinson 1992). Numerous agricultural credit programs have also been promoted by the Indonesian government through cooperation with micro finance institutions, cooperatives and NGOs (Adra, Jeremy and Blance 2009; BWTP 2009).

According to Adra, Jeremy and Blance (2009), the financial system in Indonesia consists of a wide variety of formal, semiformal and informal institutions, and the institutions which actively engage in microfinance are: commercial banks through microfinance operations; banks added to cooperatives, informal micro finance institutions, such as non-bank and non-cooperative, savings and credit associations; and individual microcredit sources such as moneylenders, shopkeepers, traders, neighbours or family members. There is also the state-owned pawnbroker (*Perum Pegadaian*) which is part of the formal financial sector and serves millions of low-income people. However, in Indonesia, semi-formal financial institutions have not played a significant role in providing financial services to small-scale farmers. For example, NGOs are more involved in social mobilisation, often assisting the government with poverty alleviation (Meagher et al. 2006). Only a few NGOs participate in commercial microfinance through the Bank Perkreditan Rakyat (BPR) (BWTP 2009).

Recently, the government has begun a policy program to support micro, small and medium enterprises through a strategy of growing lending and expanding credit. Regulatory changes designed to facilitate such lending, government attention and the creation of mechanisms to channel credit for approved purposes to micro- and small enterprises, and low income people, have contributed to increasing small scale producers' access to microfinance credit (BWTP 2009). For example, the BRI has successfully assisted lower income people by assisting 3.44 million micro borrowers through the '*Kupedes*' loan program. As a result, total loans outstanding in December 2006 were Rp27.3 trillion (USD 2.73 billion) (ADB 2006b). Another example is bank Danamon Indonesia, a private bank, which operates a specialized micro finance division, the '*Danamon Simpan Pinjam*', or Danamon Savings and Loans,

which had 400,000 micro-borrowers with outstanding loans of Rp8.6 trillion (USD 860 million) in 2007 (BWTP 2009).

Furthermore, greater attention to smallholder producers is reflected in the agricultural credit program of the government, whereby the government provides microfinance credit to small-scale producers in the form of the Agribusiness Credit Scheme. The types of commodities that are financed by this scheme include food crops, horticulture, plantation and livestock which are categorized as high value commodities (Sabirin 2001). Currently, the Food Security and Energy Credits (*Kredit Ketahanan Pangan dan Energy, KPPE*), and the People Business Credits (*Kredit Usaha Rakyat, KUR*), are the credit schemes which have the potential to support growth in business investment (capital business) and finance for production infrastructure (capital investment). Funding for these schemes is 100 % from the bank and the distribution mechanism is under banking authority. Nevertheless, the government supports by providing significant interest rate subsidies (Djoko 2008).

Even with the increasing number of financial institutions that provide microfinance services, a number of studies have found that a large number of farm households in Indonesia still find it difficult to access the formal financial institutions (Bramono et al. 2005; BWTP 2009). According to Bramono et al. (2005) there are several outstanding issues and challenges underlying this condition. First, limited outreach to rural areas, as a majority of formal financial institutions concentrate their business in the regional and district capitals of greater economic activity. Second, political interests still affect microfinance services, as the majority of microfinance programs are designed, operated and funded by government, hence many decisions to reduce poverty are politicized. Third, there is a lack of awareness of microfinance policies, as there are no centralised training centres that can be used by the different players of microfinance to access additional training in order to work effectively. Last, effects on the poorest of the poor are limited because microfinance in Indonesia is more concerned with people who are already economically active and are utilising potential resources.

3.8.2   Research and development and extension worker

This part explores the theoretical background of research and development, and the contribution of extension workers to create the competitiveness of agro-industrial and agribusiness development.

Research and development

A number of studies emphasise that agricultural research and development investments have led to economic development and improved agricultural productivity for food security and poverty alleviation (World Bank 2007b). Otsuka (2000) asserts that there are three main

ways to attain this. First, improving yield-increasing technology greatly assists in developing the food supply where the poor spend most of their earnings. Second, because poor people often depend on labour income, the research has to improve labour demand by increasing labour applying-technology. Last, because poor people usually live in rural areas, the aim of research should be to develop appropriate technology suitable for adoption under local conditions. Hence, James (1996) argues that if agricultural research is focused on technological development based on the local comparative advantages, it will lead to a rise in agricultural productivity and increased income for farmers and rural workers.

In Asian countries, research creating technological change has reduced hunger and instability in food security, and led to greater food self-sufficiency. Moreover, growth of agricultural productivity enhances pro-poor development, creating advantages for poor farmers and landless labourers by increasing agricultural output and employment (Kerr and Kolavaili 1999). According to Peter and Haddad (2001) research-led technological improvements contributed to high crops nutrients and encouraged poor people by improving their decision-making processes and their capability for collective action, as well as decreasing their vulnerability to shocks, through resource accumulation. Similarly, Beintema and Stads (2011) propose that research and development investments have increased the number and quality of agricultural products through dissemination of new technologies and crop varieties, as well as improving sustainability and reducing consumer food prices, making it possible for farmers to access markets and empower gender-based allocation of physical and human capital in the household. Oyeyinka (2004) comments that, in rural areas, collaboration between stakeholders, such as extension services, institutional developments, financial sectors, and regulatory and capacity building organisations are important to achieving effective dissemination of new technologies.

Many studies demonstrate that improving agricultural output needs investment in research and development (R & D) and education, and is often related to infrastructure development (Diao 2007; Gabre-Madhin and Haggblade 2004; Hall et al. 2006). Alston (2000) and Byerlee (2004) highlight that a high percentage of return on investment in agricultural research, both in developing and developed countries, occurs through varietal improvement. However, other studies reveal the restricted effectiveness of R & D and extension services with high production gaps, due to incapability of the system to respond to demands of producers and new sectoral barriers (Byerlee 2004; Clark 2005; Eicher 2001). While there was an improvement in funding for agricultural R & D, financial sustainability issues, and an over-dependence on limited sources of funding, eventually became a primary problem in developing countries (Beintema and Stads 2004; Pardey, Roseboom and Beintema 1997). Another challenge was that a lack of management and inefficient bureaucracies contributed

to organisational failures in obtaining both the quantity and quality of research results in many research institutions in the public sector which led to decreased funding (Echeverria 1991). Therefore, cooperation between the public and private institutions in agriculture and agribusiness R & D is needed to respond to the challenges of future global food security, where the partnerships will optimize and integrate the comparative advantages of each partner in their efforts to realise mutual purposes (Thirtle, Lin and Piesse 2003; James 1996). CGIAR and James (1996) highlight that an important role for the public sector in developing countries is to create policy strategies in agriculture and to implement technical knowledge that optimizes potential resources to reach social prosperity for the public good. Thus, government have potential access to many strategy instruments to enhance and support private research investments in joint cooperative programs, with donors as players to facilitate the implementation of collaborative programs (Anderson, Pardey and Roseboom 1994). Pray and Umali-Deininger (1998, p. 18) conclude that governments and donors have a fundamental role to overcome the restrictions:

> These include not only providing the necessary policy and regulatory framework to create an enabling environment for private firms to operate efficiently and conduct research, but also financing (not necessarily delivery of) critical public investments (e.g., education and rural infrastructure), ensuring the availability of essential support services (e.g., some types of extension, and well-functioning financial markets), and in some cases, initial financial support (research grants, tax incentives) to jump-start private sector research.

In developing countries, plant breeding research is one of the most successful research investments by the public sector which also assists the private sector research (Pray and Umali-Deininger 1998). For example, in India, some products like public germ plasm from national programs and international centres are essential to private cotton, maize, sorghum and pearl millet breeding, while in Mexico, it is important to private maize breeding (Lopez-Pereira and Garcia 1994; Pray and Kelley 1997; Singh, Pal and Morris 1995). Private pesticide research in the Philippines expanded significantly with collaboration and assistance from Planters Products, a semi-private company that was highly subsidized by the government. In countries such Turkey and Bangladesh, reducing the government monopoly in seed production led to an increase in private research investment and technology transfer by seed industry companies. In addition, the private sector had a greater opportunity to promote the improvement of research, production, and distribution of products and services in agriculture which led to efficiency benefits (Gisselquist and Pray 1995; Gisselquist 1997).

Pray and Umali-Deininger (1998) and Alston, Pardey, and Roseboom (1998)also suggest that there are some major improvements that have refocussed attention on the position of the private sector in the agricultural research system: (1) stagnancy and decreased funding levels

in public research systems are issues faced by most developing countries; (2) competition in input supply of agriculture is being privatized and promoted by many countries; and (3) the use of purchased inputs has been increased by both the growing commercialization of agriculture globally and increased competition in local and worldwide markets.

Pray and Umali-Deininger (1998) conclude that significant efforts will be required by the public and private sectors in generating the productivity-enhancing knowledge and technologies to fulfil the great challenges facing the agricultural research sector. Both the private sector, with its incentive issues or financial constraints, and the public sector with its fiscal and capacity constraints, will not able to meet these challenges alone. The public and private sectors could make better and quicker progress toward obtaining the objectives of national and global agricultural research agendas by capitalizing on the comparative advantages of each.

Agricultural research and development in Indonesia

As a developing country, the agricultural sector in Indonesia still has a fundamental role in assisting national economic growth and is a main source of income in rural areas. The majority of people in rural areas are still engaged in the agricultural sector (World Bank 2005). Consequently, agricultural research and development (R&D) are still a primary concern of the Indonesian government (Stads, Haryono and Nurjayanti 2007). In response to the importance of research and development, the government and the private sectors provide funds and conduct research and development. The sources of funding of public research are allocated from different sources, mainly from the central government, locally from promoted resources (through product sales and technology licences), public and private institutions, and bilateral and multilateral funders (Stads, Haryono and Nurjayanti 2007). However, only 0.2 percent of the average quantity of research funds were contributed by the private sector during 1995-2003 (RISTEK 2006).

The performance of the research system mainly depends on the effectiveness of the institutional framework, including the structure of the organization and various essential operational processes, including funding systems, incentive patterns, priority issues, monitoring and evaluation reports, and coordination systems between the several units and stakeholders (Rita and Cruz 2010).

In addition, agricultural research and development in Indonesia is developed through partnership working among centres and stations of government agencies, universities, non-profit organisations and the private sector. For the government agencies, the central government create the Indonesian Agency for Agricultural Research and Development (IAARD), which is organised by the Ministry of Agriculture. The mission of IAARD is to

create and develop new technological innovations which foster the agribusiness system and, therefore, assists the agricultural sector to be a strong driver of national economic growth (Stads, Haryono and Nurjayanti 2007). There are nine elements carried out by IAARD, focusing on post-harvest activities, biotechnology, livestock, horticulture, estate crops, food crops, engineering, agro-climates and socio-economic (Stads, Haryono and Nurjayanti 2007).

Operationally, IAARD's research centres and research agencies carry out research, the purpose of which is to enhance policy strategies and technology innovation, and then submit their findings to the agency's Assessment Institutes for Agricultural Technology (AIATs) at the provincial level for testing (Stads, Haryono and Nurjayanti 2007). In order to generate location-specific technologies based on farmers' requests and circumstances, research and development was decentralized. Indonesian Agency for Agricultural Research and Development (2003) reports that the advantages of this policy are that the AIATs can develop research innovations based on local characteristic so that local farmers will be able to accept them easily. Another advantage is that the AIAT staff also work closely with other regional and provincial departments in designing strategic planning and implementing a general regional research and development program involving active collaboration with universities, the private sector and farmers' institutions (World Bank 1995).

Higher education agencies provide university-level education, with research from agricultural faculties and specialized R&D institutes. Providing human resource professionals in strengthening experiments and giving training to scientific personnel of government agencies are the most essential contributions from the university. Crop research was one area of cooperation with universities, although livestock, fisheries, and socio-economic research are also important. The Bogor Agricultural University provides the most significant contribution to the Indonesian agricultural R&D system, which has seven faculties under the agricultural major (Stads, Haryono and Nurjayanti 2007). Stads, Haryono, and Nurjayanti (2007) add that not many non-profit institutions in Indonesia participate in agricultural research, which is frequently restricted and ad hoc in nature.

The private sector has a comparatively significant role in Indonesia in carrying out agricultural research and development. Recently, the involvement of the private sector in agricultural research is mainly dominated by the companies that engage in plantation, agro-input productions, forestry, food-processing and industrial fishery (Stads, Haryono, and Nurjayanti 2007). Strengthening biotechnology research by commercialising new varieties and hybrid seeds are one of the main missions for them, and is more likely to encourage agricultural research (Barichello, Patunru and Henneberry 2009). Their contribution is estimated to be around $59 million of the country's total agricultural research and

development expenditure in 2003 (Stads, Haryono, and Nurjayanti 2007). Despite this contribution, in general the limited budget for agricultural research in Indonesia has generally been a constraint in accelerating agricultural growth (Fuglie and Piggott 2006).

The Indonesian government also establishes international networks through bilateral, multilateral and regional relationships. The main purpose of cooperation is to promote the economic development of the agricultural, fisheries, and forestry sectors in assisting the themes of private sector growth, rural productivity, and human resource development (ACIAR 2006). IAARD has had a good experience cooperating with different funding agencies, and they have improved significantly in terms of economic improvement and food security issues, as well as preserving natural resources. For example, partnership with the International Rice Research Institute (IRRI) has been greatly productive, promoting rice varieties for Indonesian farmers (Stads, Haryono and Nurjayanti 2007). Nevertheless, some challenges for counterpart agencies still remains a concern, especially in interpreting research investment into practical outputs for local farming communities, agribusiness systems and public decision makers (ACIAR 2006).

Extension services

Farmers are important actors in agricultural development and their success is highly dependent on the role of agricultural extension in providing information and knowledge, through both formal and non-formal agricultural education systems (Kausar et al. 2013). In general, agricultural extension has an important role to improve knowledge and skills, and change the attitudes and behavior of farmers and their families from the traditional patterns of agriculture into a dynamic and rational system (Ballantyne 1987). Khalil et al. (2008) and Van den Ban and Hawkins (1996) remark that the transferring of knowledge from agricultural research centres to farmers by advising farmers of their decision making, educating farmers on how to make better decisions, enabling farmers to clarify their own goals and possibilities, and stimulating desirable agricultural developments are categorised as the primary goals of extension workers.

Extension services can accelerate technology transfer to assist farmers in reducing the differential between potential and actual yields, and also assist farmers to be productive in farm management. The extension worker also has an essential contribution to make in assisting research development to tailor technology based on the agro ecological and potential resource circumstances of farmers (Anderson and Feder 2003). More specifically, technology adoption by farmers is essential for their farms. For instance, educating farmers about improved varieties, cropping techniques, optimal input use, prices and market conditions, more efficient methods of production, management, storage and nutrition relevant to farmers' conditions are required for them to take advantage of, and improve, their

livelihoods (Feder, Just and Zilberman 1986). Birkhaeuser, Evenson, and Feder (1991) also argue that agricultural extension services are one of the most relevant public sector services in supporting and encouraging the diffusion of knowledge to farmers. The gap between discoveries in the laboratory and changes in individual farmer's fields can be facilitated by effective agricultural extension. Extension workers can stimulate growth of yields and improve rural incomes faster than they would in the absence of extension, by accelerating the process of diffusion of improved technology. However, much of the evidence shows that a large proportion of farm households, particularly in poor conditions, are not reached by any front-line extension workers (Haug 1999).

To achieve their missions, extension workers should effectively deliver information to end-users in a comprehensible and utilizable manner (Tiraieyari 2009). Therefore, qualified and competent extension workers are key to successful extension programs. The extension workers should have the capacity to solve problems more than just delivering messages to farmers. Understanding the comprehensive situation, and the ability to spot and possibly diagnose problems, as well as possess insightful economic-management skills in order to advise on more efficient use of resources, is the role of the extension worker (Anderson and Feder 2003).

From the agricultural extension organization perspective, competency and leadership in the process of communication to disseminate services and programs to clients are important issues for an extension worker (Peter and Garforth 1985). Competencies are emphasized to create the human resource capabilities in the form of the recruitment and selection processes, career development processes and better performance management (Heinsman et al. 2007). Leadership deals with extension worker functions, such as the catalyst function, the innovation solution function, assisting functions and resource linking functions (Havelock 1973). Moreover, the transfer of technology and development of clients' capacity are two key factors in ensuring the effectiveness of any extension service (Bennett 1989; Bennett 1993)

Additionally, Birkhaeuser, Evenson, and Feder (1991) also state that agricultural extension services are one of the most popular institutions of the public sector in supporting and encouraging the diffusion of knowledge to farmers. The gap between discoveries in the laboratory and changes in the individual farmer's fields can be overcome through the leadership capacity of the extension worker. Extension workers can stimulate faster growth of yields and rural income than would occur in the absence of extension by accelerating the processes of diffusion of improved technology and better management.

Extension services in Indonesia.

In Indonesia, extension workers are an instrument used to accelerate agricultural growth and livelihood improvement of rural farmers (Margono and Sugimoto 2011). Zakaria (2003) also suggests that the roles of agricultural extension systems are mainly dedicated to develop and improve the agribusiness system efficiency and productivity to achieve sustainable production, and to improve profitability for farmers.

In this country, agricultural extension has been defined 'as a non-formal education system for farmers and their families that aim to improve aiming at assisting them enhance better rational and technical skills, as well as knowledge, develop more positive attitudes toward change, and self-reliance in managing their farming, business and living' (Zakaria 2003 p. 3). Considering this definition, agricultural extension in Indonesia can be defined as: a behavioural development tool, an agricultural innovation diffusion, an instrument to promote agricultural entrepreneurship and agribusiness systems, a collaboration among governments at different levels, team work between the government, farming society and private institutions (Hariadi 2012).

To organise and control the effectiveness of agricultural extension systems and programs, a national policy framework was created which covers several issues: agricultural extension as an the integrated delivery system that involves active users, such as farmers, farmer groups and farmer organizations who interact with the system; central government, provincial government, district government, farmers and private sector should share the responsibility in managing agricultural extension; the central government, under the ministry of agriculture, manages the agricultural extension at the national scale and facilitates the implementation by the provincial and districts levels; the development of extension institutions, extension personnel, extension programs, extension management, extension networking and collaboration, as well as extension financing, are essential elements that influence development of the agricultural extension system (Hariadi 2012; Zakaria 2003).

In this country, however, a lack of linkages between government and extension workers results in much ineffective information being disseminated by the agricultural extension service (Kadir et al. 2003). In addition, it is difficult for potential users to access information at the central agricultural research centres , particularly in remote areas (Margono and Sugimoto 2011). Tollefson (1996) also found that extension workers are often not delivering agricultural information to farmers. Direct communication among extension institutions is also difficult due to bureaucratic regulations, lack of budget, inadequate transportation facilities to distribute the findings, and lack of financial support for the government to discuss with extension workers (Nderitu 2010).

Furthermore, limited budget allocation and lack of support by stakeholders has also led to relatively limited farmer development by agricultural extension workers in the field (Margono and Sugimoto 2011). Most extension workers have complained to the government about inadequate transportation facilities for extension activities (Margono and Sugimoto 2011). In other words, the limited procurement of vehicles greatly affected the effectiveness of extension workers in technology transfer and dissemination of information (Feder, Just and Zilberman 1986). Qamar (2002) notes that agricultural extension institutions in many developing counties face two main problems in giving advice to farmers in the field; namely, geography factors accentuating the physical distance, and inadequate infrastructure facilities.

One of the government's concerns is to encourage the agricultural extension system and program to work effectively by allocating a significant budget for extension activities. From 2010 to 2014, about USD 377 million was allocated by the central government for strengthening agricultural extension human resources, empowering the institutions, and developing the agricultural extension program (World Bank 2010). Promoting the participation of farmers, the private sector, and community-based organizations and agribusiness stakeholders in extension policy and program planning, as well as financing the implementation of agricultural extension programs, are affirmative solutions to respond to the weaknesses. Also, improving farmers' access to sources of information, technology and agro inputs through strengthening linkages and partnerships among research institutions, extension institutions, farmers, agro input suppliers and markets can be effective strategies to address the bottlenecks (Zakaria 2003).

3.8.3 Standards and regulations

Standards emphasise various rules and functions, not only for the general trading system between buyers and sellers, but also to ensure public safety and environmental protection, in both domestic and international markets. Regulations, standards and verification of applications based on conformity assessment procedures can bring many possible opportunities. However, a lack of appropriate regulation can create cost inefficiencies within domestic and international markets (World Bank 2004). Today, food standards are significant for responding to market opportunities, both domestic and international (Jaffee and Henson 2005; Maertens and Swinnen 2009). However, product quality, food safety and environmental issues are becoming major concerns in accessing and meeting consumer demands in developed countries and other high-income regions (FAO 2006).

At the same time, food trade can provide opportunities to poor countries. Unnevehr (2000) claims that food safety regulations that aim to emphasize process control and prevention of risks throughout the production process have been modified by many developed countries,

while non-traditional agricultural exports of specialty food products, such as fruits, vegetables, seafood, and meats are growing substantially in developing countries.

Furthermore, Maertens and Swinnen (2009) identify several factors that influence the growth of agri-food standards in the global market. Increasing demand and food safety is caused by a series of major food safety hazards in high-income countries that have increased consumer and public concerns about food-borne health risks. It is also influenced by increasing income and changing dietary habits. Jaffee and Henson (2004) observe that the increase in consumers' awareness of ethical and environmental issues associated with food production and trade have led to requests for specific standards. Processes of production are expected to have specific characteristics, such as the performance of the product, or organic certification, but can also include environmental and worker concerns (Unnevehr and Jensen 1999). Aksoy (2005) suggests that the growth of supermarkets in the value chains has contributed to the increase in diversification of food markets. Reardon et al. (2000, p.5) adds that the particular issues of grade standards, such as 'quality (e.g., appearance, cleanliness, taste); safety (e.g., pesticide or artificial hormone residue, microbial presence); authenticity (guarantee of geographical origin or use of a traditional process); and the goodness of the production process (e.g., with respect to worker health and safety, or to environmental contamination)' are enforced by supermarkets along the supply chain.

Several researchers, however, have suggested that food standards and regulations are often recognised as new non-tariff barriers to trade that eliminate potential exports from developing countries (Augier, Gasiorek and Lai Tong 2005; Brenton and Manchin 2003; Ferrantino 2006). Regulations and standards can be used as instruments to protect domestic farmers and agribusiness firms by banning imports (Maertens and Swinnen 2006).

The lack of capability by developing countries to address rigorous standards can be expensive and distort trade. It also leads to border detention and restrictions on trade, such as import bans for particular products (Maertens and Swinnen 2009). The costs can come from various issues, such as fixed investments in adjusting production/processing facilities and practices, recurrent personnel and management costs to implement food and other control systems, and the public and private sector costs of conformity assessment (Jaffee and Henson 2004).

Nonetheless, standards and regulation can act as a catalyst for upgrading developing countries' export sectors, and lead to enhanced market access and competitiveness (Jaffee and Henson 2004). Reducing transaction costs, promoting consumer confidence in food product safety and increasing developing countries' access to international markets can be obtained by referencing standards and certification schemes (Bryant 1989).

Maertens and Swinnen (2009) found that one of the main concerns for developing countries are the smallholder producer issues and, particularly, the poorest ones who are being omitted or squeezed out due to the high standards required along the supply chain to meet import standards for food. Other researchers highlight that smallholder producers are being excluded through the high standards of export production due to the high cost of compliance and increasing vertical coordination (Hulda 2010; Ministry of Agricultural 2011). At the farm level, smallholder producers find it difficult to (continue to) engage in high-standards of production because strict public and private standards are prohibitively high, especially because of insufficient access to credit markets (Maertens and Swinnen 2009). Increasing levels of vertical coordination along food supply chains are biased against smallholder producers and the poorest farmers, because they are omitted from contract farming on the one hand, or smallholder production is substituted by estate production in vertically integrated agro-industries (Key and Runsten 1999).However, standards are the instruments for harmonizing product and process attributes of products to suppliers in the chain, and they can also reduce transaction costs by connecting with numbers of small suppliers. Thus, well-managed contracts that emphasize technical assistance and training programs create opportunities for smallholder producers by reducing the financial and technical problems, especially in meeting rigorous standards (Swinnen and Maertens 2007).

Standards and regulation of agri-foods in Indonesia

In Indonesia, one of the most serious concerns for agriculture in participating in the international food trade is meeting the required quality standards and food regulations. Product traceability and reliable supply are requirements needed in response to market demand, while food safety is a major concern of consumers (Aziz et al. 2003). However, the WHO has identified Indonesia as one of the countries in South East Asia where food safety standards are inadequate. Inappropriate food handling practices and food hygiene are common and fail to reach consumer demands (Aziz et al. 2003). Therefore, a comprehensive law to implement a food safety control system is required to regulate the elements of pre-market and post-market control. Pre-market controls evaluate the food safety of products and ensure compliance with safety and quality requirements. Post-market control is for food products which have been transported in the market (Global Agricultural Information Network 2009). A systematic approach along the supply chain is also needed to meet the requirements of product quality and food safety standards (Aziz et al. 2003).

In Indonesia, to meet consumer standards in agricultural products for product quality, food safety and environmental concerns, the government emphasizes the need for agricultural producers and industrial players to meet the standardization process, known as the Indonesian National Standard (Standard Nasional Indonesia = SNI). SNI is concerned with

the enforcement of standards, accreditation, certification and metrology (Pusat Standardisasi dan Akreditasi 2006). SNI aims to: accelerate the flow of trade; protect consumers, businesses communities, health, safety and security, as well as environmental issues; support domestic industries in order to be strongly competitive within domestic and international markets; create competitive business; create transparency; boost innovation capacity; and create a conducive business environment (Badan Standardisasi Nasional 2001).

One example of implementing standards and regulations in response to consumer demand in Indonesia is in organic products. Consumer knowledge and awareness of food safety, and nutritional and environmental aspects, contribute significantly to the increasing demands of organic food (Yosini 2012). In response to this market, many supermarkets vertically integrate with organic farmers using contract farming (Key and Runsten 1999). There is an opportunity for the smallholders to supply this demand, althoughthe cost of compliance and certification procedures to reach the standards are challenging for individual farmers. For instance, the cost for the national certification in Java takes around US $500 to 1500 per unit farm (Saragih 2011). Indeed, it is difficult for farmers who have less than one hectare to pay these costs (Yosini 2012).

3.9   Useful enablers

This section discusses the useful enablers which consists of business linkages, business development services and ease of doing business.

3.9.1   Business linkages

In developing countries, integration of agri-food systems is undergoing rapid change (Pinstrup-Andersen 2002; Reardon et al. 2009). According to Reardon, Timmer, and Berdegué (2005) the factors that contribute to the process of integration are: advances in production, processing, logistic infrastructure, communication technologies, economic liberalisation within domestic and international markets, and changes in consumer demand. These reforms offer market opportunities for smallholder producers to link to modern markets (Bill, Lundy and MacGregor 2008; Regmi and Gehlhar 2005), but, at the same time, it creates new challenges and risks for local producers and domestic businesses, particularly in meeting rigorous food safety standards in discerning international markets (Reardon et al. 2009). Therefore, a comprehensive strategy involving encouraging agribusiness linkages can be an effective solution to integrate small-scale farmers in developing countries into export and processing markets, and into the modern economy.

Business linkages can be defined as the interaction between producers and buyers to create a mutual interest (Schulenburg 2006). Schulenburg (2006) argues that selecting new business partners is crucial in conducting business linkage, because it can affect costs and risks

involved with whether the new partner is consistent and performs productively. Furthermore, in developing countries, business linkages with small-scale producers consist of provision, distribution and purchasing activities that offer opportunities for large firms in addressing the mutual benefits. These linkages can help large firms to reduce input costs, at the same time as improving specialisation and flexibility. Increasing local integration can provide access to local knowledge. Positive social and economic impacts in the wider community, by encouraging growth and development in the local small medium enterprise sector, are also potential benefits from the business linkages (Jenkins et al. 2007)

According to Christy et al. (2009) business linkages for large agribusinesses firms in the supply chain can be achieved through both horizontal and vertical linkages. Most horizontal linkages involve large and small agro-industries, whereas vertical linkages connect to large agro-industries, farmer groups and buyer networks. Christy et al. (2009) added that in the two types of linkages, horizontal linkages are not really attractive in the value chain due to inadequate incentives for the large agro industrial firms to create such relationships. On the other hand, vertical linkages provide more advantages to large agribusinesses and farmer groups because the long-term relationship creates both direct and indirect benefits. As shown in many cases, large agro industries pursue vertical linkages with farmers, both individually and in groups, in order to access sustainable supply.

Schulenburg (2006) also maintains that horizontal linkages are a type of cooperation between agribusiness firms, in the same phase of activities as in the value chain. These linkages are based on the economic imperative that individual firms have less capacity to implement scale economies in purchasing activities (reduction of the purchasing costs are a benefit to micro small medium enterprise or MSME); individual firms are too small to have the capacity to serve particular customers (new market and increased turn-over give benefit to the MSME); by developing linkages, the cost of marketing can be eliminated by involving trade fair attendance (reduction of marketing costs and the further marketing reach are benefits to the MSME) (Schulenburg 2006).

Vertical linkages involve cooperation between firms in conducting the activities along the value chain. Co-operating to enhance competitiveness in markets are an underlying economic reason for this linkage, (Schulenburg 2006). This can be achieved by reducing costs in the value chain, or increasing the quality with the following actions: addressing quality by highlighting environmental concerns and social standards (reduction of losses and increasing consumer satisfaction are benefits); creating communication channels to increase information flow (reducing warehousing costs in the value chain and achieving higher consumer satisfaction through punctual delivery are benefits); joint action to improve product quality in the value chain (creating consumer satisfaction is the benefit); joint action

to develop new products (new markets and the ability to keep pace with dynamic technological changes as well as changes in the buying behaviour of the end consumers are created, which benefit the firms)(Schulenburg 2006).

Despite the potential benefits stated above, there are also several challenges that impede these linkages, especially with reference to the existing conditions of smallholder producers. Many studies highlight that they have limited access to markets (De Janvry, Fafchamps and Sadoulet 1991). Inadequate information about prices, lack of technology, lack of connection and poor capacity to reach potential market actors, poor input and output markets, and lack of financial access makes it difficult for them to take advantage of market opportunities. High transaction costs are often faced by smallholders due to the lack of capacity to meet standards and product quality requirements, such as standards for organic food (Poulton, Dorward and Kydd 2010). As result of these barriers, many large firms are reluctant to form linkages due to increased operational costs and difficulty in maintaining efficiency (Jenkins et al. 2007).

Addressing the challenges mentioned by the authors above, Shepherd (2007) identifies several approaches that should be considered to develop successful linkages of smallholder producers to the market: moving from a production-driven approach to becoming more market-oriented are new challenges for smallholder producers and linking organisations should provide effective tools to address the problem. Shepherd (2007) states that the private sector has an important role in involving development organisations to foster resilience and competitive markets for smallholder producers. Development organisation and business stakeholders must have enough capacity to create the commercial linkages. Subsidies and services provision, such as investment in market transport, have to focus on commercially sustainable ventures. Development organisations and donor agencies have been extensively involved in providing subsidised inputs, but there is little evidence of sustainability. Business relations depend on the existence of mutual trust between the actors involved and linkage activities, therefore trust is an essential element that determines the success of business linkages. Finally, contract negotiation between farmers and buyers, either written or oral, is an important skill for farmers to develop. Thus, access to finance is an important factor for most linkage activities; it cannot be provided by buyers, but it should be allocated by financial institutions, therefore linkages to suitable financial sectors need to be strengthened.

Strengthening the enabling environment for business linkage development (Jenkins et al. 2007) can be achieved by involving large companies in taking action to improve the effectiveness of programs beyond the value chain, such as procurement, agricultural out grower schemes, manufacturing subcontracting, outsourcing non-core function and services, distribution and retail, sales of financial services, developing information and

communication technology (Jenkins et al. 2007; Nelson 2007). Developing the capacity of smallholder producers is one of the key drivers for them to successfully meet the needs of large firms (Jenkins et al. 2007). Efficiency in matters such as business licencing, taxation and regulatory enforcement is crucial and is a responsibility of government. Engagement in the public policy process is a final strategy for strengthening linkages in the enabling environment. Indeed, exploring channels for dialog about policies, programs and regulations that affect the capability of smallholder producers to be involved, to grow and to create linkages can be undertaken by large firms (Jenkins et al. 2007).

Business linkage in Indonesia

In Indonesia, business linkage between farmers and markets are often conducted within traditional supply chains (Chowdhury, Gulati and Gumbira-Sa'id 2005). In a typical linkage of a traditional supply chain, a farmer as the main producer of vegetables produces mainly for home consumption, with little consideration given to standards and regulations or food safety. Part of the yield is sold to the vendors who usually visit the farm and collect the vegetables. Before taking the product to the wet market, they negotiate prices with the wholesalers and then send it to the wet market for sale to the final consumers. This linkage is often supported by vendors in the form of credit provision. After harvest, farmers have to sell all the yields to the vendor at a price determined by the vendor, and by existing market prices, to repay the loan (Chowdhury, Gulati, and Gumbira-Sa'id 2005). However, farmers are in a difficult situation because they lack bargaining power over price, with the price being decided before being discussed with the farmers (Rachmat and Hidayat 1999).

According to Chowdhury, Gulati, and Gumbira-Sa'id (2005), in the modern value chain, a farmer usually engages in a contractual agreement with the vendor, often oral, and the vendor has contracts on the supply of products to a supermarket chain. There could be two or more vendors involved in this linkage; the first vendor collects products from the farmers and supplies to the second vendor who has bigger financial capacity, and, in turn, they deliver to the supermarket chain. In some market chains, there is only a single vender to supply the products from farmer to supermarkets. Maintaining grades and standards are the main requirements in dealing with supermarkets in Indonesia.

In some cases, a cooperative is involved in a business network to assist farmers to obtain sustainable supply to the potential markets, farm credit assistance, distribution for production inputs and other service linkages (Suradisastra 2006). Farmers are organised in a group to establish the agri-business group (*Kelompok Usaha Bersama Agribisnis*) which aims to obtain business development facilities from the government, and encourage market linkages, with numerous stakeholders more easily (Saptana and Indraningsih 2005). For instance, the Al-ihsan Cooperative in Bogor regency has successfully established and facilitated business

linkages between farmers and supermarkets and exporters for the sustainable supply of mango. Farmers are able to meet the quality standards for mango, which has significant impacts for their livelihood standards (Retno et al. 2010). However, in many cases, particularly in rural areas that lack access to markets, farmer cooperatives do not contribute to improving the market linkage. For instance, a survey of 100 respondents in the Purwodadi sub district reported that around 89 percent of farmers do not get positive impacts from the cooperative; the respondents claimed that the cooperative only concentrates on obtaining benefits from the members, rather than expanding the potential market (Evi Yulia and Hayati 2007).

3.9.2 Business development services

Income is a crucial dimension of poverty reduction. Many organisations have attempted to enhance income generation and increase the capacity of the poor to respond to the possible market opportunities. Encouraging access of small-scale producers or small businesses enterprises to a diversity of appropriate inputs, outputs, goods and services on a sustainable basis requires appropriate policy and improvements to the system beyond the enabling environment (Hitchins, Elliott and Gibson 2004). These can be achieved by enhancing services and providing technical assistance that could be performed by public institutions in order to make the market work for the poor (Barton 1997).

The concept of business development services is closely related to the value chain concept. Smallholder producers require marketing skills to engage effectively in the market from services providers who have the capacity and better understanding of the domestic and international market situation (Anandajayasekeram and Gebremedhin 2009). Christy et al. (2009) also argues that successful investments in smallholder producers must be linked to proper assistance on business management and access to value adding activities for business networks in emerging markets. Qualification in areas such as finance, accounting, marketing management, economics, law and other technical expertise are a prerequisite to taking advantage of market opportunities and this requires experts with technical knowledge. Therefore, the development of supporting services for local business is important in order to achieve efficient performance of value chains.

Anandajayasekeram and Gebremedhin (2009,p.27) classified the business development services that are necessary for better integrated markets in value chains as:

> *infrastructural services, production and storage services; marketing and business services; financial services; and policies and regulations.*

Anandajayasekeram and Gebremedhin (2009,p.27) also identified numerous elements and instruments for each of the classifications mentioned above:

basic infrastructural services consist of development on market place, roads access and transportation facilities, communications network, energy supply and water supply. Production and storage services include input supply, genetic and production hardware from research, farm machinery services and supply, extension services, weather forecast and storage infrastructure. Marketing and business support services include market information services, market intelligence, technical and business training services, facilitation of linkages of producers with buyers, organization and support for collective marketing. Financial institutions include credit and saving services, banking services, risk insurance services, and futures markets. Finally, policy and regulatory services include as land tenure security, market and trade regulations, investment incentives, legal services, and taxation.

Barton (1997) summarises the nature of smallholder producers' demand and example of business development services: marketing services, technology development and technology supply services and training. First, smallholder producers often use numerous services supplied by marketing intermediaries. The nature of these services depends on the market situation, with some evidence that smallholder producers often pay a higher fee for the services offered by market intermediaries. For instance, they often pay for services that can assist them meet various markets or problems for market access, from obtaining the inputs and technology to supporting output marketing, through regular dealings with marketing intermediaries. Second, the demand for new technologies is highly connected with new market opportunities. Once smallholder producers understand and become aware of new opportunities, the challenge moves to obtaining the capability to supply what the market demands. This condition often requires the acquirement of new skills, techniques on management, and tools and equipment, as important factors in supporting technology development. Last, several development programs have charged for training services for smallholder producers. In others, participation in training programs is compulsory, for instance when credit providers decide that the creditors should be involved in a training program for credit management as a requirement for receiving a loan. Training services for smallholder producers have started to concentrate more on recovering costs and are looking at cost-sharing payment provisions, which assist to cover operational costs, and also help to assess client demand for specific course offerings.

In developing countries, Hitchins, Elliott, and Gibson (2004) found that business development services are needed due to the lack of performance by programs funded by development agencies and other institutions. There have been integrated programs developed by international funding agencies and governments to encourage and to strengthen business management services, particularly those provided by local professionals such as increasing the supply of providers, stimulating the demand for various services and addressing issues of both supply and demand within the parameters set by specific investments (Christy et al.

2009). However, performance is still disappointing and is manifested in three areas as follows: lack of outreach, for example only a small proportion of smallholder producers are accessing officially supported services; unsustainability, for instance the public institutions delivering the services have little impact on the smallholder producer clients; and lack of impact, for example there is no clear improvement in business performance (Hitchins, Elliott, and Gibson 2004).

Barton (1997) identified several necessary conditions that require further investigation to specify the nature of best practice for business development services: addressing the basic knowledge gaps with respect to the role of the informal sector and commercial suppliers of business development services; determining productive ways to improve business linkages between small medium enterprises and larger firms to help overcome input supply and marketing problems, and deal with technology supply and training needs; and dealing with the problem of replicating successful enterprises or services, in particular investigating the usefulness of franchising as a tool for microenterprise development.

Business development services in Indonesia

In Indonesia, smallholder producers must enhance their capacity to understand markets and foster economic opportunities to achieve success in running their farm production for sustainability and profitability. To achieve a sustainable livelihood from farming activities, they should move from production orientation at the household scale to a market orientation. Linking farmers to markets, and encouraging a more pluralistic, business-oriented and demand-driven approach to providing advice to farmers requires a comprehensive change in business development services to respond to the market demand (Mariana Wongtschowski, Heemskerk and Kahan 2013).

Recently, one of the government's efforts to increase production capacity and enhance business services for small-scale producers was to improve finances for agriculture. It included two policies: agricultural financial policy that prioritized the budget for the agricultural and supporting sectors; and agricultural financial policies which eased credit access to farmers (Departemen Pertanian 2005). These policies were directed to increase the services and utilization of credit facilities, such as the people's business credit, food security and energy credits, and the capital strengthening fund to make rural economic institutions and microfinance institutions more effective and accountable (Muhammad and Darwis 2006).

In response, banking institutions established business development services to provide several services: guidance in the preparation of financial statements (balance sheet and a list of income); assistance in preparing credit proposals; monitoring the credit approval process

by the bank or institution; assist in the process of loan disbursement and loan repayment; provide recommendations for improvement in funding management systems and financial administration (Muhammad and Darwis 2006). However, several barriers that impede improving financial services, especially for microfinance credit are: decreasing technical assistance and capacity building support to microfinance providers due to the diversity and geographical spread of organizations; weak cognizance and implementation of good practice microfinance principles for financial services institutions (government sector, semi-formal institutions and commercial banks) that are involved in the business of microfinance; and a microcredit program promoted and subsidized by government which does not create a better investment climate for sustainability of microfinance providers (Banking With The Poor Network 2009).

3.9.3   Ease of doing business

A good investment climate generates productive investment for the private sector, from small medium enterprises to multinational companies, as the engine for economic growth and for reducing poverty. Furthermore, it creates sustainable job employment and opportunities for people. It develops a wide range of goods and provides services and cost reductions which will benefit consumers. It also provides a sustainable source of tax revenues that gives opportunity to government to invest in public health, infrastructure and education sectors, and improve welfare standards (Stern and Stern 2002). To enable firm growth and ensure that smallholder producers can take advantage of their opportunities requires a regulatory environment for new entrants to invest and to drive the business, as well as generate more jobs (World Bank 2011). In other words, good business regulations can assist the private sector to grow, as well as assist businesses to enhance their network for transactions. Nonetheless, regulations have to be put in place in order to safeguard economic activities and to assist business operations; if they are poorly constructed they can become a barrier to doing business (World Bank and International Finance Corporation 2013).

A fundamental principle of Doing Business is that the economic sector activities need good rules. The rules are required to create and elucidate property rights, and also eliminate the cost of solving problems. The rules are needed to improve the probability of economic interrelationship and arrange for contractual partnership agreements, with legal certainty and protection against exploitation (World Bank 2011). Therefore, regulations must be constructed to be efficient, easy to access and implement, and should be a part of government responsibility. Christy et al. (2009) states that one of the main functions of governments is to create regulations that can stimulate efficient economic activities and reduce costs from market failures. However, regulation has to be low cost to assist in doing business and to attract investments that support economic growth and development and

reduce poverty. Based on these considerations, the World Bank (2011) classified two types of indicators for the ease of doing business. The first indicator relates to the strength of legal institutions that highlight regulation of business, and the second relates to the complexity and cost of regulatory processes. The first indicator includes the legal and regulatory framework to gain credit, protect investors, strengthen marketing contracts and resolve failures. The second concentrates on reducing costs and improving efficiency in regulatory processes for starting a business, organising permits for construction, obtaining electricity, registering and documenting property and tax payments.

To achieve a good investment climate, removing unjustified costs, risks and barriers to competition are the key message to the government to assist the private sector to invest productively, create jobs and expand (Easterly and Levine 2003)(Gallup, Sachs and Mellinger 1999). In relation to costs, World Bank and International Finance Corporation (2013) reported that the weaknesses of government performance in the role of providing public goods, supporting the provision of infrastructure and addressing market failures often increased the costs for companies, and made many potential opportunities unprofitable. For instance, the costs of contract enforcement difficulties, inadequate infrastructure, crime, corruption and regulation covered 25 percent of sales, or around three times the tax payment by companies. With regards to risk, the World Bank (2004) reported that one of the important contributions of government is maintaining a stable and secure environment, such as preserving property rights. An issue of policy uncertainty, macroeconomic instability, and arbitrary regulation can also influence profitable investments and require government intervention. While companies prefer to engage in economic activities with less competition, barriers to competition which benefit some companies negate opportunities and increase costs for other companies and for consumers (WorldBank2004). High costs and risks also become a barrier to market entry. Governments also affect barriers through market regulation and responses to anti-competitive behaviour by companies (WorldBank 2004). As part of achieving a good investment climate, governments should also provide a significant contribution to strengthening many aspects of the investment climate, such as property rights security, regulation and taxation, infrastructure investments, financial functions and labour markets (Table 3.1).

Table 3.1: Examples of government policies and behaviours and investment decisions

	Factors that shape opportunities and incentives for firms to invest	
	Government has strong influence	Government has less influence
Costs	• Corruption • Taxes • Regulatory burdens, red tape • Infrastructure and finance costs • Labour market regulation	• Market-determined prices of inputs • Distance to input and output markets • Economies of scale and scope associated with particular technologies
Risks	• Policy predictability and credibility • Macroeconomic stability • Rights to property • Contract enforcement • Expropriation	• Consumer and competitor responses • External shocks • Natural disasters • Supplier reliability
Barriers to competition	• Regulatory barriers to entry and exit • Competition law and policy • Functioning finance markets • Infrastructure	• Market size and distance to input and output markets • Economies of scale and scope in particular activities

Source: Adapted from World Bank and International Finance Corporation (2013 p.8)

Although macroeconomic policy reforms create a better investment climate and ease of doing business are undeniably important to enhance economic growth, it is often recognised that the quality of business regulation and institutional arrangements are fundamental factors that enforce and determine economic prosperity. Ease of doing business systematically emphasises that countries with extravagant regulations for doing business, and lack of policy for property rights, commonly have labour with lower productivity, increased poverty rates, more restrictions on the poor from doing business, lower economic development rates, limited capacity in human development indicators and increased levels in the frequency of corruption (Christy et al. 2009). In response to the slow progress in improving investment climates, four practical challenges that should be responded to by government are: tackling corruption and other forms of rent-seeking, establishing credibility, fostering public trust and building legitimacy, and ensuring policy interventions reflect a good institutional fit with local conditions (WorldBank 2005a)

A fundamental premise of doing business is that an economic activity requires good rules that establish and clarify property rights and reduce the cost of resolving disputes; rules that increase the predictability of economic interactions and provide contractual partners with certainty and protection against abuse (World Bank 2010). Indeed, World Bank (2010) reported that business activities such as dealing with construction permits, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a business are crucial aspects that are required to be reformed. An example of the positive impact of those aspects is a new one-stop shop for business permits

established in several local governments in Indonesia to complete company, tax and statistic registrations, business permits and licencing through the use of a website. As result, unofficial payments and illegal procedures can be avoided (World Bank 2010).

Ease of doing business in Indonesia

Due to the effect of the global financial crisis, the Indonesian government faces particular challenges. The biggest challenges are to provide new jobs for a wide range of unemployed people and economic opportunities to generate income. However, limited fiscal space for publicly-funded activities, such as infrastructure investment, or for the provision of publicly funded safety nets and social services still impede accelerated economic recovery. In order to reform the economic sector, the Indonesian government provided attention to creating a good investment climate, including reforms to business regulation, to attract domestic and foreign direct investment (Indonesia Norway Business Council 2011). The World Bank and International Finance Corporation (2010) argues that proper regulation and effective institutions, such as appropriate process for starting a business, can assist labour reallocation and productive capital. Thus, regulatory institutions, transparency and accessible processes as businesses rebuild can help to eliminate the barriers between the informal and formal, and create more advantages for the poor.

In Indonesia, a decentralization program is one of Indonesian's major transitions which provides authority to local governments to allocate spending and regulate public service provision. It creates accountability for the government to deliver policy decisions closer to the citizens. It also assists the government to promote innovative services for better investment climate, such as one-stop shops (Regional Autonomy Watch 2008). Currently, reforming regulations has improved the environment for competitive business and entrepreneurship in Indonesia. A quantitative measure of the national and local regulations can be obtained in Doing Business in Indonesia 2013, which covers ten indicators: 'starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency' (World Bank and International Finance Corporation 2013, p.4).

These measurements are based on two types of data for doing business, laws and regulations on procedural standards, and time and motion factors (World Bank and International Finance Corporation 2013). Underlying the indicators of doing business 2013, a wide range of specific procedures have been reformed by government involving bureaucratic administration and legal stages to achieve a better environment for the private sector (World Bank and International Finance Corporation 2013). For instance, to obtain a permanent business trading license *(Surat Izin Usaha Perdagangan, SIUP)* and the company

registration certificate *(Tanda Daftar Perusahaan, TDP)* for the firm only requires 15 days (World Bank and International Finance Corporation 2013).

The tax registration office cuts registration time significantly as it can be completed using an online system (World Bank 2009). Nevertheless, red tape is still a serious barrier to doing business in Indonesia. Globally, Indonesia is still the worst performing country and ranks 161 in the doing business categories. The time involved, the number of procedures, the cost involved (excluding potential corruption) and the minimum paid-up capital required to start a new business for a typical domestic firm with up to 50 employees operating in a large city, are still substantial constraints to starting a business (OECD 2010).

Despite the strengths and potential of business to support the Indonesian economy, doing business in Indonesia is not straightforward and involves risks that need to be managed. A number of regulatory barriers still exist and impede domestic and foreign investors. Corruption and lack of care for the environment remain obstacles, and bureaucratic red tape often disturbs businesses. Lack of infrastructure also constrains economic growth (Indonesia Norway Business Council 2011).

3.10   Conclusion

In introducing a comprehensive approach for the agribusiness sector, farmers and institutional policies are fundamental to improving the competitiveness of the agro-industry. Empirical evidence shows that business activities of smallholder producers involve traditional systems, with unreliable programs and poor support for a conducive business climate. The agribusiness system needs leadership to create better coordination between the agricultural sector and business firms, particularly to solve the marginalisation of smallholder farmers due to lack of input supply, inadequate financial services, poor marketing systems, absence of value chains and weak supporting technology.

The enabling environment was also introduced as a concept which highlighted the integration of policies instruments, legal and regulatory frameworks, governance, physical security and other institutions which collectively enhance the setting for businesses in order to improve and achieve market competitiveness. This concept emphasises the function of government in strengthening the enabling environment by promoting competitive markets, and highlights the social environment that causes inefficiency in markets.

The literature review in this chapter revealed that enhancing the enabling environment for agribusiness supply chains provides an effective policy for the government to assist smallholder producers to respond to increased competitiveness in domestic and international markets. In the Enrekang regency, which is the focus of this research, creating an enabling environment for competitive agribusiness and agro-industrial development is a challenging

task as there are numerous problems, including inadequate access to land registration, poor roads and transportation services, lack of marketing infrastructure, limited access to financial services, underdeveloped research, development and extension, poor strategies for business development and absence of food standards and regulations. To solve these problems, it is important to create a policy environment that creates collective action for collaboration among the private sector, the government and extension workers, and development organisations to make markets work for the smallholder producers. This research will outline the research approach of this study for the next chapter.

Chapter 4. Research methodology

4.1   Introduction

In this chapter, the research methods for the analysis of the enabling environment for agribusiness supply chains undertaken will be outlined. The chapter consists of two main sections, including qualitative research methods and quantitative research methods. In Section 4.2, qualitative methods, such as data gathering methods consisting of secondary data, in-depth interviews and focus group discussions, will be discussed. Target respondent and sample selection, location of study, and the procedures will also be explored. Data analysis, including transcribing data and thematic analysis, will also be described.

Section 4.3 focuses on the quantitative method, particularlysurvey design, and will describe data collection methods and analyses used in this research. In addition, selection of the research area and population, sample selection and design of survey instruments are also discussed. The processes of data analysis consist of descriptive analysis, cross tabulation analysis, independent sample test and paired sample-test, all of which will be presented. Lastly, ethical considerations will also be outlined through this chapter.

4.2   Qualitative research method

Qualitative research was undertaken to address the objectives of this phase. Qualitative research can be defined as scientific research that emphasises investigations of research questions, uses a predefined set of procedures to systematically investigate the questions, gather evidence, develop answers that were not decided in advance, and suggest hypotheses for further investigation (Mack et al. 2005). Mack et al. (2005) observes that qualitative research is especially suited to obtaining culturally specific information concerning the values, views, personal behaviours and social perspectives of a specific population.

Qualitative research concentrates on the conceptualisation of results, which is different from other approaches which concentrate on quantification and statistical analyses (Bryman 2008; Hesse-Biber and Patricia 2011). Powell and Single (1996) suggest that a holistic focus is required to conduct good qualitative research design. By adopting the holistic focus, a wide range of interconnected experiences, beliefs and values can be gathered from respondents by qualitative researchers. The researcher has to be more active in data collection and is therefore a main actor of the research instrument, and must be close to the respondents being investigated (Daymon and Holloway 2002).

Malhotra et al. (2008) classifies the conduct of qualitative research into direct and indirect approaches to the respondents. In this study, a direct approach was employed through the in-depth interviews and focus group discussions. With the absence of any particular literature

on analysing the enabling environment for agribusiness supply chains at the micro and meso levels, in depth interviews and focus group interviews were chosen as appropriate methods to initially investigate the issue.

4.2.1   Data gathering methods

Saunders, Philip, and Thornhill (2009) note that the selection and design of data gathering tools will depend on the objectives of the study. In this phase, secondary data was gathered from reviewing the literature, relevant documents, maps and statistics, and providing background on the characteristics of the Enrekang Regency and its enabling environment during field visits to South Sulawesi and the Enrekang Regency in April 2012. In-depth interviews and focus group discussions were conducted at the same time to explore and collect information and gather insights from stakeholders who were involved in setting the institutional policies and procedures in the enabling environment, and who produced and delivered produce to the markets influenced by this enabling environment.

Secondary data

Secondary data is a useful source of information, which can be reanalysed and reorganised to address the research questions (Saunders, Phlilip and Adrian 2009). Saunders, Phlilip, and Adrian (2009), Bryman (1989), Dale, Sara, and Michael (1988) and Hakim (2000) classify secondary data into documentary data, survey-based data, and those compiled from multiple sources. Documentary secondary data consists of written material (e.g., reports, books, journals and newspapers) and non-written materials (e.g., audio recordings, drawings, films and pictures) (Bryman 1989). Survey-based secondary data includes censuses, continuous/regular surveys and ad hoc surveys (Hakim 2000). Multiple-source secondary data can be combinations of documentary or survey secondary data that have been combined to form another set of data (Saunders, Phlilip and Adrian 2009)

Secondary data was gathered from institutions at the regional, provincial and local levels, including the Assessment Institute for Agricultural Technology (AIAT), the Agricultural and Livestock Departments, financial institutions, the Office of Statistics Bureau, business and the private sector. The information referred to the element of enabling environment, such as land tenure and property rights, trade policy, marketing, the financial sector, infrastructure conditions, input and services, research and development and extension workers programs, business development service, business linkage, ease of doing business rural credit systems, and other information concerning institutional support.

In-depth interview

One of the most popular methods for collecting data in qualitative research is the in-depth interview, because it is very effective in providing a human face to research problems and to

obtain a real picture of the participant's perceptions about the objectives of the research (Mack et al. 2005). During an in-depth interview, the researcher is a student and the participant being interviewed is an expert. Posing questions in a neutral manner to the participants, listening attentively to participants' responses and asking follow-up questions and probes based on those responses, are technical matter that should be followed by researchers. The in-depth interview method is important in qualitative research because it accepts personal information as part of the research process and acknowledges that individuals have typical and important perceptions in response to the social world, and can be united through oral communication (Hesse-Biber and Patricia 2011). Bryman (2008) suggests in-depth interviews have a wide range of advantages which include: resistance to observation, less intrusive for participants during the interview, easy to conduct with longitudinal research, greater breadth of coverage and a specific focus. Walter (2010) also notes that this method offers opportunities to investigate in-depth meanings and concentrate on complexity, while emphasising peoples' experiences and knowledge in a wide range of social settings. On the other hand, in-depth interviews also have several disadvantages, foremost of which is that they are very time-consuming for exploration, as organising an interview may take several days, or even a couple of weeks(Longhurst 2009). According to Walter (2010), in-depth interviews only deal with a small group of experiences, therefore the findings cannot be generalised to larger groups.

Focus group discussion

Asbury (1995) defines a focus group as a technique of data gathering that organises interaction into groups to obtain richness of experimental data. It is used to collect data about perceptions, knowledge and experience of a small number of respondents that emphasizes interaction about a problem, issue, service and other phenomenon (Basch 1987; Powell and Single 1996). Viewpoints and perceptions between group members and the researcher are explored with open dialog and free-flowing discussion about issues, products, services and programs (Kumar 2011; Krueger and Casey 2000). It consists of several elements, such as a moderator or facilitator, a file of questions, representative informants, and a time schedule and location for conducting the discussion (Bruseberg and McDonagh-Philp 2002; Farhana 2010; Morgan 1998). Szwarc (2005) comments that interactions among participants are managed by a moderator in a way that exposes a range of ideas on the subject of discussion. Subtle differences in responses can be identified by asking follow-up questions immediately, based on the responses offered (Stewart et al. 2007).

Stewart, Shamdasani, and Rook (2007) list a wide a range of benefits from conducting focus groups: researcher and participants interact directly; provides chances for further clarification, follow-up questions and responses to probing; the researcher can observe

nonverbal responses and facial expressions; and through the open response set up, the researcher is able to obtain a large amount of information and richness in the words of the participants. However, Bryman (2008) identifies a number of limitations of focus group discussions, including that data is not easily analysed and transcribing is time-consuming because of the wide range of voices and the need to identify exactly what is said. Walter (2010) notes that this technique is difficult to manage because it is a quite often dominated by participants with strong individual perceptions and opinions. Basch (1987) also found that focus groups are not useful to draw a conclusion about a bigger groups of respondents, or to statistically test the data and to estimate an interval, which requires quantitative data. Furthermore, Festerv (1985) states that it is also difficult to fairly investigate claims made by participants. Another challenge for focus groups is scheduling a time and appropriate location for all participants (Heary and Hennessy 2002).

4.2.2   Target respondents and sample selection

Respondents for the exploratory phase were selected using a purposive sampling technique. Purposive sampling is a non-probability sampling technique that seeks to gain a sample (Walter 2010) in systematic way based on the researcher's understanding about target participants and the objectives of the study. This technique was used because the main concern was to interview participants with specific characteristics that were of interest for the research topic. As pointed out by Hesse-Biber and Patricia (2011) and Marshall et al. (2011), when using purposive sampling, the researcher tries to find the best sample to respond to the research questions.

Administratively, a letter of invitation was delivered to the targeted institutions which included a set of questions. After discussion, contacts from the institutions were asked to suggest representatives who understood the key issues and who would be able to engage in the in-depth interviews and focus group discussion. This approach is also called the snowball sampling technique, where information is collected about potential candidates who are experts in the particular topic being investigated (Marshall 1996; Walter 2010).

Target respondents (or key informants) for the in-depth interviews and focus group discussions consisted of farmer group members, input suppliers, financial institutions, buyers, extension workers, and representatives from the government and development organisations. These groups were chosen using the agribusiness systems framework as a guide to ensure key actors in the supply chains were included. The key informants were selected based on their knowledge and experience about supply chains for the vegetable and dairy cattle industries. For instance, vegetable and dairy cattle farmers were chosen based on their position as leaders of a farmer group. Farmer group leaders addressed their

organisation's vision and experience when dealing with other actors in the agribusiness system. In addition, dealing with other institutions was highlighted as a selection criterion because the leader has the opportunity and ability to meet with the institutions that can influence the policy conditions for his organisation.

For input suppliers, the key informants were those who were regular suppliers of agricultural inputs and active in directly supporting production. Input suppliers were separated between vegetables and dairy cattle; for vegetable suppliers, these included seeds, fertilisers, pesticides, and for dairy suppliers, these included heifers, fodder, medicines. For financial institutions, target respondents were from formal and informal financial institutions that provided credit assistance to the smallholder producers. The formal financial institutions were from private, government and state-owned banks. Informal financial services are delivered by traders, moneylenders, pawnbrokers, relatives and neighbours.

For institutional buyers (e.g., supermarkets, food processors, wholesalers, inter-island, regional and local traders, and wet market buyers) those selected to be key informants were those who regularly buy vegetable and dairy cattle products and sell to other market destinations to reach the potential customers. For the government institutions, the key criterion was representatives from institutions that have a main responsibility to assist smallholder producers. The institutions at the regional level was represented by the Assessment Institute for Agricultural Technology (AIAT), at the provincial level by the agricultural and livestock services, and at the local level by the extension workers for agricultural and livestock services. For development organisations, the key informants who were chosen to be interviewed were non-government organisations whose main concern was to encourage and advocate for the smallholder producers in agriculture and who have a program in the Enrekang regency.

4.2.3   Structure of interviews

The questions for the in-depth interviews and focus group discussions were designed to capture information from the key informants. An interview guide relies on a short list of specific topics to ensure all key information is covered (Walter 2010). It is primarily designed from the review of literature and topics that are fundamental to formulate answers to the research questions. Basic elements in organising the interview guide (Bryman 2008) include: a certain amount of order in the topic area, formulating interview questions to address the research question, using appropriate language for the participants, asking categorical information (e.g., age, gender, position in office, number of years involved in an office), and avoiding leading questions. While a list of questions was designed as a guide to capture information from participants, the researcher also offered an opportunity for

interviewees to speak more naturally, more loosely and more freely about what was of interest to them, as well themes that were important to them (Bryman 2008; Hesse-Biber and Leavy 2011).

For the in-depth interviews, the questions aimed to capture insights from key informants directly about the enabling environment issues, while in the focus group discussions, questions were used to manage and facilitate group discussion, especially investigating important sub-topics of the enabling environment. The questions for the in-depth interviews and focus group discussions were similar and consisted of four sub-topics of the enabling environment for agribusiness supply chains within the vegetable and dairy cattle industries, based on the local conditions in the Enrekang regency. These included: background information, institutional background, resources, and enabling environment for institutional policies and procedures. The questions for the focus group discussion mostly focused on the enabling environment for institutional policies and procedures, because this important topic was developed from the literature review. Data from in-depth interviews were further validated in the focus groups.

The interview guides for the in-depth interviews and focus groups are in Appendix A3.

4.2.4   Conduct of interviews

Both vegetable and dairy supply chain actors were interviewed directly by the researcher using interview guides developed for their role. Hesse-Biber and Patricia (2006) state that it is important when conducting in-depth interviews to reduce the status hierarchy between the researcher and participants. The interviews were conducted from April 2012 to May 2012. Most interviews were arranged in the Enrekang regency where the majority of key informants were located. Interviews were conducted in Makassar City for the representative participants from provincial and regional government. Before the start of the interview, the aim of the interview and research were explained to the participants. They were shown the information sheet (Appendix 1) and asked to sign the consent form (Appendix 2) to ensure confidentiality and their involvement in the interview on a voluntary basis and in compliance with the requirements of the Curtin Human Research Ethics Committee.

The first step in the interview process concentrated on creating a trust and rapport with the informants. Asking questions and follow-up probes was conducted and generated to find out more data about enabling environment issues. Each interview was tape-recorded and lasted between 30-90 minutes. During the first phase of data collection for the vegetable chain, the researcher conducted 12 interviews. Each interview lasted around 2 – 2.5 hours. In the second stage of data collection for dairy chain, 12 interviews were also conducted.

During the interviews, the researcher attempted to overcome any perceived status differences and create a suitable environment to obtain information about the enabling environment issues. The informants were recognised as experts on the topic and given the authority to share their stories and experiences. The interview was in Indonesian because this language is used extensively in this part of the country. Following the advice given by Daymon and Holloway (2002) and Walter (2010), at the beginning a general chat occurred to help respondents feel more comfortable. The purpose of the research, the research topic, why participants were chosen, how the information would be used, and how confidentiality would be secured, were also explained by the researcher. The interview started with a reading of participants' right, including their voluntary participation and the possibility of withdrawal. The consent form was given to the participants to sign when they agreed. All interviews were recorded by using a digital recorder for portability, accessibility and security reasons. Notes were also written right after the interview for improving the quality of the data.

The first step of the interview time focused on creating trust and rapport with the participants. The interviews started with various demographic questions, such as personal data, age, marital status, education and number of family members. These questions are essential because it provides information in relation to the context of the participants and also functions as a base in probing questions. The next section of the interview centred on how participants expressed their opinion about the background of institutions, resources and activities. These questions were developed to obtain interviewees' opinion in relation to the goals and the objectives of institutions, services, challenges and solutions that might be effective for an enabling environment. The last section of the interview focused on the elements of enabling environments. The main goal of these questions is to obtain the perspective of participants about elements of the enabling environment consisting of secure environment, effective marketing, infrastructure, land tenure and property rights, financial services, appropriate research solutions, extension services, business development services, and standard and regulations.

The open-ended questions were constructed to be neutral rather than value-laden. The questions are as follows:

1. What projects, programs and services does your institution provide to assist smallholder producers, especially for agricultural development, in the dairy cattle and vegetable industries?
2. Who designs the plans and programs for assisting smallholder producers?
3. What were the expected benefits of these programs and services?
4. Would you consider these programs successful?
5. What problems have you experienced with these programs and services?

6. Do you cooperate with other institutions to assist smallholder producers?

7. What effects, if any, have each of the following had on the delivery of your programs to your target groups and their ability to take advantage of them? Prompt with: How? Why? Access to financial services, effective marketing arrangements for their products, supporting infrastructure (e.g., roads, markets, water and irrigation, electricity, phone access, health and education), access to appropriate extension services, a secure environment, access to appropriate extension workers, secure and stable land tenure, research and development, access to standards and regulations, business and development services

At the end of the interview, it is important to show appreciation to the voluntary participants (Head 2009). For this reason, the researcher gave Australian handcrafts such as pins, fridge magnets, key rings and stickers as tokens of appreciation.

4.2.5 Conduct of focus group discussions

The FGDs were used as an avenue for clarification and to add a depth of understanding to the concept of enabling environment through participants' use of their local language, their own words, their opinions and their gestures. The focus groups in this study increased the validity of information and measurements that were used for data analysis. The focus group discussion of vegetable issues was conducted in April 2012 at the office of an extension worker in the Anggeraja sub-district, while the discussion of dairy cattle issues was undertaken in May 2012 in the fishery and livestock department at Enrekang regency. The reasons for selecting those offices were because they had a meeting room with equipment (sound system and tape for audio recorder), and were free from distracting activities so the researcher could access clear voice recordings. Another reason was that they were easy to reach by the participants, mainly for farmers, suppliers and traders, because these areas were central to the production and marketing of participants when conducting their business.

In the focus group discussions, the researcher used a moderator to guide the discussion of the participants. In the beginning of the discussion, the moderator expressed thanks to participants for coming and introduced the participants. The objectives of the research, the reasons for undertaking the recording, and the technical discussion were also explained briefly. The success of focus groups in gathering quality data mostly depends on the personal skills of the moderator in managing group discussions (Bryman 2004; Sim 1998; Walter 2010) and creating an environment that encourages all group members to share their opinions, organizing an interactive dialog among group members, and including probing comments, transitional questions and summaries without interfering too brusquely with dialogue among participants.

Semi-structured questions were also used to collect data so that participants could have the freedom to develop new ideas, albeit still related to the topic (King & Horrocks, 2010). The questions for in-depth interview were similar in the focus group discussion, however the focus group discussions mostly focused on sections of the enabling environment for institutional policies and procedures, because this important topic was developed from the literature review (Appendix A2). This section was beneficial to identify the key elements and characteristics of the enabling environment for smallholder producers based on the perspective of participants, as the objective of the study.

The literature contains different views about the optimal size for a focus group. For instance, Strong et al. (1994) suggest four to six, Krueger and Casey (2000) recommend six to eight, five to ten are the numbers suggested by Farhana (2010), while Folch-Lyon and Trost (1981) propose between six to 12 participants. For this study, each focus group had 12 informants, with each target institution providing two key informants as representative respondents.

The focus groups were conducted in Bahasa Indonesia, however, some participants spontaneously used their local languages to express their opinions about issues regarding the enabling environment. Therefore, attention was given to both maintaining the original meaning of those words and crosschecking them at the end of the discussions. Finally, a brief summary of the discussion was presented to the participants for validation. All of the sessions were recorded. The discussions took approximately two hours.

4.2.6   Data analysis

Data collection during the in-depth interviews and focus group discussions was in the form of audio folder saved in a audio digital recorder. The audio data interviews were subsequently transcribed by the researcher to convert the data into text data, which helped the researcher when it came to the application of text analysis. The data was translated into the English context first, then it was analyzed. Thematic analysis was adopted to convert the text into the conceptualization framework. In this study, themes were identified, classified and built around the potential issues under investigation. It was conducted after the text data transcribing to English.

Transcribing data

As non-standardised interviews, both in-depth interviews and focus group discussions required transcript data for subsequent interpretation and analysis (Hesse-Biber and Patricia 2011). Listening to the audio-recording, making notes and reporting general findings are the first steps to transcribing after the completion of the interviews (Basch 1987; Hesse-Biber and Patricia 2011). It is important to obtain a comprehensive record of discussion that can be used for further subsequent analysis of data (Lewis 2000). Bryman (2008) asserts that

transcribing accurately what informants say is important. In addition, to avoid misinterpretation, the researcher should not paraphrase the words of the informants. At the beginning of transcription, the interviews were transcribed into a set of document files.

Thematic analysis

Thematic analysis is a qualitative approach that aims to discover emerging themes that are important to describing a phenomenon (Daly, Kellehear and Gliksman 1997). 'Careful reading and re-reading of the data' are essential activities in the process of identification of themes (Ryan and Bernard 2000, p. 258). This is a pattern recognition process, in which themes emerge to be part of the categories for analysis (Fereday and Muir-Cochrane 2008). Braun and Clarke (2006) note that thematic analysis is a technique to identify, analyse and report patterns or themes within a set of data. Indeed, it is a technique which is utilised to effectively organize and describe a set of data in detail. Bryman (2010) and Ricthe at (2003) observe that providing a framework is a general strategy to conducting thematic analysis in qualitative research. Likewise, Ely et al. (1997) identify six phases in thematic analysis: familiarise with data, code for general items, identify potential themes, review themes, define and name themes, and produce the report.

In this phase, thematic analysis was used to categorise the enabling environment for agribusiness supply chain to obtain a more meaningful conceptual framework. Codes and classifications for enabling environment issues for both vegetable and dairy cattle industries were created by reviewing the transcribed interviews for prospective conceptual classification, with the guideline questions also used as initial classifications. The next step was to examine the contents of each category to identify sub-topics and to choose the most appropriate quotes and substantiation for the numerous ideas, as well as to cluster in the several categories (Zemke and Kramlinger 1985). At this stage the research objectives Chamhuri (2011), and the literature review and its relationship to the data (Daymon and Holloway 2005), were examined to compact, and develop, the data.

The last step was was an inductive, analytical process (Powell and Single 1996) involving analysis of the raw data in combination with the categories and sub-topics. This entailed a great deal of creative interpretation but was an important part in the process of analysing the enabling environment. Constant comparison was conducted with the data to identify different perspectives among the respondents, and to clarify differences that connect to variables within the sample participants and their institutions.

Since the sample was relatively small, thematic analysis was completed manually. Reading and rereading of enabling environment answers were carried out carefully to seek the

potential themes, and the potential information was coded to organise the analysis. The process of transcribing interviews and organising the thematic analysis took nine weeks.

4.3   Quantitative research method

As argued by Malhotra et al. (2008), quantitative research methods can be used to make predictive generalisations derived from the theory. This is because 'this method [is] based on testing theory composed variables, measured with numbers, and analysed with statistical procedure' (Creswell 1994, p. 2).

This study used personal survey method, which required the survey design to include the research objectives, method of conducting survey, design and structure of the questionnaire, target respondents, sampling method for population and data analysis tools. Malhotra et al. (2008) suggests that the surveys can be conducted in a number of ways: personal interviews, telephone interviews, mail or email interviews, and electronic through internet facility. From an administration and practical perspective, personal interviews were the most suitable method to conduct data collection with smallholder farmers in Enrekang regency.

4.3.1   Defining the target population and sample selection

Malhotra et al. (2008, p. 470) states that the target population is 'the element collection from or physical objects which have beneficial information required by a researcher and about which interferences are to be made'. Stevens, Loudon, and Wrenn (2012) advise that determination of the target population should be related to the aim of the research in order to obtain the population of interest, and preferably, the target population should be defined based on element criteria, sampling units, extent and product class.

The elements can be defined as the objects from the information which are given by respondents. In reality, respondents should provide answers for some, if not all, of the information based on the questionnaire for the enabling environment of vegetable farmers and dairy farmers. Next is the sampling unit which, in this study, was farmers who grow vegetables and keep dairy cattle. The target populations of vegetable farmers was selected based on the type of products grown by farmers which have potential market and the ability to obtain assistance from other institutions, including both perishable and non-perishable crops. For selection of dairy farmers, both members and non-members of farmers' organisations were included and this was based on their ability to keep dairy cattle that produced production for sale, such as local cheese *(dangke)* and crackers. The number of dairy cows owned by farmers, more than four per household, was also a criterion when selecting the target population. The 'extent' refers to the geographic location. In this study, the survey was conducted in several sub-districts in Enrekang Regency, where those areas

were recognised as potential production areas for those commodities. Product class in this survey was mainly concentrated on products that were produced by farmers for sale.

In this study, selection of respondent was selected through the probability sampling technique with proportionate stratified random sampling. According to Saunders et all 2009, probability sampling also recognised as simple random sampling is technique of selecting a subset of individuals from large group of research population where each individual has the same opportunity/probability for being chosen for any step during the sampling of research process. The determination of the sample size was guided by time and resource constraints. For this study, the sample size was 250 vegetable farmers and 250 dairy farmers, for a total of 500 farmers. According to Chamhuri (2011 the acceptable sample size for a regional study, such as this research, is 500 respondents. The sample size of 500 for this study meets this standard. Comrey and Lee (1992) [cited in Field 2009] highlight with the Rule of 500, which classified 100 as poor, 200 as fair, 300 as good, 500 as very good, and more than 1000 as excellent. Respondents who were involved in both vegetable and dairy activities were not included, in order to obtain the appropriate respondent, and eliminate sampling error.

4.3.2 Site selection

This study was conducted in several sub-districts in Enrekang regency; namely, Cendana, Enrekang, Anggeraja, Malua, Baraka, Alla, Baroko and Masalle sub-districts (Figure 4.1). The choice of producers for the study was based on the potential production, particularly for the places where the majority of farmers grow vegetable crops. The vegetable farmers are mostly located in upland areas in the sub districts of Anggeraja, Malua, Baraka, Alla, Baroko and Masalle. These areas were selected because the majority of farmers cultivate vegetable products. Areas for transactions of vegetable crops between farmers and buyers (local, regional and inter-island traders) were also considered when selecting the research area. In addition, dairy cattle farmers were concentrated in Cendana and Enrekang sub-districts, as these areas were recognised as central to dairy cattle development. Angeraja sub-district was also known as a new location for dairy cattle production with a few farmers (Biro Pusat Statistik 2003).
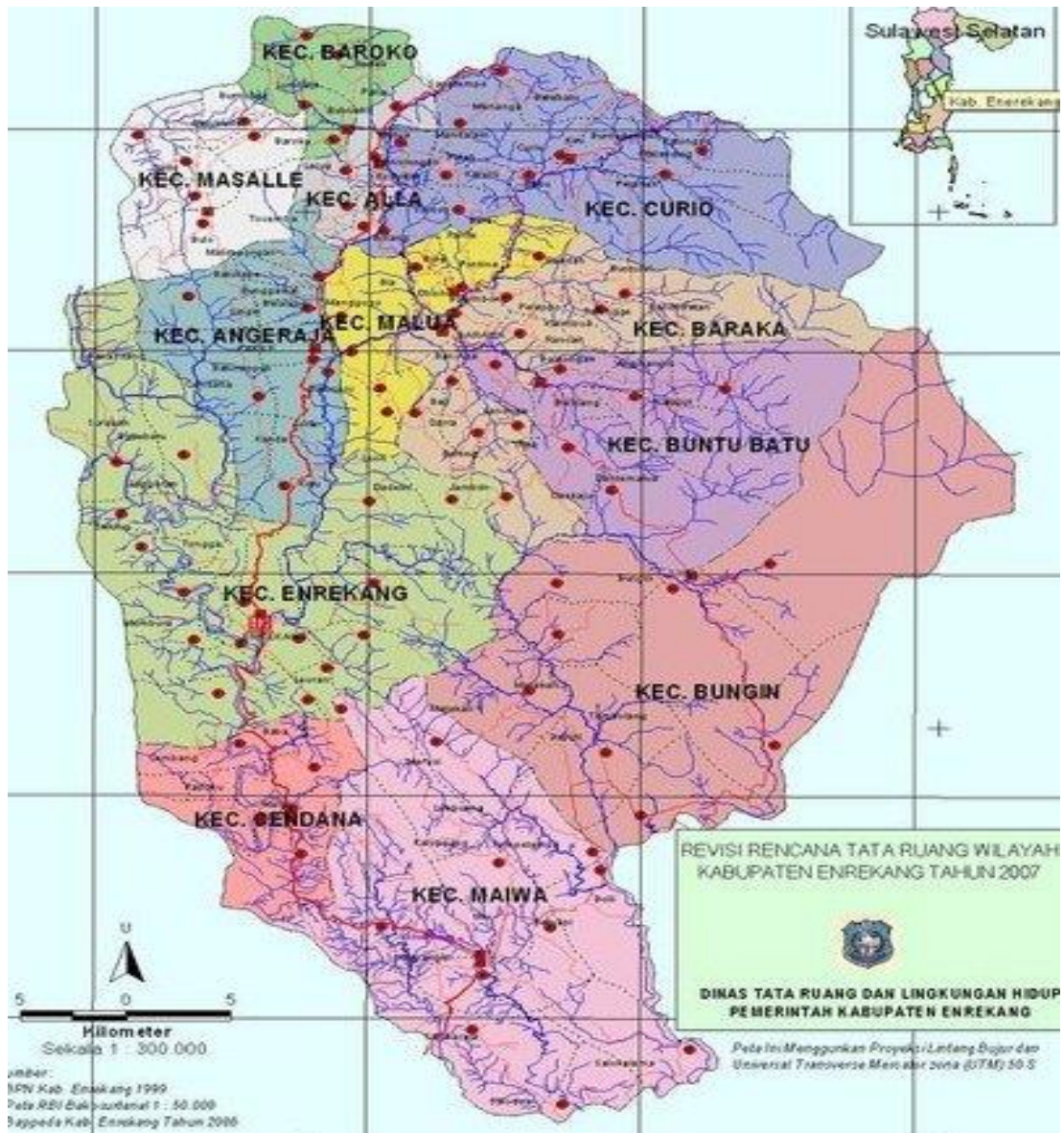
Figure 4.1: Map of Enrekang Regency

Source: Enrekang government, 2011

4.3.3   Design of survey instrument

Zikmund (2000b) suggests three aspects which should be considered to obtain a well-designed questionnaire: the sentence structure of the questionnaire, the measurement standard, and the overall aspects that will be investigated in the questionnaire. The survey instrument in this research was divided into two questionnaires which investigated factors involved with dairy cattle farmers and vegetable farmers in accessing the enabling environment.

The survey instruments contained a combination of both open-ended and close-ended questions. Open-ended questions, or unstructured questions, offer greater opportunity to respondents to express their opinions and viewpoint based on their level of understanding of

the topic. This structure also helps the researcher to achieve a better understanding of the research issues. Dornyei (2003) notes that these types of questions are mostly used for qualitative research.

For the close ended-question or structured questions, scale questions and multiple choice questions were used. To reduce potential bias, some questions included alternative answers from which respondents were instructed to choose. This type of question was normally easier and quicker to deliver, and minimal writing was required.

Many of the questions were designed in the Indonesian language and questions designed in English were then translated into the Indonesian language before conducting the pre-test because a majority of the respondents and enumerators could not speak English. After the translation, a pilot test was conducted to eliminate unexpected problems that would always arise in the data processing and analysis steps. As pointed out by Usunier (1998), a pre-test should be conducted to gain a satisfactory level of data reliability. Similarly, the pre-test aims to find unrecognised mistakes that might appear in the questionnaire preparation, namely inconvenient expressions, leading questions and unorganised flow.

The structure of the questionnaires for both the vegetable and dairy cattle respondents followed similar themes in gathering information from the smallholder producers. The questionnaires consisted of three main sections: general information on enabling environment, the level of importance and level of fulfilment of elements of the enabling environment, and indicators of economic development of smallholder producers. Copies of the English versions of the questionnaires can be found in Appendix 2 for vegetable respondents and Appendix 3 for dairy respondents.

Part I: Background information on the enabling environment

Section I focused on describing the characteristics of smallholder producers in responding to the enabling environment conditions by considering their social and demographic characteristics, land information, production systems, input and services, marketing infrastructure, farmer groups and innovations.

A. Characteristic of respondents

Respondents were characterised using social demographic factors, including name, age, gender, role in the household, number of family members, education level and participation in non-formal education training. These characteristics can provide valuable information for further investigation in relationship to the economic development indicators, particularly issues of education level and the informal training which have been conducted by farmers. As noted by Asril and Jegak (2010), demographic factors, such age, education and additional training, have been correlated with competitive advantage and superior productivity.

B. Land information

Land ownership can be categorized as a social investment, and also one of the key factors that affects the intensity of agricultural production (Kyomugisha 2008). The land issue, through this question, can be classified into source of land and administrative proof of ownership. In relation to the source of land, the respondents were asked about the way they acquired the land, whether they purchased from other owners, government tenure system, and inheritance from parents, pledge land and other sources. USAID (2007b) reports that formal land ownership is registered by government authorities. Regarding administrative proof of ownership, the questionnaire identified legislative status of their land, `trough ownership of legal certificate, tax document, and contract certificate, deed of sale from notary, or other administrative system. A further question asked about land arrangement of the smallholder producers who do not own land. This question aimed to investigate the methods smallholder producers use to produce agricultural product without having their own land. Kyomugisha (2008) and Lamba (2005) note that leasehold tenure is a land management system where tenants can utilise the land under an exclusive condition, such as pay an annual rent, or used for a period of time under specific conditions. Land arrangements for this question were classified into fixed-term with fee, free without obligation, and free but with conditions.

C. Production information

The first question about production information asked about the period of time the farmers had conducted vegetable or dairy production. It might be that the smallholder producers who engaged in production for a longer time would be associated with more networks and greater sustainability of production. Their reasons for involvement in vegetable or dairy cattle production were probed because this might influence their perceptions of elements of the enabling environment and their income. The next question investigated sources of income, the average monthly income, and percentage of income for the household from vegetable or dairy productions.

A further question asked about the types of products sold by the farmers. In the questionnaire for the vegetable farmers, a distinction was made between non-perishable and perishable categories. This question was created to gather information about which type of crop has the most potential to grow based on the resources of environment, or deliver favourable condition for farmers. Investigating the reasons to grow these types of products was also included to explore conditions that are useful to clarify those products having the potential to be developed. For example, dairy producers identified local cheese (*dangke*), fresh milk,

crackers and meat as product options which have a potential market. From those products, the main product that was produced by vegetable farmers was identified.

For vegetable respondents, the questionnaire investigated what kind of crop they would want to grow but were unable to. The reason for this question was to identify conditions that might be restricting them from growing other vegetables. The absence of conditions could be used to identify which elements of the enabling environment could be improved. A question for dairy cattle probed business profitability. The questionnaire asked about the minimum number of dairy cattle required for sustainable profit and why. A further question also enquired about limitations to keeping dairy cattle. This question aimed to identify which conditions impeded the dairy farmers in engaging in the agribusiness system of dairy. Responses to this question could be used to identify if there are conditions not present in the enabling environment.

D. Input and services

Input and services questions for both vegetable farmers and dairy were also developed. The input questions for vegetables farmers consisted of sources of seed, fertilizer and pesticide inputs, and for dairy investigated sources of heifers, fodder and medical inputs. These questions asked about the accessibility of obtaining the inputs and about services connected to traders and agents as suppliers. The reason for creating this question was to identify the main actors that supply the inputs, the service facilities that are delivered to respondents, and the ability of respondents to access these inputs.

Problems in buying the inputs for both vegetable and dairy producers were also investigated to ascertain which conditions are needed to make improvements when delivering the inputs to the farmers.

E. Production information and training services

The production information and training services questions were similar for vegetable farmers and dairy cattle farmers. The questions explored the problems experienced by farmers when growing vegetables and cultivating dairy cattle production, and the main source and types of advice and information that were provided to solve the problems. There was also a question on why the advice and information from these sources was provided, and not from other sources. It sought to gather farmer's ideas about how the problem might be solved through contributions from other sources. It was also expected that the question would assist in evaluating the source of advice from government institutions. A question on the regularity of training investigated the existence of training institutions that can serve the smallholder producer regularly, and the accessibility of farmers to connect with this institution. This question was dedicated to identifying the existence and effectiveness of

government and extension workers, or other institutions, in delivering advice and training services to the farmers.

F. Infrastructure services

Elements of the infrastructure services investigated were logistics, water and irrigation, and telecommunication facilities. The infrastructure service was one of the elements of the essential enabling of environment where the government and private sector were expected to collaborate in delivering their function at macro, meso and micro levels (Bryant (1989) and Christy et al. (2009)

F1. Logistic services

Both the vegetable and dairy cattle questionnaires investigated how far the area was from where they mostly sold their products. Determining the selling area of farmers' product might depend on potential buyer locations, whether in the main road area or in the market site. The method used to take production to the market area, and the reason to use it, was also examined. The availability of transportation facilities is closely related to road side conditions and relationship with traders, and this is mainly to reduce the transaction cost and increase trading network (Gannon and Liu 1997b). Furthermore, the following question on dairy considered whether farmers sold old cows or used for them for household consumption. The vegetable questionnaire identified the total cost of transportation to market site and the main problems with the transportation system and service conditions. The reason to ask this question was to investigate the cost of transportation which could be expensive due to the absence of public transportation and poor road conditions.

F2. Water and irrigation facilities.

Water and irrigation facilities were identified through developing questions about the sources of water and its distance from the farm area. Also, questions were asked about the sources of assistance, type of assistance and the reasons for accessing it from those institutions. This question was important to investigate the relationship between the type of commodity and the presence of water supply. For example, decisions to grow crops can be related to the availability of water, especially in upland areas (Kurnia 2004). Furthermore, there were also questions about source of irrigation assistance, the kind of the assistance, and the reason for obtaining the assistance from those institutions. This question was designed to identify the smallholder situation and whether they have irrigation infrastructure which was provided by government, other sources, or provided individually. As noted by Haggblade et al. (2002), irrigation infrastructure is a public sector facility that the government has the responsibility to establish. Hussain (2004) reports that development of irrigation infrastructure is part of the government policy program at national level in Indonesia, to attain self-sufficiency in the

agricultural sector. In addition, problems with the source of water to irrigate their farm was also questioned. The reason for asking this question was to identify situations where the government should develop policies to support smallholder producers in providing public irrigation infrastructure.

F3. Telecommunication facility

The questions about telecommunication facilities were designed to investigate the communication function, which referred to types of activities and the important position of communication in supporting the smallholder producers. Next, problems of communication in the farm area, whether they have good access, poor quality networks, and unfavourable situations, were also investigated. The role of telecommunication facilities in assisting farmers with their farming activities was investigated as it is regarded as being an important element of the enabling environment by linking farmers with sources of knowledge and technology, and also accessing market information. In addition, the main providers of telecommunication services were investigated as, in Indonesia, these services are provided by the public and private sectors.

G. Marketing services

Marketing services were investigated through the position of formal and informal buyers in conducting transactions with the smallholder producers. The formal services referred to the existence of institutional markets where the smallholder producer could sell their products, and the informal services were delivered by traders and collectors, selling directly to consumers. In general, both formal and informal services of the marketing system of agricultural production are provided by the private sector (Stepherd and Schalke 1995). Questions were asked about payment system problems and solutions needed. These questions were designed to identify the common transaction of smallholder producers in selling their product to the buyers, and the transaction mechanism such as the purchasing agreements and administration between trader and farmers. This question could provide information to the government and private sectors to establish strong partnerships in enhancing the enabling environment.

The activities conducted by smallholder producers before selling to the market were also queried. The reason for asking this question was to investigate whether they consider product selection, cleaning and packaging to maintain the quality, and enrich the product performance, before selling to the buyers.

H. Financial services

Access to financial institutions that meet the requirements of rural people are important elements to improving economic development (USAID 2007a). Financial services for

agricultural business are arranged through formal, informal and semiformal institutions (Athmer 2008). In this question, the sources of financial services from both formal and informal financial institutions, and the purposes and terms for borrowing money from those institutions, were probed. One question aimed to investigate whether the smallholder producers were more likely to borrow money from formal or informal financial sectors. Furthermore, the respondents were also asked about the credit programs that are subsidised by government to assist the smallholder producers, and to investigate the ability of farmers to access those types of credit compared to the credit without subsidies. The problems associated with obtaining credit from financial institutions were also investigated to identify areas for improvement in the provision of financial services.

Other alternatives for financial assistance, such as borrowing the inputs and the terms for borrowing inputs, were also queried, including their advantages and disadvantages.

Part II: Importance of enabling environment conditions and levels of fulfilment

Section II explores the conditions of the enabling environment for their level of importance and level of fulfilment, as perceived by farmers.

The content of those questions which assessed importance and fulfilment were similar. These questions were dedicated to identifying which of the enabling conditions might contribute more in enhancing the productiveness of smallholder producers. The questionnaires asked questions of the respondents using items under the following headings: land tenure and property rights, infrastructure (farm to market roads, transportation services, logistics and marketing infrastructure, communication facilities, water and irrigation facilities), financial services, including formal and informal financial sources, research and development and extension, standards and regulations, business development services, ease of doing business, input supplies, provision on marketing services, political support, and membership of organisations. To measure the conditions, the questionnaire followed the approach developed and used six point scales. The scale used were as follows: 1 – Not at all important, 2 – Not important, 3 – Somewhat not important, 4 – Somewhat important, 5 – Important, 6 – Very important, and Does Not Know (D). For the level of fulfilment, the scale utilised was: 1 – Not fulfilled at all, 2 – Not fulfilled, 3 – Slightly not fulfilled, 4 – Slightly fulfilled, 5 – Fulfilled, 6 – Very fulfilled. Does Not Know (D) was also included to provide an opportunity for the smallholder producers to indicate a difficult answer based on their understanding and their experience of the condition. This is also useful to avoid biased responses from respondents in the investigation process.

<u>A. Land tenure and property rights</u>

Fundamental requirements to obtain access to services and livelihood opportunities are the ability to access the land under secure tenure (Rakodi and Lioyd-Jones 2002). Access to land

and tenure security determines the nature of agricultural activity, such as whether the crop is grown for subsistence or commercial purposes. The tenure security of land affects investment capacity for increasing production, implementing technology and supporting sustainable management and production (IFAD 2008). Furthermore, land can provide collateral for accessing credit by attaching land titles. Therefore, ensuring property rights through institutional arrangements is important to constructing regulations, such the land administration.

Respondents were asked to address the following issues: the ability to use both private and public land, the presence of government institutions and the instruments that allow smallholder producers' access to land, property rights to provide security for crop production, and supporting administration systems and instruments to obtain the property rights status.

B. Infrastructure

Investments in rural infrastructure provides opportunities for increasing farm and nonfarm production, reducing unemployment and increasing income opportunities, improving distribution of wages thereby reducing poverty, and increasing income and consumption levels (Barrios 2008). Both public and private sector investment is required in physical infrastructure to improve productivity and improve long-term growth (Ifzal and Pernia 2003)

In the context of value chains, the presence of infrastructure includes the presence of pre-harvest and pro-harvest infrastructures, marketing and soft infrastructures, and the basic infrastructures that contribute to help the rural farmer to maintain sustainable growth and to meet the competitive market (KPMG 2009). In this phase, infrastructure consists of market roads, transportation services, logistic infrastructure, water and irrigation, and communication facilities.

B1. Farm to market roads

Roads are key to providing accessibility of communities in rural areas. Roads assist smallholder producers to distribute farm inputs and transport farm products to market destinations (Barrios 2008). Without accessing the roads, the smallholder would not be able to engage farm production more productively and economically (Binswanger et al. 1993). Therefore, investment in rural roads will increase utilisation of the local resources, reduce unemployment and strengthen the local economy (Dongges, Geoff and Bjorn 2007) In this section, accessibility of farm-to-market roads, proper maintenance of farm-to-market roads, and road conditions to reduce transportation costs were investigated. Responsiveness of government to complaints about road conditions was also measured.

B2. Transportation services

The presence of transportation services is an essential element for accelerating economic development. Transportation is the backbone of input distribution from producer to market. Poor road conditions and limited transportation services are impediments for smallholder producers to obtain the best inputs, and the input suppliers are restricted from distributing inputs close to the farm site (KPMG 2009). It was found in the first phase of this study that smallholder producers had additional costs to distribute farm inputs and to reach the market destination because of inadequate public and private transport. Other conditions, including timeliness of service, quality of service for transporting product, and consultation by providers with farmers were also investigated.

B3. Marketing and logistic infrastructures

Marketing and logistic infrastructure for agricultural products in the rural areas is lacking, with a lack of supporting facilities, such as landing, storage, packing, processing and retail facilities (Oraboune 2008). Small-scale farmers collect and handle the products without following more advanced quality requirements and hygiene standards and, as a result, their agricultural products are restricted from reaching potential markets (ADB 2008). Therefore, the lack of those facilities poses a challenge to the marketing system for the smallholder producers during the transition from subsistence to commercial activities. In the exploratory phase (see Chapter 4) it was found that market infrastructure was built by the local government and includes stalls, paved roads, surface water drainage, and buildings for traders (*kios or los).* However, facilities to address quality standards and food safety were absent. It was expected that the private sector would cooperate in the provision of logistic infrastructure, but may not attend to enhancing production quality. A part of the bottleneck was inadequate methods for pre and post-harvest handling, and also lack of financial resources. To respond to this situation, marketing infrastructure, such as access to a covered area where vegetables can be graded or sorted, access to a consolidation area where buyers can buy or collect vegetables, access to market stalls that can enhance the value of vegetables, and affordability of market stalls were investigated. In relation to logistic infrastructure, the factors considered were availability and affordability of baskets for vegetable transport to market, and using the basket preserves quality of vegetables.

B4. Communication facilities

The presence of communication facilities could be relevant to small-scale farmers in obtaining the important information regarding production methods, market information and management of their farm business. In other aspects, the extension services are also becoming more dependent on information facilities to expand the provision of technology

information, enhance the agricultural research and empower education systems for farmers (Meera, Jhamtani and Rao 2004). In this section, the measurements referred to access to reliable communication services, affordability of communications services, and, lastly, communication facilities that assist with market information

B5. Water and irrigation facilities

In the exploratory phase, it was found that most vegetable and dairy farmers interviewed provided their own water and irrigation facilities. When growing crops, for instance, access to water for their farm was important to respond to the intensity of growing and to determine which type of crop was suitable to the capacity of the water supply. The availability of irrigation contributes significantly to the increasing of farm production, income and reducing poverty (Ifzal and Pernia 2003). For instance, in many areas such as India, Philippines, Thailand and Vietnam, the poverty level is relatively low for irrigated areas in comparison to unirrigated areas (Bhattarai, Sakthivadivel and Hussain 2001). Measurement of important fulfilment levels were investigated for the following issues: access to reliable irrigation services to farm location, affordability of irrigation services, and presence of government programs on irrigation infrastructure to assist smallholder producers.

C. Financial services

The exploratory phase of this study found that both formal and informal financial services assist smallholder producers to continue production and improve their livelihoods. Any assistance from financial institutions was mainly used for credit for inputs, andcredit assistance to support farm production varied between formal and informal institutions in terms of amount of credit and interest rates.

C1. Formal financial sources and program credit

Formal financial services in rural areas provide smallholder producers with secure savings, credit and insurance, whether they are from government, private sector or development organisation sources. The exploratory phase indicated that formal financial services to the agricultural sector in the Enrekang regency were dominated by state owned enterprise banks, namely the BRI and the BNI. Through these banks, the creditors are organised and regulated based on a system of institutions in delivering the microfinance services. However, the selection criteria and collateral requirements led to difficulties for small scale farmers in accessing credit (Yadav 1989).

The questions for formal financial sources and program credit were created based on the conditions identified in the exploratory phase. These included: formal credit sources have repayment schedules that accommodate the situation of producers like myself; formal sources have requirements that are easy to comply with; formal sources have affordable

interest rates; formal sources consult me on the type of loans that I need; formal sources are quick to respond to complaints; presence of government credit scheme and instruments that support finance in agricultural production; program credits have requirements that are easy to comply with; and program credits provide affordable interest rates.

C2. Informal financial sources

Informal financial services assist smallholder producers in farm activities, such as input supply, production and distribution to market. They mainly serve smallholder producers who are unable to access, or are reluctant to connect, to formal financial institutions. Trust and commitment are the main requirements for the repayment to the lender. Procedures such as business permit, collateral and business proposals are absent in the informal agreements. As reported by Schlaurfer (2008) money for the informal sector is primarily provided by money lenders and pawnbrokers; indeed, entrepreneurs usually rely on family savings, neighbours and friends. In the exploratory phase, some smallholder producers were reluctant to borrow money from the bank because of strict or complex procedures and limitations on credit. Obtaining credit from the formal sources was easy for farmers who had good accessibility and administration of their business. Questions about informal financial sources were created based on the conditions of the smallholder producers in the exploratory phase; for example repayment schedules that accommodate the situation of smallholder producers like myself, private lenders who have requirements that are easy to comply with, private lenders who have affordable interest rates, private lenders who consult me on the type of loans that I need, and, lastly, private lenders who are quick to respond to complaints.

D. Research, development and extension

To reduce poverty, agricultural research and development should focus on developing technology to increase yields to produce a sustainable food supply on which rural people spend a considerable share of their income. The research should also concentrate on developing technologies that are suitable for the marginal agricultural areas where the poor mostly live (Otsuka 2000).

The exploratory phase revealed that the majority of research and development was generally perceived as being conducted by extension workers at the local level. Research and development was also perceived as ineffectual due to inadequate capabilities of local extension staff, and insufficient budget. Questions in this section investigated several issues: research and development and extension provide innovations based on local conditions and are easy to use, assistance in solving pest and disease problems, extension assistance in solving pest and disease problems, private sector assistance in solving pest and disease problems, non-government organization assistance in solving pest and disease problems,

availability of better fertilizers that provide better yield, affordability of better fertilisers that provide better yield, ease of adopting economic alternative technologies, crop production training and demonstration farms, crop production training and demonstration farms from non-government organisation, and access to better postharvest technologies.

E. Standards and regulations

Questions about standards and regulations were included because of their relevance to smallholder producers obtaining guaranteed markets and quality standards. For example, the question of market guarantee referred to having signed contract agreements with buyers and enforcement of contracts with buyers. Ruben and Saenz (2008) argue that contract farming is a key solution to achieving a better institutional environment to eliminate market and information failures by establishing connections between producers and institutional markets. Glover (1987) and Grosh (1994) note that contracts were a strategy to guarantee market supply. In relation to quality standards, the question addressed several issues: quality and grade standards are provided by buyers, quality and grades standards provided by buyers are followed, support from government on certification of products, support from private sector on certification of products, and support from NGOs on certification of products. These questions were based on the exploratory phase that found that lack of quality products and absence of consistent standards constrained products from entering potential markets, such as supermarkets and restaurants. Due to a lack of labelling and certification, the potential market for a majority of products was the wet markets in the local, regional and inter-island markets.

F. Business development services

Business development services assist smallholder producers in creating linkages to other institutions to access value added and more favourable markets. In this question, linkage to market services, whether they were from institutional buyers, government institutions, private sector and non-government organisations were investigated. Christy et al. (2009) suggest that increasing the supply of providers, stimulating the demand for various services, and addressing issues of both supply and demand within the parameters set by specific investments are the priority for business development services and should be strengthened by government and other institutions. In this question, several issues were emphasized to address the enabling environment conditions: assistance that links farmers with buyers, government assistance that links farmers with buyers, non-government organization assistance that links farmers with buyers, private sector assistance that links with smallholder producers, assistance that provides market access from farmer to potential buyers, government assistance that provides access to potential buyers and markets, non-government

organisation assistance that provides access to potential buyers markets, private sector assistance that provides access to potential buyers and markets, assistance that provides market information, government provision of marketing information, non-government organisation provision of marketing information, and private sector provision of marketing information.

G. Ease-of-doing business

Creating an environment conducive for business is important for the private sector to create competitive markets (IFC 2010). This can help increase business investment, increasing productivity, reduce operational costs and simplify the process of implementation. The exploratory phase found that challenges for the agribusiness system included the existence of procedural systems that increase operational costs, illegal payments and lengthy time for organising procedural administration. In response to these issues, questions were created to gather information about the existing conditions of ease of doing business from the perspective of smallholder producers. The questionnaire asked whether procedures for business registration were simple, government assisted with registering organisations, NGOs assisted with registering organisations, the private sector assisted with registering organisations, being able to provide proof of payment (official expenditure receipts) to buyers, securing business permits, and taxation affordability.

H. Input supply

The presence of agricultural inputs for smallholder producers has significant impacts on increasing productivity and addressing market demand. Important factors are accessibility, sufficient quantity and quality, and affordability of farm inputs from the agro input dealers (Chianu et al. 2008a). The exploratory phase revealed that inadequate supply of inputs to farm areas resulted in unstable farm production. In addition, long distances to market from input supply chain, limited stocks of inputs, and prices that increased with distance were the challenges that impeded smallholder producers in accessing inputs. To investigate input supply service issues, questions were asked about availability of agricultural input supply to farmers, affordability of agricultural inputs supply to farmers, government, private sector and LSM assistance to obtain inputs supply close to the farm.

I. Provision of marketing services

Smallholder producers require adequate marketing services to sustain production and to obtain sufficient income. Provision of market facilities is dedicated to the availability of soft and hard infrastructure that can support smallholder producers. Here the government has an important role to take responsibility in providing market infrastructures (Fan, Fang and Zhang 2001), and the private sector is required to create business linkages to small-scale

farmers in response to the market requirements based on the mutual benefit principal (Schulenburg 2006). Development organizations can also contribute in providing technical assistance to support the smallholder producers to add value and bring their products to potential markets (Shepherd 2007). Provision of marketing services in the Enrekang regency, the presence of government, non-government organisation and private sector services were investigated.

J. Political support

The regional autonomy policy means local government have the authority over local decisions to create more appropriate public policies with regards to the basic needs of their residents to lift them from poverty (Sugino 2010). Policy decisions through bottom up planning is recognised as the most suitable approach in responding to the needs and resilience of local communities (Nst 2008). The question of political support was examined in terms of several issues: local government support for smallholder producers, local government consults farmers regarding their needs, local government adopts suggestions from farmers, local government can be easily contacted, local government keeps promises, and local government is quick to address local concerns

K. Involvement in decision-making in organizations (for members of farmer organizations)

Famer organisations as an instrument of collective voice aim to help farmers to share production information, market information and strengthen the social network. Farmer organisations are important in collaborating with the extension worker to encourage research and development, and also access other favourable support, such as financial institutions (Pertev 1994). In this research, the position of farmer organisations in accessing the potential resources of enabling environment was identified. This section included several questions to measure the impact of involvement in decision-making in organizations involved in project development, decisions reflected in final project design, consultation about marketing activities, and consultation in organisational decision-making

Part 3 Economic development indicator

Section Three sought to gather information about the economic condition of smallholder producers, both vegetable and dairy. The aim of this question was to provide basic information on economic development indicators of two sectors that could be useful to assess changes that occur in these indicators in the future. Questions in this section consist of the housing indicator, and access to communication technologies. The housing indicator is asked in several items: number of bed rooms, main source of power for lighting, main source of energy for cooking, type of toilet, main water source for home, whilst access to communication technologies refers to the question on telephone and vehicle ownerships. The

United Nations categorises housing, water, energy consumption, sanitary services, personal transportation, and communication and concomitant welfare problems as social indicators. Understanding the context of these indicators requiresan integrated framework within the economic and demographic factors and related statistics (United Nations 1989).

4.3.4   Conduct of survey

The survey was conducted from June 2013 to August 2013. Four research assistants were trained to help the researcher during the data collection process. The research assistants were trained to ensure they understand all questions and statements in the survey so as to reduce bias that may appear during the data collection process.

Researchers visited the field, or the farmer's house, to conduct the surveys. At the beginning of the interview, the ethical considerations, length of the survey and preferred language were discussed with the respondents.

4.3.5   Data analysis

Since this phase involved quantitative data collection, data analysis used in this study included descriptive statistics, cross tabulation, independent samples test and paired samples tests. Data coding of open-ended questions was conducted in the beginning before entering the data in the Statistical Package for Social Science (SPSS). Malhotra et al. (2008) recommend that codes have to be mutually exclusive. Responses that had similar information were organized into the same code. Two data files for SPSS analysis were created: one for the vegetable farmer survey and one for the dairy cattle farmer survey. Even though the data coding was done, the data files were screened and cleaned for consistency and missing responses.

Descriptive analysis

Descriptive statistics were used to describe background information on the characteristics of respondents, land status, farming experience and reasons to grow these products, type of inputs and services, the main actors who provided the services and challenges accessing the inputs and services, research and development activities, the condition of infrastructure services, the presence of financial and marketing services and the challenges with these institutions, and descriptions of farmer group conditions.

Additionally, statistical analysis was also used to measure the mean, standard deviation and gap for the level of importance and fulfilment of the enabling environment conditions. The economic indicators in the open-ended questions were also described and summarized by using descriptive analysis.

Cross tabulations

A crosstabulation is 'a joint frequency distribution of cases based on two or more categorical variables'(Michael 2001, p. 1). Crosstabulation is a statistical technique used in the analysis of relationships between categorical (nominal and ordinal) data (David and Sutton 2004). In this study, the cross-tabulations were used to identify relationships between the economic development indicators and income. Chi-square statistic was used to test the statistical significance among the variables.

Independent samples t-test

The independent samples t-test is a statistical technique that is used to test significant differences between the means of two independent variables (Field 2009; Robert 2006). In this study, independent t-test was applied to identify significant differences between vegetable and dairy in the level of importance and fulfilment in accessing each element of the enabling environment.

Paired samples t-test

A paired samples t-test is a statistical technique used to determine whether two means differ significantly under the two conditions for a single variable (McCormick, Salcedo and Poh 2015). In this study, a paired t-test was used to identify any significant difference between the importance and fulfilment levels for each sector (vegetable and dairy) in accessing each element of the enabling environment

4.4 Ethical considerations

In this research, the ethics application requirements of data collection for research at Curtin University was completed by the researcher before undertaking the data-gathering step. The ethical rules and regulations outlined by Curtin University were followed to conduct data collection in both Phase 1 and Phase 2. According to Ticehurst and Veal (2000),ethical issues need to be considered by the researchers for the entire research process, including the designing of the research and collecting and analysing the data.

The important points that should be considered are: not causing harm, not putting pressure on participants, the participants have the right not to take part at any time, the information is kept securely, and confidentiality and anonymity must be maintained when reporting the data (Zikmund 2000a). As mentioned above, in this research respondents were informed about the aim of research and the level of their participation. The respondents were asked permission before interviews were recorded and respondent names were kept confidential to protect their personal identity. The respondents were also informed that they could withdraw any time they felt the need.

4.5 Concluding remarks

This chapter discussed the qualitative and quantitative methods for analysing the enabling environment for agribusiness supply chain. The qualitative research methods explored in-depth interview and focus group discussion. For the in-depth interviews, the questions aimed to capture insights from key informants directly about the enabling environment issues, while in the focus group discussions, questions were used to manage and facilitate group discussion, and especially to investigate important sub-topics of the enabling environment. Data analysis included transcribing data and thematic analysis. Meanwhile, the quantitative research method concentrated on the survey. The survey instrument in this research was divided into two questionnaires which investigated factors involved with vegetable farmers and dairy cattle farmers in accessing the enabling environment. Data analysis used descriptive statistics, cross tabulations, independent sample test and paired sample tests.

The next chapter will present the analysis and results of the study, with the next chapter first presenting preliminary finding followed by the main findings.

Chapter 5.   Qualitative Results

5.1   Introduction

This chapter contains the preliminary qualitative findings drawn from the interviews and focus group discussions. Results from the exploratory phase, including key actors and issues associated with the vegetable and dairy supply chains in Enrekang, are described. The key elements of the enabling environment delivered by institutional policy and procedure, and their effect on smallholder producers and the industrial players in the agribusiness system based on the local characteristic conditions, are the focus of the study.

The aim of the exploratory phase was to describe the enabling environment of the Enrekang supply chains for vegetable and dairy cattle producers from the perspective of respondents who are involved in the chains. It focuses on the institutional policies and procedures that constrain and enhance the enabling environment. The specific objectives of the exploratory phase were to:

1.   Identify key elements of enabling environment and challenges encountered by key participants along the Enrekang supply chain.
2.   Identify the suggested actions to address challenges to enhance the enabling environment.
3.   Determine the roles and functions of institutional policies and procedures in performing suggested actions for the enabling environment.
4.   Identify the challenges encountered in implementing institutional policies and procedures to deliver expected conditions.

The ends of the chapter with concluding remarks and a discussion of implications of the research

5.2   Qualitative findings of the vegetable supply chain in Enrekang

This section describes the elements that make up the vegetable supply chain in Enrekang Regency and the state of the enabling environment. The main actors identified in this phase consist of input and services, production system, traders, wet market and consumers (Figure 5.1)
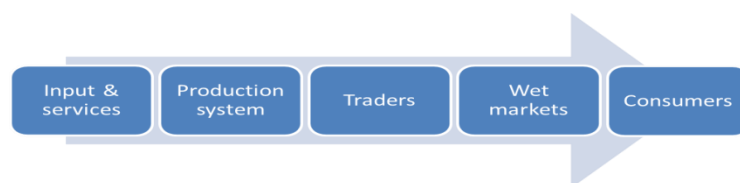
Figure 5.1 Elements of the vegetable supply chain in Enrekang Regency

The vegetable supply chain in Enrekang includes the inputs and services sector related to activities in the procurement and distribution of vegetable inputs. This is followed by the production system which is characterised by the farming system in Enrekang. Next are the traders who market the products and another chain which is the wet market situation for the transaction of vegetable products. Lastly, are consumers of vegetables which are comprised of people who live in this region and the urban wet market. The discussion of each actor is presented as follows.

5.2.1   Inputs and services for the vegetable chain

The provision of inputs and services for vegetable production such as seeds, seedlings, agro chemicals, credit, production and processing are necessary, and the private sector and governments usually provide them.

Seed and fertilizer inputs

Seeds were commonly provided by agro input suppliers and traders, who were in the wet market or areas close to the farms. There were two types of seeds marketed in this area: the seeds that have been labelled and manufactured by an agricultural company, and others without a label or trademark indicating their source. The labelled seeds were available from local agricultural stores while unlabelled seeds were seeds ordered from other regions, and seeds that were used from the previous harvest. Seeds, such as red onion and potato, were ordered from other regions by traders and were in unlabelled sacks without information on quality and source of production. Even so, they were relatively expensive and costly due to inadequate production levels. To get the seeds, farmers needed to order from the traders at least a month before planting, especially for red onion seeds. The main vegetable seeds were red onions and potatoes. A red onion farmer stated:

> *I often buy red onion seeds from Bima that is supplied by traders a month before starting to grow. It is expensive but better quality compared to other sources of seeds.*

Certified seeds *(penangkar benih)* were not available in this region and were only available through a government project. The closest certified seeds were in Java and took around two months to arrive at the production site. Production was sometimes not enough to supply the seed demand. To deal with these conditions, farmers sometimes kept their own seeds from a previous harvest if they had suitable yields and low disease levels. Farmers usually grew this seed when seeds were not available from traders or were very expensive. However, these seeds required particular attention from farmers because there was increased risk of disease due to low seed quality. Yields were also less. A leader of a farmer group mentioned that:

I often kept my own production from previous harvests as seeds for around two months because the seeds were sometimes not available when I wanted to grow potatoes and were also very expensive, if I ordered by traders.

With regards to fertilizers and pesticides inputs, the majority were supplied by the local agricultural suppliers. Traders provided them if they had a cooperative business arrangement with farmers. Farmers also obtained the fertilizers from the wet market or the location site close to the farm gate. To maintain relationships, the agents sometimes provided services, such as indirect payment or credit systems, to customers who regularly transact with them. However, a crucial consequence for the farmers is they have to pay a higher price, especially immediately after harvesting.

I am able to borrow fertilizer and pesticides inputs, but it is only for a very short time, around one or two week,s and will cost me around five percent for every transaction.

The intensity of fertiliser and pesticides input use were higher for the crops which had high potential markets, such as red onion, chili and potatoes. The application of fertilizer and pesticides sometimes depended on the soil structure and disease conditions. A majority of them used high levels of fertilizer and pesticides and did not follow the recommended level, as farmers reported. Indeed, they used fertilizer at the planting and growing phases. Pesticides were used when there were signs of disease attack or insects on their crops around their farm. A farmer commented that:

To get higher production and avoid diseases attack, I spent around 50 % of my budget to buy fertiliser and pesticide for every period planting.

However, some farmers used chemical inputs at rates less than the recommended levels, particularly for vegetable crops such as cabbage, onion leaves and carrots that were considered to have low market demand and unstable market prices. The main reason was because those inputs were expensive and, at times, revenue could not cover those inputs. A farmer who grew carrots commented:

I seldom use chemical fertilizer and pesticides inputs because these inputs are expensive for me, while the price of carrot is sometimes very low in the market.

Agricultural equipment was available from agro-input dealers in sub-district markets, except for agricultural machineries with high technology. The agricultural equipment supplied by the private sector through agro-input dealers is mainly used for land preparation and plant cultivation, such as hand tractors.

Input credit for vegetables

Input credit can be obtained by vegetable farmers through connections with both formal and non-formal financial institutions. In this region, the formal financial institutions are mainly

private banks, state-owned enterprise banks and government banks. However, only state-owned enterprises such as the Indonesian People's Bank (*Bank Rakyat Indonesia, BRI*) and the Indonesian National Bank (*Bank National Indonesia, BNI*) had the infrastructure, and were active in providing micro credit finance for the agricultural sector in this region. There was also another government bank, the Regional Development Bank *(Bank Pembangunan Daerah, BPD)*, but this institution offered credit programs that were subsidised by the government. For example, the BRI and the BNI promote the food security and energy credit program *(Kredit Ketahanan Pangan dan Energi, KPPE)* and the people's business credit program (*Kredit Usaha Rakyat, KUR*) to smallholder producers. To receive credit, both individuals and micro enterprises must meet certain requirements. Individual applicants required a reference from a local authority as evidence that they had a real business; a business license from a competent authority; a viable business to be financed; and also collateral. The creditor should also have a good credit rating with other banks or financial institutions. Through these credits programs, a farmer could apply for a maximum loan of Rp100 million (AUS $10,000), which was categorized as micro credit. A bank informant stated that:

> *Even though there are several credits that are subsidized by government, but obtaining these credits is not an easy or simple way to give to creditors. Standard requirement of banking systems must be followed such as, collateral, recommendation from local authority, and having a productive business. The bank could not process documents without following those procedures.*

To assist smallholder producers in achieving financial assistance, both the BRI and the BNI established rural branches at sub-district and village levels. Through the BRI, microfinance credit was obtained by clients from branches located in district level and sub-districts. At the district level, micro credit was offered to clients requesting more than Rp 50 million, while at the sub-district, clients could borrow less than Rp 50 million. This scheme (of less than Rp 50 million) is really useful for assisting smallholder producers because they do not have to go to the regency capital, who propose small credit scheme. As stated by a vegetable farmer:

> *I was really satisfied when I borrowed credit in BRI at the sub-district of Anggeraja because it can process my document to obtain credit of Rp 50 million without having go to regency capital of Enrekang, which takes a long amount of time and transportation is costly.*

The BNI and the BPD only provided microfinance services at the regency capital, not at the sub-district level, due to limited authority to execute certain amounts of credit. For example, in the BNI, when proposing loans of more than Rp50 million, BNI managers forwarded requests to the regional bank in Pare Pare, which is around 150 kilometres away, to obtain the final decision. Similarly, managers from the *BPD* required agreement from the central

bank in Makassar City. The policy of BNI and BPD meant that farmers had additional time and costs for travelling, and this seemed to be an obstacle. As one dairy farmer commented:

> *A challenge in borrowing money through the BNI is it's costly because the proposal credit could not be processed at this area. It should go to regional bank. It also takes more than a month to organise the document and wait for the final agreement.*

In general, accessing input credit through formal institutions was not a simple procedure. A number of requirements must be met by smallholder producers, such as collateral, and the submission of a project proposal. Due to this high procedural standard and complicated bureaucracy, the majority of vegetable farmers relied on non-formal financial institutions. Non-formal financial institutions such as money lenders generally offered commercial credit. Interest rates varied greatly, and mostly depended on the type of commodity and market price, with 25 percent to 50 percent of the loan repayable after selling their farm produce. As an example, a key informant reported that:

> *Most of the farmers who grow red onion in sub-district Anggeraja, sub-district Baraka and sub-district Malua are charged an interest rate of about 50 percent immediately after the yield has been marketed.*

Despite the high interest rates, farmers were more likely to borrow from informal money lenders. Because they could borrow without collateral, money was available every time, and there were no procedural administration or operational costs. In addition, informal credit providers, such as traders, have established business relationships with the farmers in providing seeds, agrochemical inputs, and also when marketing their products.

Training services

Training services were generally provided by the government extension services, which are part of the function of local governments. Advising and giving information to farmers were mostly conducted by extension workers at the sub-district level. The Centre for Agricultural Extension Information *(Balai Informasi Penyuluhan Pertanian, BIPP)* is the central office tasked to organise and manage the extension workers in giving advice to farmers. Field schools and case studies in various subjects were developed regularly to enhance their capabilities, so that they have good capacity to prove their knowledge and skills in appropriate methods when implementing their knowledge to farmers in the site. Regular meetings were conducted every week to create and evaluate programs in order to obtain appropriate methods to solve problems arising in farmers' fields.

Training was provided in farm fields by giving examples and creating discussions with farmers about vegetable production. As an example, a pilot program for each agricultural commodity was designed to transfer knowledge from the extension workers to farmers on

cultivation methods, disease prevention, handling and packaging. It was also an opportunity for farmers to share their experience. In addition, at the sub-district level, each extension worker had the responsibility to assist farmer groups in controlling farm activities, and also to facilitate communication with the local government. A coordinator of extension workers commented:

> *I regularly organise meetings among extension staff to share knowledge and experiences with each other before giving advice to farmers. This is to ensure that advice given to farmers can solve their problem properly.*

Furthermore, the effectiveness of technical assistance was highly dependent on the ability of extension workers to transfer new knowledge, to disseminate technology, to eliminate problems and, also, to enhance productivity on farms. Extension workers must have a specific knowledge and competency in technical areas, particularly pest and disease prevention. Each extension worker was obligated to join training provided through cooperation with agricultural research centres and research institutions at the provincial and national level. However, lack of capacity, limited facilities and insufficient numbers of extension workers were obstacles that impeded the effectiveness of extension programs to assist farmers. Lack of capacity to disseminate information and technical assistance for farmers was caused by poor network communication technology to access new information, and limited opportunity to advance joint training within more specific areas. A farmer stated that:

> *I am still unsatisfied to get better solutions from them. If I ask about technical plantation, fertilizer and pesticides used, eliminate pest and disease attack,.most of their advice is very general information without specific solutions.*

Limited transportation facilities and operational budgets also contributed to the unproductiveness of extension work with farmers. Since most of the area is mountainous and hilly, availability of transportation facility was important to accelerate the mobilization of giving advice from one village to other villages, but transportation facilities, such as a motorcycle, were not available for every extension officer. Therefore, only providing scale priority for farm problems is the only a way of solution could be found. As extension workers mentioned:

> *Due to inadequate transportation facility and operational budget, there are only a few locations that can be reached in advising technical production and responding to farmers problem.*

The limited numbers of extension workers who work in a sub-district was also a challenge in giving advice and information to farmers. In this region, there were only five professional

extension workers in each sub-district, however there are many farmer groups that need to be served in one village.

5.2.2 Production system

Farmers were the main source of production within the vegetable supply chain in this region, with few traders involved indirectly. The average land area owned by a vegetable farmer was less than 1 ha, while some of them only rented land. Several farmers were involved in a farmer group, with around 10 to 15 farmer members. The majority of land used for vegetable production was steep and mountainous and was upland rainfed. Farmers prepared and cultivated the land using traditional methods and machinery. Traditional methods involve simple manual equipment, such as hoes, crowbars, hatchets, and ploughs. Traditional methods were common for the farmers who grew crops with low market prices and low operational costs. A farmer commented:

> *I usually open my land to grow vegetable crops with a manual system through using hired labour. Operational costs by manual system ischeaper than using a machine.*

Farmers who used machinery, such as hand tractors, to cultivate land were normally those who used intensive and market-oriented farming systems. However, the rental cost of machinery tended to increase with time. A red onion farmer stated:

> *By considering the planting and harvesting times and price of the product, which increases at certain times, I prefer to rent a hand tractor for opening my land, even though it is quite expensive.*

The main vegetable crops grown in this region were: carrot, cabbage, chili, red onion, potato, maize, mustard, scallions and sweet potato. These crops were selected by farmers because they were adapted to local climatic conditions. In areas with slightly cooler and heavier rains, farmers were more likely to grow cabbages, mustard, potatoes, carrots, chili and scallions. These crops were in Alla, Baroko, Masalle, and Curio sub-districts. Crop cycles were estimated to average around two and half months, with harvesting sometimes beginning at 45 days.

Having potential markets was another factor that encouraged farmers to grow particular crops. For example, potato had a stable market price at harvest. Limited areas that were suitable, and lack of supply from other markets, were the conditions that favoured the market for this crop, although the only available market was the wet market. In addition, due to inadequate seed quality at the local area, farmers obtained seed from the local market, or they kept their own seed from the previous harvest. These obstacles prevented them from being able to supply supermarkets. An informant from the focus group discussion mentioned that:

It is difficult to grow crops with better quality and high yield productions for every harvesting time. The main problems are that better quality of seeds is unavailable in this region, which is mostly imported from other provinces, and it is also very expensive. Seeds are commonly supplied from the wet market, or from using from previous harvest.

In more humid areas, farmers were more likely to cultivate red onion, maize and tomato crops, which were mostly grown in the Anggeraja, Baraka and Malua sub-districts. Those places were also known as the centre for red onion production in South Sulawesi province and had the capacity to supply several regional markets in South Sulawesi and some islands in the eastern part of Indonesia. Based on the climate factor, those crops were able to grow with high intensity production systems, but the main production was red onion. High market prices made farmers more likely to grow this crop, with high intensity production from September to February mostly recognised by farmers as the time that red onion has the highest potential for good market. The regional and inter-island wet markets were also under-supplied during those months, as most farmers in Bima (eastern Indonesia) and Nganjuk (Java Island) were not producing red onions then. This situation has brought potential benefits to farmers. As a red onion farmer mentioned:

If farmers in Bima and Nganjuk do not grow the crops from around September to February, most of the farmers in this area grow red onion due to lack of supply in several regional markets; the yield price increases dramatically.

The profitable market for red onion meant both formal and informal financial institutions were more likely to provide credit to assist production:

It is very easy to get credit assistance when the price is increasing. Traders and money lenders offer the credi and, the BRI provide the credit facility with a quick and easy procedure.

However, high intensity production had implications at the farm level with the high frequency of disease attack and decreasing soil fertility levels. To reduce this problem, other crops, such as maize and tomato, were planted after red onion to maintain the soil fertility and reduce disease. In addition, as part of the production system, to avoid lower prices and anticipated over-production in the market, farmers do not grow a crop which has the same harvesting period as other areas. For example, cabbage area planted was reduced in July and August, because other regencies, such as Bantaeng and Gowa, planted at this time. A key informant who was a farmer leader stated:

Managing time to grow and to harvest crops are crucial points should be given attention, to avoid over production in the market. If over production happens, the price of yields is very low. I and other farmers are sometimes unwilling to bring to the market due to unbalance with the cost of transportation and operational costs.

5.2.3   Traders in the Enrekang vegetable supply chain

In this region, local traders, middleman, brokers and inter-island or regional traders are the main players in the vegetable supply chain. Each trader has links in organising the market chain of farm outputs. In this region, the market chain of vegetable products through the involvement of traders can be illustrated in several channels (Figure 5.2)

In the Chain 1 presented below, those farmers who could only produce small amounts of produce, mainly for daily consumption, sold most of their farm production to local traders/middleman, because farmers needed money immediately. Transactions were conducted through a direct payment system, and then the local traders/ middleman selling directly to local consumers in the wet markets.

Product flow; ⋯▸ Capital flow
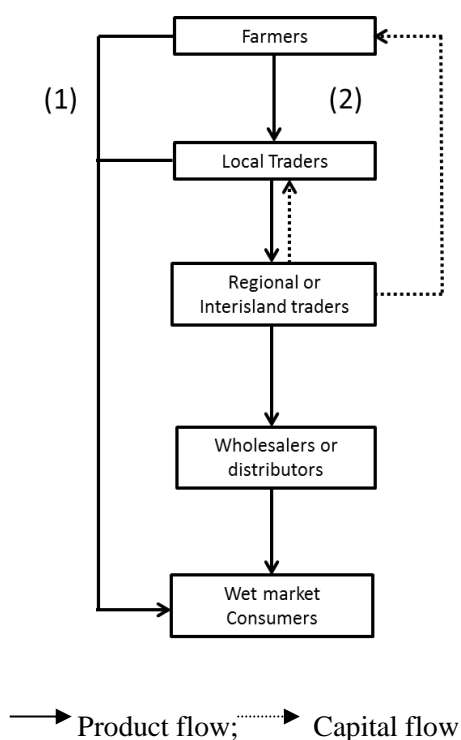
Figure 5.2: The market chain of vegetable products

Chain 2 involved several actors conducting transactions, with each actor having different functions in running the market transaction. Farmers were able to engage in intensive and market-based farming systems. Each farmer had the ability to produce large production volumes in every harvesting period. Their yields were marketed to the local traders or direct transaction to regional and inter-island traders, either in the wet market or in the farm gate. Transaction with local traders or middleman occurred if they were able to pay cash, even though the prices they offered were less than the market price. A farmer commented about his transactions with the middleman:

Even though the price of my potatoes is lower by around 10 percent than the normal prices I am able to receive cash payment from them.

Thus, in many cases, most of the local traders bought on contract, or acted as brokers or intermediaries, for regional traders and inter-island traders. They obtained capital from the regional and inter-island traders and collected the products for them. There were also local traders who acted as speculators and bought products that they sold to other traders. If they could not find other buyer or traders, they sometimes cancelled the deal with farmers.

In other transactions, several regional and inter-island traders collected products directly from the farm gate. This involved partnerships between farmers and traders. Farmers' main role was to produce yields, and traders provided capital for operational cost of production and selling the products. There were also traders who provided agricultural inputs, such as seed, fertilizer and pesticides. This business arrangement led to the creation of mutual partnerships, where farmers who did not have enough resources were able to produce yields to obtain income. At the same time, the traders were able to obtain a continuous supply.

Furthermore, most of the products were marketed in regional markets around the south Sulawesi province, several urban and inter-island markets in Sulawesi, Kalimantan and Papua islands through several wholesalers, market stalls and retailers that have been a part of this system. Thus, wholesaler, market stalls and retailers in regional and inter-island wet markets are the last destination in selling vegetable products to consumers.

However, Chain 2 has weaknesses in terms of the payment system and cooperation pattern, either between farmers and traders, or between traders and traders. Transactions were conducted traditionally without any contract agreement about a payment system, supply mechanism and quality of products. Payment occurred as a whole after the products was marketed. The inadequate contract agreements led to difficulties, particularly if there was a transaction failure at the market destination. This is because payment was often delayed and, sometimes, there was no payment. It created a serious problem to owners of products to pay the interest penalties, either from the formal bank or money lender, and also sometimes led to them stopping vegetable farming. One farmer reported that:

With traditional transaction systems, certainty of payment from traders is unpredictabl., If the demand for product increases in the market destination, the payment will be faster, but if there is a low demand of products, payment will take a couple of months, and sometimes un payment from traders. I have suffered from loss of income two times through this system.

A similar condition exists for many local traders in the Sudu wet market (a centre of vegetable marketing) who have been unable to continue their business due to debt burdens.

The debt burden is mainly from the financial sectors that provided credit. A trader in Sudu Market declared:

I have suffered from loss of income a few times when I still distributed the vegetables in several markets in Kalimantan Island. The main problem is always late payment from the agents, and even sometimes they do not pay. I do not have an authority to charge due to inadequate written agreement or contract.

Credit and agricultural inputs supply from either regional and inter-island traders occurred without formal contracts. Trust is fundamental in maintaining the payment mechanism and determines the success of a business. However, this system was unfavourable for farmers, particularly when they want to find other traders who offered better prices after harvest. Farmers had no choice but to sell their farm outputs to the traders who provide the capital and supplied the inputs. In regards to this issue, a farmer commented that:

Even though the price of the products is higher than the market price that is offered by them, however I cannot dea;, the price decision and marketing on these yields are managed by the capital provider.

5.2.4   Wet markets for vegetables

Most Enrekang farmers are subsistence farmers, which means they concentrate on improving productivity to address the necessities of daily life, rather than on value adding. Most of their products are marketed in traditional wet markets (*pasar*) from small stalls (*kios* or *los*). This type of market is located in villages (small) and in sub-district markets (bigger), however not every village and sub-district has a wet market. Open days for wet markets depends on the distance or location of a village to another market. Generally, they open once a week and only some wet markets in sub-districts open more than two times a week.

Most farmers who bring the products to the market undertake other marketing activities, buying daily living requirements such as food and clothing. Supporting reasons for their existence include reasonable prices and good atmosphere for consumers. In the Enrekang regency, there is one big wet market (*Pasar Sudu*) that has an Agribusiness Sub Terminal (AST). The AST has a place to conduct agricultural transactions and distribution control of agricultural products that will be marketed to local, regional and inter-island markets. By supporting the Agribusiness Sub Terminal, the Sudu wet market has the ability to supply regional and inter-island markets in eastern parts of Indonesia. According to local traders in *Pasar Sudu,* agricultural products in the AST come from two sources: products transported by farmers coming from several sub-districts, and products imported by traders from other regional markets in eastern parts of Indonesia. Imported products are ordered by traders from other areas to manage supply and fulfil demand to other destination markets. For instance,

the potato is imported from North Sulawesi to *Pasar Sudu* and, after that, it will be marketed to other islands. Selling and buying of products occurs on four days in a week, mainly in the morning.

It is expected that with the existence of the AST, most products will be marketed by traders follow quality standards due to adequate facilities such as grading, sorting, consolidating and packaging. However, most of the products did not meet those requirements.

5.2.5   Consumers

In rural areas such as in Enrekang regency, the main consumers of vegetable products in wet markets are people who live in this region. In urban markets, such regional market in Makassar city, the consumers are either from high or low-income levels. The ability to negotiate the price of products is a factor that makes it convenient for buying products. Most vegetable products that are purchased by consumers, either from wet markets or directly from the farm gate, are not checked for health standards. Though some farmers produce using eco-friendly farming systems, it is difficult for consumers to assess whether they have agro-chemical residuals or not because of inadequate labelling of their products. Even though the vegetables may appear fresh and look good physically, there is no guarantee that the products are of a high quality. Poor quality packaging is also encountered with products, whether coming from farm gate or other wet markets, because they are packaged in sacks or plastic bags.

5.3   Concluding remarks on vegetable chain

The key actors of the vegetable supply chains are input and services, production system, traders, wet market and consumers. Vegetable seeds, agro-chemical inputs and production and processing tools are often supplied by agents and traders. Farmers can connect to formal credit sources with low interest rates; however complicated procedures and inadequate collateral caused many of them to deal with informal financial services. Training services were only conducted by the government extension services. Field schools and other training programs are regularly offered to improve levels of farmer knowledge and experience. However, insufficient numbers of extension workers, poor vehicle facilities, and operational budgets were challenges to the provision of services to vegetable farmers in this region.

Smallholder farmers are the main production source in the vegetable supply chain. The average land area owned by a vegetable farmer is less than 1 ha, while some of them rented land. The types of crops that were grown by a farmer depended on the climate, land topography, potential market and situational price. However, a lack of marketing linkages means it is still difficult to be competitive in both domestic and international markets.

Local traders, middleman, brokers and inter-island, or regional, traders are the main actors in vegetable trading. Their ability to conduct trading is highly dependent on their own capital, position and business area. As traditional transaction methods dominate, trust is a fundamental point in maintaining the payment mechanism and determines the success of business among the actors. However, both of those transactions often lead to difficulties for farmers and traders because of insufficient supply and a lack of formal contract agreements. Most products are marketed in traditional wet markets (*pasar*) and open days depend on the distance or location of a village to another market. However, most of the products are poor quality standards.

5.4   Qualitative finding of dairy supply chain

The dairy supply chain in this region consists of four main actors, input and services, production system, wet market traders and consumers (Figure 5.3). Dairy inputs and services can be divided into the inputs that are mainly supplied and organised by the private sector, such as heifers, veterinary drugs, fodder and credit facilities, whereas the services, such as training services, are facilitated by government institutions.
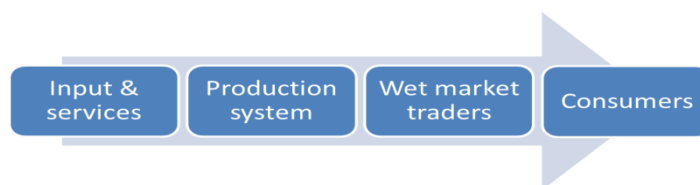
Figure 5.3: Elements of the dairy supply chain in Enrekang Regency

5.4.1   Input and services

Dairy inputs are mainly heifers, veterinary drugs, fodder and animal equipment. The actors who provided the inputs included individual farmers, local entrepreneurs, and the local government. In regard to heifers, supply of inputs was organised by individual farmers, farmer groups and the livestock department, and mostly transported from breeding farms in Java Island around Bandung, Semarang and Surabaya, not from local production. Intensive breeding systems and commercial orientation are the conditions that make those areas the leading centres of dairy population, and also the main sources of milk. In addition, most of their heifers have better genetic performance, are suitable to the local climate, and are cheaper compared to other areas. Due to their comparative advantage, most dairy farmers preferred to purchase heifers from those places. A farmer stated:

One of the reasons for me to buy heifers from breeding farms in Semarang and Surabaya is because their heifers have good genetic quality and they produce a high volume (quantity) of milk. They can also adopt to the local climate in my place, so maintaining their health condition is not difficult for me.

There were also local suppliers of heifers, but their capacity to meet heifer demand was very limited, and also expensive. A lack of heifers in the local area was a constraint to developing this region into a new dairy industrial zone. Ordering and transporting heifers to the farm site was very expensive and took a long time. A farmer leader mentioned that:

We have to pay additional costs for transportation, administration procedures and medical assistance. It takes around two weeks for heifers to arrive at the farm.

To reduce costs, farmers purchase heifers in groups to share the operational costs, such as transportation costs, medical control and other necessary services during the time of transportation.

In regards to medical and fodder inputs, these inputs are not available on the farm site. The availability of these inputs mostly depends on supply, either from agents or agro-input dealers, where they are mainly from the provincial city, Makassar. One major challenge to this is that farmers sometimes find it difficult to access extra, or specific, medicines that would be used to eliminate pest disease and improve milk production. The local agro-inputs dealer in Enrekang also do not provide any services, even though, for the regular customers, such credit service like in vegetable supply chain.

Input credit for dairy

In the Enrekang regency, most dairy farmers used credit schemes from the formal financial sector, since no informal financial sector was available. Similar to vegetables, the formal financial sector was delivered by the state-owned enterprise banks, namely the BNI and the BRI, and the local government bank called the BPD. Delivery of credit schemes, requirements to obtain loans from these schemes, and the challenges that impede farmers from dealing with those banks, were the same as for vegetable farmers. For instance, in regards to the credit program, the Food Security and Energy Credit program (*Kredit Ketahanan Pangan dan Energi, KPPE)*, and the People Business Credit program *(Kredit Usaha Rakyat, KUR)*, have contributed significantly to dairy farmers in obtaining the credit scheme with a low interest rate. As a farmer reported:

I am able to add my dairy herd to 15 in the last two years since the government promoted the KUR with lower interest rates, around 7 per year. It also increased milk production compared to before, so that I am able to produce the dangke significantly, around 40 to 60 pieces in a day. I have never delayed to pay my credit to the BRI.

With regards to the contribution of the local government bank, in the last few decades the growth of dairy cattle farming has been supported by the contribution of the BPD. In this scheme, the government allocated 70 percent of the total budget for farm credit, with the shortfall in funds covered by the BPD. Both the government and the BPD budgets are paid by farmers through the credit system, although the interest rate is lower than commercial credit. In this system, the BPD has the authority to select farmers who are able to get credit based on their ability to pay the loan, manage the financial administration system and repay regularly. The livestock department and extension workers train a representative farmer in each village as the field health worker who conducts supervision and works intensively with farmers.

However, like the vegetable supply chain, complicated procedures required by banks were a main barrier for dairy farmers. Lack of understanding about procedures and financial management caused them not to want to meet the banks. Consequently, some farmers used their own money for doing business in dairy. In addition, limited banking authority at the local level was a barrier in executing the credit agreement that impeded them from meeting with the banks.

Training services

The main extension activities for dairy were providing services in the form of breeding, and artificial insemination to improve milk production and livestock health. Technical advice and information for dairy farmers were provided by extension workers at the sub-district, which were mostly located in the Alla, Anggeraja, Baraka, Enrekang and Cendana sub-districts, and which were bases of production. Extension workers visited farms regularly, met with farmer groups in response to problems, and provided and demonstrated technical solutions. However, a barrier that impedes extension processes in the dairy supply chain is the imbalance between the number of extension workers in a village and the number of dairy farmers. A farmer noted that:

> *In my area, Cendana sub-district, there is only a veterinarian and two animal health officials who usually come to give advic., But this is not effective because there are more than 1,000 dairy farms which should be controlled. This makes it very difficult to get appropriate advice from them, especially on disease prevention.*

Another barrier is that extension workers have insufficient knowledge and experience in the different subjects required. Extension staff noted that because of inadequate numbers of extension staff in their sub-district, extension staff who have a good capacity in vegetable crops sometimes also gave advice to dairy farmers, even though their knowledge on technical systems for dairy was very limited. Therefore, farmers were sometimes unwilling to connect with extension staff because they could not solve their problems. For instance,

dairy cattle farmers often find it difficult to connect with extension workers who have the capacity to control animal health conditions.

Specific training about the prevention of eye disease and animal feeding control are absent in the local area. Similarly, improving milk production with artificial insemination with limited socialisation, resulted in farmers with a lack of skills and knowledge to detect oestrus properly. The limited number of professional staff as inseminators is also another obstacle that prevents this program from being successful. Furthermore, the local government cooperates with several research institutions to train extension workers, however involvement is limited because of limited budget allocation for human resource development. Therefore, health problems during calving and mating are crucial conditions faced by farmers because of a lack of understanding of appropriate management methods. Consequently, health care and milk productivity tend to decrease, and cows do not reach their potential milk productivity and can sometimes die. Extension staff at the regency level noted:

> *One of the problems in the extension system in this regency is the limited budget to conduct specific trainings for extension workers intensively, so that many dairy problems, specifically about disease problem, could not be solved properly. There are only four veterinarians in this region, so they could not reach all dairy farms.*

As a way of solving those problems gradually, the local government has created a strong partnership with several research institutes, such as the Indonesian Institute of Science and universities, to conduct research and implement new technology based on the actual production condition and specific location. Through this program, intensive training to obtain specific skills in disease prevention, application of technology for milk processing, treatment of lactating cows, and sharing experiences with farmers in Java Island are programmed regularly. These programs aimed to enhance the extension workers' performance in responding to the farmers' message. However, in some cases, the extension staff still struggled to understand the technologies because of basic education and a lack of skill and ability. Consequently, farmers tended to learn from experience and share information with other farmers to solve a problem in a simple manner.

5.4.2   Production system in dairy

The two main management systems in this region are the traditional and commercial farming system. The traditional farming system is at a household scale, with an average ownership of four to five heads of dairy cattle per household. They are subsistence farmers, where dairy production is another source of income, not the main livelihood. In this system, pens were commonly constructed very close to the house, sometimes blending with the house. In

addition, they had poor drainage systems. Some of them were likely to give cut and carried forage, rather than concentrates. The majority did not participate in farmers' institutions, such as farmer groups, to obtain information and share experiences, so their level of knowledge about dairy farming systems was relatively low. In addition, poor sanitation resulted in environmental pollution around the area where they lived. Consequently, milk production and, hence, profitability was lower.

Obtaining maximum profit was the main target of commercial dairy farmers in this region. Commercial farms had around eight to 15 dairy cattle per farm, with a few having more than 20. Family labour was used to reduce costs. The successful dairy farmers in this region had strong connections with the extension staff, agricultural department and formal financial institutions. High capacity production of milk was achieved with support from other institutions, such as technical reproduction from the extension services, and attendance at several advanced trainings on milk production and animal health that were organized by research and development institutions. A dairy farmer commented:

> *I always try to join the training that is programed by extension workers and agricultural department. My main motivation is to overcome the problem of my dairy cattle, especially health problems, such as eye disease, worm disease and decreasing of milk production. By often joining training, I've been able to help other dairy farmers, if they need assistance to solve their animals' health problems.*

In addition, the financial institutions also offered credit to commercial farmers due to higher profit margins, and farmers were able to make regular loan repayments.

5.4.3 Wet market traders for dairy products

The main product of milk production in Enrekang regency was the *dangke*, which was sold directly to regular customers or to wet market traders. Regular costumers either bought from the farm or ordered by mobile phone. Generally, consumers ordered a day before the *dangke* was produced. This was because demand was relatively high, and sometimes the producers could not fulfil costumer demand. Limited milk production in a day affected their ability to respond to consumer demand. However, consumers were more likely to buy the *dangke* fresh, because a lack of packaging and storage systems meant that farmers must sell the product immediately after production. As this product is in high demand, producers are given the opportunity to improve their business because they can control the amount of product that should be produced every day, as well as the amount of earned income.

Wet market traders sold *dangke* in the local market. They bought it from farmers and brought to the market. Only a few traders in the wet market sold *dangke* and they sold it in small quantities, mainly in the morning. Indeed, traders were worried about buying and

selling in large quantities because the product is perishable. If buyers don't purchase all the *dangke*, for example, traders may lose money because the product cannot be stored due to a lack of preservation and packaging systems. Lack of processing technology effects their ability to sell in modern markets. There were no specialised traders of *dangke*:

> *I am afraid to sell more than 10 pieces of dangke every day because they are easily damaged with no packaging, and cannot be saved at home.*

Recently, *dangke* crackers have been marketed, but production was limited. This is a new product and still in the promotion phase. Positive features of this product were good packaging which was also labelled, and valued-added production. It also has a chance to be marketed in supermarkets. Dairy meat is a supplementary product, which is marketed only in the local market. Farmers do not send it to supermarkets because it is costly due to long distance, and it is difficult to maintain meat quality due to poor cold box. In addition, dairy cattle that are slaughtered are relatively limited; sometimes it is only one in a week. Milk processing for human consumption is also absent in this area.

5.4.4 Consumers of dairy products

The main consumers of *dangke* and *dangke* crackers were people who live in the region or know about the products, and they buy it for daily consumption. A dairy trader indicated that consumers were more likely to buy this type of food because of the conventional processing that does not use chemicals, such as food preservatives. However, consumers who regularly purchased this product had higher incomes, since it was perceived as an expensive food when compared to other daily foods.

Consumers from outside the regency usually order by phone directly from the farmer because the food is not available in the market or supermarket. For instance, Makassar consumers order by phone and it is delivered by public transport. A dairy farmer commented:

> *I sent at least 3 packets of dangke (around 90 pieces) two times with in a week to my regular consumer in Makassar through public transport. They ordered by sending a message or by telephone call around 3 days before the dangke is produced, and, after that, I send their orders to them.*

Due to the high demand from the urban consumers, dairy farmers were interested in gaining access to supermarkets or public markets in nearby cities. Research is required to make the product more durable and of consistent quality so that it can be sold in these markets. This requires cooperation among government institutions that can facilitate this and engage with the private sector.

5.5 Concluding remarks on dairy chain

There were four main components in the dairy supply chain, input and services, production system, wet market traders and consumers. The key inputs for dairy were heifers, veterinary drugs, fodder and animal equipment. Individual farmers, groups and government often sourced heifers through connections in Java Island. Veterinary drugs, fodder and animal equipment inputs were provided by agents or agro-input dealers from Makassar. Credit is available for business activities and investment infrastructure, with most using the government credit programs, Food Security and Energy credit *(Kredit Ketahanan Pangan dan Energi, KPPE)*, and People Business Credit (*Kredit Usaha Rakyat, KUR*). However, complicated procedures and illiteracy were barriers that often impeded smallholder producers from accessing credit. Technical breeding, artificial insemination for milk production improvement and livestock health were the main activities of the extension services. However, limited numbers of extension workers, insufficient knowledge and lack of experience meant farmer problems were not addressed effectively.

The two main dairy systems were the traditional and commercial farming systems. The traditional system is small scale, while the commercial system has better management, and obtaining maximum profit was the main target. The main milk product is *dangke,* a local cheese with good local demand, which could be expanded. *Dangke* crackers were also produced and marketed, but production was limited. *Dangke* was sold to regular consumers and in local wet markets by local traders. The main consumers buy it for immediate consumption, and were richer, local people who could afford it and know and like the product.

5.6 Key elements of the enabling environment in Enrekang Regency

5.6.1 Land tenure and property rights

Land is a key resource for smallholder producers in Enrekang. Access to land is an essential issue to ensure sustainability of their farm, and determines the type of crops, either perishable or non-perishable, that can be grown. In Enrekang, farmers who did not have their own land accessed land for agriculture through crop sharing and rental land. The crop sharing arrangements were commonly organised based on oral communication or unwritten agreements between the landowner and the land users. The land user cultivated vegetable crops and shared the yields after harvest with the landowner. There were no specific rules to govern the amount of production that would be shared with the landowner. It mostly depends on the area of land and total production, although the returns from the production mostly went to the land user. However, these agreements were not secure and were a risk to the land

users, because the use of land depends on the needs of the land owner, who could take over at any time. In addition, land users were reluctant to invest in agricultural infrastructure and this sometimes this led to lower productivity.

Rental land arrangements were also unwritten agreements, with the payment system and time period of using the land an important part of the arrangement. The land users paid the landowner for each harvesting period, or annually. The amount of payment was based on the market prospects for the crop. For instance, rental land for growing red onion was more expensive, around three times the rate for cabbages. The presence of agricultural facilities, such as irrigation infrastructure, also affected the value of the contract. This was common for red onions, which was recognised as profitable. As a red onion farmer noted:

> *I always rent the land, including irrigation water, to grow red onion two times in a year. This is more expensive than renting the land for growing cabbages. But to find other lands is difficult because not all the lands have good soil, and also available rental land is very limited. Otherwise, l usually order two months before starting to plant the crop.*

The last contract system is land pledge. The owner of the land offers his/her land to anyone to hire for a certain fee. The hirer can keep cultivating the land until the owner returns the money. However, the uncertain ownership of the land makes the hirer unlikely to build permanent infrastructure. Therefore, hirers (farmers) only grow low cost crops, such as tomatoes, cabbages and carrots.

None of the above land agreements were present in the dairy industry, mainly because dairy farming requires only small land areas for construction of pens for producing milk. Land used for forage was mostly unproductive land for growing vegetables.

The National Land Agency *(Badan Pertanahan Nasional, BPN)* manages land tenure and property rights. It is a government institution that is responsible for organising land administration at the national, regional and local levels. The functions of this institution are to provide land administration services for organising certification, providing assurance of people's rights to land, and handling and solving land disputes and conflicts. However, there were a number of obstacles that impeded organising land certification, such as that the land administration system is still manual and non-transparent, therefore it takes a long time to obtain a certificate, and it is expensive. As mentioned in a farmer focus group discussion:

> *Lack of transparency for each of item that should be payed, registration of the administration is not yet online, and it takes a long time, sometimes more than three months, to get the certificate. The cost for addressing and obtaining the certificate individually is expensive…these are the reasons that obstruct many farmers from registering their land.*

In addition, geographic location, as the majority of the farmers live in village areas with poor road access to the city of the regency, is another barrier that inhibits them from registering their lands. Organising land documents requires extra costs for transportation and is time-consuming.

In Enrekang, land for both vegetable and dairy farmers was classified as registered and household rights land. Registered land is farm land that has a certificate and a tax document. This status gives farmers the right to own and use the land for agricultural activities. Farmers were able to use this certification as collateral to borrow from the banks. A red onion farmer stated:

> *By having a certificate from the BPN, I am able to apply credit to finance operational costs on my farming activities, such as buying seeds, fertiliser and agrochemicals.*

Under household rights, the land is identified as inheritance land where the owner of the land is a family member. Family members can use the land based on informal or oral agreements, with the agreement to use the land being for a certain time only.

Public land that is managed by the government is not available for growing vegetable crops in this region. While for dairy farming there is land available in the Maiwa sub-district, it is difficult for smallholder producers, as a land contract must be for a term of around 30 years. The process for organising documentation requires meeting with several ministries under the central government and this takes a long time. Increasing land conflicts in the community for those who live around the Maiwa sub-district has also constrained land use. Indeed, many farmers were occupying the land illegally.

Secure property rights are a critical factor for smallholder producers to foster social stability, environmental sustainability, increase productivity, and encourage better farm management. Land disputes in this region were often caused by family conflicts, especially over the time agreed for utilisation of inheritance land. The main issue is the small area of land for the number of family who want to utilise it. As a vegetable farmer commented:

> *I am more likely to grow vegetable crops with rental land rather than use inheritance land. Conflict with my brother and my sister often occur due to the need to use the land regularly, especially for the planting period and sharing the yields. It is also difficult to increase crop intensity because of the limited time period to use the family land.*

The national government created the Land National Operation Project- *Proyek Operasi Pertanahan Nasional (Prona)* to support farmers to obtain property rights and tenure security for their land. The central government allocates the budget through the BPN at the local level to register farmers' land and provide certificates without requiring payment. This program was very useful because the local farmers can use it for accessing financial credit as

collateral for the financial sector. However, this program did not reach most of the smallholder farmers due to quota restrictions with complicated selection, limited budget and irregular program delivery. Other local government programs existed to enable farmers to obtain property rights for their lands through allocating a budget to pay the administration costs. While these were helpful, due to limited budget they were not regular programs.

In dealing with this issue, the presence of a government program for ensuring the property rights and tenure security was one of the most important policies that should be programmed regularly. Nonetheless, it was only 50 percent of the budget that would be allocated by government, as part of the cost in organising a land administration would be contributed by smallholder producers, as reported by the leader of the farmer group.

5.6.2 Infrastructure

Development of infrastructure is one of the prime movers for government in supporting the smallholder producers in accessing the competitive market and opening isolated areas for agricultural inputs distribution. Government is responsible for establishing and maintaining infrastructure at three levels: national, provincial and local. At the national level, the Ministry of General Infrastructure has the authority to focus on the establishment and maintenance of national roads, determination of national highways, development of water conservation, and airport and port infrastructures. While at the local level, both provincial and local governments have a role to maintain the national infrastructure, and also to improve and expand the local infrastructure based on development priorities.

In this study, the researcher examined the main infrastructures that contribute to improving agriculture and its ability to reach potential markets at a local level. These included road infrastructure, water and irrigation facilities, and telecommunication and electricity.

Road network

In the study site, the road network system that connects and distributes farm inputs and products to the market, and provides access to the isolated areas, is classified into three categories: the national road (*jalan negara*), provincial road (*jalan provinsi*) and district road (*jalan kabupaten*).

The national road system is contracted and managed by the central government, and generally functions to connect several provinces in an island. It has a regional office to control and maintain roads at a provincial level. Under a national government project, national roads have been constructed and provide very good access between several regions within the south Sulawesi provinces in Sulawesi. A new national highway of 123 kilometres, including 49 bridges, has been built from Makassar to Parepare (Daniel 2011). These developments have accelerated the distribution of agricultural production to reach markets in

Makassar. With the new national highway, traders were able to reach the urban wet market in Makassar around two hours faster than before, which previously took about eight hours to travel the 240 km from the Sudu wet market. However, the road network is only well-constructed for areas of the province which are categorised as high economic potential and have a high population density. Other provinces such as North, Middle and Southeast Sulawesi are still poorly connected to agricultural markets in Enrekang. For instance, traders reported that they have to spend more than 20 hours to transport products for the 370 km from Enrekang to the Southeast province of Sulawesi, due to poor road conditions. This increases both the cost and time and, as a result, the products are expensive for consumers

Provincial roads (*jalan provinsi*) are established and maintained by the provincial government and link the regency capital to at least two capitals. The provincial government constructs and maintains bridges and paved roads to accelerate the distribution of agricultural inputs and outputs to markets within the districts in South Sulawesi province. Many provincial roads were in poor condition. Traders commented that transportation of their agricultural products to Mamaju province took many hours, and additional costs, to reach the market destination. As stated by traders:

> Even though the distance from Enrekang to the wet market in Mamaju is only around 270 kilometres, I have to spend approximately 12 hours due to the road conditions in several regencies being narrow and potholed.

District roads (*jalan kabupaten*) are constructed and maintained by the Enrekang government. Roads are designed to open access between the regency city and sub-districts, and between sub-districts and villages. In general, roads from the regency capital to sub-districts were paved, and some of the districts had concrete roads. However, at the village level that mostly influences farmers to conduct farm activities, most of the farm roads used to reach market were in poor condition and were still unpaved, generally narrow and potholed. Many farm fields, especially vegetable farms, can only be reached by using a motorcycle to distribute agricultural inputs to farm gates. There are also some roads which cannot be reached by using transportation facilities, so handling their yield manually is a solution. Within these conditions, operational costs are increased. There is also concrete road access to several villages, however the range is still limited. An experienced cabbage farmer reported that:

> It is very difficult to transport my cabbages and carrots to the market because the road condition is very poor and only jeep or truck can go to my place. It is also more expensive - at least two times higher during the rainy season.

In regards to dairy farms, road infrastructure can be accessed by both public transportation and other types of vehicle facilities. This is because they engage dairy farming close to the

city of sub regency where the majority of roads are better quality, such as paved roads. Therefore, it is easy for them to transport the *dangke* products to market, and to distribute farm inputs such as fodders. Furthermore, farmers who live in isolated areas are often forced to use unpaved roads to access several villages (as central to the dairy population) in Cendana sub-district. With inadequate bridge construction, farmers could not access public transport, or a car, to reach the market. Alternatively, farmers only used a motorcycle to transport the products to markets.

Telecommunication services

In rural areas such as Enrekang regency, access to telecommunication services is one of the supporting factors in acceleration of agricultural activities, such as market information and access, educating farmers, research and development information, and stimulating the mobilisation of inputs and outputs. Telecommunication facilities were commonly provided by a state-owned enterprise and the private sector. The state-owned enterprise is *Telkom* and the private company is *Indosat.* They compete to reach the maximum number of customers by giving various services, but it is controlled by government. Indeed, both companies provided cellular networks, building the base transceiver station (BTS) in each sub-district. However, there were still several sub-districts that consist of several villages that could not access the cellular mobile networks, such as the sub-districts of Bungin, Curio and Masalle.

In sub-districts with telecommunication facilities, an increasing number of smallholder farmers used mobile phones for communication, and a few were connected to the internet. Telephone calls or text messages were used extensively to accelerate their business activities and to improve their networks. The main contribution of mobile phones for the smallholder producers was searching for market and technical production information. For instance, traders were able to obtain price information in the market destination so that they could calculate their cost and profit for the products that they wanted to buy and market. Inter-island traders observed:

> *I always contact the main suppliers about price information in Kalimantan Island before buying products in Sudu Market. Otherwise I have a reference about type of products which have potential market.*

In addition, positive results from the use of mobile phones were that farmers could solve their problems independently and use their time more productively, since it is was not necessary to wait for the extension worker to visit. One dairy farmer mentioned:

> *I am able to solve directly the types of disease that often attacks my dairies, such as grain poisoning, bloat and helminthiasis on my mobile phone through guidance from the extension worker about medical techniques.*

However, for sub- districts without mobile phone coverage, farmers were forced to go to other areas that had a good connection. A dairy farmer in Cendana sub-districts complained that:

> *I have to go about 500 meters from my house every morning to get mobile phone access to search for the customers who have ordered my dangke products.*

Similarly, good internet access was only available in the regency capital and not in the sub-districts, even though mobile phone access was available. Consequently, finding information to support technology adoption for farm activities is more difficult in this region.

Water and irrigation facilities

Irrigation is important for agricultural production. It determines the potential area for growing the crops and is necessary to achieve quantity and quality of production. In this region, as a typical upland area, rainfall was the main source of water to farm fields, especially in the vegetable farm locations where the sources of water were from rivers and mountains. Farmers who depended on the river had to construct irrigation to obtain enough water for the farm. Indeed, through the use of this method, they could crop up to four times per year, for example for red onion crops. However, access to water was quite a challenge for them, as it was costly due to long distances from water sources and the hilly terrain. Farmers had to buy pumps, pipes and establish a reservoir. They also worked independently without government projects. Some of them, who did not have enough money, cooperated with neighbourhood farmers to share the financial cost, while others connected with moneylenders through a sharing system of production. A key informant farmer noted:

> *At the beginning, to grow red onion, I spent a lot of money, around 30 percent of my total budget, for a planting period to buy machines and other equipment as instruments to get water. My farm location is about 1 kilometre from the river.*

Most farmers who depended on water from mountains did not construct irrigation, and their cropping intensity was based on the climatic conditions. For instance, in the rainy season they planted crops extensively, while in the dry season they selected crops that were suited to the weather conditions. For example, they grew potatoes, tomatoes and carrots in the dry season, whereas in the rainy season they were more likely to grow cabbages and onions.

This was quite different for dairy farmers, because obtaining water was not as big a challenge for them. This was because most dairy farmers are in the watershed zones, such as the Cendana sub-district, where the ground water is easily obtained with a pump, and operational costs were lower for other equipment. There were also a few dairy farmers who lived in the upland area, although obtaining water was not a particular challenge as they mostly used water provided by the government as a public service facility.

In addition, the absence of infrastructure irrigation is mainly caused by geographical conditions within the highland area, and farmers who conduct farm activities are living in many places that require significant budgets for construction. Therefore, construction irrigation requires a significant budget, however the Enrekang government has limited capability to respond to this issue, as reported by a leader of government.

Electricity

Electrical energy is very valuable in relation to supporting human lives, whereby almost all activities are connected with electrical energy. Indeed, the demand for electrical energy will increase with increased agricultural activity. Electrical energy is mostly supplied by a state-owned enterprise, the national electricity company (*Perusahaan Listrik Negara*, PLN). The main task of PLN is to provide sufficient energy to the community continuously. The private sector has power stations, but most of their electrical energy is for industry, and is not available in this region. Surprisingly, most of the villages in this region were supplied with electricity, and PLN had established operational offices at sub-district levels to serve and maintain electrical supply.

The PLN continues to boost development of the power plants sector to meet electricity requirements in Sulawesi. These power plants include: the *Suppa* diesel power generating plant (PLTD Suppa) with total energy estimated at 62 MW, the Bakaru hydroelectric power plant of 126 MW, and the *Sengkang* gas powered steam plant, which has a capacity of 315 MW. (Perusahaan Listrik Negara 2014). However, supply is still not enough to meet the community and industry demand. Many customers have suffered from rotating blackouts that occur in a 24 hours cycle. This has a detrimental impact, not only for the business sector, but also for society as well. Many small-scale industries could not run their business productively due to the high frequency of blackouts, which results in a loss of customers and income. They could use their own electricity generators, although this would incur a high cost for buying fuel. A coffee grinder argued that he preferred to stop operating when there were blackouts, because using his own machinery doubled the operating costs.

There is a hydropower energy that is established by a rural community, but it is only able to supply the community who live around the village. An officer of the livestock department revealed that even though the milk production was increasing, it was a challenge to promote industrial milk processing because of inconsistent energy supply.

5.6.3   Trade policy

Trade is one instrument that contributes to accelerating economic activities of smallholder producers. Effective trade can link farmers to markets, so that they are able to produce continuously and having certainty of buyers. In order to respond to these opportunities,

agricultural products from smallholder producers should meet the market requirements for quantity and quality standards in both domestic and international markets. However, in this region, the majority of vegetables and dairy products met local standards and were marketed to the local market, whereas the majority of consumers did not emphasise the requirement of quality.

As an example of trading of products, regional and inter-island traders maintained their trading arrangements by keeping a stable product supply to the market. To achieve this, they established partnerships with farmers by providing credit assistance and agricultural inputs, and importing product from other markets. However, these approaches could not guarantee continuous availability of products due to harvest failures and unfriendly weather conditions that occur in farm production. To overcome market instability, in many cases the government imports products from other countries to keep prices stable and to respond to market demand. This is a good approach, but it has a serious implication on local prices in the market. For instance, inter-island traders mentioned that:

> *The demand for red onion from Enrekang has gradually decreased since red onions from Thailand and China are available in the market. This is mainly because red onions produced by farmers cannot compete in the market, in terms of price. Red onions that are imported are 15 to 20 percent cheaper than locally produced onions.*

Meanwhile the dairy product of *dangke*, could only be marketed in Enrekang. The unique characteristic of this product, which is only consumed by the local people, is the factor that ensures that this product could not be expanded by traders to other market destinations. Indeed, poor packaging, uncertainty of supply, and lack of addressing the quality standard as the market requirement, are other factors that influence the inability of this product to participate in competitive trading, such as attracting potential buyers in domestic and international markets. As reported by an extension staff member:

> *The process of making the dangke, such as using papaya latex for preservation and banana leaves for packaging, is the condition that means this product could not be marketed to others places due to its perishable status.*

By contrast, the milk cracker, which has good packaging and obtained the local certification body, has the opportunity to participate in the competitive trading. Indeed, the product has been sold to the supermarket at Makassar; however, the opportunity for the trading of this product can only run for a short period of time as limited production at farm level, and inadequacies when competing with other types of crackers, are identified as challenges that impede the product and, therefore, it is not able to respond continuously to the market demand.

5.6.4 Financial services

A robust financial sector is important to facilitate the transfer of purchasing power and to encourage resource allocation. It can provide working and investment capital to support increased production and the business capacity of smallholder producers, especially if this occurs through formal financial institutions.

In this study, the role of formal financial services in this region is offered by commercial banks and consists of the private bank, the state owner enterprise bank, and the local government bank, while the non-formal financial is managed by individual entrepreneurs. State-owned banks are the Bank of People' Indonesia *(Bank Rakyat Indonesia, BRI)* and the Indonesia National Bank *(Bank Nasional Indonesia, BNI)*, which offer financial services in the form of investment capital, working capital loans, and credit schemes. As a region which has low income per capita, only the state-owned banks were present and had the experience to provide financial services to the rural community. The BRI is predominantly rural micro banking networks, providing many types of credit facilities in this region. It provides offices at the village level, called the *BRI Unit Desa*. A dairy farmer stated:

> *I prefer to borrow money from the bank of BRI which is located not far away from my place. I can manage my time efficiency and also less operational for cost of transportation.*

The local government bank, the Bank of *Sulselbar*, is important in terms of deposits held and loans advanced, but has a limited offering for credit schemes. The main customers were civil servants, or creditors, who had business related to government infrastructure projects. This institution did not provide much financial assistance for agricultural purposes because it has limited authority due to its status as a local government bank. It also has a limited infrastructure facility and human resources to provide microfinance at a village level operating in the regency capital.

As a commercial financial operator, consultancy services on accounting systems and financial monitoring are conducted regularly to minimise the misuse of the credits by creditors. The facts showed that some creditors cannot differentiate between capital loans (e.g., for agriculture inputs) and infrastructure loans (e.g., for machinery). Because of poor understanding, some of them use the credit for unproductive activities and non-agricultural purposes, such as buying houses or motorcycles, as reported by the BRI staff.

Recently, the government has intervened extensively in rural financial markets, both for vegetable and dairy commodities. Under the Indonesian Bank, authority has been given to the state-owned banks to increase the amount of cheaper credit to the agricultural sector. The agricultural credit program, which is subsidized by the government, was promoted to smallholder producers, with the aim of encouraging improved productivity and to improve

livelihood standards. The food security and energy *credit (Kredit Ketahanan Pangan Dan Energi, KPPE)*, and people business credit *(Kredit Usaha Rakyat-KUR)*, were the most popular credit programs in this region, having been accessed by farmers for business capital and investment purposes. It was also effective in enabling them to avoid borrowing from money lenders. However, for smallholder producers who meet the procedural requirement, such as having collateral, having potential business enables them to access this program. Although the local government has supported administration procedures for small loans, only selected crops or commodities with better returns attract finance from the banks without collateral. One bank officer said:

> *Only creditors who have the capability to pay the loan are the most priority to deliver credit for their business farming, and, if they grow commodities, that could be able to get potential market.*

To increase the outreach of these programs, the requirements of credit are constructed easily to assist smallholder producers to propose these schemes. The requirements not only depend on the ability to provide collateral, but also recommendations from the local government authority, and, if they have been engaged in productive farm activities, this could be considered as enough criteria to deliver the credit. The type of commodity that is subsidised is also not restricted, as suggested by the government representative.

Non-formal financial sector loans were offered by professional money lenders, pawnbrokers, relatives, friends and landlords. Loans were categorised into two forms, commercial and non-commercial. Commercial loans were usually offered by professional money lenders, pawnbrokers and traders. Non-formal commercial credits do not provide a wide range of financial services, such as safe, deposit facilities and loans with large capital and long-term credits. Rather, they provided short-term credit to smallholder farmers who had difficulty accessing formal financial services and who had inadequate collateral. This service is convenient because it is available every time and minimal application costs apply. Still, some credit providers, such as traders, consider specific conditions, such as individual capability to repay loans, and prefer to give credit only to farmers who have potential business. In this regency, farmers who grow crops with intensive farming and commodities understand that stable market prices are often connected to the money lender. However, the main problem for smallholder farmers were the high interest rates and short repayment periods. Therefore, it is only the limited net profit that could be obtained by them.

5.6.5 Research, development and extension services

Agricultural research and development is managed by the Indonesian Agency for Agricultural Research and Development (IAARD) under the Ministry of Agricultural. To

produce and develop innovations in response to industry demands, the IAARD cooperates with government, universities and various research institutions. At the meso level, there is the Assessment Institute for Agricultural Technology (AIAT) which is located in Makassar. Accelerating agricultural development, and providing technological innovation based on the specific location, is the main vision of the AIAT in partnership with local government. Monthly meetings were often conducted with South Sulawesi and Enrekang governments to optimise utilisation of resources at specific locations, and to share responsibility in developing agricultural research.

The AIAT has operational staff to work with extension workers in identifying, developing and implementing research experiments and technology transfer to the farmers based on the local specific condition. The AIAT creates a program at village level, such as the improvement of farmer income through innovation (*Program Peningkatan Pendapatan Petani Melalui Inovasi* (P4MI)), by focusing on the empowerment of farmers' institutions, the development and strengthening of accessing information for technology, both on a local and national scale, the development of agricultural innovation through the spacing of plantation, and introducing a rotation system. However, a barrier that impedes in agricultural research, such as lack of coordination among government institutions, was occurring and caused many agricultural programs to be expanded without following research recommendations. Top-down planning still dominated in allocating programs, and most of the programs were project-oriented and had minimal focus on sustainability of the program. Accordingly, projects were often inefficient and costly. Limited budgets were also an obstacle for research and development and, therefore, many experiments designed to adapt technology to local geographic and climatic conditions could not run effectively. The AIAT staff commented that:

> *Lack of coordination and inconsistent policy among government agencies, particularly fund sharing, led to research recommendation which could not be implemented productively at a practical level.*

In this region, the agricultural faculty at Hasanuddin University has contributed significantly to research on crop production and disease problems, training for the extension workers, working on pilot projects for seed cultivation, and breeding farms. They were also involved in designing the local government programs, such as regional development planning, as part of social economic research. A number of research outputs have been implemented and have given farmers the opportunity to adopt the innovation.

For instance, the Enrekang government had created a partnership agreement with the Indonesian Institute of Science (LIPI) and Hasanuddin University to produce potato seeds through tissue culture by involving farmer groups and extension workers. The output of this

program was the availability of certified seed potatoes of the Granola variety, namely G-I and G-2 in the local area. Through this program, farmers have produced and obtained better seed quality in some periods of growing potatoes, and they did not depend on imported seeds from other regions, mainly from Java island. However, this research was not implemented sustainably as a potential business for farmers, mainly because of limited operational budget to support this activity and also inadequate local experts to manage the seeding process based on the methodology that was introduced by the university expert.

In regards to dairy, the Enrekang government cooperates with the Indonesian Institute of Science (LIPI), and Hasanuddin universities. As part of the agreement, the LIPI and Hasanuddin University provided professional experts on artificial insemination to build the capacity of extension workers, and to train the farmers on production techniques and disease prevention. At the same time, local government supported the operational budget to implement the program. This collaboration has improved milk production capacity, demonstrated the application of embryo transfer for dairy cattle, and can be implemented by dairy farmers easily. However, in response to the program sustainability, extensive training was required by the local expert, both extension workers and farmers who give regular guidance to farmers, particularly for specific knowledge which requires a detailed level of understanding in solving pest and disease problems.

Private sector actors, such as supermarkets, were absent in this area. It is expected that a supermarket from Makassar may take part in research for quality issue. However, no private sector or other market player participated in research and development activities. Indeed, most private sectors are more likely to be involved in the distribution of agricultural inputs.

NGOs have made positive contributions in improving capacity building for farmers. Representatives from farmer groups often participate in this training to obtain knowledge about quality issues, value adding, and improving market competitiveness. However, very few NGOs work with the local farmers, with the majority of them only working on government projects.

5.6.6 Extension services

In the Enrekang regency, the extension services consist of officers at the district and the sub-district levels. At the district level, there is an agricultural information and extension centre (*Balai Informasi dan Penyuluhan Pertanian, BIPP*) which focuses on the extension administration system. The aim of this organisation is to design programs through planning, coordination and monitoring through cooperation with several departments, such as the agricultural and livestock department, board of regional planning, and forestry and plantation departments to obtain appropriate programs for extension of the system. It communicates

with the central and provincial governments to obtain a sufficient budget for a productive extension system at the farm level.

At the sub-district level, the Agricultural Employee Training Centre (*Balai Latihan Penyuluh Pertanian, BPPL*) has the Field Extension Worker (*Petugas Pertanian Lapangan, PPL*) who manages operational advice and training for farmers. The main job for the extension worker is to provide technical support and give advice to farmers about their problems. To increase the effectiveness in delivering their services at the farm level, the extension workers established farmer groups in each village. Thus, achievement on transferring advice and reducing this problem at the farm level depends on the individual extension worker's experience and skill.

However, there were still a number of extension workers who lacked capabilities in educating farmers, for example in cropping, handling disease, and optimising the use of inputs. Many of them lacked competency and leadership skills in accelerating the process of diffusion of improved technology, and to spot and diagnose problems. An extension worker commented:

> *There are only a few of them who graduated from university and who has specific skill and competency knowledge about agricultural issues; the majority of them graduated with a diploma. Otherwise, dissemination of innovation technology and transferring knowledge sometimes could not run productively.*

This perspective coincides with the experience of the government in evaluating the role of extension workers in conducting government projects on seed potatoes. The lack of practical skill and competency of extension workers, restricted the ability of the project on certified seeds *(penangkar benih)* to produce better quality potato seed (certified seeds), as an example. Understanding and adoption of technology suggested by experts requires a higher level of education than is possessed by most extension workers. A key informant of government mentioned:

> *Inadequate human infrastructures with better knowledge and high skill meant many project partnerships with universities could not produce sustainable results. For instance, certified seeders on potatoes . Most of the project could not assist farmers productively, and only ran over a short time and spending money.*

From the smallholder's perspective, the inadequate number of extension workers made it difficult to obtain sufficient information and advice in solving problems. Appropriate techniques in improving milk production is still poorly implemented at the farm level. For instance, giving the feed for dairy is mostly based on experiment and experience, and often does not follow the composition between forage and concentrate fodders. As a result, the

dairy cows could not produce milk productively. This is supported by the fact that there are only two or three extension workers in a sub-district who have the specific skills required to work professionally with farmers, and, on the contrary, thousands of dairy farmers that should be advised.

5.6.7   Standards and regulations

The vegetable and dairy supplies that are produced and marketed in Enrekang do not follow the Indonesia National Standard (SNI), which highlights the importance of products addressing the procedural standards on quality control, food security, health issues and environmental aspects. Cleaning, sorting and grading of products were only common activities undertaken by farmers before selling to the buyers. A larger size normally attracted a higher price, and more potential buyers, when compared to a smaller size. In the vegetable products, most of the bigger sizes were usually collected by traders and marketed to regional and inter-island markets, whereas the smaller sizes were sold in the local market. A trader stated:

> *The reason to select the vegetable products which are a bigger size is because these products are easily marketed, and consumers prefer to buy the bigger size. With bigger size is also higher price.*

With no supermarket customers and only wet market customers, most farmers produced and sold their products without considering quality issues, such as taste, pesticide residues and food safety standards. Packaging was also poor, with most farmers packing vegetables in a gunny sack. In addition, in the wet market, there was no difference in price between products that followed procedural standards and conventional, wet market standards. For example, potatoes that grow using compost and less chemical pesticides attract the same price as potatoes grown from using pesticides and fertilizer, as one farmer reported. Hence, farmers did not pay attention to quality standards.

One of the solutions to realise the quality standard at the farm level is creating business linkage through having contract agreements with potential buyers in Makassar. Smallholder producers could meet the procedural standards that were requested by supermarkets, such as grade size, maximum levels of water content and better packaging systems, if there is a market guarantee for their productions. As one representative farmer remarked:

> *I and my group member can produce the yields with better quality, and following the market standard, if there are supermarkets who will buy with better price and supply them regularly.*

The challenges to contract is only for continuous supply of products and that is a constraint to farmers, particularly when extreme climatic events or disease outbreaks occur, and farmers are unable to supply sufficiency of products based on a contract agreement. An

extension worker who has facilitated a contract agreement between a farmer cooperative and the supermarket commented:

One of the challenges that are faced by farmers in meeting the requirement contract is lack of continuous supply and sometimes they could not produce optimally when there are heavy rains and a high frequency of disease attacks. This condition often happened for several commodities, such as red onions, cabbages and tomatoes.

The government has promoted programs for environmentally friendly systems by introducing organic standards, as a way to meet the demands of some urban consumers. However, following the procedures to produce the organic vegetables seems to have been difficult for farmers. Moreover, moving from conventional to organic farming systems needs time to recover soil fertility. Not using agrochemical inputs for their crops resulted in losses of income due to limited production. There was no demand for organic products in the local area, although there was an opportunity to supply supermarkets in Makassar. Nonetheless, addressing the certification standards is a very complicated procedure and is expensive for smallholder producers. A government officer stated:

Producing the organic product is difficult to implement at a practical level because it gives an impact for farmer income with low production capacity due to transitional period, and the requirement to follow the certificate procedure is high cost and lengthy time.

In the case of dairy production, standards for *dangke* as a local product, were based on traditional experience from local consumption. The grade size, taste, and packaging manner did not follow national food standards, such as modern preservation, processing and packaging. The main reason was that the product was only marketed to local consumers who understood about its perishability and taste. To keep the quality of taste, the buyers always purchase *dangke* immediately after it was produced by the farmer. A dairy farmer informant claimed that:

The dangke product can only be sold potentially through the traditional manner by heating in fresh milk and adding papaya latex solution. Even though several research institutions have used an enzyme for food preservation, however the taste is quite different and could not be sold to local consumers.

In response to a potential market, a new product, milk crackers, has been produced based on following procedural standards. Labelling to provide information about the food quality content was applied to attract consumer preference, and packaging standards were also met to maintain the food quality. This procedural standard was referenced by the local government and the formal requirement standards, such as food composition and laboratory examination, were still being developed

5.6.8 Business linkages

In this region, informal business linkages with small scale farmers were created by traders and the local agricultural suppliers. Types of business linkage are generally in the form of delivering the agricultural inputs or providing credit assistance. The traders (regional and inter-island) provide financial credit with the aim to assist farmers to produce products continuously on the one hand, and the traders continue to supply the market on other hand. This linkage is really helpful for farmers, particular for purchasing the inputs which are imported from other islands, such as red onion and potatoes. It also created the higher capacity of farmers to produce high yield because of the ability to purchase chemical inputs.

However, the disadvantages for farmers were high interest rates, the price was fully authorised by traders, and farmers' poor bargaining position over price. The trader collects the products and brings them to the market, and farmers would obtain their income after the products have been sold. The success of this linkage often depends on the ability of farmers to repay the loan, and a good relationship with the trader:

> *Due to receiving financial assistance from a trader, market opportunity of my vegetable production is usually determined by the trader, even though the price is mostly controlled by him, but really useful for me because I can grow cabbage and potato regularly.*

While the local agricultural supplier involved business linkage with farmers by providing the inputs through the credit system, farmers supply pesticides and fertiliser during the growing until harvesting period. This is helpful for those who grow intense crops and are unable to pay for the inputs in cash. The inputs are paid immediately after the products have been sold to market, however they would be charged with a higher price, around 10 percent to 15 percent more, than those paying in cash. A farmer stated:

> *To maintain a friendly relationship with the local agricultural supplier, I have to pay the total price of pesticides and fertiliser in every harvesting period, even though it is expensive for about 10 percent to 15 percent than normal price, but it is really helpful for me since growing red onion.*

There were no business linkages to institutional markets for selling dairy products to market in this region. Most of the dairy products, such the *dangke* and crackers from farmers, were marketed traditionally. In the last few decades, farmer cooperatives were established by farmer groups to market to other buyers and obtain inputs such as medicine, concentrates and fodder, but were poorly developed and mostly depended on government facilities. Indeed, farmer cooperatives had collapsed or were inoperative. There was only one dairy cooperative, which was located in Cendana sub-district, still operating to provide dairy inputs, and helping members with the marketing of their products. A key informant from the government said:

In response, the local government created a locally owned enterprise, called the *Perusahaan Umum Milik Daerah*, with the aim of facilitating smallholder producers to obtain niche markets, supply agricultural inputs close to the farm gate, and facilitate farmer links with the financial sector. Operationally, the Enrekang government provides facilities, such as trucks to transport farmers' production to markets at a reasonable cost, and storage for agricultural inputs and financial assistance to help the smallholder producers who cannot access the banks. However, a lack of experience by the government staff in business, and the bureaucratic approach in solving problems, made the institution uncompetitive with traders.

The business network between farmers and agribusiness firms are developed potentially in the provision of inputs, especially for heifers. Farmer groups that usually order an amount of heifers are given cheaper prices, and have better genetics, from the agribusiness firms in Java Island. The agribusiness firm was also responsible for the health service until the heifers arrive in Enrekang. As reported by farmers:

A positive result of regularly connecting to the agribusiness firm is that it provides cheaper prices and health assurance of dairy, as long as, if in each transaction, the order is at least 10 heifers.

However, obtaining other inputs, such as medicines and concentrate fodders through connecting with the agro input dealers, lacks linkage. Most of the local agricultural suppliers do not create linkage to support improving milk production, such as training of feed management for farmers, even though they regularly purchase inputs.

5.6.9   Business development services

Business development services in this region were mainly delivered by the local government. This refers to the condition where farmers need assistance to obtain the potential market for their production. In response, a wide range of programs was implemented, such as marketing promotion, encouraging the financial sector, and strengthening the extension worker capacity.

The BDS on marketing services was an initiative by the department of industrial and trading (*Dinas Perindustrian dan Perdagangan, Deperindag*) which cooperated with local entrepreneurs, such as the Chamber of Commerce and Industry (*Kamar Dagang dan Industri, Kadin*) and conducted business meetings at both provincial and national levels to promote potential investment, especially for superior commodities in Enrekang. This attempt

aimed to attract the private sector to enable them to create business linkages with smallholder producers and local entrepreneurship. Business meetings commonly resulted in memoranda of understanding between local entrepreneurs, and the buyers on marketing contracts and business roles. However, it often failed on the implementation level. The main problem was commonly related to supply uncertainty of products in the long term, poor quality and high costs and economic inefficiency. For example, access from the farm gate to the port of Makassar was costly due to long distances and length of time due to poor infrastructure conditions. As a government representative commented:

> *Most agreements with the private sector from business meetings is difficult to implement; infrastructure problems and production capacity are the main issues as recognised by buyers who could not give benefit to buy vegetable products from Enrekang.*

Likewise in relation to the dairy production, the local government has regularly promoted to the private sector with regards to the potential business that could be developed by establishing the milk processing industrial. This was supported with a high population of dairy, however the private sector mentioned that the milk processing plant was difficult to operate due to limited milk supply and the consistency quantity. In addition, poor infrastructure facilities, such as road, electricity and telecommunication were other barriers.

The BDS on financial services were presented by the state ownership enterprise bank, the BRI and the BNI. The agricultural credit program was introduced to vegetable and dairy farmers. Moreover, guidance on making project proposals, business meetings, monitoring and evaluation to creditors was always conducted. However, these services could only be effective for those who had access to financial services. Indeed, there were still a large proportion of small scale farmers with poor access to financial services. A key informant from a bank commented:

> *In order to get appropriate use of the credit scheme, technical assistance for organizing the proposal, monitoring system and financial administration should be conducted. The reason is because many cases of credit, especially for subsidised credit from government, are often not paid by the users if they do not know about the correct procedural system.Unfortunately only a few of them have the opportunity to meet the financial services.*

A technical production aspect was delivered by the extension services. The services were commonly related to the encouraging of the sustainability of production, and introducing procedural standards. The extension worker serves vegetable and dairy farmers by regular visiting them at their farm gate, giving advice, and transferring knowledge on technical production. Technical expertise was provided to assist smallholder farmers mitigate crop risk, such as disease attacks, to ensure the sustainability of production. Thus, artificial insemination and feed management are introduced and demonstrated technically to farmers

in order to achieve high milk production, and to maintain demand of *dangke*. Additionally, training on quality issues, such as packaging systems and labelling procedures, were also delivered to farmers to ensure production met market requirement and having added value. At the vegetable crops, as an example, the institution of production standard and food, the board of seed control and certification for food crops and horticulture *(Balai Pengawasan dan Sertifikasi Benih Tanaman Pangan dan Hortikultura BPSBTH)* in Makassar was invited to provide training for smallholder producers on product quality and food safety standards. This knowledge is beneficial as it helps to improve smallholder capacity to produce products based on quality requirements, such as avoiding the use of seed from previous harvest, eliminating the use of high chemical inputs, maintaining soil fertility, and sorting and grading techniques. However, it was poorly implemented at production site. The main reason was due to inadequate market demand locally for the products that follow the market standard. The representative of farmers noted:

> I will be able to produce the yields by following the production standard, such as cleaning and grading properly, packaging and using less chemical fertiliser and pesticides, as long as there is buyers who can provide market guarantee and reasonable prices.

Similarly, the extension workers promoted the importance of milk processing technology and good packaging for the *dangke* products. The intention was to make the *dangke* more durable so that there was the opportunity to expand the market, especially to reach the potential market in the urban city at Makassar. However, this innovation could not be implemented at the farmers level as most producers were more likely to produce the *dangke* in a simple manner in response to the consumer preference locally, as reported by a representative of the livestock department.

5.6.10   Ease of doing business

Productive investment by the private sector creates opportunities to utilise potential resources, allowing business linkages with smallholder producers to expand their core business and to develop their capacity to reach profitable markets. In this research, ease of doing business for agricultural production, both vegetable and dairy business in this region, refers to the ability of institutional policy to provide better procedures and rules to create a conducive environment for the private sector institutionally. To assist the private sector, the Enrekang government, through the Department of Investment and Permit, created a one-stop service to simplify the regulatory arrangements and rationalise licensing requirements linked to provincial and central governments. Through this system, private sector businesses who need to establish a business can obtain the final legalisation in less than a week through the Enrekang government, without meeting with various departments at different institutions and locations. This is very useful in organizing the licencing procedure which takes a short time,

and is a transparent and uncomplicated procedural administration, as stated by vegetable traders.

However, some of the rules were still under the authority of the central government. Even though there was a representative of the national Integrated Economic Development Zone of Parepare (*Kapet Parepare*) located in Parepare city, which covered the Enrekang regency, to manage the permit system and arrangements for the private sector, it lacked the authority to streamline and implement investment permits. Indeed, the investment procedures had several practical problems. The government officials lacked the capability to implement the rules in the right place, although the rules were a major part of their responsibility. Some rules impeded the private sector, such as illegal service fees, informal payments for local leaders and unpredictable costs for administration service. Incomplete details of implementation steps created delays. A trader stated:

> *The positive result in organising business documents at this moment is a simple procedure only arranged in one office and it does not take a lot time. But it is often difficult at the implementation level, such as informal arrangements with local leaders, and unnecessary payment.*

To increase the transparency of investment, cutting red tape through restructuring, and processes for assessing the approval of private sector investment, was important and needed to be implemented at a practical level. In addition, training was also essential and needed to be conducted to increase the ability of professional staff members to offer good service for the investors. However, there seems to be challenges at the practical level, due to inadequate experience of staff in serving the private sector because of limited investment in the agricultural sector in this region.

Despite several approaches by the government to create a better investment environment for the private sector, there were inevitably challenges that required further investigation. Corruption still occurs at each level of the government institution, especially at the local level. Corruption mostly involves providing unofficial payments to officials to get faster and simpler service. Dairy farmers who transport heifers from Java Island to Enrekang commented that:

> *Extra payment should be prepared by drivers for security post office in every regency, until they arrive in Enrekang.*

5.7 Conclusions and implications

The investigations of the enabling environment for the agribusiness system in Enrekang regency has demonstrated that enhancing the enabling environment is important to creating favourable conditions for smallholder producers. Increasing competitiveness and resilience

of smallholder producers can only be achieved if there are significant contributions from the government institutions, private sector and development organisations. Smallholder producers have been marginalized and sidelined from supply chains due to poor management and lack of access to favourable resources.

Given this situation, enhancing the enabling environment for the agribusiness system in Enrekang regency is a new approach to overcome the problems that impede smallholder producers, and assist them to better understand the challenges that face each player in meeting market requirements. However, these improvements require several actions: the government should improve the physical infrastructure, such as roads, that improve access from farm gate to market; strengthen financial institutions at the local level so they can execute credit agreements; collaborate among private sector, government and development organisations to promote standards and regulations; facilitate the marketing operation that can assist small-scale farmers access to alternative markets; promote better integration among research and development institutions to obtain new innovations and appropriate technology that can be implemented productively at the farm level; and strengthen extension institutions by providing enough resources and their capability to work with farmers.

Therefore, institutional policy and procedures should put smallholder producer in the place where they can participate productively in accessing emerging markets. Deeper investigation is needed to identify which elements of the enabling environment will make a greater contribution in enhancing the competitiveness of smallholder producers in the agribusiness system in Enrekang regency. This is done in the quantitative phase of this study, the results of which are discussed in the next chapter.

Chapter 6. Quantitative results

6.1 Introduction

In this chapter, an attempt was made to test and refine the theoretical framework of the enabling environment that was developed from the literature and from the preliminary investigations of the supply chains in Enrekang regency. The aim was to create and quantify relationships that can be applied in the process of identifying and analysing the enabling environment that applies to the smallholder producers in the Enrekang regency of South Sulawesi. Formulation of policies and procedures for intervention strategies to enhance the enabling environment for the agribusiness supply system was another aim. This study deals with measurement of the enabling environment by identifying the conditions of the enabling environment that can assist smallholder producers to participate in competitive markets. The conditions included potential resources, such as input and services, and policies that were incorporated to enhance the enabling environment.

6.2 The objectives of this phase of the study

Phase 2 concentrated on the investigation and analysis of the smallholder producers in achieving access to the resources for an enabling environment. Dairy cattle and vegetable farmers have different conditions in accessing the enabling environment. Conditions refer to the potential of smallholder producers to link with the elements of the enabling environment. The specific objectives of this phase were to:

1. Describe and analyse the enabling environment conditions for the vegetable and dairy cattle farmers

2. Identify the key elements that contribute to enhance the enabling environment for agribusiness supply chain

3. Provide suggestions for institutional policies and procedures to enhance the enabling environment

In doing so, this chapter concentrates on three main areas: general information about the enabling environments, important indicators of the condition of the enabling environment, and economic development indicators for farmers. Smallholder producers were the main concern in this phase because they benefit from an enhanced enabling environment, they are the focus of much development work, and their relatively larger numbers make it easier to conduct quantitative analysis.

6.3 Background of farmers and their enabling environment

This section contains information about the demographics of the farmer respondents, their production and marketing systems, and their interactions with their enabling environment.

6.3.1 Demographic characteristics of vegetable and dairy farmers

The largest number of respondents were in the age group between 41 to 45 years old (30% vegetable and 28% dairy), followed by 36 to 40 years old (20% and 21%) and 26 to 30 years old (12% and 16%). The complete distributions are in (TableA6.1) in Appendix6.

More males were interviewed in both the vegetable (81%) and dairy cattle (88%) sectors than females (19% and 9%) as this reflects the traditional farming situation (Table A6.2). For the vegetable sector, of the 203 male respondents, 89% were the household head, 16% were the spouse of the household head, and 3% were children of the household head. Of the 47 females, 100% of them were the spouse of the household head. For dairy, from 220 male respondents, 91% were the household head, 5% were the spouse of the household head, and 4% of them were the children of household head. Of the 30 female respondents, most of them were the household head. The complete distribution is in (Table A6.3). The higher proportion of male than female household heads indicates that males dominate the formal social family structure in this region.

With regards to formal education, secondary school, senior high school and diploma levels were the education levels attained by the majority of both the vegetable and dairy sector respondents (Table A6.4). With a significant proportion of respondents educated to senior high school, diploma and university levels, formal education may not be a factor limiting adoption of information and technology obtained from training or other non-formal education.

Non-formal training received by respondents was generally based on training that taught the respondents to solve urgent problems. The main areas of training received by the vegetable farmers were pest and disease control (33%), planting and cultivation methods (23%), and conservation methods (20%). Since they began vegetable farming, 17% of respondents said they have never received any non-formal training on vegetable farming (Table A6.5).

For dairy respondents, training on animal health was the most common (46%), followed by insemination technology (21%), and training on packaging for local cheese (18%). There were also several respondents who had not received any non-formal education training since beginning dairy farming (Table A6.6).

6.3.2 Farm size, land ownership and leasing for both vegetable and dairy

The average farm size for vegetable farmers was 0.83 ha, with a range from 0.12 ha to 1.4 ha. The small size is a partly due to the steep, mountainous area. For the dairy farmers, the average farm size was 1.01 ha, with a range from 0.5 ha to 2 ha (Table A6.7).

Most vegetable respondents either own the land (48%) for growing vegetables, or own part of the land (33%). The remainder (18%) do not own the land they grow vegetables on, they share crop and rent land. For the dairy farmers, most respondents have their own land (70%), followed by those who own a part of the land (27%), only 3% did not have their own land (Table A6.8).

Concerning vegetable respondents who have their own land, the majority acquired the land as inheritance from their parents (60%), with other sources including purchasing (29%), and pledge land (11%). Pledge land is land used to grow vegetable due to the owner of the land owing an unpaid debt to the respondents. For dairy, most respondents obtained their own land through purchasing (82%) and inheritance from their parents (18%) (Table A6.9).

In the vegetable sector, of 121 with legal documents of land ownership, 50% of land was certificated, 30% had tax documents, 14% contract certificates, and 6% deed of sale from a notary. In the dairy sector, of 76 legal documents, 54% were ownership certificated, 9% tax documents, and 37% contract certificates (Table A6.10).

Those respondents who own only a part of the land, or do not have land for growing vegetables, access land through family connections (47%), connections with relatives (e.g., cousins and uncles) (33%), or borrowing land from friends (21%). Those with no land access land through connections with relatives (39%), friends or acquaintances (35%), or family (26%). None of the respondents mentioned government land as a source of land for growing vegetables. For dairy respondents, most of them accessed land through having a relationship with family, such as father, mother, brother or sister (50%), followed by a connection with a friend (28%), and those who acquired the land from a relative (22%). Those respondents who do not have land borrow from their family (75%) and relatives (25%) (Table A6.11).

In the vegetable sector, of the 129 respondents who do not own all or some of the land they use for vegetable farming, arrangements for using land include: fixed-term contract with fee (50%), free but with conditions (36%), and free without obligation (14%). Fixed term with fee arrangements include paying the owner at a certain time, which is usually every plantation period. Free without obligation means that the farmer uses the land without any payment obligations or crop sharing. Free but with conditions includes paying taxes, or sharecropping, with the land owner. For dairy, of the 76 respondents who do not have their

own land, arrangements for using land consist of fixed-term contract with fee (54%), free but with conditions (37%), and 9% free without obligation (Table A6.12).

6.3.3 Vegetable and dairy cattle growing experience

The average years farmers have been growing vegetables was 9.8 years. The minimum was two years and the maximum was 30 years. In dairy, the average was 9.6 years, with a minimum of three years and a maximum of 20 years (Table A6.13). Most vegetable and dairy farmers have between 6-15 years of experience. Some vegetable farmers, but no dairy farmers, had more than 20 years experience (Table A6.14)

The main reason they grew vegetables were: main livelihood (32%), economic reasons (29%), financed by money lender (18%), increase income (15%) and easy to get a job (4%). For dairy, reasons for dairying were: products have high potential market (46%), main livelihood (23%), increase income (20%), supporting financial sector (7%) and government assistance (5%) (Table A6.15). Around ¾ of respondents from both sectors received 75% of their total household income from either vegetables or dairying, reflecting their importance to their livelihoods (Table A6.16).

6.3.4 Income from all sources

Nearly half (40%) of vegetable respondents had an average monthly income ranging from Rp 2,000,000 (AUD $ 200) to Rp 3,000,000 (AUD $ 300), with 28% having greater than Rp 3,000,000 (AUD $ 300) (Table A6.17). In addition to farmer income, working as traders (46%) contributed significantly to obtain an income level of more than Rp 3,000,000 (AUD $ 300) (Table A6.18)

Almost half (48%) of dairy respondents had an average monthly income of more than Rp 3,000 000 (AUD $ 300) per month, with 46% in the range the range of Rp 2,000,000 (AUD $ 200) to Rp 3 000 000 (AUD $ 300) (Table A6.17). In addition to farm income, working as government (63%) contributed significantly to obtain an income level of more than Rp 3 000 000 (AUD $ 300) (Table A6.19).

6.3.5 Vegetable crops grown and their advantages and limitations

Non-perishable crops

Red onion was the most common non-perishable crop grown (56%), with potatoes (26%) and carrots (21%) being the other two (Table A6.20). The main reasons to grow those crops were: high market prices and supported by financial sector, high market price and suited to the local climate, and high yield and low operational costs (Table A6.21). High market price reflects the situation whereby price increases dramatically in certain months caused by a lack of supply from other areas. Financed by the financial sector was based on the formal and

non-formal financial sectors being willing to support farmers to grow the crops. Most of this support was for red onion crops. Stable market prices occur due to stable supply (no excess supply) because these crops can only grow in specific cool climates, mainly in high land areas. High yields refer to high quantities harvested in a short time, for example less than 60 days. The low operational cost reflects crops that can be produced without spending much on chemical fertilisers and pesticides, with most farmers using manure.

Perishable crops

Perishable crops grown included tomatoes (45%), chili (37%), cabbages (10%) and onion leaves (8%) (Table A6.22). The reasons given for growing those crops included to reduce disease, improve soil fertility, it has high potential market, high-intensity production, suitable to climate, low operational cost for input provision, and cooperation with trader (Table A6.23).

Underlying these reasons were farmers' experience and observation that plant rotation reduced disease and improved soil fertility; for example following red onion with tomatoes. High intensity production was similar to that experienced by farmers with non-perishable crops. Climate factors referred to the favourable time to grow a crop to obtain sufficient production, such as dry season for tomatoes and slightly rainy for cabbages. Cooperation with traders meant that respondents could get agricultural inputs to support production.

The limiting factors for growing non-perishable crops and perishable crops were different proportions, which were reflected by farmers (Table 6.1).

Table 6.1: Main limitations to growing non-perishable and perishable crops

Limitation	Non-perishable crop		Perishable crop	
	Frequency	Percent	Frequency	Percent
Lack of finance	74	30	57	22
Lack of markets	66	27	125	50
Poor seed quality	63	25	19	8
High operational cost	23	9	14	6
Inadequate water supply and pesticide residues in water	13	5		
High diseases levels	11	4	35	14
Total	**250**	**100**	**250**	**100**

For both non-perishable and perishable crops, farmers reported a lack of market linkages which was presented by 30 % for non-perishable crops and 23% for perishable crops because most production can only go to the wet market and it is difficult to access modern markets. Another important constraint was poor seed quality. Most seeds were imported from other islands without labelling and certification that provide information on the quality of seeds.

Lack of finance, which was indicated by 27% for non-perishable crops and 50% for perishable crops, means that they do not have sufficient working capital for agricultural inputs for their crops. The formal financial sector was difficult to access due to complicated procedures, while the informal financial sector that provides credit has high interest rates.

Poor seed quality with 25% for non-perishable crop and 8% for perishable crop indicated that they commonly grow crop without seed certification, and sometimes use seed from a previous harvest.

High operational costs which reflected 9% for non-perishable crop and 6% for perishable crop, referred to situations where almost 50 percent of the budget had to be allocated to purchase chemical fertilizers and pesticides required in order to obtain better production. High disease levels, with 4% for non-perishable crops and 14% for perishable crops, may be related to poor management and poor quality seeds. This issue is more important during the rainy season and can reduce yield and quality. Inadequate water supply (5% for non-perishable crops) was an issue for unirrigated farms. High pesticide residues arise when water becomes polluted due to high intensity use of chemical fertilizers and pesticides. The scoping study found this was a particular problem for red onion farmers who were mostly in upland areas, and sourcing water from rivers was a big challenge, especially during the dry season.

6.3.6   Dairy cattle products and their advantages and limitations

Local food cheese was the main dairy product for 98% of respondents with a few (2%) producing crackers (Table A6.24). The scoping study found that the cheese, or *Dangke,* was produced by heating fresh milk and adding a papaya latex solution. Crackers were another product of milk which was more durable, and used better packaging compared to *Dangke.*

The advantages of *dangke* include low operational costs and high market prices; the products have high market demand and are linked to potential markets (Table A6.25). Low operational cost might refer to products that can be produced traditionally without technological processing. High market price meant the products could be sold to local consumers at a competitive price. Respondents who produced crackers took advantage of an opportunity to sell in modern markets, such as a supermarket in Makassar.

Expensive heifers was one of the main constraints in engaging in dairy cattle farming (52%), followed by high diseases (27%), low milk production (17%) and limited supply of forage (4%) (Table 6.2). Expensive heifers was due to most heifers being imported from Java Island, which was costly in terms of transportation and operational costs, as the scoping study found. High levels of disease and low milk production may be related to challenges in

adapting to climate conditions, poor food quality and lack of medical controls. Limited supply of forage fodders referred to inadequate land for growing forage fodder.

Table 6.2: Limitations in dairy cattle production

Limitations	Frequency	Percent
Expensive for heifers	130	52
High disease	68	27
Low milk production	42	17
Limited supply of forage fodders	10	4
Total	**250**	**100**

6.3.7 Problems with sourcing suitable vegetable seeds

Vegetable seeds for both non-perishable and perishable crops were categorised into certified, uncertified and own seeds (Table 6.3). Certified seed was only used by 4% of the respondents for non-perishable crops and not at all for perishable crops. The scoping study found that certified seeds were only available when there were government projects, especially for red onion and potato seeds. Certified seeds were not available in the wet market or in local agricultural stores.

Table 6.3: Types of seeds preferred to grow non-perishable and perishable crops

Seed quality	Non-perishable crop		Perishable	
	Frequency	Percent	Frequency	Percent
Certified	9	4	0	0
Uncertified	169	67	186	74
Keeping own seeds	72	29	64	26
Total	**250**	**100**	**250**	**100**

Uncertified seeds were the most common type of seeds used for non-perishable crops (67%) and perishable crops (74%). For non-perishable crops, uncertified seeds lack a certificate or reference that provides information about seed quality from an authorising institution. For perishable crops, uncertified seeds referred to seeds that were only labelled with production source. Uncertified seeds for perishable crops were easy to obtain in the wet market or from local agriculture suppliers.

Farmers kept their own seeds for both non-perishable and perishable crops (29% and 26%, respectively). Seeds from previous harvests were kept for several months before planting started. This generally occurred when they needed to grow the crop and the crop was very expensive or not available in the market.

The government was the source of seeds for 4% of respondents growing non-perishable crops, but for no respondents with perishable crops (Table A6.26). The government were providing seeds to farmers as part of a pilot project to encourage better production. Local agricultural supply stores were the source for 26% growing non-perishable crops and 76% for perishable crops.

Traders were the largest source of seeds for non-perishable crops (40%), but were not used by growers of perishable crops. This might relate to the seeds for non-perishable crops not being produced in the Enrekang regency, whereas seed for perishable crops were available in in the local agricultural stores. The local market was a source for both non-perishable (22%) and perishable (24%) crops. These seeds were for home consumption, not for commercial uses. These seeds were also cheaper and quicker to obtain but were recognised by farmers as being a high disease risk.

6.3.8 Problems with sourcing and costs of dairy heifers

All dairy respondents remarked that the breed of heifers they preferred to buy was the Fries Holland. The reasons given were high milk production (52%) and adapted to the climatic conditions (48%) (Table A6.27). Most of the heifers were supplied from Java Islands (80%) (Table A6.28). Only a few obtained heifers from government assistance, through local traders, or heifers born to their dairy cows.

Almost one hundred percent of respondents bought heifers through a group (96%), with the remainder buying them individually. The reasons for group buying were lower cost (52%) and cheaper (44%). The reason given by those who bought as individuals was that they were purchasing a small number of heifers (Table A6.29). However, the challenges faced by respondents when acquiring heifers were expensive price (55%), not available in the local area (25%), and high risk during transportation (20%) (Table A6.30).

6.3.9 Acquiring fertiliser for vegetables

Most farmers mixed chemical and organic fertilisers (64%), followed by chemical fertilizer (22%) and organic fertiliser (14%) (Table A6.31). Mixed fertilizer was assumed by them to improve soil fertility through the effects of organic fertilizer, and to achieve high productivity with chemical fertilizer. It was also a means to reduce costs, as organic manure was cheaper than chemical fertiliser. Chemical fertiliser is only produced by companies and mostly supplied by local agricultural stores. Red onion farmers commented that using chemical fertilizer enabled them to obtain maximum production. Organic fertilizers included compost and organic manure from their livestock. Farmers mostly obtained chemical fertilizer from the local agricultural supply store (82%), followed by traders (10%), while some said they make their own fertilizer (8%) (Table A6.32). Some stores provide credit to

retain buyers, especially red onion farmers. Traders also provided fertiliser to the respondents. They supplied fertilizer to farmers based on sharing of operational costs and profits. Those who make their own fertiliser do so using natural resources for compost and mixing with organic manure from their livestock.

Despite both local agricultural supply stores and traders providing credit through partnering with farmers, there were several factors that impeded farmers from obtaining fertiliser (Table 6.4).

Table 6.4: The challenges in obtaining fertilizer input

Challenges	Frequency	Percent
Expensive	141	56
Only available in the sub-district market	53	21
High transportation cost	37	15
Lack of quality of subsidised fertilizer	19	8
Total	**250**	**100**

A large percentage of respondents said that expensive fertilizer price was one of the problems with growing vegetables (56%). This evidence is supported in the scoping study, which found that the farmers seldom used chemical inputs because of their expense, while at the same time market prices were low. Several farmers complained about the difficulty of accessing enough fertilizer because it was only available in the sub-district market (21%). High transportation costs of getting the fertilizer to the farm gate was also reported by 15% of respondents. The latter issue is particularly relevant to those who live in rural villages with poor road access.

6.3.10 Acquiring dairy fodder inputs

About half obtained fodder from their own garden and through purchasing concentrates from agents, while the other half made up their own concentrates (Table A6.33). Expensive fodder was the main challenge in keeping dairy cattle (61%), followed by lack of access to transport for fodder (31%) (Table 6.5). Expensive fodder may be because they were produced by manufacturing companies and, therefore, had to be transported to the rural area. Lack of access to transport for fodder was important to those with no access to public transport which required access to a private motor vehicle.

Table 6.5: The challenges in obtaining fodder

Challenges	Frequency	Percent
Expensive	153	61
Transportation problem	78	31
Lack of storage	13	5
Limited available on fodder forage	6	2
Total	**250**	**100**

6.3.11 Acquiring vegetable pesticides

The majority of farmers (68%) obtain pesticides from the local agricultural supply store. About one-third obtained the pesticides from traders (Table A6.32).

Most (67%) said expensive prices for purchasing pesticides were a constraint to growing vegetables. There were also some 33% of respondents who reported that obtaining pesticides was difficult because they were only available in the sub-district market (Table A6.34). These constraints were similar to those for fertilizer inputs because those inputs were generally required to be transported from outside the region to the agricultural store in the sub-district area.

6.3.12 Acquiring dairy medicines

Respondents purchased antibiotic, anthelmintic and vitamins to treat and prevent disease, as well as to increase milk production of their dairy (Table A6.35). Those medicines were categorised as the products that are sold commercially. Most respondents purchased medicines from the local agricultural store (79%), although 21% received them from a local government project (Table A6.36). The reasons for using the local agricultural stores were because they were the main dealer supplying the medicines and had easy access. Most of respondents did not access services from the suppliers, even though they were regular buyers (96%), although 4% did receive a discounted price.

Expensive medicines was the main constraint (78%), although others noted a lack of stores selling medicines (22%) (Table A6.37). A key reason for the expensive medicines was its commercial production outside the local region. Specific medicines needed to be ordered from Makassar, the provincial capital.

6.3.13 Challenges and sources of training and information for crop production

Pest and disease outbreaks were the most widely mentioned problem in growing vegetables (34%) (Table 6.6). Other key challenges raised were lack of seed quality (20%) and the low price of vegetables (17%).

Table 6.6: Challenges with crop production

Crop production challenges	Frequency	Percent
Pest and disease problems	85	34
Lack of seed quality	45	20
Low price of vegetable	42	17
Financial problem	27	11
Inadequate seeds	28	11
Low yield production	10	4
Lack of experience	9	4
Total	**250**	**100**

Almost half (48%) of the respondents said that the government, and their extension services, were the most important source of information and training (Table A6.38). Many try to solve their problems using their own observations (36%) and through discussion with other farmers (16%). The private sector plays little role.

When asked what training and information was relevant to them to achieve better crop production, training on pest and disease received the most mentions (56%), which correlates with high pest and disease levels being the major problems for farmers (Table A6.39).

Other key topics mentioned were training on crop cultivation techniques and soil conservation and water management. Training on crop cultivation techniques was needed by respondents due to their perception that, through understanding cultivation techniques, it would be easy to cultivate the crop and there would be less pest and disease attacks. Soil and water management were requested by those growing vegetable in higher land areas because they often experienced land erosion during the rainy season, and limited water during the dry season.

6.3.14 Challenges and sources of training and information for dairy production

Pest and disease prevention was the main challenge for dairy producers (52%). Sourcing inputs (25%) and lack of milk processing (20%) were also important problems (Table 6.7). Pests and diseases included infectious and non-infectious diseases of dairy cows. Dairy inputs were inadequately supplied locally and were mostly transported from other areas. Lack of milk processing may refer to poor pasteurization technology to maintain the quality of milk, and to kill harmful organisms such as bacteria, viruses and protozoa.

Table 6.7: Problems in keeping the dairy cattle

Problems	Frequency	Percent
Pests and diseases	129	52
Provision on inputs dairy	62	25
Lack of milk processing technology	50	20
Environmental polluted	9	4
Total	**250**	**100**

Most respondents depend on government extension services to obtain training and information (80%), with a few solving problems themselves, or through other farmers or groups (Table A6.40). The government extension service, therefore, have an important role to provide knowledge, skills and technological innovation that can be implemented easily by respondents.

Training on *dangke* preservation (30%), and pest and disease (29%), were the main types of training requested. Other respondents mentioned training on artificial insemination (15%), technology biogas and organic compost (13%), and the method on making fodder (10%), with only a few of them requesting market information (Table A6.41). Methods for *dangke* preservation relate to a desire for knowledge about preservation techniques so their product would be more durable and more marketable.

6.3.15   Infrastructure issues for vegetable and dairy farmers
Distance of selling the products
The average distance of respondents from the place where they sold most of their vegetables was 13 kilometres. There were several farmers who were within 1 kilometre, with the maximum distance being 39 kilometres. Those with only 1 kilometre had access to a road, so that the buyers or traders could come close to the farm. Those further away had to transport their products by connecting to a village road, and then to a sub-district road, since they generally transported to the wet market at the sub-district level (Table A6.42).

For dairy farmers, the average distance of respondents from the place where they sold most of their dairy products was 2 kilometres, with a minimum of 0 kilometres and a maximum distance of 4 kilometres. Those with only 0 kilometres were the respondents who sold their products mainly from their home. Those with a distance of 4 kilometres had to bring the dairy products to the wholesaler, or *kios,* and local wet market (Table A6.42).

Type of transportation services
Around half (54%) used a truck or jeep to transport their vegetables to market (Table 6.8). These forms of transport were chosen by respondents because many roads could only be

used by those vehicles due to very poor road conditions, especially the village road. Most farmers have high transportation costs when transporting products to market (Table A6.43).

Other transportation used was public transportation and their own vehicle. Public transport is operated and owned individually, with the government controlling the operation system under the transportation department. However, public transport only reaches farm locations with a good road network, and only runs effectively during wet market days, with irregular services on other days. Farmers who used their own vehicles were in areas that were difficult to access by truck and public transportation, and could only be accessed by motorcycle due to very narrow roads, especially farm roads.

There were also some respondents connected to traders who collected their product. Vegetables were collected from the farm gate, or put in a place that could be accessed by traders' transport. In general, this system was mostly used by farmers who had a business relationship with traders, such as providing the agricultural inputs. Others have regular contact with traders, so they do not have costs for transportation to market.

Unlike vegetable farmers, most dairy respondents sold their products to the traders or wholesaler (48%), other respondents through directly selling at home (26%), or using their own vehicle (24%) (Table 6.8). Collected by traders and wholesaler means the products were collected directly by traders in the place of production, mainly at home. Using own vehicle occurred in areas with poor market access, such as several villages in the Cendana sub-district, with access only by motorcycle. Selling at home meant that they sold dairy products at home where the buyers come to purchase. The scoping study found that this marketing system mostly related to the area with better transportation access and regular buyers.

Table 6.8: Method of transportation of products both vegetable and dairy

Method of transportation	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Truck or Jeep	134	54	-	-
Public transportation	47	19	4	2
Own vehicle	43	17	61	24
Collected by trader/wholesaler	26	10	119	48
At home	-	-	66	26
Total	**250**	**100**	**250**	**100**

Inadequate refrigeration was the main problem when bringing the products to the market (78%), followed by a lack of public transportation (22%) (Table A6.44). Lack of public transportation was a problem where this was lacking, with private or other motor vehicles being required. Inadequate refrigeration constrained farmers from keeping products and maintaining quality when they were selling the products in the market.

6.3.16   Sources of water for vegetable and dairy production

Vegetable production

Rain was the most common source of water for growing vegetables (48%), followed by using a river or stream (26%), ground water (21%) and mountain spring (6%) (Table A6.45). The region is an upland area with rainfall averaging about 1,669 mm per annum (Bappeda 2009), however maintaining water resources is important for sustainability of vegetable production.

Those depending on rain-fed supplies were mainly in the highland areas. Farmers with access to rivers or streams have established irrigation systems to overcome water shortages, especially during the dry season. For instance, most red onion farmers have established their own irrigation to obtain enough water supplies from rivers due to inadequate water in the farm area. Ground water and mountain springs are mostly used by farmers who grow vegetables that do not require as much water. Some farmers said that they are more likely to grow potatoes and carrots due to those crops being able to grow with limited water. However, no respondents had obtained water supplies from irrigation that was established by farmer groups, or from other irrigations facilities.

Distance from water sources varied greatly for vegetable respondents (Table A6.46). Some respondents were less than a half kilometre from the water source, while others were up to 2.7 kilometres. Those close to their supply used water inside the farm, either rainfed or other sources of water. Those at a distance from their supply obtained water from outside the farm by investing irrigation infrastructure.

Dairy production

Artesian well using ground water was the most common source of water for dairy farmers (90%), with rainfed (8%) and river or stream (2%) being minor sources (Table A6.45). Artesian wells were mainly in the watershed area, such as the sub-district Cendana, where the majority of dairy farmers were (Baba et al. 2011).

Those depending on rainfed were in the high land areas, with most of them having constructed reservoirs, or small dams, to provide water during the dry season. Those obtaining water from a river or stream had constructed their own systems.

Similarly for dairy, those respondents close to water were was accessing it from inside their farm, while those further from sources of water had constructed their own water supply systems, mainly obtaining water from rivers or streams.

6.3.17   Sources of assistance with water for vegetable and dairy respondents

Most respondents established their own water and irrigation systems when they needed water for their farm land, with vegetable farmers (50%) and dairy farmers (97%) (Table A6.47).

Investment in water supply and irrigation consists of providing reservoirs, pumps and water hose. Relatives and friends refer to farmers who live in the neighbourhood of the farm. In the vegetable sector, some land owners provide access to irrigation as part of the rental agreement. Capital providers are persons involved in business cooperation with the vegetable respondents who provide finance for purchasing equipment. There was no government support for irrigation or water supply for vegetable and dairy production.

6.3.18 Problems in sourcing water for vegetable and dairy

Those vegetable farmers in upland areas depend on rainfed sources, but have many problems with irrigating farm land. High operational cost was the main obstacle to respondents (45%), with other key obstacles being no dam (28%), and no government assistance (12%) (Table A6.48). High operational cost was mainly due to the cost of irrigation infrastructure to obtain water from distant water sources. No dam relates to a lack of reservoirs to keep water to irrigate, particularly during the dry season. Some farmers expected the government to assist in providing irrigation facilities, but there was none in this area.

In contrast, most dairy respondents did not have significant problems in obtaining water. About one quarter were concerned about water pollution

6.3.19 Telecommunication facility

Almost half (48%) of respondents used the telecommunication facility for obtaining market price information, other respondents used it for marketing transaction (16%), and a few (4%) used it to communicate with extension in relation to solving pest disease. However, there were some respondents (32%) who had inadequate access to a telecommunication facility.

With regards to dairy farmers, some 42% of respondents used a telecommunication facility for marketing transaction with customers, followed by 17% of respondents used to obtain price information. However, it was a higher percentage of farmers (41%) without any access to a telecommunication facility (Table A6.49).

6.3.20 Marketing services, challenges and solutions
Marketing of vegetable production
Farmers had different approaches when linking to buyers (Table A6.50). Many connected with inter-island traders (40%), followed by wet market retailers (22%), agents or collectors (20%), and regional traders (18%). Factors that influenced farmers to connect to traders, both inter-island and regional, were particularly related to their provision of credit and business partnerships, especially for agricultural inputs supply. Connecting to the wet market retailers was based on obtaining a cash payment. Agents or collectors were mainly used by those who have small quantities of vegetables and need immediate cash payment.

However, marketing vegetables brings several obstacles to farmers. A large proportion noted that delayed payment from buyers was the main constraint in selling their vegetables (41%), followed by low market price (34%), and difficulty obtaining access to price information (21%) (Table 6.9). Some traders only pay after selling the vegetables, mostly traders who were in a business partnership with farmers, with final payments after the products have been sold. Low market price tended to be for vegetable products brought to the wet market when it was over supplied, but also lack of demand from other market destinations. Lack of market information referred to inadequate information enabling farmers to predict vegetable prices. Some farmers have not received payment from buyers who had not paid them for the products they had offered to sell for them.

Table 6.9: Problems with payment systems

Problems	Frequency	Percent
Delayed payment	103	41
Low market prices	85	34
Lack of market information	52	21
Unpaid by buyers	10	4
Total	**250**	**100**

In solving these problems, most farmers (70%) suggested that organising marketing contracts was one solution, followed by providing market information and market infrastructure (Table A6.51). Marketing contracts would allow formal agreements between buyers and farmers which include quantity, quality and market price. Access to formal price information would overcome the problem for the majority of farmers who, when selling vegetables, only obtained information from traders and middleman that usually control and determine the prices. Market infrastructure relates to a lack of cold storage and other facilities to maintain quality of products, particularly in the harvesting period.

Marketing of dairy productions

The majority of dairy respondents were connected to local traders (72%), followed by directly selling (24%) and wet markets (4%) (Table A6.52). Factors that influence dairy farmers to sell to local traders were that they bought directly from the farm, and also lived nearby. Direct selling means that they sell directly to the costumers where they come to purchase at home, and also without involving agents or other traders. Consequently, they do not have transportation costs when marketing their products. Those connected to wet market retailers took the products to the sub-district market and sold them to retailers.

The two key problems for dairy marketing were lack of potential markets (68%) and poor quality standards (32%) (Table A6.53). Lack of potential market may relate to the *dangke*

products not having potential buyers, such as supermarkets, due to lack of quality and quantity of production. Poor quality standards refer to the *dangke* products with poor packaging and food hygiene's standards. Solutions to marketing problems suggested by dairy respondents included improving the quality standard (43%), and links to potential markets (42%) (Table A6.54). Improving quality standards mostly relates to healthier, safer and better packaged products. Improving links to potential buyers reflects a desire to meet with potential buyers who would contract for regular purchases.

6.3.21   Financial service issues

Sources of finance

Almost half of vegetable respondents (42%) obtain money for growing vegetables from the informal financial sector, with 29% accessing the formal financial sector and 28% using neither (Table A6.55). The informal financial sector offered services with easy procedures and availability, while the formal financial sector required farmers to have the ability to fulfil the required procedures. A land certificate was the most valuable element to meet formal banking requirements.

In contrast, for dairy production, the formal banks were the main source of credit. The main banks were the BRI, which not only serves the clients in the city of regency, but also in the sub-district.

Main purpose for borrowing money

Most vegetable respondents (68%) borrow money for agricultural inputs such as seeds, fertiliser and pesticides (Table A6.56). This correlates with concerns about the high cost of inputs. Providing irrigation infrastructure was another reason (10%), which relates to problems with sourcing water outlined earlier.

Most dairy respondents borrowed money to buy heifers (72%), followed by improving their business capacity (21%) (Table A6.57). The main dairy inputs for borrowed money were buying heifers. Improved business capacity reflects the need for more capital to provide medicines and fodders, and also for construction of permanent cages. Equipment expenditures included tools and equipment for milk production and processing.

Access to credit programs

Most farmers grow vegetables without using formal credit programs (72%) and there were only a few (28%) who used credit programs (Table A6.58). The reasons to not use credit programs were being more convenient and easy to connect to money lenders, difficulties accessing them through banks, only the crops that have high potential market would be financed, and a lack of information from the government (Table A659). Of the 70 vegetable respondents who access the credit programs, most (93%) are accessing the people business

credits, and only 7% are accessing the food security and energy credit program (Table A6.60). The reasons respondents who have used the people business credits included it were because it has a low interest rate (82%) and it doesn't require proof of collateral for small credit facility (18%), while those who used the food security and energy credit did so due to facilitation by government (10%) (A6.61).

More than a half of the dairy farmers used credit programs (54%) (Table A6.62). Of 136 dairy respondents connected to credit programs, 82% used people business credit and 18% the food security and energy credit program (Table A6.63). The respondents' reasonsfor using the people business credit program were that it has a low interest rate, and, those connected to the food security and energy credit program mentioned this credit was facilitated by the government, and also had a low interest rate (Table A6.64). Those not linked to a credit program mentioned a lack of information and inadequate collateral (Table A6.65).

Challenges in applying for credit

Complicated procedures were the most significant problem that impeded both vegetable and dairy farmers trying to access credit from the formal financial sector (Table 6.10). The procedure included the various administration documents, such as a reference letter from local government, preparing a credit proposal and collateral. Addressing those procedures, and accessing information from the bank, generally takes more than a month. Some argued that bank loans increased administration costs. Smallholder farmers have transportation costs due to the need to meet with the bank. Thus, distance to the financial source was also a factor that impeded respondents from preparing proposals for financial assistance. The BRI and the BNI, which have the schemes, were mainly located in the city of Enrekang, while smallholder farmers live in villages with poor road access and transportation services. The lack of banking authority at sub-district and district levels was also a constraint for respondents when they wanted to develop a credit proposal. As found in the scoping study, when smallholder farmers requested more than Rp 50 million, the final agreement had to be decided by the BRI at the district level.

Table 6.10: Challenges in applying for credit from the formal banks

Challenges	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Complicated procedure (Collateral)	169	68	140	56
Costly	41	16	43	17
Distance to bank	29	12	27	11
Lack of banking authority	11	4	40	16
Total	**250**	**100**	**250**	**100**

6.4 Economic development indicators

This section contains information on the economic development indicators for the respondents. This provides some baseline information on comparison of the economic status of dairy and vegetable farmers.

6.4.1 Housing indicators

Number of bedrooms

While most dairy respondents had either two (47%) or three (36%) bedrooms, the distribution for the vegetable respondents ranged more evenly between one (23%) and more than three (28%), with a mode of three (38%) (Table A6.66). A Chi square test showed the two industries were significantly different (p-value = 0.000) (Table A6.67). Income was positively correlated with the number of bedrooms for both industries (A6.68).

Main source of power for lighting

Electricity was the main power for lighting for 92% of vegetable and 100% of dairy respondents (Table A6.69). Paraffin was used by 8% of vegetable respondents, all of whom were in the lowest income category, whereas it was not used by dairy respondents (none of whom were in the lowest income category). A Chi square test showed these distributions were significantly different (p-value = 0.000) (Table A6.70).

Main source of energy for cooking

A greater proportion of dairy respondents used gas for cooking (94%) than did vegetable respondents (83%), with firewood being the other main source (Table A6.71). None used electricity. Most people using firewood were in the lower income brackets for both vegetable and dairy respondents. Once again there was a significant difference between the two sectors (p-value = 0.000) (Table A6.72) and (Table A6.73).

Type of toilet used

While all dairy respondents had private flush toilets, only 86% of vegetable respondents had this facility (Table A6.74). The remainder used public flush toilets in the lower income level for vegetable respondents. The sectors were significantly different (p-value = 0.000) (Table A6.75).

Main water source for home

Vegetable respondents received their home water from a range of sources including mountain water source (42%), rain water (26%) and tap/piped water (23%), while for dairy respondents the main source was bore hole (92%), while the remainder (8%) used tap/piped water (Table A6.76). There appears to be no apparent relationship between income and main water source, however Chi square tests showed there were significant difference (p-value = 0.005) for vegetable, but not for dairy. Vegetable respondents who had higher income levels

still depended on mountainous water sources (e.g., 30% of those with more than Rp 3,000 000) (AUD $ 300) (Table A6.77), while for dairy 50% with income level more than Rp 3, 000,000 (AUD $ 300) used bore water (Table A6.78).

6.4.2   Access to information communication technologies

Type of information facility

More dairy respondents than vegetable respondents had a TV, while vegetable respondents were more likely to have a DVD player and Satellite channel than dairy respondents. The same proportion of vegetable and dairy respondents owned radios (Table A6.79). Income was positively correlated with owning a TV, DVD Player and satellite channel at home for both industries, while there was a significant difference between industries (p-value= 0.000) (Table A6.80) and (Table A6.81).

Telephone ownership

More dairy respondent households (79%) owned a mobile phone than did vegetable respondent households (62%), while none in either group had a fixed phone (Table A6.82). Income contributed positively to use of a mobile phone for vegetable respondents (p-value = 0.000) (Table A6.83), while there was not a significant difference for dairy (p-value = 0.258) (Table A6.84).

The main reason for the lack of mobile phones was that several sub-districts did not have a mobile network. For instance, in sub-districts such as Massalle, Baroko and Bungin as the base of agricultural production, the mobile phone can be used due to lack of infrastructure for a mobile network (Biro Pusat Statistik 2003).

6.4.3   Vehicle ownership

Vegetable respondents were more likely to own a motor cycle than were dairy respondents (93% vs 86%), however dairy respondents were more likely to own a car (14% vs 3%). Consequently, all dairy respondents had access to a vehicle, whereas 4% of vegetable respondents did not (Table A6.85). Cars were more likely to be owned by those with higher incomes, whereas those without access to a vehicle were in the lower income brackets and this made a significant difference (p-value=0.000) (Table A6.86) and (Table A6.87).

6.5   Ratings of the enabling environment conditions by farmers

The enabling environment was investigated using smallholder perceptions about the importance and levels of fulfilment of elements of the enabling environment using a series of criteria developed from the literature and the scoping study. Gaps in the enabling conditions are identified through differences in perceptions about the importance and fulfilment of the

conditions. However, some of the elements were not measured for both fulfilment or importance, due to inadequate measurement, which is a weakness of the study.

6.5.1 Land tenure and property rights

Vegetable respondents

For the vegetable respondents, all items for land tenure and property rights were rated higher than 5 (out of 6) for importance, with the highest rating being 5.50 for 'Presence of government programs and instruments that support administration processes to get land certificates for property rights status' (Table 6.11). Conversely, all (except perhaps 'Access to private land for crop production' at 2.76) rated poorly for level of fulfilment, with means of less than 2. The largest gap was for 'Property rights to provide security for crop production' (3.74) although the gaps for all were greater than 3.0. There were significant differences (p-value = 0.000) for all items between the levels of importance and fulfilment

Table 6.11: Ratings for land tenure and property rights – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Presence of government programs and instruments that support administration processes to get land certificates for property rights status	5.50	0.52	1.92	0.76	-3.58	0.000
Property rights to provide security for crop production activities	5.39	0.50	1.58	0.64	-3.74	0.000
Local government consults farmers on land requirements for crop production	5.38	0.50	1.87	0.74	-3.08	0.000
Presence of government programs and instruments that allow smallholder producers access to land for crop production	5.28	0.49	1.83	0.70	-3.36	0.000
Access to land for crop production	5.28	0.47				
Access to private land for crop production			2.76	0.82		
Access to public land for crop production			1.86	0.70		

P-value is for paired sample test significant at 5% level
n = 250; Ratings out of 6 with 6 the best

Dairy respondents

Similarly, for the dairy respondents, all items for land tenure and property rights were rated higher than 5 (out of 6) for importance, with the highest rating being 5.86 for 'Presence of government programs and instruments that support administration processes to get land certificates for property rights status' (Table 6.12). However, ratings for level of fulfilment were more mixed, with 'Property rights to provide security for dairy cattle activities' with a mean of 4.22 and a gap of 1.56. The gap for the others was greater than 3.0, with the largest gap being for 'Presence of government programs and instruments that allow smallholder

producers access to land for dairy cattle farm' (4.32). There were significant differences (p-value = 0.000) for all items between the levels of importance and fulfilment.

Table 6.12: Ratings for land tenure & property rights – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Presence of government programs and instruments that support administration processes to get land certificates for property rights status	5.86	0.35	2.51	0.57	-3.35	0.000
Property rights to provide security for dairy cattle farm activities	5.78	0.42	4.22	0.75	-1.56	0.000
Presence of government programs and instruments that allow smallholder producers access to land for dairy cattle farm	5.68	0.47	1.36	0.50	-4.32	0.000
Access to land for dairy cattle farm	5.53	0.52				
Local government consults farmers on land requirements for dairy cattle farm	5.01	0.62	1.41	0.50	-3.60	0.000
Access to public land for dairy cattle farm			1.47	0.54		
Access to private land for dairy cattle farm			1.31	0.49		

P-value is for paired sample test, significant at 5%;
n = 250; Ratings out of 6 with 6 the best

Comparison between vegetable and dairy

All the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and were found to have significant differences (p-value=0.000) between the two sectors (Table 6.13), with the biggest difference being 0.40for 'Presence of government programs and instruments that allow smallholder producers access to land'. The ratings of fulfilment showed larger differences and they were significant (p-value = 0.000). The largest difference was for 'Property rights to provide security for farm activities, with the dairy sector rating their level of fulfilment for this item 2.64 higher than the vegetable sector. Conversely, for 'Access to private land', vegetable respondents rated their level of fulfilment 1.45 higher than did the dairy respondents.

Table 6.13: Differences in ratings between vegetable and dairy respondents for land tenure and property rights

Items	Importance				Fulfilment			
	V	D	Diff	p	V	D	Diff	p
Presence of government programs and instruments that support administration processes to get land certificates for property rights status	5.50	5.86	0.36	0.000	1.92	2.51	0.60	0.000
Property rights to provide security for farm activities	5.39	5.78	0.39	0.000	1.58	4.22	2.64	0.000
Local government consults farmers on land requirements	5.38	5.01	0.37	0.000	1.87	1.41	0.40	0.000
Presence of government programs and instruments that allow smallholder producers access to land	5.28	5.68	0.40	0.000	1.83	1.36	0.47	0.000
Access to land	5.28	5.53	0.25	0.000				
Access to public land					1.86	1.47	0.39	0.000
Access to private land					2.76	1.31	1.45	0.000
n	250	250			250	250		

V   = Vegetable;   D = Dairy
Diff. = Difference; *P* – value is for Independent samples t test with significant at 5% level

6.5.2   Infrastructure

Farm-to-market roads – vegetable respondents

For vegetable respondents, all items for farm to market roads rated higher than 5.0 for importance, with 'Accessibility of farm-to-market roads' rated highest at 5.46 (Table 6.14). Fulfilment levels were between 2.0 and 3.0, resulting in gaps of 2.0 to 3.0, with the smallest gap being 2.46 for 'Accessibility of farm-to-market roads' and the largest gap being 2.95 for 'Complaints on roads are properly addressed by the government'. There were significant differences (p-value = 0.000) for all items between the levels of importance and fulfilment.

Table 6.14: Ratings for farm-to-market roads – vegetable farms

Items	Importance		Fulfilment		Gap	p
	Mean	SD	Mean	SD		
Accessibility of farm-to-market roads	5.46	0.52	3	0.94	-2.46	0.000
Proper maintenance of farm-to-market roads	5.44	0.51	2.66	0.92	-2.78	0.000
Good roads to reduce transportation costs	5.24	0.48	2.52	0.87	-2.72	0.000
Complaints on roads are properly addressed by the government	5.08	0.54	2.14	0.76	-2.95	0.000

P-value is for paired sample test, significant at 5% level
n = 250; Ratings out of 6 with 6 the best

Farm-to-market roads – dairy respondents

Likewise, for dairy respondents, all items for farm to market roads rated higher than 5.0 for importance with 'Accessibility of farm-to-market roads' highest at 5.81(Table 6.15). Fulfilment levels were rated around 3.0, resulting in a gap of 2.0, with the smallest being 2.10 for 'Accessibility of farm-to-market roads' and the largest gap being 2.27 for 'Complaints on roads are properly addressed by the government'. There were significant (p-value = 0.000) for all items between the levels of importance and fulfilment.

Table 6.15: Ratings for farm-to-market roads – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Accessibility of farm-to-market roads	5.81	0.39	3.71	0.84	-2.10	0.000
Proper maintenance of farm-to-market roads	5.79	0.41	3.64	0.55	-2.15	0.000
Good roads to reduce transportation costs	5.74	0.44	3.49	0.53	-2.25	0.000
Complaints on roads are properly addressed by the government	5.47	0.51	3.20	0.81	-2.27	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Farm to market roads - comparison between vegetable and dairy

Comparing all the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and there were significant differences (p-value=0.000) between the two sectors (Table 6.16), with the biggest difference being 0.50 for 'Good roads to reduce transportation costs'. The ratings of fulfilment between the sectors showed no large differences, but they were significantly different (p-value = 0.000). The largest differences was for 'Complaints on roads are properly addressed by the government', with the dairy sector rating their level of fulfilment for this item 1.06 higher than the vegetable sector.

Table 6.16: Differences in ratings between vegetable and dairy respondents for farm to market roads

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Affordability of transportation services for inputs and marketing	5.46	5.81	0.35	0.000	3.00	3.71	0.71	0.000
Proper maintenance of farm-to-market roads	5.44	5.79	0.34	0.000	2.66	3.64	0.98	0.000
Good roads to reduce transportation costs	5.24	5.74	0.50	0.000	2.52	3.49	0.97	0.000
Complaints on roads are properly addressed by the government	5.08	5.47	0.39	0.000	2.14	3.20	1.06	0.000
n	250	250			250	250		

Transportation services-vegetable respondents

For vegetable respondents, all items for transportation services were rated higher than 5 (out of 6) for importance, with the highest rating being 5.39 for 'Availability of transportation for vegetable inputs and marketing' (Table 6.17). However, the fulfilment levels were 2.0, resulting in a gap of 2.5 or greater, except for 'Farmers consulted on service needs by transportation service providers' present the lowest fulfilment being 1.58 and largest gap of 3.47.There were significant differences (p-value=0.000) for all items between the levels of importance and fulfilment.

Table 6.17: Ratings for transportation services-vegetable farms

Items	Important		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Availability of transportation for vegetable inputs and marketing	5.39	0.49	2.94	0.96	-2.45	0.000
Affordability of transportation services for vegetable inputs and marketing	5.23	0.44	2.54	0.84	-2.70	0.000
Timeliness of transportation services for vegetable inputs and marketing	5.16	0.52	2.38	0.87	-2.79	0.000
Transportation services that preserve quality of vegetables products when marketing	5.07	0.54	2.16	0.79	-2.91	0.000
Farmers consulted on service needs by transportation service providers	5.04	0.49	1.58	0.58	-3.47	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Transportation services-dairy respondents

For dairy respondents, all items for transportation services rated higher than 5.0 (out of 6) for importance, with the highest rating being '5.68 for 'Availability of transportation for dairy cattle inputs and marketing' (Table 6.18). The fulfilment levels were between 2.0 and 3.0, resulting in gaps of between 2.0 and 3.0, with the lowest gap being 2.33 for 'Availability of transportation for dairy cattle inputs and marketing,' and the highest gap being 2.96 for 'Transportation services that preserve quality of dairy cattle products when marketing'. There were significant differences (p-value=0.000) for all items between the levels of importance and fulfilment.

Table 6.18: Ratings for transportation services – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Availability of transportation for dairy cattle inputs and marketing	5.68	0.47	3.35	0.52	-2.33	0.000

Affordability of transportation services for dairy cattle inputs and marketing	5.63	0.48	3.26	0.53	-2.38	0.000
Transportation services that preserve quality of dairy cattle products when marketing	5.31	0.49	2.36	0.51	-2.96	0.000
Timeliness of transportation services for dairy cattle inputs and marketing	5.16	0.39	2.51	0.55	-2.65	0.000
Farmers consulted on service needs by transportation service providers	5.1	0.36	2.26	0.58	-2.83	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Transportation services - comparison between vegetable and dairy

All the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and there were significant differences (p-value= 0.000) between the two sectors, except for 'Timeliness of transportation services for dairy cattle inputs and marketing' (p-value = 0.923) and 'Farmers consulted on service needs by transportation service providers' (p-value = 0.173) (Table 6.19). The biggest difference is 0.40 for 'Affordability of transportation services for inputs and marketing'. All the ratings of fulfilment were higher for the dairy industry than the vegetable industry, with the range being 0.14 (p-value 0.037) for 'Timeliness for transportation services' to 0.72 for 'Affordability of transportation', with these being significantly different at p = 0.000.

Table 6.19: Differences in ratings between vegetable and dairy respondents for transportation services

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Availability of transportation service for inputs and marketing	5.39	5.68	0.29	0.000	2.94	3.35	0.41	0.000
Affordability of transportation services for inputs and marketing	5.23	5.63	0.40	0.000	2.54	3.26	0.72	0.000
Timeliness of transportation services for inputs and marketing	5.16	5.16	0.00	0.923	2.38	2.51	0.14	0.037
Transportation services that preserve quality of products when marketing	5.07	5.31	0.24	0.000	2.16	2.36	0.20	0.000
Farmers consulted on service needs by transportation service providers	5.04	5.09	0.05	0.173	1.58	2.26	0.69	0.000
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference ; P – value is for Independent samples t test with significant at 5% level

Marketing infrastructure -vegetable respondents

For vegetable respondents, all items for farm to market roads rated higher than 5.0 (out of 6) for importance with 'Access to a consolidation area where buyers can buy or collect vegetables' highest at 5.32 (Table 6.20). However, the fulfilment levels of all items were relatively low between 1.0 and 2.0, resulting in gaps of between 2.68 for 'Access to a consolidation area where buyers can buy or collect vegetables' and 3.35 for 'Affordability of

market stalls'. There were significant differences (p-value=0.000) for all items between the levels of importance and fulfilment.

Table 6.20: Ratings for marketing infrastructure –vegetable farms

Items	Importance		Fulfilment		Gap	p-
	Mean	SD	Mean	SD		
Access to a consolidation area where buyers can buy or collect vegetables	5.32	0.47	2.64	1.28	-2.68	0.000
Access to a covered area where vegetables can be graded or sorted	5.31	0.46	2.23	0.69	-3.08	0.000
Access to market stalls that can enhance the value of vegetables	5.22	0.41	1.77	0.73	-3.44	0.000
Affordability of market stalls	5.11	0.41	1.76	0.71	-3.35	0.000

P-value is for paired sample test, significant at 5%;
n = 250, Ratings out of 6 with 6 the best

Marketing infrastructure – dairy respondents

For dairy respondents, all items were rated higher than 5.0 (out of 6) for importance, with 'Access to a covered area where dairy cattle milk being processing' highest at 5.59 (Table 6.21). However, the mean fulfilment levels were mixed, with 'Access to a consolidation area where buyers can buy or collect of milk processing of dairy cattle' with a mean of 3.74 and the lowest gap of 1.80. The gap for others was greater than 2.0, with the largest gap being for 'Access to market stalls that can enhance the value of dairy cattle products' (3.29). There were significant differences (p-value=0.000) for all items between the levels of importance and fulfilment.

Table 6.21: Ratings for marketing infrastructure – dairy farms

Items	Importance		Fulfilment		Gap	p
	Mean	SD	Mean	SD		
Access to a covered area where dairy cattle milk being processing	5.59	0.49	3.22	0.91	-2.38	0.000
Access to a consolidation area where buyers can buy or collect of milk processing of dairy cattle	5.55	0.5	3.74	0.95	-1.80	0.000
Access to market stalls that can enhance the value of dairy cattle products	5.44	0.5	2.15	0.68	-3.29	0.000
Affordability of market stalls	5	0.43	1.98	0.76	-3.02	0.000

P-value is for paired sample test, significant at 5%;
n = 250, Ratings out of 6 with 6 the best

Marketing infrastructure - comparison between vegetable and dairy

All the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and there were significant differences (p-value = 0.000) between the two sectors (Table 6.22), with the biggest difference being 0.28 for 'Access to a covered area where the yields can be graded or processed'. The ratings of fulfilment showed some larger differences with

dairy having a higher rating on all items. The largest difference was for 'Access to a covered area where the products can be graded or processed', with the dairy sector rating their level of fulfilment for this item 1.10 higher than the vegetable sector. All differences were significantly different.

Table 6.22: Differences in ratings between vegetable and dairy respondents for marketing infrastructure

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Access to a consolidation area where buyers can buy or collect the products	5.32	5.55	0.23	0.000	2.64	3.74	0.58	0.000
Access to a covered area where the products can be graded or processed	5.31	5.59	0.28	0.000	2.23	3.22	1.10	0.000
Access to market stalls that can enhance the value of products	5.22	5.44	0.22	0.000	1.77	2.15	0.38	0.000
Affordability of market stalls	5.11	5.00	0.11	0.003	1.76	1.98	0.22	0.001
	250	250			250	250		

V   = Vegetable; D = Dairy
Diff. = Difference ; P – value is for Independent samples t test with significant at 5% level

Logistic infrastructure – vegetable respondents

For logistic infrastructure, the items for logistic infrastructure were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.20 for 'Availability of baskets for vegetable transportation to market' (Table 6.23). The fulfilment levels were between 1.0 and 2.0, resulting in gaps of around 3.15, with both gaps being significantly different at p = 0.000.

Table 6.23: Ratings for logistic infrastructure – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Availability of baskets for vegetable transportation to market	5.20	0.41	2.04	0.77	-3.16	0.000
Affordability of baskets for vegetable transportation to market	5.10	0.34	1.95	0.75	-3.15	0.000

P-value is for paired sample test, significant at 5%;
n = 250, Ratings out of 6 with 6 the best

Logistic infrastructure – dairy respondents

For dairy respondents, all items for farm to market roads rated higher than 5.0 (out of 6) for importance, with 'Availability of refrigeration for keeping of dairy cattle products in market place' highest at 5.53 (Table 6.24). However, all items rated poorly for level of fulfilment with means of less than 2.0. The largest gap was for 'Availability of refrigeration for keeping

of dairy cattle products during transportation' (3.93) although the gaps for all were greater than 3.5. All items had significant differences between importance and fulfilment.

Table 6.24: Ratings for logistic infrastructure – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	**SD**	**Mean**	**SD**		
Availability of refrigeration for keeping of dairy cattle products in market place	5.53	0.49	1.62	0.61	-3.92	0.000
Affordability of using container refrigerator for keeping of dairy cattle products during transportation	5.42	0.49	1.65	0.54	-3.76	0.000
Availability of refrigeration for keeping of dairy cattle products during transportation	5.40	0.49	1.47	0.50	-3.93	0.000
Affordability of using container refrigerator for keeping of dairy cattle products in market place	5.39	0.49	1.63	0.57	-3.76	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Logistic infrastructure - comparison between vegetable and dairy

The items of availability of logistic infrastructure and affordability of logistic infrastructure for transportation to market were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and were found to have significant differences (p-value =0.000) between the two sectors (Table 6.25),with the biggest difference being 0.31 for 'Affordability of logistic for transportation to market'. Similarly the differences in the fulfilment levels were significant, but also not large, with the largest difference for 'Availability of logistic infrastructure for transportation to market', with the vegetable sector rating their level of fulfilment 0.57 higher than the dairy sector.

Table 6.25: Differences in ratings between vegetable and dairy respondents for logistic infrastructure

Items	Importance				Fulfilment			
	V	**D**	**Diff**	*p*	**V**	**D**	**Diff**	*p*
Availability of logistic infrastructure (baskets-vegetable, refrigeration-dairy cattle) for transportation to market	5.20	5.40	0.20	0.000	2.04	1.47	0.57	0.000
Affordability of logistic infrastructure (baskets-vegetable, refrigeration-dairy cattle) for transportation to market	5.10	5.42	0.31	0.000	1.95	1.65	0.30	0.000
Availability of refrigeration for keeping of dairy cattle products in market place		5.53				1.62		
Affordability of using container		5.39				1.63		

refrigerator for keeping of dairy cattle
products in market place

n	250	250

Communication facilities – vegetable respondents

For vegetable respondents, all items for communication facilities were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.65 for 'Access to reliable communication services' (Table 6.26). The fulfilments levels were around 3, resulting in gaps of slightly more than 2.0, with lowest gap being 2.24 for 'Communication facilities assist market information' and the largest gap being 2.63 for 'Access to reliable communication services'. All were significantly different at p = 0.000.

Table 6.26: Ratings for communication facilities – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Access to reliable communication services	5.65	0.49	3.02	1.74	-2.63	0
Affordability of communications services	5.39	0.51	3.06	1.68	-2.33	0
Communication facilities assist market information	5.32	0.47	3.08	1.54	-2.24	0
Communication facilities that assist production information	5.27	0.46	3	1.58	-2.27	0

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Communication facilities – dairy respondents

For dairy respondents, all items for communication facilities rated higher than 5.0 (out of 6) for importance with 'Access to reliable communication services' coming in highest at 5.46 (Table 6.27). The mean fulfilment levels were higher than 4, resulting in relatively small gaps, with the lowest gap being 0.81 for 'Affordability of communications services' and the highest gap being 0.97 for 'Communication facilities that assist production information. All items were significantly different.

Table 6.27: Ratings for communication facilities – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Access to reliable communication services	5.46	0.50	4.60	0.98	-0.86	0.000
Communication facilities assist market information	5.39	0.50	4.44	1.08	-0.95	0.000
Communication facilities that assist production information	5.34	0.51	4.37	1.10	-0.97	0.000
Affordability of communications services	5.33	0.47	4.52	0.99	-0.81	0.000

P-value is for paired sample test, significant at 5% level.
n = 250, Ratings out of 6 with 6 the best

Communication facilities - comparison between vegetable and dairy

There was little difference in the ratings of the communication facilities items on importance for both vegetables and dairy, with 'Affordability of communications services' and 'Communication facilities assist market information' not being significantly different (Table 6.28). However, the differences in ratings of fulfilment were larger (and also significant at p-value = 0.000), with dairy respondents being more satisfied. The largest difference was for 'Communication facilities that assist production information', with the dairy sector rating their level of fulfilment for this item 2.24 higher than the vegetable sector.

Table 6.28: Differences in ratings between vegetable and dairy respondents for communication facility

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Access to reliable communication services	5.65	5.46	0.20	0.000	3.02	4.60	1.49	0.000
Affordability of communications services	5.39	5.33	0.06	0.173	3.08	4.44	1.38	0.000
Communication facilities assist market information	5.32	5.39	0.02	0.636	2.16	2.36	1.29	0.000
Communication facilities that assist production information	5.27	4.60	0.12	0.005	3.00	4.37	2.24	0.000
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference ; P – value is for Independent samples t test with significant at 5% level

Water and irrigation facilities– vegetable respondents

For vegetable respondents, all items for water and irrigation facilities rated higher than 5.0 (out of 6) for importance with 'Presence of government program on irrigation infrastructure to assist smallholder producers' highest at 5.80 (Table 6.29). However, all items rated poorly for fulfilment ranging from 1.10 to 1.53, resulting in gaps between 3.64 and 4.70, with the largest gap for 'Presence of government program on irrigation infrastructure to assist smallholder producers' (4.70). All differences were significant (p-value=0.000).

Table 6.29: Ratings for water and irrigation facilities – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Presence of government program on irrigation infrastructure to assist smallholder producers	5.80	0.42	1.10	0.31	-4.70	0.000
Access to reliable irrigation services to farm location	5.53	0.50	1.63	0.55	-3.90	0.000
Affordability of irrigation services	5.11	0.33	1.47	0.54	-3.64	0.000

P-value is for paired sample test, significant at 5% level.
n = 250, Ratings out of 6 with 6 the best

Water and irrigation facilities – dairy respondents

Access to sources of water to support the production process of dairy was rated 5.24, and the mean fulfilment of this condition was also high at 5.00, resulting in a gap of 0.24. However, the ratings were significantly different (p-value= 0.000) (Table 6.30).

Table 6.30: Ratings for water and irrigation facilities – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Access to source of water to support production process of dairy	5.24	0.44	5.00	0.35	-0.24	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Water and irrigation facilities **- comparison between vegetable and dairy**

The only item that could be compared was 'Access to reliable irrigation services or source of water', which was rated for importance at 5.53 for vegetables and 5.24 for dairy. The difference was significant (p-value =0.000) (Table 6.31). However, the ratings of fulfilment showed a much higher value, with dairy farmers being more satisfied. The gap between vegetables and dairy was significant (p-value 0.000).

Table 6.31: Differences in ratings between vegetable and dairy respondents for water and irrigation facilities

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Access to reliable irrigation services (vegetable) or source of water (dairy)	5.53	5.24	0.29	0.000	1.63	5.00	3.07	0.000
Affordability irrigation services	5.11				1.47			
Presence of government program on irrigation infrastructure to assist smallholder producers	5.80				2.16			
n	250	250			250	250		

V   = Vegetable;   D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

6.5.3   Financial Services
Formal financial services –vegetable respondents

The only item for formal financial services that was rated for both importance and fulfilment was 'Credit programs have requirements that are easy to comply with', which was rated 5.6 for importance and 2.76, resulting in a significant gap of 2.84 (p-value= 0.000) (Table 6.32). The ratings for fulfilment for all other items was mixed, with the smallest rating at 1.54 for 'Formal sources who are quick to respond to complaints' and the highest rating at 3.19 for 'Presence of government credit scheme and instruments that that support finance in agricultural production.'

Table 6.32: Ratings for formal financial services – vegetable farmers

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Formal sources who are quick to respond to complaints			1.54	0.55		
Formal sources who consult me on the type of loans that I need			1.59	0.55		
Formal sources who have affordable interest rates			1.94	0.78		
Formal credit sources have repayment schedules that accommodate situation of producers like myself			2.16	0.90		
Formal sources have requirements that are easy to comply with			2.42	0.95		
Credit programs have requirements that are easy to comply with	5.60	0.49	2.76	0.95	-2.84	0.000
Credits program provide affordable interest rates			2.82	1.10		
Presence of government credit scheme and instruments that support finance in agricultural production			3.19	0.82		

P-value is for paired sample test, significant at 5% level;
n = 250, Ratings out of 6 with 6 the best

Formal financial services – dairy respondents

For dairy respondents, 'Credit programs have requirements that are easy to comply with' was rated 5.50 for importance and 3.98 for fulfilment, with the gap of 1.52 being significantly different (p-value= 0.000). Once again, ratings of fulfilment were mixed, with the smallest for 'Formal sources who have affordable interest rates' at 2.19, and the highest for 'Credits program provide affordable interest rates' at 4.63 (Table 6.33).

Table 6.33: Ratings for formal financial services – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Formal sources who have affordable interest rates			2.19	0.70		
Formal credit sources have repayment schedules that accommodate situation of producers like myself			2.33	0.68		
Formal sources who consult me on the type of loans that I need			2.42	0.74		
Formal sources have requirements that are easy to comply with			2.58	0.69		
Formal sources who are quick to respond to complaints			2.65	0.62		
Credits program have requirements that are easy to comply with	5.50	0.52	3.98	0.66	-1.52	0.000
Presence of government credit scheme and instruments that support finance in agricultural production			4.06	0.68		
Credits program provide affordable interest rates			4.63	0.73		

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Formal financial services - comparison between vegetable and dairy

The difference in the ratings on importance for 'Credits program have requirements that are easy to comply with' was small at 0.10, although the difference was significant at the 5% level (p-value 0.021) (Table 6.34). The ratings for fulfilment showed dairy respondents were more satisfied with a rating of 3.98, versus 2.76 for vegetable respondents. While differences between the ratings for fulfilment were all significant at the 5% level, the dairy respondents appear to be considerably more satisfied than vegetable respondents on the items of 'Credits program provide affordable interest rates' and 'Presence of government credit scheme and instruments that support finance in agricultural production'.

Table 6.34: Differences in ratings between vegetable and dairy respondents for formal financial services

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Formal credit sources have repayment schedules that accommodate situation of producers like myself					2.16	2.33	0.17	0.016
Formal sources have requirements that are easy to comply with					2.42	2.58	0.16	0.031
Formal sources who have affordable interest rates					1.94	2.19	0.26	0.000
Formal sources who consult me on the type of loans that I need					1.59	2.42	0.27	0.000

Items	Importance				Fulfilment			
Formal sources who are quick to respond to complaints					1.54	2.65	0.23	0.000
Presence of government credit scheme and instruments that support finance in agricultural production					2.65	4.06	1.41	0.000
Credits program have requirements that are easy to comply with	5.60	5.50	0.10	0.021	2.76	3.98	1.21	0.000
Credits program provide affordable interest rates					2.82	4.63	1.81	0.000
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

Informal financial services – vegetable respondents

For vegetable respondents, the ratings for fulfilment of financial services was mixed, with 'Informal sources who have affordable interest rates' with lowest mean of 2.01, and 'Informal sources who have requirements that are easy to comply with' having the highest mean of 4.01 (Table 6.35).

Table 6.35: Ratings for informal financial services – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Informal sources who have affordable interest rates			2.01	0.76		
Informal sources that have repayment schedules that accommodate situation of smallholder producers like myself			2.72	0.91		
Informal sources who are quick to respond to complaints			3.15	1.15		
Informal sources who consult me on the type of loans that I need			3.24	1.12		
Informal sources who have requirements that are easy to comply with			4.01	1.59		

P-value is for paired sample test, significant at 5 level.
n = 250, Ratings out of 6 with 6 the best

Informal financial services – dairy respondents

For dairy respondents, all items for fulfilment of informal financial service rated poorly, ranging from 1.17 for 'Informal sources who are quick to respond to complaints', 'Informal sources who have requirements that are easy to comply' and 'Informal sources who consult me on the type of loans that I need', to the highest at 1.19 for 'Informal sources who have affordable interest rates' (Table 6.36).

Table 6.36: Ratings for informal financial services – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Informal sources who are quick to respond to complaints			1.17	0.38		
Informal sources that have repayment schedules that accommodate situation of smallholder producers like myself			1.18	0.39		
Informal sources who have requirements that are easy to comply with			1.17	0.38		
Informal sources who have affordable interest rates			1.19	0.40		
Informal sources who consult me on the type of loans that I need			1.17	0.37		

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

Informal financial services - comparison between vegetable and dairy

Since none of the items were measured for importance, only the ratings of fulfilment could be compared. Ratings for fulfilment for the vegetable sector were significantly higher than those for the dairy sector (p-value = 0.000) (Table 6.37). The largest difference was for 'Informal sources who have requirements that are easy to comply', with the vegetable sector rating their level of fulfilment for this item 2.84 higher than the dairy sector.

Table 6.37: Differences in ratings between vegetable and dairy respondents for informal financial services

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Informal sources that have repayment schedules that accommodate situation of smallholder producers like myself					2.72	1.18	1.54	0.000
Informal sources who have requirements that are easy to comply with					3.64	1.17	2.84	0.000
Informal sources who have affordable interest rates					2.01	1.19	0.96	0.000
Informal sources who consult me on the type of loans that I need					3.24	1.17	2.08	0.000
Informal sources who are quick to respond to complaints					3.15	1.16	0.82	0.000
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference ; P – value is for Independent samples t test with significant at 5% level

Vegetable sector-comparison between formal and informal financial sources

Since, none of the items were measured for importance, only the ratings of fulfilment could be compared. Ratings for fulfilment of all items for the informal sources were significantly higher than those for the formal source (p-value = 0.000), although they were not significant for 'financial sources who have affordable interest rates' (p-value = 0.298) (Table 6.38). The largest difference was for 'financial sources have requirements that are easy to comply', with the informal source sector rating their level of fulfilment for this item at 1.58 higher than the formal source.

Table 6.38: Differences in ratings between formal and informal services for vegetable sector

Items	Importance				Fulfilment			
	formal	informal	Diff	p	formal	informal	Diff	p
Financial credit sources have repayment schedules that accommodate situation of producers like myself					2.16	2.72	0.56	0.000
Financial sources have requirements that are easy to comply with					2.42	4.00	1.58	0.000
Financial sources who have affordable interest rates					1.94	2.00	0.26	0.296
Financial sources who consult me on the type of loans that I need					1.59	3.24	0.27	0.000
Financial sources who are quick to respond to complaints					1.54	3.15	0.23	0.000
n	250	250			250	250		

Diff. = Difference

P – value is for Independent samples t test with significant at 5% level

Dairy sector-comparison between formal and informal financial sources

Since none of the items were measured for importance, only the ratings of fulfilment could be compared. Ratings for fulfilment of all items for the formal sources were significantly higher than those for the informal source (p-value = 0.000) (Table 6.39). The largest difference was for 'Financial sources who are quick to respond to complaints', with the formal source sector rating their level of fulfilment for this item at 1.49 higher than the informal source.

Table 6.39: Differences in ratings between formal and informal services for dairy sector

Items	Importance				Fulfilment			
	formal	informal	Diff	p	formal	informal	Diff	p
Financial credit sources have repayment schedules that accommodate situation of producers like myself					2.33	1.18	1.15	0.000
Financial sources have requirements that are easy to comply with					2.58	1.19	1.39	0.000

Financial sources who have affordable interest rates	2.19	1.04	1.15	0.000
Financial sources who consult me on the type of loans that I need	2.42	1.17	1.25	0.000
Financial sources who are quick to respond to complaints	2.65	1.16	1.49	0.000
n	250 250		250	250

Diff. = Difference

P – value is for Independent samples t test with significant at 5% level

6.5.4 Research, development and extension

Research, development and extension services – vegetable respondents

For vegetable respondents, all items for research, development and extension were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.44 for 'R & D provide assistance in solving pest and disease problems' and 'Crop production training and demonstration farms from the government (Table 6.40). However, all (except 'Government and extension provide assistance in solving pest and disease problems' at 3.34 and 'R & D and extension provide innovations based on local conditions and that are easy to use' at 2.52) rated poorly, at less than 2.0 for level of fulfilment. The smallest rating was for 'Crop production training and demonstration farms from the private sector' (1.21). There were significant differences (p-value = 0.000) between the levels of importance and fulfilment

Table 6.40: Ratings for research, development and extension services– vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
R & D and extension provide innovations based on local conditions and that are easy to use			2.52	1.01		
R & D provide assistance in solving pest and disease problems	5.44	0.54				
Crop production training and demonstration farms from the government	5.44	0.58				
Access to better postharvest technologies	5.42	0.54	1.82	0.74	-3.61	0
Availability of fertilisers that provide better yields	5.36	0.58	1.97	0.04	-3.39	0
Government and extension provide assistance in solving pest and disease problems			3.34	1.05		
Private sector provides assistance in solving pest and disease problems			1.43	0.53		
NGO provides assistance in solving pest and disease problems			1.56	0.57		
Crop production training and demonstration farms from the private sector			1.21	0.41		
Crop production training and demonstration farms from NGOs			1.47	0.51		

P-value is for paired sample test, significant at 5 level.

n = 250, Ratings out of 6 with 6 the best

Research, development and extension services – dairy respondents

For dairy respondents, all items for research, development and extension were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.71 for 'Training on improving milk production and demonstration farms from the government' (Table 6.41). However, the ratings for level of fulfilment were more mixed, with 'Government and extension provide assistance in solving pest and disease problems' with the highest mean of 3.33, and for 'NGO provides assistance in solving pest and disease problems' with the lowest mean of 1.55.

Table 6.41: Ratings for research, development and extension services – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Training on improving milk production and demonstration farms from the government	5.71	0.45				
R & D provide assistance in solving pest and disease problems	5.68	0.47				
Access to better postharvest technologies	5.47	0.50	1.96	0.73	-3.52	0.000
Availability of heifer that provide better yields	5.42	0.49	2.82	0.67	-2.60	0.000
R & D and extension provide innovations based on local conditions and that are easy to use			2.58	1.01		
Government and extension provide assistance in solving pest and disease problems			3.33	0.75		
Private sector provides assistance in solving pest and disease problems			1.68	0.50		
NGO provides assistance in solving pest and disease problems			1.55	0.57		
Training on improving milk production and demonstration farms from the private sector			1.56	0.50		
Training on improving milk production and demonstration farms from NGOs			2.28	0.85		

P-value is for paired sample test, significant at 5 level
n = 250, Ratings out of 6 with 6 the best

Research, development and extension services - Comparison between vegetable and dairy

While the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and there were significant differences (p-value = 0.000), some, such as 'Access to better postharvest technologies,' were not significantly different between the two sectors (p-value = 0.304) (Table 6.42). The biggest difference is 0.27 for 'Crop production training and demonstration farms'.

Table 6.42: Differences in ratings between vegetable and dairy respondents for research, development and extension

Items	Importance				Fulfilment			
	V	D	Diff	p	V	D	Diff	p
R & D and extension provide innovations based on local conditions and that are easy to use					2.52	2.58	0.06	0.479
Research & D assistance in solving pest and disease problems	5.44	5.68	0.24	0.000				
Government and extension provide assistance in solving pest and disease problems					3.34	3.33	0.01	0.922
Private sector provides assistance in solving pest and disease problems					1.43	1.68	0.25	0.000
NGO provides assistance in solving pest and disease problems					1.57	1.55	0.01	0.000
Availability of inputs (fertilisers-vegetable, heifers-dairy) that provide better productions	5.36	5.42	0.25	0.056	1.97	2.82	0.85	0.000
Crop production training and demonstration farms	5.44	5.71	0.27	0.000				
Crop production training and demonstration farms from the government and extension					1.97	3.32	1.35	0.000
Crop production training and demonstration farms from the private sector					1.21	1.56	0.37	0.000
Crop production training and demonstration farms from NGOs					1.47	1.56	0.81	0.000
Access to better postharvest technologies	5.42	5.47	0.05	0.304	1.82	2.28	0.14	0.033
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

Apart from 'R & D and extension provide innovations based on local conditions and that are easy to use' and 'Government and extension provide assistance in solving pest and disease problems', which were not significantly different (p-value = 0.479 and 0.922, respectively), the others were statistically different, although on 'Crop production training and demonstration farms from the government and extension' had a large difference, with the dairy sectors rating their fulfilment for this item 1.35 higher than the vegetable sector.

6.5.5 Standards and regulations

For vegetable respondents, all items for standards and regulations were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.51 for 'Having signed contract agreements with buyers' (Table 6.43). However, ratings for level of fulfilment were poor,

with the highest 'Enforcement of contracts with buyers' at 2.24. The largest gap was for 'Having signed contract agreements with buyers' (4.04), but other gaps were around 3.0. Based on the results of a t-test, all items were significantly different (p-value=0.000) between importance and fulfilment levels.

Table 6.43: Ratings for standards and regulations – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Having signed contract agreements with buyers	5.51	0.51	1.47	0.51	-4.04	0.000
Support from government on certification of products	5.31	0.49	1.83	0.64	-3.48	0.000
Enforcement of contracts with buyers	5.26	0.44	2.24	0.96	-3.02	0.000
Quality and grades standards imposed by buyers are followed by producers	5.08	0.77	1.28	0.45	-3.79	0.000
Support from NGOs on certification of farms	5.08	0.38	1.49	0.66	-3.61	0.000
Quality and grade standards provided by buyers	5.04	0.71	1.94	0.75	-3.10	0.000
Support from private sector on certification of farms	5.03	0.32	1.73	0.65	-3.30	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, all items for standards and regulations were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.75 for 'Having signed contract agreements with buyers' (Table 6.44). Conversely, all (except 'Support from government on certification of products' at 2.76) rated poorly for level of fulfilment with less than 2.0. The largest gap was for 'Enforcement of contracts with buyers Support from government on certification of products' (4.17), while the lowest gap for 'Support from government on certification of products' (2.88). Based on the results of a t-test, all items were significantly different (p-value=0.000) between importance and fulfilment levels.

Table 6.44: Ratings for standards and regulations – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Having signed contract agreements with buyers	5.75	0.43	1.72	0.60		0.000
Enforcement of contracts with buyers	5.67	0.47	1.5	0.55		0.000
Support from government on certification of products	5.64	0.48	2.76	0.97		0.000
Support from private sector on certification of farms	5.4	0.51	1.64	0.67		0.000
Quality and grade standards provided by buyers	5.08	0.27	1.59	0.51		0.000
Support from NGOs on certification of farms	5.08	0.39	1.5	0.34		0.000

Quality and grades standards imposed by buyers are followed by producers	5	0.37	1.56	0.59	0.000

P-value is for paired sample test, significant at 5 % level
n = 250, Ratings out of 6 with 6 the best

Standard and regulations - comparison between vegetable and dairy

All the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy and, while the differences were small, there were significant differences (p-value = 0.000), except for 'Quality and grade standards provided by buyers', and 'Quality and grades standards imposed by buyers are followed' (Table 6.45). The biggest difference was 0.76 for 'Support from government on certification of product'.

Table 6.45: Differences in ratings between vegetable and dairy respondents for standard and regulation

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Having signed contract agreements with buyers	5.51	5.67	0.16	0.000	1.48	1.50	0.03	0.000
Enforcement of contracts with buyers	5.26	5.77	0.50	0.000	2.24	1.72	0.52	0.000
Quality and grade standards provided by buyers	5.04	5.07	0.03	0.456	1.94	1.59	0.35	0.000
Quality and grades standards imposed by buyers are followed	5.07	5.00	0.08	0.160	1.28	1.56	0.28	0.000
Support from government on certification of products	5.31	5.64	0.76	0.000	1.83	2.76	0.93	0.000
Support from private sector on certification of products	5.03	5.40	0.33	0.000	1.73	1.64	0.09	0.120
Support from NGOs on certification of products	5.44	5.71	0.27	0.000	1.48	1.50	0.03	0.602
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference ; P – value is for Independent samples t test with significant at 5% level

The differences in ratings of fulfilment for vegetables and dairy were small, although most were significantly different (p-value = 0.000), except for 'Support from private sector on certification of products' and 'Support from NGOs on certification of products,' with no significant differences (p-value = 0.120 and 0.602) respectively. The largest differences were for 'Support from government on certification of products', with the dairy sector rating their level of fulfilment for this item 0.93 higher than the vegetable sector. Conversely, for 'Enforcement of contracts with buyers', vegetable respondents rated their level of fulfilment 2.24 higher than did dairy respondents.

6.5.6 Business development services

For vegetable respondents, the two items measured for business development services were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.53 for 'Assistance that link farmers with buyers' (Table 6.46). The ratings of fulfilment items were relatively poor between the lowest mean of 1.27 for 'NGO provision of marketing information' and the highest mean of 2.75 for 'Private sector provision of marketing information'.

Table 6.46: Ratings for business development services - vegetable farms

Items	Importance		Fulfilment		Gap	p
	Mean	SD	Mean	SD		
Assistance that link farmers with buyers	5.53	0.49				
Assistance that provides market information	5.43	0.5				
NGO provision of marketing information			1.27	0.44		
NGO assistance that links farmers with buyers			1.3	0.46		
Government provision of marketing information			1.33	0.48		
Government assistance that links farmers with buyers			2.06	0.7		
Private sector assistance that links with smallholder producers			2.1	0.82		
Private sector provision of marketing information			2.75	0.84		

P-value is for paired sample test, *significant at 5 % level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, the two items for business development services were rated 5.59 for 'Assistance that links farmers with buyers' and 5.56 for 'Assistance that provides market information' (Table 6.47).The ratings of fulfilment items were relatively poor, except for 'Government provision of marketing information' (2.62), and 'Government assistance that links farmers with buyers' (3.22).

Table 6.47: Ratings for business development services – dairy farms

Items	Importance Mean	SD	Fulfilment Mean	SD	Gap	*p*
Assistance that links farmers with buyers	5.59	0.50				
Assistance that provides market information	5.56	0.50				
NGO provision of marketing information			1.36	0.52		
NGO assistance that links farmers with buyers			1.40	0.49		
Private sector provision of marketing information			1.68	0.53		
Private sector assistance that links with smallholder producers			1.83	0.60		
Government provision of marketing information			2.62	0.80		
Government assistance that links farmers with buyers			3.22	0.92		

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

The items on 'Assistance that links farmers with buyers' and 'Assistance that provides market information' were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and were found to be significant between the two sectors (Table 6.48). The largest difference was 0.26 for 'Assistance that links farmers with buyers'.

Table 6.48: Differences in ratings between vegetable and dairy respondents for business development services

Items	Importance V	D	D	*p*	Fulfilment V	D	Diff	*p*
Assistance that links farmers with buyers	5.53	5.59	0.06	0.212				
Government assistance that links farmers with buyers					2.06	3.22	1.16	0.000
NGO assistance that links farmers with buyers					1.30	1.40	0.09	0.031
Private sector assistance that links with smallholder producers					2.10	1.83	0.56	0.000
Assistance that provides market information	5.43	5.56	0.13	0.004				
Government provision of marketing information					1.32	2.62	0.53	0.000
NGO provision of marketing information					1.27	1.36	0.03	0.531
Private sector provision of marketing information					2.75	1.68	1.07	0.000
n	250	250			250	250		

For the ratings of fulfilment for assistance linking to buyers, the largest differences was for 'Government assistance that links farmers with buyers ', with the dairy sector rating their level of fulfilment for this item 1.16 higher than the vegetable sector. Conversely, for the provision of marketing information items, vegetable respondents rated their level of fulfilment for 'Private sector provision of information' 1.07 higher than did the dairy respondents.

6.5.7   Ease of doing business

For vegetable respondents, all items for ease of doing business were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.45 for 'Registration with the institutional business that is not complicated procedures' (Table 6.49). The ratings of fulfilment were between 1.32 and 2.30, the latter being for 'Assistance from government to register organisation'. The largest gap was for 'Affordable taxes' (3.47), although the gaps for all were greater than 3.0. All differences between importance and fulfilment were significant (p-value=0.000).

Table 6.49: Ratings for ease of doing business – vegetable farmers

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Registration with the institutional business that is not complicated procedures	5.45	0.54	2.11	0.95	-3.34	0.000
Securing business permit with the local government	5.28	0.55	2.24	1.02	-3.04	0.000
Being able to provide proof of payment (official expenditure receipts) to buyers	5.25	0.47	1.99	0.77	-3.26	0.000
Affordable taxes	5.02	0.71	1.54	0.63	-3.47	0.000
Assistance from private sector to register organisation			1.32	0.49		
Assistance from NGO to register organisation			1.94	0.75		
Assistance from government to register organisation			2.3	0.76		

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, all items for ease of doing business were rated better than 5 (out of 6) for importance, with the highest rating being 5.47, also for 'Registration with the institutional business that is not complicated procedures' (Table 6.50). However, the ratings for fulfilment level were more mixed, with 'Securing business permit with the local government' with highest mean of 3.38 and a gap of 2.02. The gap for others was greater than 2.0, with the largest gap being for 'Being able to provide proof of payment (official expenditure receipts) to buyers' (2.94). All were significantly different (p-value=0.000).

'Assistance from government to register organisation' received a relatively high fulfilment level of 3.21.

Table 6.50: Ratings for ease of doing business – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Registration with the institutional business that is not complicated procedures	5.47	0.50	2.67	0.80	-2.80	0.000
Securing business permit with the local government	5.39	0.51	3.38	0.68	-2.02	0.000
Being able to provide proof of payment (official expenditure receipts) to buyers	5.30	0.48	2.36	0.67	-2.94	0.000
Affordable taxes	5.22	0.51	2.74	0.58	-2.48	0.000
Assistance from NGO to register organisation			1.66	0.60		
Assistance from private sector to register organisation			1.94	0.75		
Assistance from government to register organisation			3.21	0.89		

P-value is for paired sample test, significant at 5 level
n = 250, Ratings out of 6 with 6 the best

While all the items were ranked above 5.0 (out of 6) for importance for both vegetables and dairy, and there were significant differences for 'Affordable taxes' (p-value= 0.000) and 'Securing business permit with the local government'(p-value = 0.018) between the two sectors (Table 6.51), none of the differences were large, with the biggest difference being 0.21 for 'Affordable taxes'. However, the ratings of fulfilment showed slightly larger (and also significant at p-value = 0.000) differences. The largest differences was for 'Affordable taxes', with the dairy sector rating their level of fulfilment for this item 1.20 higher than the vegetable sector. Conversely, for 'Assistance from NGO to register organisation ', vegetable respondents rated their level of fulfilment 0.28 higher than the dairy respondents.

Table 6.51: Differences in ratings between vegetable and dairy respondents for ease of doing business

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Registration with the institutional business that is not complicated procedures	5.45	5.47	0.02	0.667	2.11	2.67	0.56	0.000
Assistance from government to register organisation					2.30	3.21	0.91	0.000
Assistance from NGO to register organisation					1.94	1.66	0.28	0.000
Assistance from private sector to register organisation					1.32	1.49	0.62	0.000

Being able to provide proof of payment (official expenditure receipts) to buyers	5.25	5.30	0.05	0.258	1.99	2.36	0.37	0.000
Securing business permit with the local government	5.28	5.39	0.11	0.018	2.24	3.38	1.14	0.000
Affordable taxes	5.02	5.22	0.21	0.000	1.54	2.47	1.20	0.000
n	250	250				250	250	

V = Vegetable; D = Dairy

Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

6.5.8   Business Linkages

Input supply

For vegetable respondents, availability of agricultural input supply to farmers was rated 5.47 (out of 6) for importance. For fulfilment, 'Affordability of agricultural inputs supply to farmer and government, private sector' and 'NGO assistance to facilitate availability of agricultural inputs supply' were lower (2.55 and 2.92) respectively (Table 6.52)

Table 6.52: Ratings for input supply-vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Availability of agricultural input supply to farmers	5.47	0.51				
Affordability of agricultural inputs supply to farmer			2.55	1.01		
Government, private sector and NGO assistance to facilitate availability of agricultural inputs supply			2.92	1		

P-value is for paired sample test, significant at 5 level

n = 250, Ratings out of 6 with 6 the best

For dairy respondents, 'Availability of agricultural input supply to farmers' was rated 5.38 (out of 6) for importance. For fulfilment, 'Government, private sector and NGO assistance to facilitate availability of agricultural inputs supply' and 'Affordability of agricultural inputs supply to farmer' were relatively high compared to many other items at 3.12 and 3.48 respectively (Table 6.53).

Table 6.53: Ratings for input supply – dairy farms

Items	Importance Mean	SD	Fulfilment Mean	SD	Gap	*p*
Availability of agricultural input supply to farmers	5.38	0.50				
Affordability of agricultural inputs supply to farmer			3.48	0.69		
Government, private sector and NGO assistance to facilitate availability of agricultural inputs supply			3.12	0.64		

P-value is for paired sample test, significant at 5 levels
n = 250, Ratings out of 6 with 6 the best

While the item of availability of agricultural input supply to farmers was ranked above 5.0 (out of 6) for importance for both vegetables and dairy, the difference was small and significant only at the 5% level (p-value = 0.034) (Table 6.54). The ratings of fulfilment showed the dairy sector to be more satisfied with the availability and affordability of input supplies and government support in assisting with supplies, with the differences being significant at p = 0.01 or better. The largest difference was for 'Affordability of agricultural inputs supply to farmer', with the dairy sector rating their level of fulfilment for this item 0.93 higher than the vegetable sector.

Table 6.54: Differences in ratings between vegetable and dairy respondents for business linkages-input supply

Items	Importance V	D	Diff	*p*	Fulfilment V	D	Diff	*p*
Availability of agricultural input supply to farmers	5.47	5.38	0.10	0.034	2.11	2.67	0.56	0.000
Affordability of agricultural inputs supply to farmer					2.55	3.48	0.93	0.000
Government, private sector and NGO assistance to facilitate availability of agricultural inputs supply					2.92	3.12	0.20	0.007
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

Provision of marketing services

For vegetable respondents, the item on assistance for vegetable products to obtain market access was rated 5.39 (out of 6) for importance. For fulfilment, the lowest rating was 1.48 for 'NGO assistance for vegetable products to get market access', while assistance from the private sector was rated 3.08 and government assistance 2.92 (Table 6.55).

Table 6.55: Ratings for provision of marketing services – vegetable farms

Items	Important		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Assistance for vegetable products to get market access	5.39	0.51				
Government assistance for vegetable products to get market access			2.92	1.07		
NGO assistance for vegetable products to get market access			1.48	0.61		
Private sector assistance for vegetable product to get market access			3.08	0.97		

P-value is for paired sample test, significant at 5 % level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, 'Assistance for dairy cattle products to get market access' was rated 5.47 (out of 6) for importance. For fulfilments, both NGO assistance (1.63) and private sector assistance 2.22 for market access were rated more poorly than government assistance at 3.86 (Table 6.56).

Table 6.56: Ratings for provision of marketing services – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Assistance for dairy cattle products to get market access	5.47	0.50				
NGO assistance that provide market access of dairy cattle production			1.63	0.52		
Private sector assistance that provide market access of dairy cattle production			2.22	0.89		
Government assistance that provide market access of dairy cattle production			3.86	0.84		

P-value is for paired sample test, significant at 5 % level
n = 250, Ratings out of 6 with 6 the best

While dairy respondents rated assistance to get market access slightly higher for importance than did the vegetable respondents (5.47 vs 5.38), this was small but still significant (p-value 0.007) (Table 6.57). However, for fulfilment the dairy sector was more satisfied with government assistance rating as this item was 0.94 higher than the vegetable sector, while the vegetable sector was more satisfied with the private sector assistance, rating it 0.86 higher.

Table 6.57: Differences in ratings between vegetable and dairy respondents for business linkages- provision and marketing services

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Assistance for vegetable products to get market access	5.39	5.47	0.08	0.007				

Government assistance for vegetable products to get market access			2.92	3.86	0.94	0.000
NGO assistance for vegetable products to get market access			1.48	1.63	0.16	0.002
Private sector assistance for vegetable product to get market access			3.08	2.22	0.86	0.000
n	250	250		250	250	

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

6.5.9 Political support

For vegetable respondents, all items for political support were rated higher than 5 (out of 6) for importance, with the highest rating being 5.41 for 'Local government supportive to smallholder producers' (Table 6.58). Fulfilment levels were between 3.0 and 4.0, resulting in the gaps of 1.0 to 2.0, with the smallest gap being 1.56 for 'Local government supportive to smallholder producers' and the largest gap being 2.06 for 'Local government who can be easily contacted'. All items were significantly different (p-value=0.000).

Table 6.58: Ratings for political support item –vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Local government supportive to smallholder producers	5.41	0.57	3.85	0.68	-1.56	0.000
Local government consults farmers regarding their needs	5.40	0.60	3.42	0.88	-1.98	0.000
Local government who adopts suggestions from farmers	5.36	0.54	3.70	0.79	-1.66	0.000
Local government who can be easily contacted	5.32	0.67	3.26	0.86	-2.06	0.000
Local government keeps promises	5.32	0.70	3.59	0.85	-1.73	0.000
Local government who is quick to address local concerns	5.40	0.63	3.36	1.01	-2.04	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, all items for political support were rated higher than 5.0 (out of 6) for importance, with the highest rating being 5.27 for 'Local government consults farmers regarding their needs' (Table 6.59). Fulfilment levels were between 3 and 4, resulting in the gaps of 1.0 to 2.0, with the smallest gap being 1.36 for 'Local government who adopts suggestions from farmers' and the largest gap being 2.02 for 'Local government consults farmers regarding their needs'. Ratings of importance and fulfilment were significantly different (p-value=0.000) for all items.

Table 6.59: Ratings for political support item –dairy farms

Items	Importance Mean	Importance SD	Fulfilment Mean	Fulfilment SD	Gap	p
Local government supportive to smallholder producers	5.13	0.70	3.62	1.05	-1.51	0.000
Local government consults farmers regarding their needs	5.27	0.70	3.25	0.82	-2.02	0.000
Local government who adopts suggestions from farmers	5.06	0.73	3.70	0.79	-1.36	0.000
Local government who can be easily contacted	5.24	0.73	3.26	0.86	-1.97	0.000
Local government keeps promises	5.23	0.68	3.59	0.85	-1.63	0.000
Local government who is quick to address local concerns	5.23	0.68	3.36	1.01	-1.87	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

In terms of importance ratings for the criteria for political support, the results showed that while there are differences between the ratings of vegetable and dairy farmers, not all criteria were statistically significantly different. Out of the six areas for political support, only responses for 'local government's supportiveness to smallholder producers' and 'local government that adopts suggestions from farmers' were statistically significantly different between vegetable and dairy farmers, at 5% level of significance. In terms of fulfilment, only 'local government meets promises' was found to be statistically significantly different between vegetable and dairy farmers, with this criteria rated as more fulfilled in the dairy sector than in the vegetable sector.

Table 6.60: Differences in ratings between vegetable and dairy respondents for political support

Items	Importance V	Importance D	Importance Diff	p	Fulfilment V	Fulfilment D	Fulfilment Diff	p
Local government supportive to smallholder producers	5.41	5.13	0.28	0.000	3.85	3.62	0.23	0.004
Local government consults farmers regarding their needs	5.40	5.27	0.14	0.019	2.30	3.21	0.91	0.024
Local government who adopts suggestions from farmers	5.36	5.06	0.30	0.000	3.78	3.70	0.23	0.228
Local government who can be easily contacted	5.32	5.24	0.09	0.160	3.18	3.26	0.09	0.215
Local government meets promises	5.32	5.22	0.10	0.107	3.07	3.59	0.52	0.000
Local government who is quick to address complaints in local concerns	5.40	5.23	0.17	0.004	3.19	3.36	0.17	0.061
n	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

6.5.10   Involvement in decision-making in organizations

For vegetable respondents, all items for 'Involvement in decision-making in organizations' were rated better than 5 (out of 6) for importance, with the highest rating being 5.38 for 'Consulted on marketing activities' (Table 6.61). However, the means fulfilment level were relatively poor between 1.58 and 2.20, resulting in the gaps of about 3 and more, all of which were statistically different ($p = 0.000$). The smallest difference was 2.95 for 'Decisions reflected in final project design' and the largest at 3.85 for 'Consulted on marketing activities'.

Table 6.61: Involvement in decision-making in organizations – vegetable farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Consulted on marketing activities	5.38	0.67	1.53	0.68	-3.85	0.000
Involvement in project development	5.26	0.63	2.00	0.80	-3.26	0.000
Decisions reflected in final project design	5.15	0.58	2.20	0.91	-2.95	0.000
Consulted in organisational decision-making	5.12	0.59	1.58	0.67	-3.54	0.000

P-value is for paired sample test, significant at 5% level
n = 250, Ratings out of 6 with 6 the best

For dairy respondents, all items for 'Involvement in decision-making in organizations' were greater than 5.2 for importance, with the highest rating being 5.26 for 'Involvement in project development' (Table 6.62). However, the mean fulfilment levels were relatively poor between 1.95 and 2.85. Consequently, the gaps were mostly greater than 3.0, except for 2.36 for 'Consulted on marketing activities'. The largest was 3.28 for 'Decisions reflected in final project design'. All items were significantly different (p-value=0.000).

Table 6.62: Involvement in decision-making in organizations – dairy farms

Items	Importance		Fulfilment		Gap	*p*
	Mean	SD	Mean	SD		
Involvement in project development	5.26	0.46	2.00	0.77	-3.06	0.000
Consulted in organisational decision-making	5.24	0.59	2.21	0.84	-3.03	0.000
Decisions reflected in final project design	5.22	0.66	1.95	0.70	-3.28	0.000
Consulted on marketing activities	5.21	0.57	2.85	1.05	-2.36	0.000

P-value is for paired sample test, significant at 5 % level
n = 250, Ratings out of 6 with 6 the best

None of the differences for importance were large between the dairy and vegetable respondents, with the largest being 0.19 (Table 6.63). The differences between the sectors in ratings of fulfilment were larger, with the largest difference being 'Consulted on marketing activities' with the dairy sector rating their level of fulfilment for this item 1.32 higher than

the vegetable sector (p. 0.000). Conversely, for 'Decisions reflected in final project design', vegetable respondents rated their level of fulfilment 0.26 higher than did the dairy respondents (p=0.000).

Table 6.63: Differences in ratings between vegetable and dairy respondents for involvement in decision-making in organizations

Items	Importance				Fulfilment			
	V	D	Diff	*p*	V	D	Diff	*p*
Involvement in project development	5.26	5.26	0.00	0.936	2.00	2.20	0.20	0.005
Decisions reflected in final project design	5.15	5.22	0.19	0.195	2.20	1.95	0.26	0.000
Consulted on marketing activities	5.38	5.21	0.17	0.002	1.53	2.85	1.32	0.000
Consulted in organisational decision-making	5.12	5.24	0.12	0.028	1.58	2.21	0.63	0.000
N	250	250			250	250		

V = Vegetable; D = Dairy
Diff. = Difference; P – value is for Independent samples t test with significant at 5% level

6.6 Summary and implications

This chapter, which investigated the enabling environment for agribusiness supply chains, presented findings that smallholder farmers have limited accessibility and capability to overcome constraints in the enabling environment. This makes it difficult to farm productively and respond to demands from competitive markets. Access to property rights through land certificate, for instance, was limited, with low proportions of vegetable and dairy farmers having a certificate. While the government has programs and instruments to support the administration processes to obtain land certificates for property rights, fulfillment levels were low.

Physical infrastructure in this region such as farm roads, irrigation facilities, logistic infrastructure and transportation services were also poorly developed. Poor farm road construction leads to difficulty accessing public transport and, consequently, higher transportation costs to markets and to transport inputs. Inadequate irrigation infrastructure makes it difficult to increase cropping intensity. Instead, construction of their own irrigation systems is a high cost due to long distances and hilly terrain. In addition, poor communication infrastructure and quality of access in some places creates difficulty for farmers obtaining timely market information. To obtain access to conduct transactions, they have to go to other places which have a network connection. A further challenge was poor logistic infrastructures that limit accessibility for small scale farmers to potential buyers due to a lack of packaging and cold storage facilities to meet and maintain quality.

Only a small proportion of farmers were able to access credit programs to purchase chemical inputs and better quality seeds for vegetable farmers, and buy heifers for dairy farmers due to

complicated procedures, particularly the collateral requirement. In contrast, the informal financial sector offered services with easy procedures and without collateral; consequently, farmers were more likely to finance purchases with them, even though they charged a high interest rate.

These problems meant farmers were unable to obtain certified seeds due to inadequate local production so they used uncertified seed, or seed from the previous harvest, which often increased production risk. Expensive fertiliser and pesticides were other challenges that impeded farmers from improving production. Similarly, dairy farmers face barriers of improving milk production due to an inadequate local supply of heifers, leading to expensive imports from other provinces. Markets for both vegetable and dairy products were only local, and it was difficult to reach potential markets due to poor quality and lack of quantity.

Assistance with problems of lack of quality production and high pest and disease outbreaks that impede both vegetable and dairy commodities requires research and development, and extension workers to provide practical solutions and technological innovations. However, these programs were poorly delivered.

In addition, there is a need for linkage to potential buyers based on the survey finding that farmers are suffering from linkage to traders who often offer lower prices and delay payment. This will require contract agreements with buyers for supply guarantee, quality standard and price. The government has an important role in creating good market environments. Indeed, less complicated procedures for business registration is one important policy to improve market functions and productivity of investment.

Furthermore, addressing the political support was also an essential condition to obtain valuable information to enhance the enabling environment for agribusiness supply chains. However, this element was not investigated in the first phase of this study, which was a limitation.

Chapter 7.   Discussion

7.1   Introduction

This chapter discusses the findings about the enabling environment for vegetable and dairy farmers in the Enrekang Regency of South Sulawesi, Indonesia. The discussion focuses on the effects of government policy at the local, provincial and regional levels, and their effectiveness in enhancing the enabling environment for agribusiness supply chains in the Enrekang Regency of South Sulawesi.

The chapter begins with a discussion of the framework developed as part of the thesis to guide the analysis of the enabling environment for smallholder farmers in the South Sulawesi province of Indonesia. Each of the elements of the framework are then discussed, drawing on the findings derived from all components of the study. This provides the basis for the Conclusion chapter, which explicitly addresses the conclusion to the objectives of the study.

7.2   A framework for analysis of the enabling environment for smallholder farmers in South Sulawesi, Indonesia

The framework for analysis of the enabling environment for smallholder farmers in South Sulawesi, Indonesia was developed from the initial concept in Figure 1.1, the exploratory investigations, and the main findings from the study of smallholder vegetable and dairy producers in the Enrekang regency of Sulawesi in Indonesia.

The main elements of the Enrekang supply chains consist of input and services, production systems, traders, wet market and consumers. The system begins with farm inputs, which includes the activities to provide and distribute farm inputs, which is commonly handled by traders and agro input dealers. Following this is farm production where vegetable and dairy farmers produce the main products. Next is the process of buying the products by traders, either from the farm gate or in the wet market. The final component is the wet market where local consumers purchase the product(s).

The system is characterised by traditional supply chains with inadequate supply chain orientations and, therefore, there are several constraints along the chains that lead to difficulties for farmers in producing agricultural products productively, and to respond to emerging markets. Some inputs are unavailable in the local area and have to be imported from other areas. Inadequate access to financial services and lack of capital impede farmers from buying inputs. This forces farmers to find alternative sources of finance with easier requirements but which incur higher repayment costs. Poor quality and inadequacies in infrastructure, such as farm roads, irrigation facility, telecommunication network and market infrastructures, affect production and market accessibility. Poor technical practice and

application of technology leads to the inability of farmers to increase farm production, and meet quality standards and food health for consumption. Inadequate market information and contracts often results in lower prices, uncertainty about buyers, and instability of supply. There were also problems with quality constraining products from being sold in potential markets, such as modern supermarkets.

In order to respond to these constraints, policy intervention from the government is one solution to create an enabling environment to help strengthen smallholder producers to improve their market competitiveness and the effectiveness of the agribusiness system. Each of the elements represents a crucial point that requires effective policy and services to support growth in agricultural productivity, and to improve the functioning of markets (Figure 7.1)

The ability to meet market standards in trade is a policy issue that needs to be addressed to facilitate smallholder farmers' participation in global trade, but it also encourages market linkages to domestic buyers. This requires local research and development, and effective training at the farm level to meet quality standards and food regulations. Availability of farm inputs is necessary to sustain linkages to markets; this would create potential markets for the private sector or other institutional markets to provide the input services needed by farmers. Therefore, investment in farm roads and other infrastructure is urgently needed to boost rural economic activities, to open isolated markets, and to accelerate input distribution. Furthermore, accessibility of credit programs is essential to assist farmers to use cheaper credit to produce and sustain farm output, and therefore improved procedures for applying for credit are crucial. This requires access to effective property rights processes to obtain land certificates and tenure security as one solution to meet the criteria for obtaining credit. In addition, simple administration to assist the ease of doing business for the private sector is also a factor that contributes to creating enabling conditions for effective agribusiness systems, and for the growth of agro industrialisation in this region
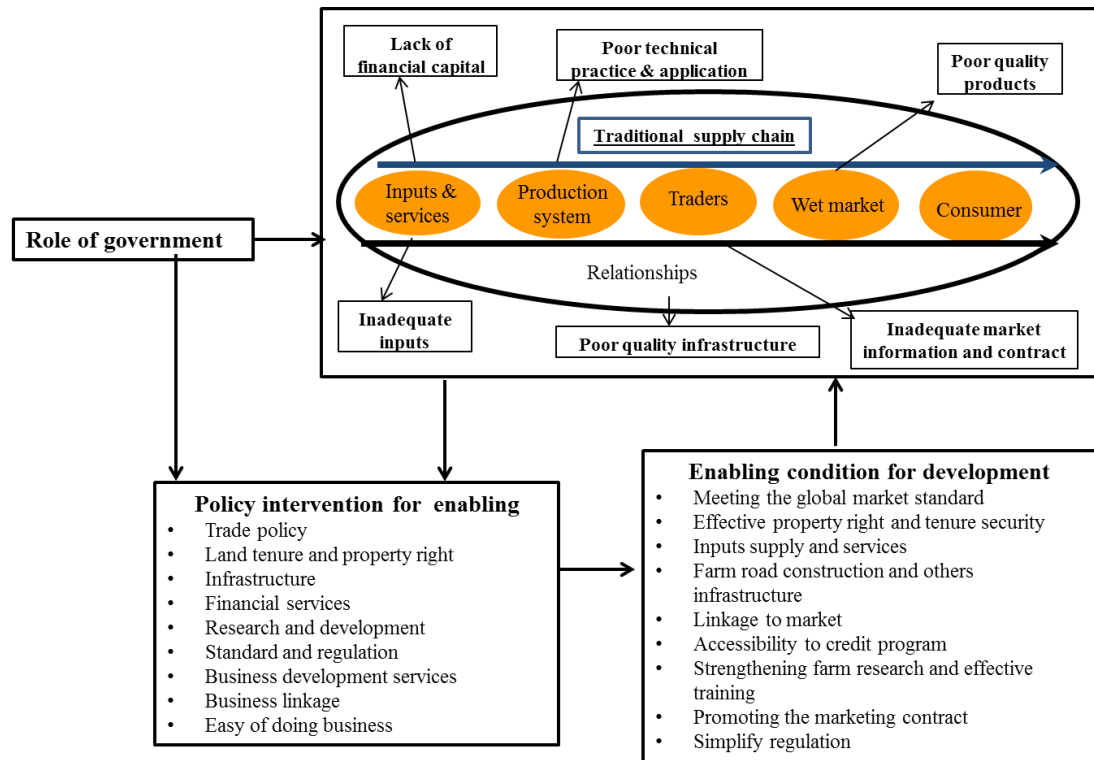
Figure 7.1: A framework for the analysis of the enabling environment for smallholder farmers in South Sulawesi, Indonesia

7.3 Elements of the enabling environment from the meso and micro perspective

7.3.1 Trade policy

Trade can act as a catalyst to boost economic development and reduce poverty, especially in developing countries, through enhancing competitiveness by reducing input costs, increasing value adding, and facilitating export diversification through opening new markets. Trade also encourages innovation through facilitating technology investment and accelerating research and development, expanding business opportunities for local entrepreneurship by creating new markets, and giving the lowest price for consumers by increasing goods supply and services (Ann and Straub 2005, AusAID 2007, Erwidodo and Hadi 1999, Gibbs 2007)

Instruments of trade policy that have been reformed by the Indonesian government in order to better incorporate agriculture in global markets include reducing the number of tariff rates, lowering the ceiling of tariff rates, and raising the number of import items by giving very low tariff rates (Bautista 1997, Suryana and Erwidodo 2011). They could benefit Enrekang farmers if they are able to meet the requirements of world agricultural markets. However, the potential gains from global trade are relatively low for smallholder farmers in Enrekang regency.

As a rural area, there is little agricultural trading growth within traditional marketing channels in Enrekang. The vegetable and dairy products that are produced are mainly sold in the wet market, where consumer preferences are less focussed on more developed market standards.

For the vegetable industry, the crops which have potential for increased production and markets, such as red onion, potato, and chili, are grown using chemical fertilizers and pesticides, but are limited by input constraints. Most products are sorted, graded and packed in wooden boxes for perishable crops and 'gunny' sacks for non-perishable crops. Their inabilities to access certified seeds locally, and lack of experience in recognising product certification requirements, are also challenges for farmers to meet emerging market requirements.

Similarly in dairy, poor quality is an issue for *dangke* because it is produced by traditional preservation techniques with papaya latex using banana leaves for wrapping. In addition, the lack of consistent quality and quantity impedes farmers from increasing their market share. Several additional obstacles impede farmers, such as poor village infrastructure that links to markets, not enough water or unirrigated land (especially during the dry season), and expensive replacement heifers.

These are consistent with the findings of IFAD (2002) and Nyangito et al. (2004) who state that the major challenges for the agricultural sector in developing countries that make it difficult for smallholder producers to take advantage of world trade are low farm production, poor infrastructure, lack of market linkages, inadequate access to credit services, and high cost for production inputs. Therefore, the ability of the vegetable and dairy sectors in Enrekang to take agricultural trading opportunities depends on their ability to overcome market barriers and can be achieved through supporting infrastructure to accelerate the production and make markets work efficiently; through research and development activities to create technological innovations for local conditions; the professionalism of extension workers to solve the problem; and accessibility to financial institutions. As argued by Erwidodo and Hadi (1999), government intervention is required to support funding of public services, such as research and development, extension workers and rural infrastructure, and to create a policy environment to foster development of the private sector and market efficiency.

In addition to these constraints, the products could not compete with other imported products due to high costs. For instance, when the government imports products from other countries to keep prices stable, and to respond to market demand as part of the market stability policy, this has serious implications for local producers due to lower prices in local markets. For

example, red onions from Thailand and China are available in the market, are better quality and are around 15 -20% cheaper than local produce. This is consistent with the findings by Lubis and Arianti (2011) who identify a strategy to maintain market stability in terms of supply and demand of products in the domestic market used by government, which is to import products from other countries, but this effects local producers when they cannot compete in terms of quality and price due to constraints in local agribusiness systems.

7.3.2   Land tenure and property rights

Land is an essential resource for agricultural activities (Christy et al. 2009) and it is also useful for economic functions, such as access to financial facilities (Feder and Feeny 1991). Therefore, ensuring the status of property rights is critical for smallholder producers to enhance their capacity for sustainable production (IFAD 2008). Where farmers have limited access to effective property rights, government intervention is required to create appropriate policy and instruments that support administration processes to obtain land certificates for smallholder farmers to access property rights for their land.

Addressing tenure security and property rights for the community in this region is the function of the National Land Agency *(Badan Pertanahan Nasional, BPN)*. This institution provides land administration services for organising certification, providing assurance of people's rights to land, and handling and solving land disputes and conflicts. Effective legal administration for tenure security will be beneficial for farmers in terms of utilizing the land resource and to invest in more productive farming activities. For example, most red onion farmers invest in permanent irrigation because they have tenure security through instruments, such as certificates of land ownership. Maxwell and Wiebe (1999) claim that farmers will undertake long-term investment if their land tenure is secure because it will lead to higher benefits from agricultural production.

Tenure security provides collateral for both vegetable and dairy farmers to meet the requirements of financial institutions (BRI or BNI) when applying for agricultural credit (working capital and investment capital) to support the farm production that will lead to increasing the capacity of farmers to respond to the market. This has been positive for some vegetable farmers who have the capability to purchase better quality seeds, rather than using seeds from the previous harvest, to use sufficient fertilizer and pesticides, and for dairy farmers to enable them to buy heifers, which are expensive inputs. This is consistent with the findings by Deininger (2003), who states that land can be used as collateral for accessing credit and, therefore, enhance the capacity of people to take market opportunities.

However, while there are increasing numbers of farmers who have registered their land through the National Land Agency, vegetable farmers have lower accessibility to obtain a

land certificate than dairy farmers. Of 121 vegetable farmers who own land, only 50% have certificates, while the number of dairy farmers who have certificates is higher; of the 174 farmers, 73% have certificates. The higher proportion of dairy farmers with certificates creates a favourable environment, with a higher proportion of them having access to agricultural credit programs.

Other farmers have documents not formally registered by the BPN, such as tax documents, contract certificates and deeds of sale from a notary public. Unregistered land documents leads to land insecurity and difficulty in accessing financial markets. The study by Hayes, Roth, and Zepeda (1997) note that insecurity of land tenure leads to disadvantages in land investment and the inability to meet financial requirements.

The main problem that impedes farmers from registering their land is the high cost of obtaining registration, lengthy time for arranging documents, complicated procedures and poor technical administration when registering their land through the BPN. Lamba (2005) also found fees charged for conducting surveys, unofficial payments for registration, and time consumed in accessing information were the major challenges for land administration systems in most developing countries. In Kenya, for instance, it is a challenge for farmers to organise land administration due to highly centralised processes, low accountability, unreliable costs, inadequate human resources, and lack of information technology; therefore the land status is mostly insecure and of uneconomical size (USAID 2009).

In response to the problem, the policy intervention required is the presence of government programs and instruments that overcome the bottlenecks in assisting farmers with formal registration of property rights. The national program *Prona,*which has been successful in assisting poor farmers to obtain land certificates, could be reprogrammed and expanded, but it should be administered better. The policy reform here is mainly to simplify legal administration and provide sufficient budget for investment in capacity and technology improvement. The weaknesses of the national land project is that the land administration system is likely inefficient and costly, from the selection phase through to providing the certificate due to the various institutions of government involved from the village to regency levels (Baktiar 2009). In addition, the program is usually not sustainable because it depends on the national budget and donor agencies (Agustin, Sinuraya and Pasaribu 2007). With a limited budget, legislative innovation and administration is required to accelerate the level of registration (Lamba 2005). Molen (2003) also argues that inadequate funds has led to poorly developed land administration and ineffective enforcement of the legislation.

7.3.3 Infrastructure

Farm road access and transportation services

In this region, a rural road network has been constructed in order to improve accessibility of isolated areas and distribution of farm inputs and products to market, and ultimately improve income for farmers. To obtain these missions, availability of transportation services that can be accessed by farmers timely, easily and cheaply is an important priority in this region. As suggested by Fan and Zhang (2004) and Gannon and Liu (1997), rural infrastructure investment enhances the ability of farmers to reach input and output markets, to reduce production and transportation costs, to stimulate the growth of rural economy both in farm and non-farm agriculture, and to facilitate the integration of rural areas with other market destinations. In addition, Kadir (2009) and Suhardi (2010) found that having accessibility to transportation services accelerates distribution of goods, increases economic activities such as market accessibility, and increases accessibility of information and trading

The majority of farmers, however, are constrained by poor roads to market, which leads to higher transportation costs due to the difficulty of public transport access. Vegetable farmers usually sell their products in the Sudu wet market at the sub-district level, where they purchase inputs. Some of them are farming around 39 kilometres from the wet market and have to travel over unpaved, generally narrow and potholed roads. Most farmers depend on jeeps and trucks for transport as the main means of transport. Public transport is only able to reach production areas with a good road network, such as connection from the city village to the sub-district, and only runs effectively during wet market days, with irregular services on other days. Road conditions are very difficult during the rainy seasons, which limit truck access, thereby increasing transportation costs and time. With this condition, farmers have difficulty in delivering the product on time and in good quality condition. For instance, cabbage farmers have to spend around four hours to reach the Agribusiness Terminal Station in the Sudu wet market, although the distance is only 30 kilometres and, consequently, transportation costs double during the rainy season. Some farm roads can only be traversed by a motorcycle to distribute agricultural inputs to farm gate and product to markets, while some are too poor for motorised transport and inputs, and products must be handled manually. This supports the findings of Eaton and Shepherd (2001) and Gajigo and Lukoma (2011) who state that poor road conditions, and inadequate network connection, decreases farmers' margins by increasing transportation cost of inputs and decreasing accessibility to market and quality of products. Gebresenbet and Bosona (2012) also argue that limited accessibility of transport facilities effects farmers as they have little possible opportunity to participate in the market, and therefore this makes it difficult for them to escape poverty.

For the dairy farmers surveyed, accessibility of farm to market roads is slightly better than for vegetable farmers, because their farms are close to the sub-district roads, which are paved, and can be accessed by car and public transport. With better road access, farmers can bring fodder inputs to the farm more easily and transport milk production, such as *dangke* to market, with a reasonable cost for transportation. Investment in rural roads, reducing the cost of production and the cost of transactions, encouraging trade and fostering labour specialization, is a key cornerstone for sustainability of rural economic development (Gannon and Liu 1997). The exception is in the sub-district of Cendana, which is more isolated, and dairy farmers have to use a motorcycle and not a car, or public transport, to obtain inputs and sell products at the market due to an inadequate bridge infrastructure.

The average distance of respondents from where they sold most of their dairy products was two kilometres. Some of them sell directly to consumers at home and others who live around four kilometres from the market connect to local traders who bring the products to the local wet market. Otsuka and Yamano (2005) found that poor road construction is common in most developing nations, especially for rural roads, and makes it difficult for farmers to access markets. In addition, poor road conditions and inadequate network connections of transportation, led to high economic cost, and resulted in a decreasing income margin to farmers (Eaton and Shepherd 2001; Ousman and Lukoma 2011). For instance, in Kenya, most rural roads were unpaved tracks, trails, footpaths, and natural, gravel and earth roads, and, therefore, agricultural inputs become scarcer, prices higher and transportation of farm production to market more expensive (Kiprono and Matsumoto 2014).

Differences in accessibility of infrastructure between the two sectors are reflected in differences in the economic development indicators. For instance, for the housing indicators (number of bedrooms, main source of power for lighting, main source of energy for cooking, type of toilet used) dairy farmers rate higher than vegetable farmers, consistent with better accessibility to infrastructure. Income is also correlated with the level of accessibility to information communication technologies and vehicle ownership.

Considering the gap for road accessibility between importance and fulfilment is high, intervention by the Enrekang government to improve rural roads is important. Increasing rural infrastructure investment will help markets work more effectively and provide long-term benefits. However, investment in rural roads should be assessed against other investments to determine which should be prioritized. Torero (2011) suggests poor coordination among public investments at national, regional, local and donor agency levels can lead to the complementarities of infrastructure investment not being fully realized. In many cases, investment in infrastructure is based on a top-down approach rather than need driven. Rural infrastructure investment is commonly assessed for each sector at the national

level, with little or no assessment of need at the local government level where the services will be needed. As a result, many cases of infrastructure investment could not contribute effectively to the development goal of countries to reduce poverty alleviation. This is because inadequate coordination among public investments may lead to an inappropriate nexus between availability of services and use.

Marketing, storage and packaging infrastructure

Access to a consolidation area where buyers can buy or collect vegetables depends on infrastructure. In the Sudu wet market, for example, as one of the central vegetable markets in South Sulawesi, both buyers and farmers can easily transact due to the agro terminal station. This market is supported by infrastructure, such as road access, room for transactions, and accessibility of market information due to a better telecommunication network. Regional and inter-island traders can easily collect the products directly, either from farmers or from local traders. The vegetable products can also be transported, either by using public transport or private vehicles and trucks. Conversely, when buying at the farm gate, buyers or traders often face challenges collecting products due to limited infrastructure and services, such as the lack of public transport due to poor road construction.

Although the Sudu wet market is the main destination for both regional and inter-island markets, the vegetable products that are collected by buyers from farms at the Agribusiness terminal station are poorly stored and packaged. Perishable crops, such as tomatoes and chilies, are commonly kept in wood boxes, and the non-perishable crops, such as red onion, potatoes and carrots, are stored in gunny sacks. There is no cold storage facility to enable products to be kept to maintain the market supply, for instance during the peak season, and also no refrigerated containers to maintain quality when the products are transported to other market destinations. Poor packaging and storage infrastructure, and non-standard crates and boxes, make it difficult for products to gain access to potential markets (de Paulo Correia 2014).

Conversely, the dairy industry has access to a covered area where processed dairy milk can be reached by using public transport or motorcycle. However, buyers and traders prefer to collect the *dangke* by using their own motorcycle and taking them directly to households. The reason is a motorcycle is more time efficient for delivering to households because public transport is not available all day, particularly in the early morning, and also, *dangke* is a perishable product and is generally purchased in small quantities. To maintain product quality and safety for consumers, *dangke* requires refrigeration. However, the equipment is not available both during the transportation from the source of production and in the wet market, with traders commonly keeping it in a small basket. With no refrigerator, traditional preservation and poor packaging, transactions of this product are commonly in small

quantities as the product cannot be stored. Inadequate refrigerator containers, locally and for transport to other locations, mean this product cannot be sold in major city markets, such as Parepare or Makassar. Sunaryanto, Priyanto, and Ismanto (2011) suggest that to respond to market demand for both quality and quantity, storage facilities, such as a cold box and container refrigerator, are productive solutions. With these, product quality can be maintained in term of freshness, taste and performance. It also helps to reduce the level of damage between pre-harvest and post-harvest before purchasing by the consumer. By controlling the temperature and humidity properly, products can be kept and sellers can adjust time of sale to increase volume and price.

Communication facilities

In Enrekang regency, access to reliable communication services is essential for obtaining greater access to information about markets, production systems, training services, and research and development for the vegetable and dairy sectors. Reliable communication services include telecommunication infrastructure, such as fixed telephone, mobile phone and internet connection that can be accessed by farmers easily. Ramírez and Richardson (2005) found that in emerging market countries, telecommunication services, including telephones or computers with internet access, have an important role in accelerating economic activities and expanding information for those societies who are isolated.

Both Telkom and Indosat, the main telecommunication operators, have established transceiver stations (BTS) in each sub-district for mobile phone access and internet connection. Access to communication networks has been helpful for farmers to obtain market information and technical production information. Indeed, both vegetable and dairy farmers are able to conduct marketing transactions for their products with traders. For instance, inter-island and regional traders contact local traders in the Sudu wet market about prices of vegetable products, so they are able to calculate profit and cost when purchasing product to supply market destinations, such as Kalimantan and other regional markets in the eastern part of Indonesia. Dairy farmers are able to sell directly to their regular customers by calling or through text messages. Escobal (2005) note that higher access to telecommunication facilities and other infrastructure services leads to reductions in transaction costs, efficiency with time, and enhances spatial integration between markets and other players. He added that communication technology improves mobilization and makes transportation systems more efficient. In addition, access to telecommunication services is one of the minimum necessary conditions for participation in competitive domestic, regional and international markets (Mansell 2004).

Other benefits of access to telecommunication services are that farmers can search for information to solve problems (e.g., production technology and handling disease) through

the internet so that they can act independently without depending on extension workers whose numbers are lacking in this region. For instance, farmers can access veterinary techniques for solving grain poisoning, bloat and helminthiasis through guidance provided over the telephone by extension workers. Hollifield et al. (2000) states that investment in rural telecommunication infrastructure enhances the ability of rural people to adopt new techniques.

In Enrekang, however, communication services could not be accessed by smallholder producers throughout the region. As commercial operators, the telecommunication companies prioritise investment in telecommunication infrastructure for the places that have high economic growth, high population density and accessibility of road infrastructure. Consequently, some villages with hilly terrain, limited population, sparsely clustered settlement and poor roads have poor access to telephone services. Telkom (2009a) provide limited telecommunication services to remote areas because the returns from investments are lower, and allocation to those markets would limit their opportunities in the dynamic market for telecommunication services.

Dairy farmers in some villages in the Cendana sub-district have to travel around two kilometres every day to get telephone information of orders or buyers who want to purchase their products. The level of telephone ownership varies with location for dairy and vegetable farmers, with 79% of dairy farmers and 62% of vegetable farmers having their own mobile phone. Income was positively correlated with the use of a mobile phone for vegetable respondents (p-value = 0.000), while there was not a significant difference for dairy (p-value = 0.258). The main reason for the lack of mobile phones was that several sub-districts did not have a mobile network. For instance, in sub-districts such as Massalle, Baroko, and Bungin, which are bases of agricultural production, mobile phones can not be used due to the lack of mobile infrastructure (Biro Pusat Statistik 2003).

Water and irrigation facilities
Access to reliable irrigation services is one of the important factors for sustainable farm activities, both for growing crops and for dairy cattle farming. Availability of water determines the type of crops grown, but also contributes to the quantity and quality of production. As a region with highland areas and monsoonal climate, most farmers depend on rain, rivers or streams and ground water for their water/ irrigation needs. Nevertheless, a continuous supply of water is a particular challenge for farmers to grow crops productively due to the limited availability of water during the dry season. To adapt to the situation, farmers grow crops based on the climate, for instance in the dry season they grow carrots, tomatoes or potatoes, while in the rainy season they are more likely to grow cabbages and onion leaves. As pointed out by Sigit and Murtiningrrum (2003), when rainfall varies

spatially and temporally, farmers' crop production is impeded due to the lack of guarantee of supply at the optimum time.

Because of a lack of permanent irrigation or government water projects to obtain enough water for their crops, farmers have established their own irrigation by connecting either to rivers or mountain springs. There is high demand during the dry season when farmers need water so they can harvest three or more crops in a year, with some red onion farmers harvesting four times in a year. According to Small and Svendsen (1990) construction of irrigation aims to modify spatial and seasonal availability of water, thereby improving agricultural production, particularly during the dry season. Construction of irrigation in upland areas can increase productivity around two to three times higher than that of rainfed agriculture (Kurnia 2004). However, irrigation construction is expensive due to the hilly terrain and long distances to access water; the lowest distance was half a kilometre and the highest distance was up to 2.7 kilometres to the water source. Investments in pumps, machines and reservoirs also have to be provided by farmers. Some cooperate with neighbouring farmers to share the financial cost, while others connect with moneylenders using a system of sharing production. Therefore, it is only farmers who grow crops, such as red onion and potatoes, who indicated that they have the resources to construct the irrigation. Other farmers, who could not construct irrigation and have insufficient water, especially during the dry season, had lower cropping intensity and lower income.

In comparison, most dairy farmers had sufficient access to water. Most dairies are located in the watershed zone and are therefore able to obtain ground water by using a pump, which is quicker and cheaper. Some of them obtain water on their farm, with the greatest distance being 800 meters. A few dairy farmers who live in upland areas use water that is supplied by the government as part of a public service facility.

The biggest gap in accessibility of irrigation services is in vegetable production areas, which requires collaboration between government and the rural communities to develop, construct and manage irrigation based on local resources. According to Nugroho, Nuroji, and Indriyanto (2012) this can be achieved by shared responsibility of government and local communities. The central, provincial and local government can provide planning and design, technical advisors, sufficient budget for construction, while the rural community can be responsible for maintaining the infrastructure.

7.3.4 Financial services

Most financial services to smallholder producers in rural areas are dominated by the State-owned banks, both the Bank of People Indonesia *(Bank Rakyat Indonesia-BRI)* and the Indonesia National Bank (*Bank Nasional Indonesia-BNI*). With these services, the credit

programs, Food Security and Energy Credit *(Kredit Ketahanan Pangan dan Energy- KKPE)* and People Business *Credit (Kredit Usaha Rakyat-KUR),* can be accessed.

Vegetable farmers who have accessed the credit programs benefit through increased production capacity because they have resources to buy sufficient fertilizer and pesticides for their crops, which they previously could not purchase due to the cost. Also production improved through greater capacity to purchase better quality seed compared with using seeds from a previous harvest, which increases production risk. It also helped them to invest in irrigation, thereby increasing cropping intensity and yield. In addition, accessing credit helps farmers to escape the domination of money lenders who offer easy to get finance, but at interest rates of around 50 percent for every transaction. For dairy farmers, the benefits arise from increasing productivity of the *dangke* product through having the power to purchase heifers. For example, a farmer who accessed the KUR program, increased his dairy herd to 15 in the last two years, and was able to produce around 40 to 60 pieces of dangke in a day. Spio (2002) asserts that credit programs are one solution to agricultural production problems, lower production capacity and unsustainability of farming activities. They can act as an effective tool to encourage small-scale farmers to avoid exploitation by money lenders. However, only a small proportion of smallholder vegetable producers have accessed the credit programs (28%) and most farmers grow vegetables without using the credit programs (72%). There was a significant difference (p-value = 0.000) between their rating of importance and fulfilment of credit. While, in dairy, more than half used the credit program (54%), there was also a significant difference (p-value = 0.000) between their ratings of importance and fulfilment.

The increasing number of dairy farmers who use the credit program is supported by their ability to meet credit requirements such as collateral, with 73% of their land certified. Another favourable factor is that the *dangke* product has a high potential market and consistently good price. As farmers could not always fulfil local market demand, the produce should be ordered a day before being produced, therefore farmers can repay the loan regularly, which means a good payment record and better linkages to the banks when applying for extra credit. .

Complicated procedures, such as a reference letter from the local government, preparing a credit proposal, and collateral are the most significant problems that impede farmers trying to access commercial credit or credit program from the financial sector. Difficulty to register their land as potential assets for collateral (Besley 1995) reduces access to formal credit (Woldie, Isaac Mwita and Saidimu 2012). Addressing those procedures and obtaining information from the bank generally takes more than a month and increases administration costs. Adams and Fitchett (1992) also found that the high possibility of default, and lack of

collateral, lead to difficulties for small-scale farmers when applying for credit. Spio (2002) also note that bureaucratic red tape, including complicated procedures, cumbersome and time-consuming processes, especially when meeting with various public institutions, lead to delays in approval and increased costs, and therefore the loans sometimes could not be obtained when needed. Although the local government has supported administration procedures, such as a reference letter without collateral for small loans (less than Rp 50 million), only selected crops or commodities with better returns attract finance from the banks, as was found in the vegetable sector.

Other obstacles that impede farmers were distance from a bank and limited banking authority of local managers. The BRI and the BNI, which have the schemes, were mainly located in the city of Enrekang, while smallholder farmers live in villages with poor road access and transportation services. Boucher, Guirkinger, and Trivelli (2009), Fenwick and Lyne (1998) and Winter, Nelson and Temu (2005) found high loan transaction costs due to distance have discouraged borrowers and lenders, thereby exacerbating credit constraints. Lack of banking authority at the sub-district and district levels was also a constraint for respondents when they want to develop a credit proposal. As found in the scoping study, when smallholder farmers requested more than Rp 50 million, the final agreement had to be decided by the BRI at the district level.

Because these obstacles limited farmers' access to formal credit programs, vegetable farmers especially obtained loans from the non-formal financial sector, offered by professional money lenders, pawnbrokers, relatives, friends and landlords. Spio (2002) suggests that low interest rates operated by banks could not reduce the monopoly of informal finance in rural areas, since they face restricting conditions in accessing formal credit. No collateral requirement, available every time, and minimal application costs are factors that make it convenient for farmers to use moneylenders, even though interest rates are higher, with a range from 25 percent to 50 percent of the loan repayable after selling their farm production. Fitri (2006), Larson, Zaqueu, and Graham (1994), and Manig (1996) also found that with inadequate collateral and other assets as a physical guarantor, borrowers are more likely to connect with the informal financial services who commonly charge high interest rates. This is due to easy access, various loan sizes being available, flexibility on repayment schedule, personal guarantees, convenience, and a shorter time period to obtain the loan agreement. Even so, in this region, some credit providers, such as traders, consider specific conditions, such as individual capability to repay the loan, and prefer to give credit only to farmers who have business potential, such as farmers of red onion crop.

7.3.5 Research, development and extension services

In Enrekang, the most important issue to be addressed by agricultural research for vegetable farmers is solving pest and disease problems. This is because many farmers who grow both perishable and non-perishable crops have reduced yield and quality due to pests and diseases. It appears that lack of knowledge and skills leads to excessive use of pesticides and failure to follow recommendations, partly due to insects being resistant to the pesticides used. Adiyoga et al. (1999) suggest that one of the factors that influences farmers to overuse pesticides is the misconception that high rates and frequency will be more effective, and therefore minimize, production risk. However, the result is that in the long term, resistance increases and pest and disease levels increase (Dismukes and Vandeveer 2001).

In Enrekang, there is no research and development, or diagnostic efforts, to detect or control disease that is conducted either by the government or private sectors. Agricultural research is only conducted and funded by the local government if there is research partnership in terms of providing technical experts and sharing operational budget among research institutions, such as Hasanuddin University and the Indonesian Institute of Sciences *(Lembaga Ilmu Pengetahuan Indonesia, LIPI)*. Research partnerships among the public institutions from different levels and the private sector are necessary because the Enrekang government does not have enough budgetary and human resources to sustain such research activities. This study found that research on improved seed cultivation for potatoes failed to produce better seeds continuously due to the lack of operational budget and inadequate local experts to sustain the research activity. Most of the experts came from the university which is a considerable distance from the research site, which made it costly. Likewise in dairy, training on artificial insemination, and demonstration of the application of embryo transfer to improve milk production and dairy population, are unsustainable due to insufficient budget. To make it sustainable, extensive training to the extension worker is required to create local experts who can provide regular guidance to farmers.

The research project only ran for a short time due to its funding, without gaining funding to achieve sustainability. Beintema and Stads (2004) and Pardey, Roseboom, and Beintema (1997) suggest that financial sustainability issues, and an over-dependence on limited sources of funding, was a primary problem of research in developing countries. Lack of management and inefficient bureaucracies contributed to organisational failures in obtaining both the quantity and quality of research results, and led to decreased funding (Echeverria 1991). The government has a role to create policy instruments to enhance and support private sector investment in collaborative research programs, and for donor agencies to facilitate the implementation of research partnerships (Anderson, Pardey and Roseboom 1994)

While it might be expected that the private sector could play a significant role in carrying out agricultural research on pest and disease prevention, and supporting research funding, in this region there is no private sector involved. Rather, the private sector are more likely to be engaged in commercial markets as agricultural input distributors. Involvement of the private sector in agricultural research is usually organised by large companies who are mostly involved in plantation, agro-input production, forestry, food-processing and industrial fishery (Stads, Haryono and Nurjayanti 2007). Non-profit organisations also do not contribute significantly to agricultural research; indeed, they are only involved if there is a government project.

Crop management training and demonstration farms can be important enablers for the growth of the agricultural sector. Due to their poor understanding and practical implementation of technology, farmers need effective advice and information from extension workers to achieve high production for their crops. Even though a large proportion of them have high levels of education, they still lack the ability to grow crops and solve many farming problems. For instance, many of them use seed from previous harvests because it is cheaper, but this results in low yields and a tendency for crop failure. They also do not follow fertilizer and pesticides recommendations, which impacts on quality and consumer safety. In addition, they are more likely to solve the problem based on their experiment and experience, rather than collaborating with extension workers.

Effective responses to problems are needed through participatory approaches used by extension workers to provide relevant advice and technology about improved varieties, cropping techniques, optimal input use, prices and market conditions, more efficient methods of production, and farm management (Feder, Just and Zilberman 1986). Another effective approach involves the use of farmer field schools that are conducted on-farm and provide technical practise and advice on crop production management. Discussions between farmers are a key component, so that it is easy to transfer and share knowledge and experience about theory and practical aspects of farming. Wiebers (1993) observes that a key principle of the farmer field school is participatory training and hands-on experiments, and this increases the confidence of the pest experts through using self-teaching experiments, and is an effective way to train other farmers.

Effective extension workers who could encourage farmer's capacity for better farming practices and responses to problems could only be achieved if the extension workers have enough competence, skill and leadership to facilitate the development of practical solutions to farmer problems. In this region, lack of capacity, limited facilities and insufficient numbers of extension workers impede the effectiveness of extension programs to assist farmers. Lack of capacity includes poor skills to solve problems effectively due to lack of

access to information and innovation technology, as well as limited access to advanced training. This could be related to working and spending time in rural areas where there is limited access to information about innovations and technologies due to poor communication infrastructure, and also lack of local government budget to enhance human resources. An investigation by Margono and Sugimoto (2011) produced similar findings in that undeveloped information infrastructure, and difficulty obtaining new information, are factors that impede extension workers from delivering innovations and new technology which resulted in limited skills and knowledge to work with farmers.

Limited transportation and operational budgets also contributed to unproductive extension work with farmers in Enrekang. Since most of the area is mountainous and hilly, transport is important, but motorcycles are not available for every extension officer. Consequently, transferring knowledge and delivering technological information on farm production to farmers was not effective. Feder, Just, and Zilberman (1986) also found that limited procurement of vehicles greatly affects the effectiveness of extension workers in technology transfer and dissemination of information. In addition, Qamar (2002) notes that agricultural extension institutions in many developing counties face two main problems in giving advice to farmers in the field, namely geographic factors accentuating the physical distance and inadequate infrastructure. Limited numbers of extension workers who work in the sub-district is also a challenge, where there are only five professional extension workers in each sub-district, with many farmer groups to be serviced in each village.

For the dairy sector, demonstration farms and training in improving milk production to meet consumer demand are required. This enabling condition relates to the ability of farmers to understand and implement several elements that influence milk production such as artificial insemination, providing better concentrates and forage and use of medicines. Karuniawati (2012) and Siregar (2003) found that the quality and quantity of milk was affected by production factors including provision of feed (concentrates and forages), provision of medicines and vitamins, provision of water, and labour. Siregar (2003) added that intensive use of artificial insemination contributed to improving milk production.

In Enrekang, however, deficiencies in these factors impede farmers from improving the quality and quantity of milk. With artificial insemination, for example, many farmers have limited skills to detect the oestrus cycle properly. The limited number of extension workers who have the skill and capability to conduct inseminations are also barriers to the success of this program. There are only a veterinarian and two animal health officials who can give guidance to more than 1000 dairy farmers. According to Herawati et al. (2012) and Webb (1992), the success of artificial insemination is determined by the skill of the inseminator in

determining the placement of semen in the reproductive tract and identifying the best time to achieve acceptable conception rates.

Concentrates that contain high levels of energy and protein are required for dairy cattle because not all nutrition can be obtained from grass or forage, therefore concentrates are necessary as a supplement (Karuniawati 2012). However, most farmers do not use the appropriate combination of forage and concentrate to obtain a balance of nutrients because they lack the knowledge and rely on daily experience and feeling. Furthermore, the high cost of fodders and transportation are problems. To overcome these problems, almost half the farmers made their own concentrates by using resources available around their farm, such as tofu, bran, groundnut cake and molasses. Mixtures are based on their own experience and experiments rather than scientific nutritional principles.

Medicines are also not regularly available and are expensive at the farm, since farmers have to connect with agro input dealers in the city of Enrekang, or order through the main agent in Makassar. Farmers can sometimes obtain medicines from government, although this is commonly from projects, and stocks are usually limited. These challenges mean farmers can not maximise milk production and take care of animal health.

7.3.6 Standards and regulations

Due to the traditional farming systems, both farmers of perishable and non-perishable crops have difficulty accessing modern domestic markets located in Makassar. Most products do not follow the procedural standards and regulations on quality control, such as taste, chemical residues and food safety issues. Packaging is also poor, with gunny sacks for non-perishable crops and wooden boxes for perishable crops. Crop production meets the standards of local, regional and inter-island markets, and wet markets in Makassar and Kalimantan, where there is no price difference for crops meeting quality standards, including chemical residue standards. Since the local market and consumers do not value these quality aspects, farmers do not pay attention to them. For instance, farmers who produce potatoes by using compost and less pesticides, receive the same price in the Sudu Wet Market as potatoes which are produced using chemical fertiliser and high levels of pesticides.

In order to respond to modern quality standards and regulations, a contract with buyers is an essential condition and one of the solutions to involvement in higher value markets. This is based on evidence finding that farmers can produce the delivery volume, grade size, reduced chemical residue and better packaging system, if there is a contract with potential markets. Sharma (2008) found that it is important for farmers to be linked to markets that can assist them to shift from subsistence or traditional agricultural to meet the quality standards of more modern markets.

Farmers would be required to sign a contract committing them to grow certain crops and to deliver a particular quantity and quality at a time, and expect to be paid a guaranteed price. Such contracts provide an alternative to traders who control price and sometimes monopolise the marketing system. The buyers would need to purchase the yield, and preferably, assist with purchase of inputs and production information

With a contract, farmers are in a better position to obtain credit from banks rather than money lenders, who charge a higher interest rate. Marketing risks that arise from delayed payment or non-payment, which often occurs in the traditional system, can be reduced. It also provides an opportunity to obtain sufficient agricultural inputs, such as fertilizers and pesticides, and to use better quality seeds. Connecting to extension workers and technical experts who are professional, rather than using their own experience and assumptions, can lead to better management (Khalil et al. 2008). According to Little and Watts (1994) and Simmons (2002), a contract provides a positive impact through better access to markets, credit and technology, easier access to agricultural inputs and services, but can reduce marketing risk, improve managerial skill and connect to technical expertise.

The situation is similar for dairy production. *Dangke,* the main product, is produced traditionally without addressing a quality standard, technical preservation, better packaging and food safety issues. High local demand for the traditionally processed and packaged product is a factor that makes farmers unwilling to change the standards for food production. Kasim and Sirajuddin (2011) found that most *dangke* production are sold to local people and, sometimes due to demand, consumers need to order a day before production. Kasim and Sirajuddin (2011) also found that they are satisfied with the existing packaging.

To meet demand from supermarkets in Makassar, a new product, milk crackers, has been produced using procedural standards, such as labelling and better packaging, based on the local government certification. By following those requirements, and with active promotion in collaboration with extension workers, milk crackers have been able to meet the requirements of several supermarkets in Makassar and obtain contractual agreements with regards to quantity and quality of supply and price. Through this agreement, farmers have found it easier to apply for the People Business Credit to support the business and it has involved more women's groups in making crackers. This is consistent with the findings by Da Silva (2005), Okorley and Ayekpa (2012) and Miyata, Minot, and Hu (2009), that an advantage of contractual agreements for farmers is that the buyers will purchase the products with specific quality and quantity measurements. Additional benefits for farmers include better access to improved management approaches, technical services and financial assistance.

However, this market opportunity was not sustained due to a gradual decrease in demand from supermarkets. The main reasons were that the product was not competitive with other products in term of sustainable supply and quality aspects. Production of crackers could not fulfil market demand consistently and deliveries were sometimes not met due to low milk production, and farmers preferring to produce *dangke*. Also, addressing the quality standard requires numerous procedures such as inspection, regular monitoring and technical supervision, which seems to be a challenge for dairy farmers, and has a high operational cost. Maertens and Swinnen (2009) also found that one of the challenges to farmers to upgrade agricultural commodities for markets, and for achieving high quality standards, are lack of capacity to adopt new technical production due to the cost involved.

To respond to this challenge, the cooperative could potentially create the marketing contract with supermarkets, or other potential buyers, to achieve a guarantee purchase and sale of the products. According to Chowdhury, Gulati, and Gumbira-Sa'id (2005), by involving farmers in the cooperative, they can obtain benefits on reducing the cost of transportation, increasing accessibility to the inputs provision and having a strong bargaining position linkage to the market. However, for the cooperative to be successful, it is important to work to become independently manageable without depending on government intervention. Other factors, such as transparent and efficient internal management, product orientation, cooperative and technical training, and appropriate external support from professional NGOs, could also contribute to determine successful cooperative development (Garnevska, Liu and Shadbolt 2011)

7.3.7 Business development services

Both vegetable and dairy farmers rate the importance of assistance that links farmers to the buyers for business development services highly, in part because a lack of guaranteed quality and quantity of supply limits their options to supply alternative markets. Therefore, an effective approach to facilitate better integration with potential buyers could be achieved by creating business development services among farmers, traders, public institutions and other value chain stakeholders to reduce barriers. Vorley, Lundy, and McGregor (2009) suggest that building collaboration, co-investment and knowledge sharing between producers, suppliers, processors and retailers would assist small-scale farmers in reducing the market barriers and that would lead to increasing capability to respond to market requirements such as quality, safety and consumer assurance, reliability of supply, and sustainability. In response, various programs have been initiated by government institutions, such as facilitating marketing and promotion, providing technical advice and training services, and encouraging the financial sector.

To expand market networks and to encourage and enable the private sector to create business linkages with smallholder producers, a marketing promotion of local superior commodities has been conducted. For instance, the Department of Industry and Trade facilitates and supports local entrepreneurs, such as the Chamber of Commerce and Industry, through business meetings at both the provincial and national levels to promote potential investment with the aim to find potential buyers who are able to conduct transactions and undertake investments. Suyatna (2010) advocates regional marketing and promotion as an effective strategy for local government to attract investment and lead to economic growth. It has resulted in business agreements for marketing systems and business roles through memorandums of understanding among the stakeholders. However, implementation of this program is often unsuccessful. The main problem is uncertain supply of products in the long term, poor quality, high cost and economic inefficiency. An example in Enrekang is the failure to establish a milk processing plant due to poor market linkages and the ability to supply the consistent quantities needed by such a plant. As stated by Fisher and Qaim (2011) and Shepherd (2007), lack of capability to fulfil standards and continuity of supply are challenges for smallholder producers to take advantage of potential opportunities in dynamic markets. In addition, access from the farm gate to the port of Makassar, for example, is costly due to long distances and time factors due to poor infrastructure. Inadequate and poor infrastructure increase costs and also makes transactions excessively costly (North 1990; Williamson 1979). To create the investment, a region should ensure the market can work properly and this can be achieved through availability of infrastructure facilities (Kuncoro 2007; Tambunan 2006).

Anderson (2008) suggests regular assistance and technical training are needed by farmers to improve the production that leads to increase farmers' incomes and foster development in rural areas, with extension workers being important to provide the agricultural services. However, this study found that technical advice and training services are often not effective or frequent, due to lack of human resources and limited operational budgets. Therefore, farmers are forced to rely on their own experiments and experience for solutions. World Bank (2002) reported that the extension system in Indonesia is unsustainable, mainly because of limited budget to support their activities. At the district level, much of the funding is being allocated to routine programs, rather than in supporting the development of agricultural and extension systems. Through this constraint, some farmers, under their own initiative, attempted to solve the problem based on local practices and experiments, such as using natural pesticides against plant disease and pests (Herianto et al. 2010).

To help production meet market requirement and to value add, training on quality issues, such as seed selection, packaging systems and labelling procedures, has been programmed

by agricultural and livestock and extension worker departments in Enrekang. For vegetable crops in Enrekang, The Institution of Production Standard and Food, The Board of Seed Control and Certification for Food Crops and Horticulture *(Balai Pengawasan dan Sertifikasi Benih Tanaman Pangan dan Hortikultur, BPSBTH)* is responsible for assessing product quality and certification is invited to provide training for farmers on seed cultivation and procedural certification. This training has given valuable information for the potato farmers to respond to the quality requirements, such the risks of using seed from previous harvest, eliminating the use of high chemical inputs and maintaining soil fertility, and sorting and grading techniques. According to Ngugi, Gitau, and Nyoro (2007), farmers who obtain advice and are involved in training are able to fulfil market demands of quantity and quality products. However, most farmers depend on traders, both regional and inter-island and, hence, often do not realise the importance of production quality, which means they find it difficult to meet the demands of potential buyers.

The formal financial services in the district, BRI and BNI, assist smallholder producers by offering credit services. The agricultural credit program is introduced to vegetable and dairy farmers. To improve the ability of smallholder producers to manage their finances and repay loans, consultancy services and training on accounting and financial monitoring systems are conducted to minimise the misuse of credit by creditors. This is important as guidance to use the credit, since some creditors in this study could not differentiate between working capital (e.g., for agriculture inputs) and investment capital (e.g., for machinery). Other farmers were found to use agricultural credit for unproductive activities and non-agricultural purposes, such as buying houses or motorcycles. As suggested by Sievers and Vandenberg (2007) successful credit use can help reduce poverty, and improved repayment ability would assist the financial services achieve a measure of sustainability. Technical services for financial management are also needed to reduce risks and difficulties with repayment of loans. Farmer's income is cyclical due to the seasonal nature of their production and requires adjusting loan repayment schedules to allow for the cyclical income flow. This is what occurs with informal credit. There also needs to be policies and procedures to assist farmers to repay the loan when there are natural failures of farm production due to seasonal conditions. Muhammad and Darwis (2006) note that providing counselling on financial management helped enable farmers to manage loans professionally and fostered efficiency to eliminate unproductive costs and, therefore, loan defaults were reduced.

7.3.8   Business Linkage
Input supply
Local agricultural suppliers and traders are the main actors that provide inputs to vegetable farmers, while the local agricultural store, and the government for a few, are the main actors

for dairy farmers. Farmers create informal linkages to either local agricultural suppliers or traders to obtain inputs, and to overcome the need to pay cash for expensive inputs. Some of the expense of farm inputs is because these inputs are not available locally and come from the sub-district city, or even further. For instance, better quality potato seeds are not produced in Enrekang and have to be imported from West Java, which increases costs. Chianu, Mairura, and Ekise (2011) found poor quality road infrastructure and long distances led to increased transportation costs and higher prices of farm inputs.

The main types of business linkage involve delivering agricultural inputs (e.g., seeds, pesticides and chemical fertilizers), some of which include credit services. These linkages are based on mutual relationships with high levels of trust and strong commitment between farmers and the suppliers or traders. The business linkages have created a mutual ongoing business partnership between farmers and traders, with the traders able to access guaranteed production to supply their wet market demands, while farmers are able to obtain inputs and sell their produce yields for sufficient income. To obtain mutual benefit for the traders, sharing of operational costs, and profit equality, is a part of the agreement on this linkage. For the input suppliers, the debt for their inputs is paid directly after the produce is sold, although at a higher price of around 10 percent to 15 percent. This corroborates findings by Cadilhon et al. (2007) that the successful linkages between traders and farmers in Indonesia is demonstrated by the ability of traders to work closely with farmers by addressing some problems of farm production through providing cash and working capital. However, this linkage does not occur for the majority of vegetable farmers. Better linkages are only for those with better road access, access to market information and for crops that have more profitable markets. The barriers for the majority, such as crop failure and instability of market price, make it difficult for them to develop linkages, particularly to repay loans with higher interest rates. These farmers seldom use chemical inputs, resulting in low quality of the produce and ineffective disease control. As Chianu, Mairura, and Ekise (2011) suggest, one of the factors responsible for the gap between potential and actual yields is low use of inputs by small farmers. Market constraints restrict farmers' profitability and increase production risks. To increase access to farm inputs, the government needs to implement policies to reduce market barriers through improving road and other infrastructure, and improving credit access.

While dairy farmers mostly obtain inputs from the local agricultural store, there is no specific linkage with traders, like in the vegetable sector. Farmers usually pay in cash when buying these inputs without credit facilities or business cooperation. However, obtaining medicines is not easy as the stores are in the regency city, which adds extra cost for

transportation. The problem is more complicated if farmers need specific medicines, as these have to be ordered from Makassar city.

An effective linkage has been achieved by collaboration among government, the local government bank (BPD) and extension workers to support the growth of dairy cattle farming. In rural areas, a comprehensive approach among the public sector and development agents to the provision of support services is needed to create, and strengthen, the growth of smallholder producers (SASIX 2007). To assist farmers with the financial ability to source heifers from Java, the Enrekang government, through the Department of Agriculture and Livestock *(Dinas Pertanian dan Peternakan),* allocated 70 percent of the budget for microfinance credit, and the shortage of funds is covered by the BPD. Loans are repaid by farmers through the credit system with lower interest rates than commercial credit. In this system, BPD selects farmers who are able to obtain credit based on their ability to repay the loan, manage the financial administration system and repay regularly. To ensure sustainability of milk production and decrease risk, extension workers train farmers on technical production, such as feed management, health monitoring and artificial insemination. This linkage has contributed to improving the capacity of farmers to respond to the demand for *dangke*. However, this linkage mainly reaches farmers who are already economically actively engaged in dairy farming and having the ability to repay the loan. As pointed out by Bramono et al. (2005), to maintain the credit market flow, microfinance institutions prefer to create relationships with people, or an enterprise, so that they have the potential to make a profit and repay the loan. Bagi (1983) adds that the length of farming experience, better education and high frequency communication with extension workers are factors that determine the increase of probability and managerial ability of farmers utilising the credit.

Marketing services

Agricultural market in the industries studied in Enrekang involve traditional supply chains, with farmers mostly depending on traders as the main buyers who sometimes give them cash advances, and a few pay cash for their produce. In traditional supply chains, farmers and traders do not conduct value adding activities, such as better packaging, to address specialised market requirements, with the main activities being cleaning and sorting. According to de Paulo Correia (2014), lack of skill and knowledge about marketing, lack of information on input and output prices, and low capital cause farmers to engage in traditional chains, therefore their bargaining position with the traders is weak.

Farmers in these traditional supply chains are offered low prices, partly because of poor quality production and high dependence on traders and the wet markets. Traders have the power to determine the price, as they provide inputs and credit assistance, and also have

better information about markets, for example in vegetable chains. Therefore, farmers are in a difficult position to supply potential markets. Too much dependence on the traders increases their vulnerability, due to the trader's position as the main exchange partners, which makes them more powerful to create, and manage, the trading mechanism and obtain a favourable result for them (Heide and John 1988). Nevertheless, without assistance from traders who deliver inputs and credit, farmers think that they will find it difficult to grow crops, so this type of linkage makes them feel powerless to avoid traders (de Paulo Correia 2014). With regard to this, traders have the power to determine the product value, and lead to lower prices being received by farmers (Batt and Cadilhon 2007).

One possible solution for smallholder vegetable and dairy producers to access higher value markets is by encouraging farmer institutions, such as farmer cooperatives, as an instrument to facilitate farmers' ability to meet the market demand, and also to negotiate contracts. As found by Vorley, Lundy, and McGregor (2009), modern supermarkets and retailers are more likely to establish business linkage with institutional farmers, than individual farmers. Involvement in such institutions can increase bargaining power, eliminate a wide range of problems, such as producers dispersion, inefficient economic scale, limited access to market information, lack of technology innovation, poor access to finance, inconsistent supply, and quality and risk management.

Farmers associations or cooperatives could act to collect the product directly from farmers and then transport to supermarkets in Makassar. Farmers would not be paid directly, rather, they would be paid on the product delivered and recorded, and later paid the agreed price. To address the quality issue, the products are processed based on standard requirements (e.g., cleaned, graded, sorted, packed and labelled) and stored in a cool room before delivery to customers. With storing in a cool room, a cooperative is able to select the buyer and deliver the products to those buyers who purchase at a higher price, and also make the chain activities more efficient (de Paulo Correia 2014). Through this linkage, market information can also be obtained, and this is important in order to know preferences that are requested by buyers. According to Batt and Cadilhon (2007), information is important for farmers to determine what type of crops should be grown in a specific season to respond to the market.

Contribution by financial institutions is also important in linking farmers to markets effectively. Their contribution is required to ensure farmers have enough capital to support farm production. Farmers are then able to provide the inputs and continue to produce high yields. In Enrekang, due to the lack of capital, vegetable farmers use poor quality seeds and lack chemical inputs. Consequently, production is low and risky. Likewise in dairy, farmers often face challenges to improve milk production due to limited capital to obtain heifers from Java. Access to financial services improves access to quality seeds and significantly

raises the use of inputs. However, it needs collective action to build up the capacity of institutions serving farmers to raise access and reduce the cost of financial services (Dioum 2008). Other contributions of financial assistance are to overcome cash flow issues for farmers since many supermarkets often pay only after a period of time, while farmers need to purchase inputs, and other necessary inputs, to support production and daily needs. Vorley, Lundy, and MacGregor (2008) reveal supermarkets and other modern retailers often pay late to the suppliers (often around 45 days). Farmer's associations or cooperatives can pay in advance to the farmers, however they also need liquidity to finance these advances. Consequently, there needs to be mechanisms to bring liquidity into the supply chain, therefore financial services play an important role in assisting small-scale farmers to participate in dynamic modern markets by providing working capital.

7.3.9   Ease of doing business

Good business regulations can assist the private sector to grow and businesses to enhance their network for transactions. It creates productive investments not only for generating profits for firms by reducing risks and costs, but also for providing the goods and services needed to improve living standards for society. If a region such as Enrekang wants to accelerate investment, regulations have to be put in place in order to safeguard economic activity and to assist firm operations; if they are poorly constructed there can be barriers to doing business (World Bank and International Finance Corporation 2013).

To assist the private sector create productive investment from utilisation of potential resources, a one-stop shop services centre program was created by the Enrekang government through the Department of Investment and Permits. The main goal of this program is to simplify the regulatory arrangements and to rationalise licensing requirements linked to provincial and central governments. Therefore, the private sector, which needs to establish a business, can obtain the final legalisation in less than a week through the Enrekang government, without meeting with various departments at different institutions and locations. This would assist the private sector or agribusiness firms to organise licencing procedures, using a process that takes a short time, is transparent and has uncomplicated procedural administration. According to Steer (2006), one-stop-shop services (OSSS) (*Pelayanan Terpadu Satu Pintu (PTTSP)*) were created by the government to simplify the licensing process in a way that the private sector no longer needs to meet various different local departments or agencies to obtain the business permits. The new institution is established from mergers of various technical departments into one office where licenses and permits can be gained more quickly. This reform to a one-stop-shop service would decrease the burden on business and create efficiency in the licensing administration (OECD 2010). However, at a practical level, government officials lacked the capability to implement the

rules, although the rules were a major part of their responsibility. Many licenses and business permits have been produced with the aim to raise local revenues, but this often results in market inefficiencies. Evidence from this study of Enrekang has found the agribusiness activities in both the vegetable and dairy sectors are suffering from difficulties in addressing procedures for business legislation. Delays and the numerous procedures of different institutions are common. For instance, organising the cooperative business licence involves various local government institutions and requires lengthy time to obtain a business permit. Similarly with dairy, operational costs to transport heifers from Java to Enrekang are increased due to unofficial payments at security posts along the national highway. According to Hausmann and Rodrik (2003), unofficial payments to the government increase the cost of doing business and if extended to higher levels of government lead to deep distortions of policy making and demoralize government credibility. Typically, company or individuals make payments to the government officials in return for a favourable decision, whether this is a high level policy decision or a more ordinary matter, such as obtaining connection to utilities or organising business administration (Dollar, Hallward-Driemeier and Mengistae 2003).

In addition, operating systems of business administration which are done manually and not online, make unofficial payments and time wasting more likely when complying with business legislation. This is different to registering online where the firms can submit electronically with a single document that covers all information that is requested by different agencies, is low cost, and no direct contact between traders and public officials, potentially cutting down opportunities for unofficial payments (OECD 2010).

7.4   Summary

Creating an enabling environment for farmers is one of the most serious concerns of the government to foster competitiveness of agro business and agro-industry that would lead to increasing income, reducing poverty and improving the livelihood of poor farmers. To reduce market barrier, the government constructed the road infrastructure and communication network. To enhance the capacity of farm production, and attempt to promote better farming practice, extension workers provide technical expertise and training services for farmers through the participatory approach in the form of field school. The government also realised the importance of research and development to produce technological innovation based on a specific location through a joint cooperative program with other public research institutions, at both central and provincial levels. Promoting the credit program is also conducted by both the BRI and the BNI to assist farmers with the financial resources to purchase the inputs. In addition, the *Prona* program is also programmed to assist farmers to enable them to register their land for property rights and

tenure security. However, inappropriate policy and services from the government and other stakeholders, at both central and provincial levels, results in ineffective functioning of markets at the local level. Consequently, increasing the marginalisation of small scale farmers renders them inadequate to participate in the competitive market. Poor farm road infrastructure, for instance, makes farmers suffer from the increase of the high cost of transport to reach the market and to distribute the inputs, and also because roads cannot be accessed by public transport. On the contrary, national and provincial roads are high quality and can be accessed by public transport in a timely manner. Similarly, most of the research programs are unsuccessfully implemented at a practical level due to poor design among public research institutions, neither central nor local levels for the sustainability of research programs, particularly on a research budget, and providing technical experts who maintain the research activities at farm level. Insufficient number of extension workers, and lack of professionals to deliver messages to the farmers, are barriers for farmers to engage in farming productively. Centralistic programs on land administration through the BPN for land registration still face several constraints, such as bureaucracy procedures, cost and length of time. Therefore, there are only a small proportion of farmers who are able to obtain a land certificate, which is potentially to be used for collateral. This influences a limited number of farmers to meet the financial credit requirements.

In addition, inadequate inputs and local expense are also other barriers that significantly influence vegetable and dairy farmers to be productive. Alternatively, farmers depend on traders to obtain the inputs supply through the business partnership, but this leads to limited opportunity for farmers to find other alternative markets which might potentially offer a competitive price, such as in the vegetable chain. These constraints make it difficult for farmers to integrate into higher value chains, particularly to take the opportunity to link with modern markets. Most products are offered at low prices, partly because of poor quality production and high dependence on traders and the wet markets.

Response to the unfavourable conditions and complexity of problems, enabling institutional and policy environment are required to achieve well-functioning markets to realise the competitiveness of agro-industry. To obtain the effective policy intervention, it is important to specify which particular areas should be prioritised sequentially based on their level of function to realise the sustainability of production, and to strengthen market demand.

Chapter 8.   Conclusions and recommendations

8.1   Introduction

Most studies on the enabling environment have focussed on macro level issues, whereas this study is one of the first, if not the first, to analyse the enabling environment for agribusiness supply chains at the local, provincial and regional levels. This chapter presents the conclusion and recommendations arising from the study to analyse the effects of government policies to enhance the enabling environment for vegetable and dairy supply chains in the Enrekang Regency of South Sulawesi, Indonesia. The specific objectives of the study were to:

1.   Explore and develop a conceptual framework as a guide to identifying government policy initiatives to enhance the enabling environment.
2.   Describe and analyse the interconnection of government policy at local, provincial and regional levels on the enabling environment.
3.   Explain and analyse the role of the private sector in the enabling environment.
4.   Identify and suggest changes to government policies at the local, provincial and regional level to enhance the enabling environment.

Conclusions to these objectives are discussed in turn, including highlights of findings for elements of the enabling environment for the vegetable and dairy agribusiness systems. Implications and policy recommendations are presented, and the chapter concludes with limitations of the study and areas for further research.

The key findings of the study with relevance to the first three objectives are presented in the following sections:

8.1.1   The conceptual framework of government policy to enhance the enabling environment

The conceptual framework of government policy is constructed as an instrument for guiding the government to create effective policy to enhance the enabling environment for agribusiness supply chains in this region (Figure 8.1). The priority policy for the enabling environment is the pivotal elements where the government has played an important role to ensure, and to facilitate, farm production and to promote well-functioning markets. This consists of the availability of farm input supply, assistance that promotes linkage to market, and accessibility of farm road to market. The second-order programs are called the "importance elements" which refers to required policy actions from the government to support, and encourage, research and development in solving pest disease and demonstration farm of extension worker for improving crop and milk products; the presence of government

programs that provide tenure security and property rights; and easy access to credit program. Lastly, are the "the useful elements" as the supporting policy condition but not necessarily priority – these include marketing contract, marketing standard and simplifying business regulations. Understanding this framework is presented from the pivotal elements to the important, and then down to the useful elements.
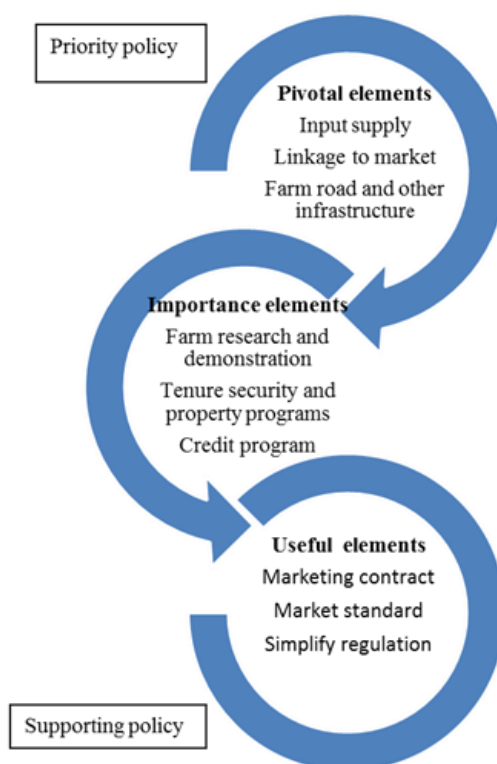
Figure 8.1: The framework of government policy to enhance the enabling environment at the micro level

Pivotal elements of the framework

Input supply

The availability of inputs is one of the most important factors underpinning a competitive farming sector. It allows the sector to respond to market demand, particularly continuity of farm production and quality guarantees. However, it is a major constraint for farmers in Enrekang because the inputs are expensive and not available locally. For instance, vegetable farmers are constrained by the lack of better quality of seeds. To obtain red onion and potato seeds, farmers have to order through traders from other provinces, which takes time and is relatively expensive. Likewise, dairy production is limited by a shortage of dairy cattle owned by farmers, while heifers which have better genetics must be imported from Java which is costly and takes time for shipping. Poor roads also hamper farmers in obtaining inputs, and increases the cost of transport to market. As stated by Chianu et al. (2008), limited use of farm inputs reduces production capacity and farmers' ability to respond to

market demand. They suggest government policy and institutional interventions are required to create the enabling conditions for the private sector to supply inputs effectively and efficiently, which brings favour for farmers to access inputs.

As a way forward, government policy intervention is necessary in Enrekang to support the input supply sector, while improving farm roads and other infrastructure are important to assist the private sector to fully take up farm input supply functions and assist farmers in obtaining inputs at affordable prices. Access to credit is also important to assist farmers with limited capital resources in buying inputs. Agricultural research to produce better varieties of seeds suited to local conditions is also needed.

Linkage to market

Assistance that links vegetable and dairy farmers to buyers would increase their options to supply markets, as, currently, they depend on local traders as the main buyers. Most transactions are conducted without any contract agreements that include payment systems, supply mechanisms and quality of products. In these chains, traders have the power to determine the price as they provide inputs and credit assistance and also have better information about markets. However, in the existing system, the advantage for farmers is that there is no formal administration and a reliance on trust and social relationships between farmers and traders. Without assistance from these traders, they would be unable to grow and sell their crops; therefore, they cannot avoid the traders which reduces their bargaining position, choices and ability to establish linkages to other potential buyers. According to Batt and Cadilhon (2007), this system provides power to traders to decide the product value, therefore decreasing farmers' profit.

One effective approach is to assist small-scale farmers to participate in modern markets. By linking them to these markets, farmers can improve price certainty if they can produce the products based on demand from the markets. To establish these linkages, farmers require assistance and training services to improve their understanding and ability to fulfil consumers' preferences for better packaging, quality and safety from chemical residues (Shepherd 2007). Market linkage can also be facilitated by improving accessibility to financial services for payments, investment in farm roads to facilitate the movement of farm products at reduced cost, improved telecommunication services for easy access to market information, and permanent irrigation to enhance productivity and reliability of supply, particularly for upland farmers who depend on rain.

Farm road and other infrastructure development

Investment in rural road infrastructure by the government is required to improve market accessibility and to accelerate the distribution of agricultural inputs. Most farm roads to reach markets are in poor condition, unpaved, generally narrow and potholed, which makes

it difficult to deliver the product on time and in good quality. Public transport only reaches production areas with a good road network, which mainly links Enrekang city to the sub-district level. Government needs to develop and sustain adequate road networks to support urban and rural economic growth. Investment in rural roads has contributed significantly to improve the movement of product to market (Shepherd 2007), and also stimulates the trading activities and services (ADB 2005). Irrigation infrastructure is also important, but the absence of irrigation could be solved by constructing their own cooperative irrigation systems or agreements with money lenders that involves sharing production. Accessibility of telecommunication networks has been helpful in accessing marketing information and transaction, but poor networks in some places means farmers have to travel to other places to access network connection.

Important elements of the framework

Farm research and extension worker training

At a practical level, research and development and training services depend on the ability of public research to provide outputs, such as improved cultivars and agronomic practices for crop management. Pest and disease research and extension, is required by farmers to obtain effective solutions to decrease the risk of crop failure and low milk production for dairy. This will enable them to increase crop intensity, with cheaper costs for seed, better taste and higher nutrient content, rather than using the seed from previous harvests. Kerr and Kolavaili (1999) claim that the most important contribution of research on improved genetics of seeds is to obtain new varieties of crop which have better genetics, responsiveness to other inputs, such as fertiliser, resistance to pests and diseases, and higher potential yields. Dairy farmers also expect availability of better heifers locally, and this can be possible by regularly conducting research on artificial insemination and application of embryo transfer, so that farmers are not forced to import heifers from Java Island, which are very expensive.

Currently, the research programs are underdeveloped and lack attention by the government. They are mainly conducted if there is a research partnership that provides technical experts, and a budget from public research institutions, both regional and provincial. As a result, most research programs are unsuccessful due to limited attention from the government in providing the research budget to maintain research activities and to support the professional experts who can educate farmers and manage the research. The research programs are project-oriented and have minimal focus on sustainability. For instance, the research on potato seed could not produce a new variety of seeds locally due to inadequate budget to support the research activities and experts to manage the research.

Support is also required for extension to provide information, deliver advice and transfer knowledge to farmers for better farming practices, as farmers have poor knowledge with

regards to optimising the use of inputs, and they often used chemical inputs without following the recommended levels and withholding periods, which can lead to contaminated produce for consumption. They also do not realise the effects of using seed from previous harvests for the next planting, which tend to be low yielding, genetically weak, and susceptible to disease, and contribute this to the general low farm production. Similarly, dairy farmers could not use artificial insemination professionally due to a lack of information and understanding to identify the correct phase of oestrus for cattle impregnation.

Effective transfer of knowledge and advice to farmers is mostly determined by the level of professional skill of extension workers, sufficient numbers of extension workers and program support to serve farmers. The study found that many of them lacked competency and leadership skills in accelerating the process of diffusion of improved technology, and to spot and diagnose problems. Limited numbers of extension workers work with farmers. In the Cendana sub-district, there is only a veterinarian and two animal health officials available to give advice to more than 1,000 dairy farmers.

Therefore, agricultural research and extension needs to be given priority attention by the government, so that it becomes more effective to facilitate innovation for agricultural growth in this region. However, to be effective, policy attention to enhance agricultural research is required at each level of government (Byerlee and Alex 1998). Involving the private sector could also be another solution to reduce declining funding from the government. Spielman, Hartwich, and Grebmer (2010) identify three specific issues in involving the private sector in agricultural research and development which includes sharing the operational cost of research, translating research output into products for poor farmers, and promoting innovative research.

Tenure security and property rights programs

Intervention by the government to support administration processes is required by farmers for registration of their land for property rights and tenure security. The importance of this is underlined by the finding in this study that most of the farm land is unsecure and unregistered for property rights. This is a major constraint for both vegetable and dairy farmers in applying for credit from BNI and the BRI, as they lack collateral for their land. It also constrains their security to utilise the land in the most productive manner through investments in their own irrigation for growing crops and permanent pen construction for dairy.

The small scale farmers interviewed were willing to register their land, however registering their land through the BPN takes a long time and involves costly administrative procedures. The *Prona* program is one solution introduced by the Central government to assist small

scale farmers obtain a land certificate without payment. However, patch delivery of the program due to limited budget means that only a small proportion of farmers have registered their land. Therefore, policy action from the government is required to solve several problems that impede farmers from registering their land through the BPN. These are mainly to simplify legal administration and provide sufficient budget for investment in capacity and technology improvements to the program.

Credit programs

The government has credit programs, such as food security, energy credit and people business credit to improve accessibility of farmers to financial institutions. The focus of the policies has been on progressive institutionalisation by the BRI and the BNI to provide an adequate, timely and low interest rate facility to support farmers to improve agricultural practices and profitable farming activities. To assist credit access, the BRI and the BNI established a rural branch at the sub-district level. Vegetable farmers who have accessed the credit programs benefit through increased production capacity to buy sufficient fertilizer and pesticides for their crops, and quality is also improved through greater capacity to purchase better quality seed.

In dairy, the benefits arise from increasing productivity of the *dangke* product through to increasing herd size through the capability to purchase heifers, and also producing milk crackers with better packaging. Adebayo and Adeola (2008) found that easy access to financial services, including cheaper and timely credit, has contributed to increased productivity and market opportunity, which can increase income and reduce poverty for rural people. However, access to credit programs was limited among the vegetable and dairy producers in Enrekang due to constraints such as collateral requirement, complicated procedures, and lengthy time. Consequently, only a small proportion of smallholders have accessed the credit programs. Inadequate collateral was also a major constraint to farmers to access the credit programs. Therefore, improved accessibility can occur through facilitating improvement to the land administration program, so that they can use their land certificate as collateral. Thus, having potential market through the contract could be considered as criteria to propose and obtain the credit program.

Useful elements of the framework

Marketing contracts

Most of the vegetable and dairy products are marketed traditionally where farmers are commonly connected through the traders. Farmers are often given an uncertain price and delayed payment, which can increase risks, such as credit payment risk, if they use bank loans. Farmers, therefore, require market guarantees and marketing contracts to ensure the products have regular buyers who are able to purchase at a reasonable price. If there is a

contract, farmers could address market requirements, which include quality standards and food regulations, such as appropriate packaging, size, labelling, and food safety. Contracts can facilitate access to reliable markets, with farmers providing a guaranteed supply of products, and buyers ensuring a market price (Eaton and Shepherd 2001). In addition, buyers can provide a guarantee of payment for the products if the specification for product standard and quality are fulfilled (MacDonald et al. 2004).

With a contract, over-production during harvest time, particularly for crop commodities that lead to the decreasing price of products, can be reduced. In addition, an assured market and guarantee of payment can potentially facilitate farmers' requests for loans from banks. Contract agreements can be used as a surety to obtain credit to purchase the inputs (Charles and Shepherd, 2001). Optimising the ability of farmers to meet marketing contracts needs to be integrated and involved with other institutional environments. In addition, the professionalism of extension workers is crucial in providing technical advice and knowledge on better farming practices so that farmers can respond to market requirements and successfully meet the contract. The presence of financial institutions to provide credit loans is necessary to help farmers purchase farm inputs to support farm production and productivity.

Market standards

Accessibility to global markets is important for smallholder producers, but to participate successfully requires them to fulfil the market requirements which emphasize food standards and regulations (Maertens and Swinnen 2006). This is a challenge for smallholder farmers in the Enrekang region, where most engage in traditional farming and market systems. Vegetable and dairy products could only be marketed locally due to poor quality standards. Some vegetable crops are grown with high use of chemical inputs without considering the environmental impact and food safety. Moreover, it is sometimes harvested too soon after the last chemical application. The products are commonly kept in wood boxes and gunny sacks for packaging which increases the percentage of losses.

Likewise in dairy, the *dangke* product is produced without following food hygiene standards. It is produced by using papaya latex for preservation and banana leaves for packaging, which can lead to contamination from pathogens. As a result, these products do not meet market standards in Makassar which requires higher quality and food safety standards. Josling and Roberts (2011) emphasise that the inability to comply with product standards is a major challenge for farmers in developing countries attempting to participate in global markets. Product standard can include detailed health and safety standards such as packaging, permitted additives, food hygiene and processing standards to pesticides residues, but these requirements are poorly developed in developing counties (Otsuki, Wilson and Sewadeh

2001). In Indonesia, inappropriate food handling practices and food hygiene are common and fail to reach consumer expectations (Asis et al. 2003).

<u>Simplify regulation</u>

Production in Enrekang has the capacity to supply several regional markets in South Sulawesi and some islands in the eastern part of Indonesia. In addition, *dangke* has potential markets locally. To accelerate the expansion of markets by the private sector, a one stop shop services (OSSS) (*Pelayanan Terpadu Satu Pintu (PTTSP)*) was established by the government. OSSS aims to help the private sector organise business licenses and reduce the time and cost because they no longer have to meet with various departments at different levels and places when organising the license. World Bank (2013) claims that the aim of the one stop shop services is to improve the coordination process among the government institutions and to provide transparency in investment regulations to attract private sector investment.

The one-stop shop services centre program was created by the Enrekang government to assist the private sector in productive investment in the region. The aim of this program is to simplify the regulatory arrangements and rationalise licensing requirements so that the private businesses could obtain the legal documents in less than a week through the Enrekang government without meeting with various departments at different institutions and locations. However, the lack of coordination between the levels of government at the practical level still leads to delay, complicated procedures and unofficial payments.

Despite this positive contribution, the growth of agro industries in this region is still lagging behind because the business regulations processes are still far from being fully effective at a practical level. When organizing a business license, the numerous procedures of the business registration and licencing process still require meeting with various government institutions at different places which impedes private sector investment. This often leads to increased cost to obtain licences and illegal charges to shorten waiting times. Elliot (2008) investigated the complexity in business regulation at a practical level and found it is mainly caused by many regulations regarding building structures, nuisance factors, and the environmental aspect, which has overlapping procedures and creates confusion in the implementation. Technical standards for building construction and site safety are poorly developed and, therefore, often involves negotiation with officers, which leads to unofficial payments to obtain the permit.

To address these constraints, the various levels of government have to simplify the rules of business by removing unnecessary licenses which do not have a positive impact on the business environment, such as a seed entry permit and cattle transportation permit which

should be provided by agribusiness firms at local level. The government should also fully support the implementation of the one stop services by giving authority to one department to organise all documents for licencing and allowing them to remove overlapping licenses. Implementation of an online system for licencing procedures and payment might be an effective solution to improve efficiency, establish effective procedures and reduce illegal payments. As pointed out by Steer (2006), the implementation of Web-based systems for licensing permits will facilitate improvements to timeliness, service standards, efficiency and information transparency.

8.1.2 Interconnection of government policy at local, provincial and regional levels of the enabling environment

This study found that improving the enabling environment for agribusiness supply chains is required to increase the capability and competitiveness of smallholders to realise sustainability of farm production and respond to profitable market opportunities. However, for the policy to be effective in strengthening smallholder producers, good linkages are required for institutional policies at the macro, meso and micro levels. The *Prona* program, for instance, has been assisting farmers to obtain land certificates, therefore increasing farmers' capability to fulfil financial credit requirements, such as collateral for loans. However, as a national program, it was designed through a top-down approach, with limited involvement of provincial and regency governments in sharing roles and responsibilities. Consequently, the BPN often does not offer a favourable service at a practical level, with complicated procedures, high costs, lack of human resources, poor technology application, and unofficial payments impeding farmers when registering their land.

Investment in national and provincial road infrastructure has been a significant contribution to increasing economic activities and market accessibility. For instance, under a national government project, national highways of around 123 kilometres have been constructed and provided very good access between several regions within the south Sulawesi provinces in Sulawesi. Through the new national highway, traders were able to reach the urban wet market in Makassar around two hours faster than before, which previously took about eight hours to travel the 240 km from the Sudu wet market. Conversely, roads at the district level, which are linked directly to farm activities, are mostly poor quality and unpaved. Farmers face difficulties accessing inputs and transporting outputs to market. This study found that most of the village roads that connected to farms have limited public transport and farmers encounter additional costs for transportation for specific vehicles, such as trucks or jeeps to reach the market. This decreases the net margin for farmers.

Likewise, research and development is required to generate technological innovations that are location specific and that can be adopted by farmers to improve agricultural production.

Research and development is required to overcome pest and disease problems, develop and test seed varieties for local conditions, dairy cattle insemination technologies and application of embryo transfer. However, top-down approaches in designing the research programs among the public research institutions at the central and provincial levels means the programs do not run effectively at the local level. Research programs were project oriented, often inefficient, costly, and had minimal focus on sustainability of the program. For instance, the study found that research partnership among the Indonesian Institute of Sciences at the central level, and the Hasanuddin University at the provincial level, failed to produce better potato seed due to poor coordination among the research institutions in providing the technical experts who can manage and maintain the research activities, as well as the insufficient research finding. Similarly, dissemination of artificial insemination technology and application of embryo transfer could not reach dairy farmers due to inadequate training for farmers and the lack of expertise at the local level to deliver the program to farmers, as the local government has limited financial resources for this program.

Overall, enhancing the enabling environment for agribusiness supply chains seems to be difficult to implement effectively because of poor linkage among the institutional governments at various levels in delivering their functions. In response, a partnership program is urgently required to remove the worst of the biases with regards to agricultural growth, and to be able to compete in the market.

8.1.3   The role of the private sector in the enabling environment

The participation of the private sector in enhancing the enabling environment for agribusiness supply chains for both vegetable and dairy industries in Enrekang is limited and includes very few medium to large businesses. Indeed, in the vegetable industry, most linkages occur between smallholder farmers and locally-based individual traders. For example, to ensure their continuity of supply, traders create a business partnership with farmers by supplying inputs, such as seeds, fertilizer and pesticides, and credit, with an unwritten agreement that the farmers will sell their product to them after harvest. The debt for their inputs is paid directly after sale, but at a higher price of around 10% to 15%.

In the informal financial sector, traders or money lenders provide significant credit to farmers who lack the capability to meet the requirements of the formal financial sector to obtain loans to purchase inputs. However, they charge higher interest rates of about 25% to 50% of the loan repayable after sale of the produce.

In the dairy industry, the private sector mainly consists of local agricultural stores that provide medicines and fodder from their stores in the wet markets, but there is no business partnership with farmers, such as provision of credit.

Ideally, the private sector could partner with government in research, development and extension programs. The private sector could help mitigate decreasing research funding, while the government could create a more conducive business environment for the private sector to take advantage of research outcomes. An instance where this might have occurred failed owing to the public institutions failure to achieve the research output due to insufficient budget. Research on improved seeds for potatoes failed to produce better seeds due to a lack of operational budget to sustain the research activities. Consequently, farmers import seeds from other provinces which are expensive, and which are mostly uncertified. In dairy, dairy products such as *dangke* and crackers have failed to access potential markets due to the lack of research to develop innovations so that these food products could meet market requirements.

Institutional buyers could help provide improved access for farmers to markets through contract farming. Farmers with a contract have market guarantees with regards to price, quality standards and supply certainty. With a contract, farmers are also in a better position to obtain credit from banks, rather than money lenders, who charge higher interest rates. In addition, marketing risks that arises from delayed payment or non-payment, which often occurs in the traditional system, is reduced.

The limited involvement of agribusiness firms in enhancing the enabling environment bring particular challenges for smallholder farmers in improving production and market accessibility. The Government needs to reduce constraints to assist the private sector to facilitate farmers in entering high value markets, improve input supply and services, and participate in research, development and extension.

8.2   The implications and policy recommendations

This section presents the implications and policy recommendations in enhancing the enabling environment for agribusiness supply chains in Enrekang regency.

8.2.1   Changes to government policies at the local, provincial and regional level to enhance the enabling environment

In this region, smallholders' producers would have a greater opportunity to participate in domestic and international markets if changes in government policies and policy implementation leads to the condition where there is a favourable environment that supports and facilitates farmers and agribusiness firms to develop effective agribusiness systems which are more integrated in the creation of value chains. Therefore, any policies and strategies should be targeted at achieving higher production capacity, and at addressing market requirements, particularly through value-added production. To achieve this, greater

collaboration is required between the various levels of government. Some of the policies and strategies needed are discussed below.

Investment of rural infrastructure development

It has been found that poor development of rural infrastructure leads to high costs for delivery of inputs to the farm gate and products to market. Inadequate irrigation infrastructure reduces crop production and intensity. Rural network connections are poor in some villages, so it is difficult to access market information and price of products.

Investment in rural infrastructure should therefore be prioritised to create a conducive environment for agricultural production and market integration. Rural roads are the responsibility of the local government, but they lack funds to invest in improvement and maintenance. Other infrastructures, such as telecommunications and irrigations, may present greater opportunities to involve private sector investment thorough public-private partnerships.

Enhancing research and development

One of the problems to achieving higher production and quality for vegetable and dairy products is inadequate technological innovation. Most products are of poor quality. Inadequate research, development and extension on seed quality, for example, is constraining vegetable production, while inadequate processing and preservation technologies for *dangke* impede its potential market. A strengthening of development and extension, particularly at the local government level, is necessary to assist farmers to produce high value production and to meet consumer preferences. To achieve successful research, effective interaction, coordination and collective action based on existing capabilities and appropriate incentives among the research institutions are required. Strong interaction and coordination could improve the implementation of research policy and induce stakeholder researchers to be more aware of, and responsive to, the research needs and targets of local industries.

Encouraging linkage to market

To assist small scale farmers in accessing new markets, best practice farming systems need to be developed with them. Extension workers are important to the provision of knowledge and transferring skills in relation to market requirements. It is important for farmers to understand emerging market requirements for packaging, chemical residue limits and food safety, as these requirements do not exist in Enrekang. However, local extension workers also lack this knowledge and skill. Guarantee of supply is also important for successful linkages, but this requires the input supply and trading, and marketing ends, to function effectively. Government intervention will be crucial to solve barriers to entry to markets and

to create a conducive environment for the private sector to make the necessary investments for addressing market requirements.

Improving accessibility to credit

Improved access to credit is necessary to overcome the lack of capital for purchasing inputs and investment in farm infrastructure. In Enrekang, inadequate access to financial services is mainly caused by limited capability of smallholder producers to fulfil credit requirements, mainly for collateral. Collateral can be obtained through access to land certificates which requires smallholder farmers to register their land through the BPN. However, the procedures to achieve this are still constraining many smallholder farmers from obtaining their certificates.

In addition, improved access to credit may also be achieved without collateral when farmers have contracts with recognised buyers. To facilitate this, local government can issue a reference letter for easy access to credit. Further study is required to see whether having a potential business and better positive linkages to the buyers improve farmers' access to credit and their ability to make regular loan repayments.

Bringing input supply close to the farm

Inadequate supply of inputs such as seeds, fertiliser and pesticides at the local level constrain crop yields, intensity and quality. With dairy, the unavailability of heifers, and limited supply of medicines and fodder, limit milk production capacity. It is important to provide these inputs close to the farm gate. Government action to provide enabling conditions through investment in roads and other rural market infrastructure could enable the private sector to make the investments to reduce these deficiencies.

Enhancing extension worker capacity

Limited capacity of extension services at the farm level makes it difficult for farmers to obtain the technical advice and skills on better farm management. Farmers face numerous problems that often cause production failure and low production quality, such as pests, diseases and efficient use of inputs; however, the gap between availability of extension workers and the number of farmer groups that are needed to be advised for each village is a barrier to communication. Consequently, farmers try to find the solutions based on personal experiments and experience, or sharing with other farmers, but lack scientific support. One solution is to enhance human resources of extension worker by frequent training at local, provincial and national levels. The government has to support them by allocating sufficient budget to encourage research experiments and pilot programs to provide relevant innovations to address farmer problems. Improved recruitment procedures for extension staff should be based on specific skills and leadership capacity.

Empowering the regulation in the right places

This study found that agribusiness activities in both the vegetable and dairy sectors are confronted with difficulties in complying with business legislation due to complicated, lengthy, costly and poor administration procedures. These barriers limit agribusiness in assisting smallholder farmers to utilise their resources effectively and efficiently. A solution to address these constraints is to simplify the regulatory arrangements and rationalise licensing requirements to accelerate private sector investment. The Local government needs to take responsibility to create a better business environment with easy access, efficient and transparent processes, and through removing unjustified costs.

8.3 Theoretical, methodological and practical contributions

This section presents the theoretical contribution of this study in analysing the effects of government policy at the local, provincial and regional levels to enhance the enabling environment for agribusiness supply chains. Methodological contribution and practical implication are also presented. The final section outlines the limitation of the thesis for further research.

8.3.1 Theoretical contribution

Most of the previous research on enabling environments has been conducted in a broader context at the macro or national level. As an example, White and Peter 2004 state that the enabling environment is highly related to all external factors, such as physical security, the social and cultural context of business, macroeconomic policies, and physical and social infrastructure services. Likewise, World Bank (2004) investigated agribusiness enabling environments in the macro context and argues that creating an enabling environment is necessary to stimulate a conducive business for multinational companies and domestic firms.

This is the first study in Indonesia that analyses the effects of government policy at the local, provincial and regional levels to enhance the enabling environment for agribusiness supply chains in a comprehensive way at micro level. The study analyses the key ingredients for an enabling environment that can be used by the government to create an effective policy environment to foster growth of agriculture competitively, particularly the vegetable and dairy sectors. Element of inputs supply, linkage to potential market, and farm road investment are classified as "the pivotal element" and are the biggest priority with regards to policy forthe government. These pivotal elements focus on the provision of inputs supply locally because smallholder producers find it difficult to reach the sustainability of farm production productively, and market continuously, due to lack of inputs and better quality locally. This finding is supported by Rosegrant et al (2001) who state that the use of inputs is a primary ingredient to increase productivity, and to sustain intensive agriculture in the long

term (Crawford et al, 2006). Next, facilitating linkage to potential market highlights the importance for smallholder producers to obtain competitive price and market guarantee for their production. In this region, the agricultural market involves traditional supply chains, which is mostly dependent on traders as the main buyers who often give uncertain price and delayed payment. This finding is supported by Lapar et al (2006) who suggest that smallholder producers need to improve their price and quality competitiveness in order to survive by linking to potential markets. Last is the element of farm rural road infrastructure. This element is pivotal based on the finding that smallholder producers find it difficult to reach the market in a timely manner, and to distribute agricultural inputs effectively due to poor rural road construction. This leads to increasing cost of inputs, decreasing quality of productions, and, therefore, little opportunity for them to participate in the competitive market. Therefore, investment in rural road infrastructure by the government is an essential element to be constructed to improve market accessibility and to accelerate the distribution of agricultural inputs. Gannon and Liu (1997) also claim that investment, and improving access to rural roads, reduces the cost of shipping agricultural products to the market, lowers production cost by reducing the delivered input prices, and, as a result, it increases net farm gate prices and raises farmers' income.

The second order key ingredient for an enabling environment is "the importance elements" where the government should pay attention to farm research and demonstration farm, land tenure security and property rights, and credit programs. The importance of farm research is highlighted in the study because it is difficult for vegetable farmers to obtain high yield and high quality produce due to the effects of pests and diseases. In the study site, insects are becoming resistant to pesticides, therefore research on diagnostic efforts to detect, or control, disease is one of the important programs. Furthermore, the study found that the demonstration farm, or technical solution for artificial insemination, providing better concentrates and forage, and use of medicines, are all important activities; hence, farmers should be trained on these issues, especially dairy farmers, in order for them to obtain maximum milk production.

Next, the element of land tenure security and property rights program was considered. The study shows that government intervention is required to create effective policy and instruments that overcome bottlenecks (e.g., bureaucratic procedure, unofficial payment and lengthy time) for addressing the land administration system. The importance of legal administration for farmer land is demonstrated by the fact that land provides a collateral to meet financial institution requirements when applying for credit. This is consistent with the findings by Deininger (2003) who state that land can be used as collateral for accessing credit which therefore enhances the capacity of people to take market opportunities.

Finally, the credit program element was investigated. The study shows that enhancing the access of smallholder producers to credit programs provides benefits through increasing production because this provides the resources to provide inputs, and to purchase better quality inputs. However, collateral requirement, complicated procedures, and lengthy time are challenges for farmers, therefore there only a small proportion of smallholder producers could access credit. To improve accessibility to credit, integrating the program to other sectors, such as ease of procedure to obtain land administration systems for collateral and facilitating potential markets for obtaining a contract, can be solutions.

The third key ingredient is the "useful elements" that consist of marketing contract, market standard and simplifying regulation. In terms of marketing contract, the findings in this study reveal that marketing contracts creates opportunities for smallholder producers to obtain a potentially reliable market and competitive price. It also facilitates farmers to address market requirement, however optimising the ability of farmers to meet marketing contracts needs to be done in partnership program with other institutional environments, such as extension worker for assisting advice to meet food standards and financial services for helping them obtain credit.

Next is the element of market standard. This study found that it is helpful to promote food standard and regulation at the farm level as products could not meet potential market standards. Most of the products have issues with food handling practices and food hygiene.

Last is the element of simplifying regulation. This study reveals that it is essential for the government to simplify business regulation due to the fact that growth of agro industries in this region is still lagging behind because the business regulations processes are still far from being fully effective at a practical level. Unofficial payments, delays, and the numerous procedures at the different level of institutions, are a common condition in organising business permits.

8.3.2   Methodological contribution

Previous research on the enabling environment has used either macro level data or qualitative data from meetings of 'experts'. This research is the first to combine both qualitative and quantitative data from participants to analyse the enabling environment from the perspective of participants in two supply/value chains.The combination of both qualitative and quantitative research into a single mixed method approach increases the rigour of the study and obtain an appropriate approach to manage complex problems.This approach is known to be a more appropriate technique of answering diverse and complex research problems than a single method.

In-depth interviews and focus group discussion approaches have helped to explore the elements of enabling environment delivered by institutional policy and procedures, and their effect on the industrial players in the agribusiness system of the two industries. These approaches have also helped to determine the roles and functions of institutional policies and procedures to enhance the enabling environment. The survey has assisted to investigate and measure the situation of smallholder producers in the vegetable and dairy industries in achieving access to the resources of the enabling environment. The combination of qualitative and quantitative approaches resulted in a model that can guide the government in creating an effective program and policy intervention to enhance the enabling environment for vegetable and dairy farmers at the micro level.

8.3.3 Practical contribution

The findings from this research have practical value because they can enhance the understanding of the effectiveness of government policy at the local, provincial and regional levels in enhancing the enabling environment for agribusiness supply chains. The study presents the issues that need to be addressed by all levels of government in Indonesia from a policy perspective if they are to assist smallholder farmers to participate in national and, ultimately, global value chains, with particular relevance to local government. The study has achieved a framework as an instrument for guiding the government to create effective policy to enhance the enabling environment for agribusiness supply chains, for both vegetable and dairy industries in the Enrekang region.

The study highlights the importance of government at different levels in conducting coordination and in sharing the roles and responsibilities in arranging and implementing the program for smallholder producers because sometimes the policy program, which is designed as a top down approach and is poorly coordinated, does not promote the enabling condition required to effectively support the growth of the agricultural sector; hence, most programs have poor results and are not sustainable.

The research also highlights the importance of implementing public-private partnerships. The government is devoted to create policies to make an enabling environment for the private sector to utilize their resources productively. Farm road and other infrastructure investments by the public sector can stimulate the private sector to fully take up farm input supply functions and assist farmers in obtaining inputs at affordable prices, and also encourage the private sector to create market integration with farmers into value added production. Simplifying regulatory arrangements, and rationalising licensing requirements that link to all levels of governments, will create productive investment by agribusiness firms. The private sector can also play a significant role in carrying out agricultural research

through supporting research funding based on specific locations, such as creating better varieties of seeds, pest disease prevention, producing better genetic heifers and improving milk production.

8.4   Limitation of study and areas for further research

A number of areas for further research have been identified during the process of this research. These are described below:

Firstly, this study concentrated on analysing the enabling environment, particularly the effects of government policy in enhancing the enabling environment for agribusiness supply chains. To analyse policy at the local level, the importance and the fulfilment levels of each element were identified and explored. However, some elements could not be quantified and analysed, as not all the importance or fulfilment levels were recorded. Consequently, some issues could not be explored more fully. Nonetheless, this is an area which can be explored in future research.

Secondly, while most elements were investigated using both qualitative and quantitative methods, trade policy was only assessed through a qualitative approach, due to time constraints. In future research, it is important to obtain quantitative information as well.

Thirdly, this study could also investigate other external factors, such as political factors and involvement in decision-making in organisations and other factors, to strengthen the information in delivering suggested actions for effective policy within the enabling environment context. Once again, this is, potentially, another area for future research.

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Appendix 1: Information Sheet

Research Title: Analysis of the enabling environment for agribusiness supply chains at the local, provincial and regional levels: the case of South Sulawesi, Indonesia

Investigator: Ferdi

Purpose of Study

This study aims to investigate and to analysis of the smallholder producers in achieving access to the resources of the enabling environment. Dairy cattle and vegetable farmers have different conditions in accessing the enabling environment. The conditions refer to the potential of smallholder producers to link with the elements of the enabling environment. The specific objectives of this phase are: to develop and to explore the theoretical framework of enabling environment for the smallholder farmers at the local government level; to describe and to analyse the enabling environment conditions for the vegetable and dairy cattle farmers; to identify the relative importance and level of fulfilment, from the perspective of the farmers, of the key elements that contribute to enhancing their capability to manage their farms profitably; to provide suggestions for institutional policies and procedures to enhance the enabling environment

Procedure

If you agree to be involved in this study, you will be delivered questionnaire survey and providing the answer for about 60 minutes. The researcher will ask your level of understanding and experience in relation to your main activities. The researcher will give a guide when you need assistance in providing appropriate answer for questions. If you feel strongly on any issue or have more to add beyond the questionnaire, you should feel free to given your opinions.

Confidentiality

All questionnaire data from result of survey will be transferred into a word document on a Curtin School of Management computer using identification numbers only, no names will be used. Access to the stored data will be restricted by a password known only by the investigators. All data collected and consent forms will be stored safely in a locked cupboard at the Curtin School of Management.

The results of the study will be reported on, although it will not be possible to identify individual participants as no identification numbers or names will be included in the report

material. On completion of the study, all data will be stored in a secure and confidential location with the project supervisor for five years. After this time, all data will be destroyed. This is a Curtin University requirement.

Request for Further Information

You are encouraged to discuss and/or express any concerns or questions regarding this study with the investigators at any time. You should feel confident and secure about your involvement in the study.

Refusal or Withdrawal:

You may refuse to participate in the study and if you do consent to participate then you will be free to withdraw from the study at any time without fear or prejudice.

If you do decide to withdraw from the study at any time please contact me or my supervisor at the earliest possible convenience. All data will be destroyed if you do decide to withdraw.

Contact Details:

Student : ferdi@student.curtin.edu.au   Supervisor: htwehtwe.thein@curtin.edu.au

Approval

This study has been approved by the Curtin University Human Research Ethics Committee (Ethics Approval Number _____). If needed, verification of approval can be obtained by either writing to the Curtin University Human Research Ethics Committee, c/- Office for Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning +61-8-92662784.

Appendix 2: Consent Form

Research Title : Analysis of the enabling environment for agribusiness supply chains at the local, provincial and regional levels: the case of South Sulawesi, Indonesia

Investigator : Ferdi

You are of your own accord making a decision whether or not to participate in this research study. Your signature verifies that you have decided to participate in the study, having read and understood all the information accessible. Your signature also officially states that you have had adequate opportunity to discuss this study with the investigators and all your questions have been answered to your satisfaction.

You will be given a copy of this consent document to keep.

I,(the undersigned) _____

Please PRINT

of _____

Postcode _____   Phone _____

consent to involvement in this study and give my authorisation for any results from this study to be used in any research paper, on the understanding that confidentiality will be maintained. I comprehend that I may withdraw from the study at any time without discrimination. If so, I undertake to contact Ferdi (Phone +61-425955001) at the earliest opportunity.

Signature _____ Date _____

I have explained to the participant the procedures of the study to which the participant has consented their involvement and have answered all questions. In my appraisal, the participant has voluntarily and intentionally given informed consent and possesses the legal capacity to give informed consent to participate in this research study.

Investigator: _____ Date: _____

Appendix 3: Questionnaire of in-depth interviews and focus groups discussion

A3.1 Questioner for financial sector

A. Background information

1. Completed by : ……………………………..
2. Date…………………………........................
3. District/Sub-district…………………….......
4. Respondent name……………………...............
5. Respondent age…………………………………
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education……..........................
8. Position………………………………………….

B. Institution background
   1. Name of institution:
   2. Type of financial institution:
      ( ) Micro-finance service provider
      ( ) Cooperative bank
      ( ) Development bank
      ( ) Commercial bank
      ( ) Government bank
   3. Who are your target clients?

C. Operations
1. Who are your usual clients and percentage from total client base?

Usual clients	Percentage
small businesses	
households,	
smallholder producers	

2. Do you provide financial services to smallholder producers? If yes
   What kind of services do you provide to smallholder producers?
   (i.e. loan packages, input provision)
3. Do you provide loans to smallholder producers? If yes
   What is the maximum amount?
   What is the interest rate?
   What are the terms?
4. Do you require collateral? Why?
   What things do you accept for collateral?
5. What problems do you encounter when providing financial assistance to smallholder producers?
   What do you think causes these problems?
   What are the solutions to these problems?
6. What do you need to serve more smallholder producers?
7. Do you have plans to expand your operations?
8. Do you develop programs that would provide assistance to smallholder producers?

(i.e. technical knowledge to mitigate crop failure, establishing contacts with buyers, skills training)

9. What effects, if any, have each of the following had on the delivery of your programs to your target groups and their ability to take advantage of them?
   How? Why?
   • A secure environment (good law and order)
   • Effective marketing arrangements for their products
   • Infrastructure (e.g., roads, markets, electricity, phone access, water and irrigation, health and education services)
   • Access to appropriate research solutions
   • Access to business development services

A3.2   Questioner for vegetable traders

A. Background information
1. Completed by: ……………………….…
2. Date…………………………........................
3. District/Sub-district………………………......
4. Respondent name……………………..............
5. Respondent age……………………………….
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education……...........................
8. Position……………………………………..

B. Source of business
1. How long have you been involved in this business/ enterprise?
2. What kinds of vegetable products do you buy?

[ ] Non-perishables (Potatoes, Red onions, Carrots)   [ ] Perishable (Cabe, Tomatoes, Cabbages)

[ ] Others (specify

3. Where do you buy these products?

farm gate
local market
other places? (for example sub-district market or regency market).

4. What is your main position in conducting this business? Are you as local trader, middleman, retailers or inter-island trader?

5. What is the transaction system? Do you go to the village/farm gate to buy the product or producers bring in to the market? Are there any other transaction system?

C. Marketing system

1. What are the average buying and selling prices of vegetable products in short use and perishable items?

No	Vegetable products	Average buying price (How much did you pay for the product?) (Rp/unit)	Average selling price (How much did you sell the product? (Rp/unit)
1	Non perishables		
2	Perishable		
3	Others (specify)		

2. What is the mechanism for deciding prices?
   Check whether the price based on production cost, demand and supply or market price? Or are there any other settings up prices system?
3. What is the average volume of vegetable products you buy in a month?

The average volume of vegetable products					
Short use	Kg	Perishable	Kg	Others	Kg
Potatoes		Cabe			
Red onions		Tomatoes			
Carrots		Cabbages			

4. What other marketing costs do you have for this activity?
5. How are vegetables transported to the market?

public transportation (bus, truck, or other)
own transport
others

6. What is the unit price of transport to the different markets? Would you like to fill it?

Transport	Unit Price (Rp)
Bus	
Truck	
Others (specify)	

8. What are your costs when selling vegetables? Would you like to fill it?

Item	description	cost	comment
Transport			
Handling			
Processing			
Storage			
Other value adding			
activities			
Others (specify)			

D. Assistance for traders

1. What are the main challenges or problems in running this business?
   What are you suggested to overcome these challenges or problems?
2. What services do you provide to your current vegetable suppliers?
   Are there any problems with these?
   How might they be improved?
3. What services do you receive from your current vegetable customers?
   Are there any problems with these?
   How might they be improved?
4. What assistance have you received from government, NGOs or businesses
   How beneficial was this assistance? Why?
   How might it be improved?
5. What effects, if any, have each of the following had on your business?
   Prompt with: How? Why?
   - A secure environment (good law and order)
   - Effective marketing arrangements for their products
   - Infrastructure (e.g., roads, markets, water and irrigation, electricity, phone access, health and education)
   - Secure and stable land tenure
   - Financial services
   - Access to appropriate research solutions
   - Access to appropriate extension services
   - Access to business development services
   - Access to standard and regulations
6. Are there any other comments you would like to make about how the environment for the dairy or vegetable industries in the Enrekang Regency might be improved?

A3.3   Questioner for dairy traders

A. Background information

1. Completed by: …………………………………
2. Date………………………….......................
3. District/Sub-district…………………….......
4. Respondent name……………………..............
5. Respondent age……………………………….
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education……...........................
8. Position………………………………………..

B. Source of business

6. How long have you been involved in this business/ enterprise?
7. What kinds of milk products do you buy?
     [ ] Dangke (Local branch)   [ ] Fresh Milk   [ ] Others (specify
8. Where do you buy these products
    Do you buy these products directly from farm gate, local market or other places? for example sub-district market or regency market.
9. Where do you want to sell these products?
    local market in Enrekang
    wet market in Makassar
    or supermarket and hotel in Makassar
    others
10. What is your main position in conducting this business? Are you as local trader, middleman, retailers or inter-island trader?
11. What is the transaction system? Does trader comes to the village/farm gate to buy the product or producers bring in to the market? Are there any other transaction systems?
12. What is the volume of dairy cattle products do you buy for monthly transaction/period?
      Dangke (local branch)…………kg   Fresh milk………Kg   Others (specify)……..

C. Marketing system

1. .What are the average buying and selling prices of dangke, fresh milk and others?

No	Dairy Cattle products	Average buying price (How much did you pay for the product?) (Rp/unit)	Average selling price (How much did you sell the product? (Rp/unit)
1	Dangke (local branch)		
2	Fresh milk		
3	Others (specify)		

2. What is the mechanism of setting up prices? Whether the price based on production cost, demand   supply or market price? Or are there any other settings up prices system?
3. What is the average volume of dairy cattle products you buy in a month?
    dangke ……. Kg,   fresh milk………..kg,   others (specify)……..
4. What is the average volume of dairy cattle products did you buy for monthly transaction/period?
5. What other marketing costs have you spent in this activity?
6. Where place do you always sell the dairy cattle production? Do you sell to village market, sub-district market, district market, and regional market or Makassar market?
7. How are dairy cattle products for dangke, fresh milk transported to the market? Do you use public transportation (bus, truck, etc), own transport and other transportations?

D. Assistance for traders

1. What are the main challenges or problems in running this business?
2. What are you suggested to overcome these challenges or problems?
3. What services do you provide to your current dairy cattle suppliers?
    Are there any problems with these?
    How might they be improved?
4. What services do you receive from your current dairy cattle customers?
    Are there any problems with these?
    How might they be improved?
5. What effects, if any, have each of the following had on your business?   Prompt with: How? Why?
   - A secure environment (good law and order)
   - Effective marketing arrangements for their products
   - Infrastructure (e.g., roads, markets, water and irrigation, electricity, phone access, health and education)
   - Secure and stable land tenure
   - Financial services
   - Access to appropriate research solutions
   - Access to appropriate extension services
   - Access to business development services
   - Access to standard and regulations
6. What assistance have you received from government or other businesses
    How beneficial was this assistance? Why?
    How might it be improved?

A3.4 Questioner for agriculture and livestock departments and extension worker

A. Background information
1. Completed by: ………………………………
2. Date……………………………......................
3. District/Sub-district…………………….......
4. Respondent name…………………….........
5. Respondent age…………………………….
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education……......................
8. Position…………………………………..

B. Institution background
1. What are the functions of your institution?
2. What is the geographical scope of your institutions? operations?
   ( ) Local government
   ( ) Provincial government
   ( ) Regional government

3. What are the main activities of your institution?
4. Who are the target groups assisted by your organization?

C. Resources

1. Where do you get your operating funds?

   ( ) International funding
   ( ) National government
   ( ) Provincial government
   ( ) Local sponsors
   ( ) Others

2. How many staff do you have who responsible to encourage vegetable and dairy cattle productions?
3. What forms of support do you get from the provincial and regional governments?

D. Enhancing the enabling environment for the institutional policies and procedures
1. What projects, programs and services does your institution provide to assist smallholder producers especially for agricultural development in the dairy cattle and vegetable industrial?
2. What are the expected benefits of these programs and services?
3. Would you consider these programs successful? Why? How? Why not?
4. What problems have you experienced with these programs and services?
   What were the main causes of these problems?
   Does problem related to human resource? How?
   What about budget? How?
5. What challenges do you encounter when delivering these programs and services that connect to government institutions?
   What about private sector and NGO? Or others?
   What are your suggested solutions to overcome these challenges?
6. What effects, if any, have each of the following had on the delivery of your programs to your target groups and their ability to take advantage of them?
   Prompt with: How? Why?
   - A secure environment (good law and order)
   - Effective marketing arrangements for their products

- Infrastructure (e.g., roads, markets, electricity, phone access, water and irrigation, health and education services)
- Secure and stable land tenure
- Financial services
- Access to appropriate research solutions
- Access to appropriate extension services
- Promotion and implementation of standard and regulation
- Access to business development services

7. Are there any other comments you would like to make about how the environment for the dairy or vegetable industries in the Enrekang Regency might be improved?

A3.5   Questioner for farmer group's vegetable and dairy productions

A. Background information
1. Completed by : ………………………………
2. Date………………………….............................
3. District/Sub-district…………………….......
4. Respondent name……………………..............
5. Respondent age………………………………
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education…….............................
8. Position…………………………………………..

B. Institution background
1. How long has your group been together?
2. What are the main functions of the group?
3. What are the main activities it organises for farmers?

C. Resources
1. Where do you get your operating funds?
   ( ) International funding
   ( ) National government
   ( ) Regional government
   ( ) Provincial government
   ( ) Local sponsors
   ( ) Others

D. Enhancing the enabling environment for the institutional policies and procedures
 1. What projects, programs and services have you got from extension workers and government institutions to improve vegetable production in your group?
     What were the expected benefits of these programs and services?
     How beneficial was this assistance? Why?
     How might they be improved?

 2. What projects, programs and services have you got from financial services and development organisations to improve vegetable production in your group?
     What were the expected benefits of these programs and services?
     How beneficial was this assistance? Why?
     How might they be improved?
 3.   What activities has your organisation conducted for vegetable producers?
     What are they?
     How do they affect your members?
 4.   What challenges has your group experienced?
     Would you like to give suggestion to overcome these challenges?
 5.   What effects, if any, have each of the following had on the delivery of your programs to your target groups and their ability to take advantage of them?
         Prompt with: How? Why?

   • Access to financial services
   • Effective marketing arrangements for their products

- Supporting infrastructure (e.g., roads, markets, water and irrigation, electricity, phone access, health and education)
- Access to appropriate extension services
- A secure environment
- Access to appropriate extension workers
- Secure and stable land tenure
- Research and development
- Access to standard and regulation
- Business and development services

6. Are there any other comments you would like to make about how the environment for the dairy or vegetable industries in the Enrekang Regency might be improved?

A3.6   Questioner for development organization

A. Background information
1. Completed by : ………………….……
2. Date…………………………….........................
3. District/Sub-district…………………….......
4. Respondent name……………….….............
5. Respondent age………………………………
6. Gender`: [ ] Male   [ ] Female
7. No. of year's education……...........................
8. Position…………………………………..

B. Institution background

1. Name of organisation:
2. Type of organisation: ( ) Local NGO
                         ( ) National NGO
                         ( ) International NGO
3. What are the objectives of your organisation?

C. Resources
1 Where do you get your funds from?
    ( ) International funding
    ( ) National government
    ( ) Provincial government
    ( ) Local sponsors
    ( ) Others
2 How many staff do you have?
3 Who are the target groups assisted by your organization?

D. Enhancing the enabling environment for assisting smallholder producers for dairy cattle or vegetables producers.

1. What projects, programs and services does your institution provide to assist smallholder producers especially for agricultural development in the dairy cattle and vegetable industries?
2. Who designs the plans and programs for assisting smallholder producers?
3. What were the expected benefits of these programs and services?
4. Would you consider these programs successful? Why? How? Why not?
5. What problems have you experienced with these programs and services?
       What were the main causes of these problems?
       Does problem related to human resource? How?
       What about budget? How?
6. Do you cooperate with other institutions to assist smallholder producers?
       With whom do you collaborate? Prompt: government, private sector, other NGOs
       Why?
       Would you consider these programs as successful? Why? How? Why not?
       What challenges do you encounter when delivering these programs and services?
       What are your suggested solutions to overcome these challenges?

7. What effects, if any, have each of the following had on the delivery of your programs to your target groups and their ability to take advantage of them?
   Prompt with: How? Why?
   - A secure environment (good law and order)
   - Effective marketing arrangements for their products
   - Infrastructure (e.g., roads, markets, electricity, phone access, water and irrigation, health and education services)
   - Secure and stable land tenure
   - Financial services
   - Access to appropriate research solutions
   - Access to appropriate extension services
   - Promotion and implementation of standard and regulation
   - Access to business development services
8. Are there any other comments you would like to make about how the environment for the dairy or vegetable industries in the Enrekang Regency might be improved?

Appendix 4: Questioner for vegetable respondent

Analysis of development policy at the local, regional and provincial level on the enabling environment for agribusiness supply chains in regions of South Sulawesi, Indonesia

Survey Instrument

Respondent Number: …………………. Date :

Part I. Background Information on Enabling Environment

A. Characteristic Respondent

1.1.   Name   :
1.2.   Age   :………………Year
1.3.   Sex   : [   ] [Male]   [   ] [Female]
1.4.   Role in household:
   [   ] Household head
   [   ] Spouse of household head
   [   ] Child of household head
   [   ] Other: ………………………….
1.5.   Number of household members :
1.6.   Formal Education (In Year) :
   [   ]   None
   [   ]   Primary School
   [   ]   Secondary School
   [   ]   Senior High School
   [   ]   Diploma
   [   ]   University
1.7.   Non Formal Education

Field of Education	Duration	Organizer

B. Land information

1.8.   In what area is your farm located?
1.9.   What is the total size of your farm? ……………..Hectares
1.10.   Do you own the land that you farm?
   [   ] Yes   [   ] Only a part   [   ] [No] (Proceed to Q1.12)
1.11(a) if yes, how did you acquire the land?
   [   ] Purchased
   [   ] Government tenure instrument
   [   ] Inheritance from parents
   [   ] pledge land
   [   ] Others: ....
   (b) Thus, what sort of legal document do you have for the land
   [   ] Ownership certificate
   [   ] Tax document
   [   ] Contract certificate
   [   ] Deed of sale from notary
   [   ] Other (specify):…………………………

1.12   If only a part or no, who owns the land?
        [   ] Family; father, mother, brother or sister
        [   ] Relatives; cousins, uncles
        [   ] Friends or acquaintances
        [   ] Government land
        [   ] Others:...
1.13   What are your arrangements for using the land?
        [   ] Fixed-term with fee;
        [   ] Free without obligation
        [   ]Free but with conditions
        [   ] Others:...

 C. Production information
1.14   How many years have you been growing vegetables for sale?   …………… year

1.15   What made you decide to grow vegetables for sale?

1.16   Do you have another source of income in addition to vegetable farming?

        [   ] Trader
        [   ] Wage as farm labourer
        [   ] Wage as government officer
        [   ] Others, please specify …….
1.17   What is your average monthly net income from growing vegetables for sale?
        [   ] Under Rp 1.000 000
        [   ] Rp 1000 000 – Rp 2.000.000
        [   ] Rp 2.000.000 – Rp 3.000.000
        [   ] Rp 3.000.000 and up
1.18   What percentage of your total income comes from growing vegetables for sale?
        [   ] 1 – 25%   [   ] 26 – 50%   [   ] 51 – 75%   [   ] 76 – 100%
1.19   What are the main kinds of vegetables crops you grow?
        [   ] Non-perishable vegetables such as: potatoes, red onions and carrots
        [   ] Perishable vegetables such as: cabbages, chilies, tomatoes, onion leaves
1.20   What are your reasons for growing of these types of vegetables?

Type of vegetables	Reasons for growing
Non-perishable vegetables	
Perishable vegetables	

1.21.   Are there vegetables you want to grow but can not? What are they?

1.22   What are your limitations in growing these vegetables?

(Q1.22)Type of vegetables	Limitation for growing vegetables
Non-perishable vegetables	
Perishable vegetables	

D.   Input and services

DI Seeds input

1.23 When you plant vegetables, do you prefer to buy certified seeds, uncertified seeds, or keep your own seed?

Type of vegetables	Certified	Non certified	Keeping own seeds
Non perishable vegetables			
Potatoes ,			
Red Onion			
Carrots			
Perishable vegetables status			
Cabbages			
Chilies			
Tomatoes			
Onion leaves			

1.24 Based on kind of vegetables that you usually grow, who is the main supplier for vegetable seeds?

1.25 Why from them and not from someone else?

Type of vegetables	(Q1.24) The main supplier	(Q1.25)Why from them and not from someone else?
Non-perishable vegetables		
Perishable vegetables status		

1.   Government,   2. Local agricultural supply store,   3. Traders,   4. Others, specify

1.26 What kind of services do you get from your main seed supplier when you are regular buyer form these type of seed?

1.27 If there is not enough seed availability that for you want to buy, where else do you get seed before planting season?

1.28 What are your reasons for this choice?

1.29 What are your main problems when buying seed?

D2.Fertilizer input

1.30 How often do you use fertilizer?
[ ] Always
[ ] Often
[ ] Sometimes
[ ] Seldom
[ ] Never

1.31   What type of fertiliser do you prefer to you use?
        [   ] Chemical fertilizer, please specify
        [   ] Organic fertilizer, please specify
        [   ] Others, specify

1.32 (a)Who is the main supplier of fertilizer inputs for your vegetables?
        [   ] Local agricultural supply store
        [   ] Provided by the government
        [   ] Supplied by trader
        [   ]Make my own
        [   ] Others, specify …………………………………………

     (b) Can you explain why they are as the main supplier?

1.33   What kind of services do you get from your main fertilizers supplier?

1.34   What are the main problems when buying fertilizers?

D3. Pesticide input

1.35   How often do you use pesticides?
        [   ] Always
        [   ] Often
        [   ] Sometimes
        [   ] Seldom
        [   ] Never

1.36   What are the main types of pesticides that you usually use? What for?

1.37 (a) Who is the main supplier of pesticides for your vegetables?
        [   ] Local agricultural supply store
        [   ] Provided by the government
        [   ] Supplied by trader
        [   ] Others, specify …………………………………………

     (b) Can you explain why they are the main supplier?

1.38   What kind of facilities services do you get when you are regular buyer of these types
        of pesticides from
        your main pesticide supplier?

1.39   What are the main problems when buying pesticides?

E Production information and training services
1.40 What problems do you experience in growing vegetables?

1.41 (a) Who do you usually provides advice and information when you need assistance to solve these problems?
(b) What kinds of advice and information do they provide?
(c) Why from them and not from someone else?

(1.41 a) Source of advice and information	(1.41b)Type of advice and information	(1.41c)Why from them and not from someone else

1. Government, extension services,   2. Traders [buyers],   3. Own observation,
3, Farmers

4. Farmer group,   5. Others, specify,

1.42 (a) Who do you usually approach when you are looking training that you need?
(b) How often do you get training?
[ ] Always
[ ] Often
[ ] Sometimes
[ ] Seldom
[ ] Never
(c) What type of training do they provide?

(1.42 a) Source of training	(1.42b) Intensity of training	(1.42c)Type of training

1. Government and extension services   2. NGOs   3. Farmer group
4. Others, specify

F.Infrastructure services

F1. Logistics

1.43 How many kilometres is your farm from the place where you sell the most of your vegetables?.........kms

1.44 (a)How do you take your vegetables to the area where your sell them?
[ ] Through public transportation
[ ] Own vehicle
[ ] Collected by trader/wholesaler
[ ] Collected by marketing officer (Organisation)
[ ] Others: ....
(b) Why from these options, not from others

1.45   How much does it cost to transport your vegetables to the area where you usually sell them?
Rp .... per sack. [Weight of sack] .... kg
Rp .... per crate. [Weight of crate] .... kg
Rp .... per *basket.* [Weight of basket] ....kg

1.46. What are your main problems when taking your vegetables to market?

F2. Water and irrigation facilities

1.47   What is the source of water to irrigate your vegetables?
[   ] Rain-fed
[   ] River or stream
[   ] Irrigation of farmer group
[   ] Ground water
[   ] Others

1.48   How many kilometres is your vegetable farm from these sources of water ? …….kms

1.49   (a)Who do you usually approach when you are looking assistance to irrigate of your vegetable farm
(b) What kind of assistance do they provide?
(c)Why from them not from someone else?

(Q1.49a) Source	(Q1.49b) Type of assistance	(Q1.49c) Why from them and not from someone else

1 - Government,   2 – NGO   , 3 –Other farmers,
4 –Relatives and friends   5 – Others, specify

1.50   What are you main problems in sourcing of water to irrigate your vegetable farm?

F3   Telecommunication facilities

1.51   (a) Do communication facilities assist you to conduct activities for your vegetable farming? If yes……*?*What kind of activities? Why it is important for these activities?

(b)If not …….What is the main problem with communication facilities?

1.52   Who usually provides communication facilities in your area? What kind of facilities do they provide?

Source of communication	Type of facilities

F. Marketing services

1.53   What activities do you undertake before selling your vegetables?
1.54   Where do you undertake these activities?

	(1.53) Activities	(1.54) Place conducted
	Cleaning	
	Grading (Classify)	
	Sorting	
	Consolidating	
	Other activities:	

1.55. To whom do you usually sell your vegetables?
1.56   Why do you prefer sell your vegetable productions to them?

(Q1.55) Usual buyers	(Q1.56) Why do you prefer to sell to them?

1. Cooperatives,   2. Wet market retailers,   3. Inter-island traders,   4. Regional traders,
4. Agents Collectors,   5. Directly selling,   6. Retail own vegetables

1.57   What are your main problems when selling your vegetables?

1.58 What solutions do you need to solve the problems?

G. Financial services

1.59   From whom do you borrow money to support the vegetable activities?
[   ]   Formal banks
[   ]   Informal banks
[   ]   Micro financial institution
[   ]   Others, please specify

1.60   For what purposes do you borrow money?

1.61 What are the terms when you borrow money?
(Interest and days)

Source	Purposes	Terms]
Formal		
Informal		

1.62 (a) Have you proposed the food security and energy credit and people business credit schemes which are subsidized by government? If yes …… Please proceed to Q1.63 to Q1.64

(b) If not …….Why you have not proposed?

1.63 What are the terms and interest rate for these credits schemes?

Credit programs	Purposes	Terms and interest rate
Food security and energy credit		
People business credit		

1.64 Do they have advantages and disadvantages compared to commercial credit schemes?

Credit programs	Advantages	Disadvantages
Food security and energy credit		
People business credit	Advantages	Disadvantages

1.65 What challenges are there in applying for credit from the formal banks? What are the reasons?

Challenges	Reasons

1.66   Were there instances in which you borrowed inputs such as seed, fertilizer and pesticides instead of cash? If yes … Proceed to Q1.67…or If not ……Why not?

1.67   From whom do you usually borrow inputs? Why from them?

1.68   What are the terms for borrowing inputs?

1.69 What are the advantages of borrowing inputs instead of cash?

1.70 What are the disadvantages of borrowing inputs instead of cash?

(Q1.68) The terms for borrowing inputs	(Q1.69) Advantages	(Q1.70) Disadvantages

Part II. Importance of conditions and levels of fulfilment

(Column 1) Please rate the level of importance of the following conditions as they relate to enhancing your ability to grow and sell vegetables profitably. Please use 1 – Not at all important, 2 – Not important, 3 – Somewhat not important, 4 – Somewhat important, 5 – Important, 6 – Very important, and D – Does not know.

(Column 2) Please rate the current level of fulfillment of the following conditions as they relate to your ability to grow and sell vegetables profitability.. Please use 1 – Not fulfilled at all, 2 – Not fulfilled, 3 – Slightly not fulfilled, 4 – Slightly fulfilled, 5 – Fulfilled, 6 – Very fulfilled, D – Does not know.

A. Land tenure and property rights

	Level of importance (Column 1)							Level of fulfilment (Column 2)						
(2.1) Access to land for crop production	1	2	3	4	5	6	D							
(2.2) Access to public land for crop production								1	2	3	4	5	6	D
(2.3)Access to private land for crop production								1	2	3	4	5	6	D
(2.4)Presence of government programs and instruments that allow smallholder producers access to land for crop production	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.5)Local government consults farmers on land requirements for crop production	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.6)Property rights to provide security for crop production activities	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.7) Presence of government programs and instruments that support administration processes to get land certificates for property rights status	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B. Infrastructure
　　B1. Farm-to-market roads

(2.8) Accessibility of farm-to-market roads	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.9) Proper maintenance of farm-to-market roads	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.10)Good roads to reduce transportation costs	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.11)Complaints on roads are properly addressed by the government	1	2	3	4	5	6	D	1	2	3	4	5	6	D

　　B2Transportation services

(2.12)Availability of transportation for vegetable inputs and marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.13) Affordability of transportation services for vegetable inputs and marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.14) Timeliness of transportation	1	2	3	4	5	6	D	1	2	3	4	5	6	D

services for vegetable inputs and marketing														
(2.15) Transportation services that preserve quality of vegetables when marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.16)Farmers consulted on service needs by transportation service providers	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B3. Marketing and logistic infrastructures

B31. Marketing infrastructure

(2.17) Access to a covered area where vegetables can be graded or sorted	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.18) Access to a consolidation area where buyers can buy or collect vegetables	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.19) Access to market stalls that can enhance the value of vegetables	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.20)Affordability of market stalls	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B32. Logistic infrastructure

(2.21)Availability of baskets for vegetable transportation to market	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.22)Affordability of baskets for vegetable transportation to market	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B4. Communication facilities

(2.23) Access to reliable communication services	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.24) Affordability of communications services	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.25) Communication facilities that assist with obtaining market information	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.26) Communication facilities that assist with obtaining production information	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B5. Water and irrigation facilities

(2.27) Access to reliable irrigation services to farm location	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.28)Affordability of irrigation services	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.29) Presence of government program on irrigation infrastructure to assist smallholder producers	1	2	3	4	5	6	D	1	2	3	4	5	6	D

C. Financial services

C1.Formal financial sources and program credit

(2.30) Formal credit sources have repayment schedules that accommodate situation of producers like myself								1	2	3	4	5	6	D
(2.31) Formal sources have requirements that are easy to comply with								1	2	3	4	5	6	D
(2.32) Formal sources who have affordable interest rates								1	2	3	4	5	6	D
(2.33) Formal sources who consult me on the type of loans that I need								1	2	3	4	5	6	D
(2.34) Formal sources who are quick to respond to complaints								1	2	3	4	5	6	D
(2.35)Presence of government credit scheme and instruments that provide finance for agricultural production								1	2	3	4	5	6	D
(2.36) Credit program requirements that are easy to comply with	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.37) Credit programs at affordable interest rates								1	2	3	4	5	6	D

C2. Informal financial sources

(2.38) Informal sources that have repayment schedules that accommodate situation of smallholder producers like myself?								1	2	3	4	5	6	D
(2.39) Informal sources who have requirements that are easy to comply with								1	2	3	4	5	6	D
(2.40) Informal sources who have affordable interest rates								1	2	3	4	5	6	D
(2.41) Informal sources who consult me on the type of loans that I need								1	2	3	4	5	6	D
(2.42) Informal sources who are quick to respond to complaints								1	2	3	4	5	6	D

D. Research, development and extension

(2.43)R & D and extension provide innovations based on local conditions and that are easy to use								1	2	3	4	5	6	D
(2.44) R & D provide assistance in solving pest and disease problems	1	2	3	4	5	6	D							
(2.45) Government and extension provide assistance in solving pest and disease problems								1	2	3	4	5	6	D
(2.46) Private sector provides assistance in solving pest and disease problems								1	2	3	4	5	6	D
(2.47) NGO provides assistance in solving pest and disease problems								1	2	3	4	5	6	D
(2.48)Availability of fertilisers that provide better yields	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.49) Crop production training and demonstration farms from the	1	2	3	4	5	6	D							

government													
(2.50) Crop production training and demonstration farms from the private sector								1	2	3	4	5	6	D
(2.51)Crop production training and demonstration farms from NGOs								1	2	3	4	5	6	D
(2.52)Access to better postharvest technologies	1	2	3	4	5	6	D	1	2	3	4	5	6	D

E. Standards and regulations

(2.53) Having signed contract agreements with buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.54) Enforcement of contracts with buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.55) Quality and grade standards provided by buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.56) Quality and grades standards provided by buyers are followed	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.57) Support from government on certification of products	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.58) Support from private sector on certification of products	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.59)Support from NGOs on certification of products	1	2	3	4	5	6	D	1	2	3	4	5	6	D

F. Business development services

(2.60) Assistance that links farmers with buyers	1	2	3	4	5	6	D							
(2.61) Government assistance that links farmers with buyers								1	2	3	4	5	6	D
(2.62) NGO assistance that links farmers with buyers								1	2	3	4	5	6	D
(2.63) Private sector assistance that links with smallholder producers								1	2	3	4	5	6	D
(2.64)Assistance that provides market information	1	2	3	4	5	6	D							
(2.65) Government provision of marketing information								1	2	3	4	5	6	D
(2.66) NGO provision of marketing information								1	2	3	4	5	6	D
(2.67) Private sector provision of marketing information								1	2	3	4	5	6	D

G. Ease-of-doing business

(2.68) Simple procedure for registering organisation	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.69) Assistance from government to register organisation								1	2	3	4	5	6	D
(2.70) Assistance from NGO to register organisation								1	2	3	4	5	6	D
(2.71)Assistance from private sector to								1	2	3	4	5	6	D

register organisation													
(2.72) Being able to issue official receipts to every buyer	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.73) Securing business permit from the local government	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.74)Affordable taxes	1	2	3	4	5	6	D	1	2	3	4	5	6	D

H. Input supply

(2.75) Availability of agricultural input supply to farmers	1	2	3	4	5	6	D						
(2.76) Affordability of agricultural inputs supply to farmer								1	2	3	4	5	6	D
(2.77)Government and private sector assistance to facilitate availability of agricultural inputs supply								1	2	3	4	5	6	D

l. Provision and marketing services

(2.78) Assistance for vegetable products to get market access	1	2	3	4	5	6	D						
(2.79) Government assistance for vegetable products to get market access								1	2	3	4	5	6	D
(2.80) NGO assistance for vegetable products to get market access								1	2	3	4	5	6	D
(2.81) Private sector assistance for vegetable product to get market access								1	2	3	4	5	6	D

J. Political support

(2.82) Local government supportive of smallholder producers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.83) Local government consults farmers regarding their needs	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.84) Local government who adopts suggestions from farmers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.85) Local government who can be easily contacted	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.86) Local government meets promises	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.87) Local government who is quick to address local concerns	1	2	3	4	5	6	D	1	2	3	4	5	6	D

K. Involvement in decision-making in organizations (for members of farmer organizations)

(2.88)Farmer group members can be involved in project development by farmer organisations	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.89) Farmer members decision reflected in final project design	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.90) Farmers consulted on marketing activities by farmer groups	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.91)Farmers consulted in organisational decision-making by farmer group	1	2	3	4	5	6	D	1	2	3	4	5	6	D

Part 3. Economic development indicator

We are now going to measure the level of economic development in your area. Please provide your answer based on the following question.

A. Fuel and Power

3.11. Are the following items used at your home as source of power for lighting?

Yes = 1 No = 2
[1] Electricity   [   ]
[2] Gas   [   ]
[3] Paraffin (lantern)]   [   ]

3.12. Are the following items used at your home as fuel for cooking]?

Yes = 1 No = 2
[1] Electricity   [   ]
[2]Gas   [   ]
[3]Firewood   [   ]
[4]Charcoal   [   ]

B. Information and Communication

3.13 Does your household own any information facilities such as the following items?
Yes = 1 No = 2
[1] TV   [   ]
[2] DVD Player   [   ]
[3] Satellite channel   [   ]
[4] Radio   [   ]

3.14 Does your household own any communication facilities such as the following items?
Yes = 1 No = 2
[1] Mobile phone   [   ]
`   [2] Fixed phone   [   ]

C. Transportation

3.15 Does your household own any transportation facilities such as the following items?

Yes = 1 No = 2
[1] Car   [   ]
[2]Motor cycle   [   ]
[3]Bicycle   [   ]

D. House condition

3.16. How many bedrooms are in your house?
[ ] 1
[ ] 2
[ ] 3
[ ] More than 3

3.17. What kind of toilet is mainly used at your home?

    [ ] Flush toilet private
    [ ] Flush toilet public
    [ ] Bush
    [ ] River

3.18 What is the main source of water for drinking at your home?

    [ ] Tap/piped water
    [ ] Bore hole
    [ ] Protected well/spring
    [ ] Rain water
    [ ] Mountainous water source

Appendix 5: Questioner for dairy respondents

Analysis of development policy at the local, regional and provincial level on the enabling environment for agribusiness supply chains in regions of South Sulawesi, Indonesia.

Survey Instrument

Respondent Number: ………………….   Date :

Part I. Background Information on Enabling Environment

A. Characteristic Respondent

1.11. Name   :
1.12. Age   :………………Year
1.13. Sex   : [ ] [Male]   [ ] [Female]
1.14. Role in household:
     [ ] Household head
     [ ] Spouse of household head
     [ ] Child of household head
     [ ] Other: ………………………….
1.15. Number of household members :
1.16. Formal Education (In Year)] :
     [ ]   None
     [ ]   Primary School
     [ ]   Secondary School
     [ ]   Senior High School
     [ ]   Diploma
     [ ]   University
1.17. Non Formal Education

Field of Education	Duration	Organizer

E. Land information
1.18. In what area is your farm located?
1.19. What is the total size of your farm? ……………..Hectares
1.20. Do you own the land that you farm?
     [ ]   Yes   [ ] Only a part   [ ] [No] (Proceed to Q1.12)
1.11(a) if yes, how did you acquire the land?
     [ ] Purchased
     [ ] Government tenure instrument
     [ ] Inheritance from parents
     [ ] Pledge land
     [ ] Others: ....
  (b) Thus, what sort of legal document do you have for the land
     [ ] Ownership certificate
     [ ] Tax document
     [ ] Contract certificate
     [ ] Deed of sale from notary
     [ ] Other (specify):……………………………

1.12   If only a part or no, who owns the land?

[   ] Family; father, mother, brother or sister
[   ] Relatives; cousins, uncles
[   ] Friends or acquaintances
[   ] Government land
[   ] Others:...

1.13   What are your arrangements for using the land?
[   ] Fixed-term with fee;
[   ] Free without obligation
[   ]Free but with conditions
[   ] Others:...

 F.   Production information

1.14   How many years have you been dairy farming?…………….year

1.15   What made you decide to raise dairy cattle?

1.16   Do you have another source of income in addition to dairy cattle farmer?

[   ]   Traders
[   ]   Wage as farm labours
[   ]   As government officer
[   ]   Others, please specify …….

1.17   What is your average monthly net income derived from dairy cattle activities?

[   ]   Under Rp 1.000 000
[   ]   Rp 1000 000 – Rp 2.000.000
[   ]   Rp 2.000.000 – Rp 3.000.000
[   ]   Rp 3.000.000 and up

1.18   What percentage of your total income comes from conducting business in milk production?

[   ] 1 – 25%   [   ] 26 – 50%   [   ] 51 – 75%   [   ] 76 – 100%

1.19   What kinds of dairy products do you sell?

[   ]local food cheese
[   ] fresh milk
[   ] crackers
[   ]meat

1.20 . What are you reason to produce these product?

(Q1.19) Type of products	(Q1.20) Reason to produce

1.   Local food cheese,   2. Fresh milk.   3. Crackers,   4. Meat

1.21   What do you do for old cows? Do you sell them to the market or consume them?

[   ]Sell to market   or   [   ] Household consumption

1.22   Based on your experience, what is the minimum number of dairy cattle to get appropriate benefit from this business? Number………… and why?

1.23   What are your limitations in keeping your dairy cattle?

G. Input and services

D1. Heifers input

1.24   What types of dairy heifers are the most suitable to grow in your area? Why?

1.25   Do you buy dairy heifers?

1.26   Who is your main supplier of your dairy heifers?

1.27   Why from them and not from someone else?

(Q1.26)The main supplier	(Q1.27)Why from them and not from someone else?

1. Supply from Java Island,   2. Provided by the government,   3. Supplied by dairy traders at local scale
4. Heifers were born from mother cows,   5. Others, specify

1.28 (a). Which one do you prefer when you buy heifers?
        [   ] Group   or   [   ]Individually

    (b) What are your reasons for preferring this approach?

1.29   What kind of services do you get from your main heifers supplier?

1.30   What are your main problems when you buy heifers?

D2.Fodder input

1.31 (a)   What are the main fodder types used to feed your dairy cattle?
        [   ] Local agriculture supply store
        [   ] Provided by government
        [   ] Supplied by trader
        [   ] Forage's fodder from own garden
        [   ] Others, specify

    (b) Can you explain why they are the main supplier?

1.32   What kind of services do you get from your main fodder supplier?

1.33. What are the main problems in obtaining fodder?

D3. Medicine input

1.34   How often do you use medical treatments for your dairy cattle?
        [   ] Always
        [   ] Often
        [   ] Sometimes
        [   ] Seldom
        [   ] Never

1.35   What are the main types of livestock medicines that you usually use? What for?

1.36 (a)   Who is the main suppliers of livestock medicines?
      [ ] Local agricultural supply store
      [ ] Provided by the government
      [ ] Supplied by traders
      [ ] Make my own
      [ ] Others, specify

   (b) Can you explain why they are the main supplier?

1.37   What kind of facilities services do you get when you are regular buyer of these types
       of livestock medicines from your main livestock medicine supplier?

1.38. What are the main problems when buying pesticides?

E.   Production information and training service

1.39   What problems do you experience in keeping dairy cattle?

1.40   (a) Who do you usually provide advice and information if you need help to solve these
problems?
       (b)What kinds of advice and information do they provide?
       (c) Why from them and not from others?

(1.40a) Source of information	(1.40b) Type of advice and information	(1.40c)Why from them and not from someone else

       1. Government, extension services,   2. Traders.   3. Own observation, 4. Farmers,
       5. Farmer group,   6. Others, specify

1.41   (a) Who do you usually approach when you are looking training that you need?
       (b) How often do you get training?
         [ ]   Always
         [ ]   Often
         [ ]   Sometimes
         [ ]   Seldom
         [ ]   Never
    . (c) What type of training do they provide?

(1.41 a) Source of training	(1.41b) Intensity of training	(1.41c)Type of training

       1.   Government and extension services   2. NGOs   3. Farmer group
            4. Others, specify

H.   Infrastructure services

E1. Logistic

1.42   How many kilometres is your farm from the place where you sell the most of your
       dairy products?........kms

1.43   (a) How do you take your dairy products to the area where your sell them?
            [   ] Through public transportation]
            [   ] Own vehicle
            [   ] Collected by trader/wholesaler
            [   ] Collected by marketing officer (Organisation)
            [   ] Others
       (b) Why from these options, not from others

1.44   How much does it cost to transport your dairy products to the area where you usually
       sell them?
       Rp   per bucket. [Weight of bucket]   kg [for local cheese]
       Rp .   per milk tank. [Weight of tank t] ....   kg [for milk fresh]
       Rp   per a plastic bag [Weight of plastic bag]   kg[for crackers]

1.45. What are your main problems when taking dairy products to market?

E2. Water and irrigation facilities

1.46   What is the source of water for your dairy farm?
          [   ] Rain-fed
          [   ] River or stream
          [   ] Irrigation of farmer group
          [   ] Artesian well from ground water
          [   ] Others

1.47   How many kilometres is your dairy farm from the source of water?…….kms

1.48   (a) Who do you usually approach when you are looking assistance to irrigate of your
            dairy cattle farm?
       (b)What kind of assistance do they provide?
       (c)Why from them, not from someone else?

(Q1.48a) Source of assistance	(Q1.48b) Type of assistance	(Q1.48c) Why from them and not from someone else

       1 - Government,   2 – NGO   , 3 –Other farmers,
       4 –Relatives and friends   5 – Others, please specify

1.49. What are you main problems in sourcing of water for your dairy farm?

E3 Telecommunication facility

1.50 .(a) Do communication assist you to conduct activities of your dairy farm? If yes……
What kind of activities? Why are they it is important for these activities?

Type of activities	Why it is important for your activities

1. Price information,   2. Costumer communication,
3. Extension communication, 4 Weather information,   5. Others, please specify

(b)If not ……What is the main problem with communication facilities?

1.51 Who usually provide communication facilities in your areas?What kind of facilities do they provide?

Source of communication	Kind of facilities

F.   Marketing services

1.52   What activities do you undertake before selling your vegetables?
1.53   Where do you undertake these activities?

	(1.52) Activities	(1.53) Place conducted
	Cleaning	
	Grading (Classify)	
	Sorting	
	Consolidating	
	Other activities:	

1.54. To whom do you usually sell your dairy products?

1.55. Why do you prefer to sell to them your dairy cattle production?

(Q1.54) Usually buyers	(Q1.55) Why do you prefer to sell to them?

1.   Cooperatives,   2. Wet market retailers   3. Inter-island traders
,   4. Regional traders   5. Local trader,   6. Supermarket,
7. Agents-collectors,   8. Directly selling   Others, please specify

1.56. What are you main problems when selling your dairy cattle productions?

1.57. What solution do you need to solve the problem?

G. Financial services

1.58. From whom do you borrow money to support your dairy cattle farm?
[ ]   Formal banks
[ ]   Informal banks
[ ]   Micro financial institution
[ ]   Others, please specify

1.58. For what purposes do you borrow money?

1.60. What are the terms when you borrow money?
(Interest and days)

Source	Purposes	Terms
Formal		
Informal		

1.61. Which one do you prefer to borrow money between formal and informal banks?
Would you like to explain advantages and disadvantages form these types of bank?

Source	Advantages	Disadvantages
Formal		
Informal		

1.62. (a) Have you proposed the food security and energy credit and people business credit schemes? If yes   …. please answer Q1.63 to Q1.64

(b) If not……..Why you have not proposed?

1.63 What are the terms and interest rate for these credits schemes?

Credit programs	Purposes	Terms and interest rate
Food security and energy credit		
People business credit		

1.64 Do they have advantages and disadvantages compare to commercial credits

Credit programs	Advantages	Disadvantages
Food security and energy credit		
People business credit	Advantages	Disadvantages

1.65 What challenges are there in applying for credit from the formal banks? What are the reasons?

Challenges	Reasons

1.66 Were there instances in which you borrowed inputs such as heifers, fodders and medicines instead of cash? If yes …….. Proceed to Q1.67 or If not ……,,,.Why not?…………………………………………...

1.67 From whom do you usually borrow inputs? Why from them?

1.68 What are the terms for borrowing inputs?

1.69 What are the advantages of borrowing inputs instead of cash?

1.70 What are the disadvantages of borrowing inputs instead of cash?

(Q1.68) The terms for borrowing inputs	(Q1.69) Advantages	(Q1.70) Disadvantages

Part II. Importance of conditions and levels of fulfilment

(Column 1) Please rate the level of importance of the following conditions as they relate to enhancing your ability to grow and sell vegetables profitably. Please use 1 – Not at all important, 2 – Not important, 3 – Somewhat not important, 4 – Somewhat important, 5 – Important, 6 – Very important, and D – Does not know.

(Column 2) Please rate the current level of fulfillment of the following conditions as they relate to your ability to grow and sell vegetables profitability.. Please use 1 – Not fulfilled at all, 2 – Not fulfilled, 3 – Slightly not fulfilled, 4 – Slightly fulfilled, 5 – Fulfilled, 6 – Very fulfilled, D – Does not know.

A. Land tenure and property rights

	Level of importance (Column 1)							Level of fulfilment (Column 2)						
(2.1) Access to land for crop production	1	2	3	4	5	6	D							
(2.2) Access to public land for crop production								1	2	3	4	5	6	D
(2.3)Access to private land for crop production								1	2	3	4	5	6	D
(2.4)Presence of government programs and instruments that allow smallholder producers access to land for crop production	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.5)Local government consults farmers on land requirements for crop production	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.6)Property rights to provide security for crop production activities	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.7) Presence of government programs and instruments that support administration processes to get land certificates for property rights status	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B. Infrastructure

B1. Farm-to-market roads

(2.8)Accessibility of dairy cattle farm-to-market roads	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.9) Proper maintenance of farm-to-market roads	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.10) Proper road reduce transportation cost	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.11) Complaints on roads are properly addressed by the government	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B2. Transportation services

(2.12) Availability of transportation for dairy cattle inputs and marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.13) Affordability of transportation services for vegetable inputs and marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.14) Timeliness of transportation	1	2	3	4	5	6	D	1	2	3	4	5	6	D

services for vegetable inputs and marketing													
(2.15) Transportation service that preserves quality of dairy cattle products when marketing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.16) Farmers consulted on service needs by transportation service providers	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B3. Marketing infrastructure

(2.17) Access to a covered area where dairy cattle milk being processing	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.18) Access to a consolidation area where buyers can buy or collect result of milk processing of dairy cattle	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.19) Access to market stalls that can enhance the value of dairy cattle products	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.20)Affordability of market stalls	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B4. Logistic infrastructure

(2.21) Availability of refrigeration for keeping of dairy cattle products during transportation	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.22) Affordability of using container refrigerator for keeping of dairy cattle products during transportation	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.23).Availability of refrigeration for keeping of dairy cattle products in market place	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.24)Affordability of using container refrigerator for keeping of dairy cattle products in market place	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.25) Using container refrigerator service preserves quality of dairy cattle products	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B5. Communications facilities

(2.26) Access to reliable communication services	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.27) Affordability of communications services	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.28) Communication facilities that assist with obtaining market information	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.29)Communication facilities that assist with obtaining production information	1	2	3	4	5	6	D	1	2	3	4	5	6	D

B6. Water and irrigation facilities

(2.30) Access to source of water to support production process of dairy	1	2	3	4	5	6	D	1	2	3	4	5	6	D

C. Financial services
C1. Formal financial sources

(2.31) Formal credit sources have repayment schedules that accommodate situation of producers like myself								1	2	3	4	5	6	D
(2.32) Formal sources have requirements that are easy to comply with								1	2	3	4	5	6	D
(2.33) Formal sources who have affordable interest rates								1	2	3	4	5	6	D
(2.34) Formal sources who consult me on the type of loans that I need								1	2	3	4	5	6	D
(2.35) Formal sources who are quick to respond to complaints								1	2	3	4	5	6	D
(2.36)Presence of government credit scheme and instruments that provide finance for agricultural production								1	2	3	4	5	6	D
(2.37) Credit program e requirements that are easy to comply with								1	2	3	4	5	6	D
(2.38) Credit programs at affordable interest rates								1	2	3	4	5	6	D

C2. Informal financial sources

(2.39) Informal sources that have repayment schedules that accommodate situation of smallholder producers like myself?								1	2	3	4	5	6	D
(2.40) Informal sources who have requirements that are easy to comply								1	2	3	4	5	6	D
(2.41) Informal sources who have affordable interest rates								1	2	3	4	5	6	D
(2.42) Informal sources who consult me on the type of loans that I need								1	2	3	4	5	6	D
(2.43) Informal sources who are quick to respond to complaints								1	2	3	4	5	6	D

D. Research, development and extension

(2.44)R & D and extension provide innovation based on local conditions and that are easy to use								1	2	3	4	5	6	D
(2.45) R & D provide assistance in solving disease problems								1	2	3	4	5	6	D
(2.46) .Government and extension provide assistance in solving disease problems								1	2	3	4	5	6	D
(2.47) Private sector provides assistance								1	2	3	4	5	6	D

	1	2	3	4	5	6	D	1	2	3	4	5	6	D
in solving pest and disease problems														
(2.48) NGO provides assistance in solving pest and disease problems								1	2	3	4	5	6	D
(2.49) Availability of better heifers that provide better yield	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.50) Training on improving milk production and demonstration farms from the government	1	2	3	4	5	6	D							
(2.51) Training on improving milk production and demonstration farms from the private sector								1	2	3	4	5	6	D
(2.52) Training on improving milk production and demonstration farms from NGOs.								1	2	3	4	5	6	D
(2.53) Training on improving milk production and demonstration farms from input suppliers								1	2	3	4	5	6	D
(2.54) Access to better milk processing technologies	1	2	3	4	5	6	D	1	2	3	4	5	6	D

E. Standards and regulations

	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.55) Having signed contract agreements with buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.56) Enforcement of contracts with buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.57) Quality and grade standards provided by buyers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.58) Quality and grades standards imposed by buyers are followed by producers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.59) Support from government on certification of products	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.60) Support from private sector on certification of farms	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.61) Support from NGOs on certification of farms	1	2	3	4	5	6	D	1	2	3	4	5	6	D

F. Business development services

	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.62) Assistance that links farmers with buyers	1	2	3	4	5	6	D							
(2.63) Government assistance that links farmers with buyers								1	2	3	4	5	6	D
(2.64) NGO assistance that links farmers with buyers								1	2	3	4	5	6	D
(2.65) Private sector assistance that links with smallholder producers								1	2	3	4	5	6	D
(2.66) Assistance that provide market information	1	2	3	4	5	6	D							
(2.67) Government provision of marketing information								1	2	3	4	5	6	D
(2.68) NGO provision of marketing information								1	2	3	4	5	6	D
(2.69) Private sector provision								1	2	3	4	5	6	D

marketing information													

G. Ease-of-doing business

(2.70)Simple procedures for registering an organisation	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.71) Assistance from government to register organisation								1	2	3	4	5	6	D
(2.72) Assistance from NGO to register organisation								1	2	3	4	5	6	D
(2.73)Assistance from private sector to register organisation								1	2	3	4	5	6	D
(2.74) Being able to issue official receipts to every buyer	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.75) Securing business permit from the local government	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.76)Affordable taxes	1	2	3	4	5	6	D	1	2	3	4	5	6	D

H. Input supply

(2.77) Availability of agricultural input supply to farmers	1	2	3	4	5	6	D							
(2.78) Affordability of agricultural inputs supply to farmer								1	2	3	4	5	6	D
(2.79)Government, private sector and LSM assistances to obtain inputs supply close to farm								1	2	3	4	5	6	D

I.Provision and marketing services

(2.80) Assistance to dairy cattle products to get market access	1	2	3	4	5	6	D							
(2.81) Government assistance for dairy cattle products to get market access								1	2	3	4	5	6	D
(2.82) NGO assistance provides that provide market access of dairy cattle production								1	2	3	4	5	6	D
(2.83) Private sector assistance for dairy cattle products to get market access								1	2	3	4	5	6	D

J. Political support

(2.84) Local government supportive of smallholder producers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.85) Local government consults farmers regarding their needs	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.86) Local government who adopts suggestions from farmers	1	2	3	4	5	6	D	1	2	3	4	5	6	D
2.87) Local government who can be easily contacted	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.88) Local government meets promises	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.89) Local government who is quick to address complaints in local concerns	1	2	3	4	5	6	D	1	2	3	4	5	6	D

K. Involvement in decision-making in organizations (for members of farmer organizations)

(2.90) Farmer group members can be involve in project development by farmer group organisation	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.91) Farmer members decisions reflects in final project design	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.92 Farmers consulted on marketing activities by farmer groups	1	2	3	4	5	6	D	1	2	3	4	5	6	D
(2.93) Farmers consulted in organisational decision-making by farmer group	1	2	3	4	5	6	D	1	2	3	4	5	6	D

Part 3. Economic development indicator

We are now going to measure the level of economic development in your area. Please provide your answer based on the following question.

B. Fuel and Power

3.12. Are the following items used at your home as source of power for lighting?

    Yes = 1 No = 2
    [1] Electricity   [ ]
    [2] Gas   [ ]
    [3] Paraffin (lantern)]   [ ]

3.13. Are the following items used at your home as fuel for cooking]?
    Yes = 1 No = 2
    [1] Electricity   [ ]
    [2]Gas   [ ]
    [3]Firewood   [ ]
    [4]Charcoal   [ ]

C. Information and Communication

3.13 Does your household own any information facilities such as the following items?

    Yes = 1 No = 2

    [1] TV   [ ]
    [2] DVD Player   [ ]
    [3] Satellite channel   [ ]
    [4] Radio   [ ]
    [5]   [ ]

3.14 Does your household own any communication facilities such as the following items?

    Yes = 1 No = 2
    [1] Mobile phone   [ ]
`   [2] Fixed phone   [ ]

D. Transportation

3.15 Does your household own any transportation facilities such as the following items?

    Yes = 1 No = 2

    [1] Car   [ ]
    [2]Motor cycle   [ ]
    [3]Bicycle   [ ]
D. House condition

3.16. How many bed rooms in your house?
    [ ] 1
    [ ] 2
    [ ] 3
    [ ] More than 3

3.17. What kind of toilet is mainly used at your home?

    [ ] Flush toilet private

    [ ] Flush toilet public

    [ ] Bush

    [ ] River

3.18 What is the main source of water for drinking at your home?

    [ ] Tap/piped water

    [ ] Bore hole

    [ ] Protected well/spring

    [ ] Rain water

    [ ] Mountainous water source

Appendix 6: Additional tables of results

Table A6.1: Age of respondents

Age categories	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
20-25 years old	22	9		
26-30 years old	29	12	23	9
31-35 years old	39	16	30	12
36-40 years old	50	20	52	21
41-45 years old	74	30	70	28
46-50 years old	23	9	40	16
51-55 years old	13	5	35	14
Total	250	100	250	100

Table A6.2: Gender of respondents

Gender	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Male	203	81	220	88
Female	47	19	30	9
Total	250	100	250	100

Table A6.3: Role in household by gender

Role in household	Vegetable		Total	Dairy		Total
	Male	Female		Male	Female	
Household head	181	0	173	200	0	200
	89%	0%	69%	91%	0%	80%
Spouse of household head	16	47	69	11	30	41
	8%	100%	28%	5%	100%	16%
Child of household head	6	0	8	9	0	9
	3%	100%	3%	41%	0%	4%
Total	203	47	250	220	30	250
	100%	100%	100%	100%	100%	100%

Table A6.4:Education level of respondents

Education level	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
None	10	4	3	1
Primary school	24	10	18	7
Secondary school	57	23	39	16
Senior high School	79	32	103	41
Diploma	60	24	60	24
University	20	8	27	11
Total	250	100	250	100

Table A6.5: Non-formal training received-vegetable respondents

Training topics	Frequency	Percent
Pest and disease control	83	33
Planting and cultivation method	57	23
Conservation method	51	20
Post harvesting handling	17	7
Never undertaken training	42	17
Total	250	100

Table A6.6: Non-formal training received–dairy respondents

Training topics	Frequency	Percent
Training on animal health	114	46
Insemination technology and livestock waste treatment	52	21
Training on packaging for local cheese (The dangke), and production of crackers	46	18
Never follow the training	38	15
Total	250	100

Table A6.7: Distribution of sizes of vegetable farm

Type of commodity	Minimum	Maximum	Mean	Std. Deviation
Vegetable	0.12	1.4	0.83	0.31
Dairy	0.5	2	1.01	0.39

Total (n = 250)

Table A6.8: Land ownership

Ownership categories	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Own the land	121	48	174	70
Only a part	83	33	68	27
Do not have land	46	18	8	3
Total	250	100	250	100

Table A6.9: How land was acquired by those who own all their land

			Purchased		Inheritance		Pledge land		Total	
			V	D	V	D	V	D	V	D
Do you own land that you farm?	Yes	#	35	143	73	31	13		121	174
		%	29	82	60	18	11		100	100

Cross tabulation of land ownership and how land was acquired
V = vegetable sector; D = dairy sector

Table A6.10: Land ownership documents

Ownership categories	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Ownership certificate	61	50	127	73
Tax document	36	30	34	20
Contract certificate	17	14	23	7
Deed of sale from notary	7	6		
Total	121	100	76	100

Table A6.11: How land was acquired by those who have only part or no

			Family, father, mother, brother, sister		relatives, cousins, uncles		friends or acquaintances		Total	
			V	D	V	D	V	D	V	D
Do you own land that you farm ?	Only a part	#	39	34	27	15	17	19	83	68
		%	47	50	33	22	21	28	100	100
	No	#	12	6	18	2	16	0	46	8
		%	26	75	39	25	35	0	100	100

Cross tabulation of part land ownership and how acquired
V = vegetable sector; D = dairy sector

Table A6.12: Payment terms for part owners and those who don't own land

Payment terms	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Fixed-term with fee	65	50	41	54
Free but with conditions	46	36	28	37
Free without obligation	18	14	7	9
Total	129	100	76	100

Table A6.13: Distribution of years for engaging in both vegetables and dairy

Years in productions	Minimum	Maximum	Mean	Std. Deviation
Vegetable	2	30	9.8	4.81
Dairy	3	20	9.7	3.47

Table A6.14: Experience with vegetable and dairy farming

Age categories	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
0 - 5 Years	57	23	32	13
6 - 10 Years	93	37	128	51
11 - 15 Years	80	32	78	31
16 - 20 Years	11	4	12	5
21 - 25 Years	7	3	0	0
26 - 30 Years	2	1	0	0
Total	250	100	250	100

Table A6.15: Reasons for involvement in vegetable and dairy farming

	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Main livelihood	80	32	57	23
Economic reason	73	29		
High potential economic	-	-	114	46
Increasing income	37	15	49	20
Finance by money lender	44	18	-	-
Supporting financial sector	-	-	18	7
Easy to get a job	16	4	-	-
Government project	-	-	12	5
Total	250	100	250	100

Table A6.16: Percentage of income both vegetable and dairy

	Vegetable			Dairy
	Frequency	Percent	Frequency	Percent
1 – 25%	5	2	5	2
26 – 50%	59	24	47	19
51 – 75%	77	31	111	44
76 – 100%	109	44	87	35
Total	250	100	250	100

Table A6.17:Average income both vegetable and dairy cattle

	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Under Rp 1 000 000	21	8		
Rp 1 000 000 – Rp 2 000 000	57	23	15	6
Rp 2 000 000 – Rp 3 000 000	101	40	115	46
Rp 3 000 000 and up	71	28	120	48
Total	250	100	250	100

Table A6.18: Sources of additional income of vegetable respondents by income category

Source of income		Income category				Total
		Under Rp1m	Rp1m- Rp2m	Rp2m - Rp3m	Rp3m and up	
Traders	#	0	8	28	31	67
	%	0	12	42	46	100
Wage as farm labour	#	21	39	42	22	124
	%	17	32	34	18	100
Wage as government	#	0	5	15	17	37
	%	0	14	41	45	100
Others	#	0	8	6	8	22
	%	0	36	27	36	100
Total	#	21	60	91	78	250
	%	8	24	37	31	100

Table A6.19: Sources of additional income of dairy respondents by income category

Source of income		Income category				Total
		Under Rp1m	Rp1m- Rp2m	Rp2m - Rp3m	Rp3m and up	
Traders	#	0	1	10	10	21
	%	0	5	48	48	100
Wage as farm labour	#	0	11	81	73	165
	%	0	7	49	44	100
Wage as government	#	0	1	9	17	27
	%	0	4	33	63	100
Others	#	0	2	14	21	37
	%	0	5	38	57	100
Total	#	0	15	114	121	250
	%	0	6	46	48	100

Table A6.20: Main non-perishable crops

Non-perishable crop type	Frequency	Percent
Red onions	132	56
Potatoes	57	26
Carrots	53	21
Total	250	100

Table A6.21: Reason to grow type of non-perishable crops

Reason	Frequency	Percent
High market price and financed by the financial sector	125	50
High market price and suitable to the local climate	72	29
High-yield productivity and low operational cost	53	21
Total	250	100

Table A6.22: Main perishable crops

Perishable crops	Frequency	Percent
Tomatoes	114	45
Chilies	96	37
Cabbages	24	10
Onion leaves	19	8
Total	250	100

Table A6.23: Reason to grow the type of perishable crops

Reason	Frequency	Percent
Reduce disease and improve soil fertility	75	30
High-intensity production and climate factor	54	22
High potential market	61	24
Low operational cost for input provision	48	19
Cooperated by traders	12	5
Total	250	100

Table A6.24: Dairy productions

	Frequency	Percent
Local food cheese (*Dangke*)	244	98
Crackers	6	2
Fresh milk	-	-
Meat	-	-
Total	250	100

Table A6.25: Type of dairy products and reasons to produce

			Type of products		
			Local food cheese (Dangke)	Crackers	Total
Reason to produce	Low operational cost and high market price	#	154	0	154
		%	100%	0%	100%
	High market demand	#	90	0	90
		%	100%	0%	100%
	Link to potential market	#	0	6	6
		%	0%	100%	100%
Total		#	244	6	250
		%	98%	2%	100%

Table A 6.26: Sources of seeds for non-perishable and perishable crops

Source	Non-perishable crop		Perishable	
	Frequency	Percent	Frequency	Percent
Traders	101	40	0	0
Local agricultural supply store	60	24	139	56
Local market	42	17	12	5
Keeping own seeds	38	15	99	40
Government	9	4	0	0
Total	250	100	250	100

Table A 6.27: Type of dairy and reason to purchase

			Reason to purchase		
			Suitable to climate condition	High milk production	Total
Type of dairy	Fries Holland	#	119	131	250
		%	48%	52%	100%
Total		#	119	131	250
		%	48%	52%	100%

Table A 6.28: Source of heifers

	Frequency	Percent
Supply from Java Island	201	80
Provided by the government	20	8
Supplied by dairy traders at local scale	18	7
Heifers were born from mother cows	11	4
Total	250	100

Table A 6.29: How heifers bought by reason for this method of purchase

How bought	Reason			Total
	Low operational cost	Cheaper	Purchasing a small number	
Group	129	112	0	241
	54%	47%	0%	100%
Individually	0	0	9	9
	0%	0%	100%	100%
Total	129	112	9	250
	52%	44%	4%	100%

Table A 6.30:Limitation in acquiring heifers

	Frequency	Percent
Not available in local production farm	62	25
Expensive and high transportation cost	137	55
High risk for heifers safety standard	51	20
Total	250	100

Table A 6.31: Type of fertilizer

Fertiliser type	Frequency	Percent
Both chemical and organic fertilizers	159	64
Chemical fertilizer	56	22
Organic fertilizer	35	14
Total	250	100

Table A 6.32: The main supplier both fertilizer and pesticides inputs

Source	Fertilizer		Pesticides	
	Frequency	Percent	Frequency	Percent
Local agricultural supply store	206	82	170	68
Supplied by trader	24	10	80	32
Make my own	20	8		
Total	250	100	250	100

Table A 6.33: Sources of fodder

	Frequency	Percent
Fodder from own garden and concentrates that are bought from agents	127	51
Fodder from own garden and concentrates that are made by my self	123	49
Total	250	100

Table A 6.34: Problems in getting pesticides

Problem	Frequency	Percent
Expensive	168	67
Only in sub-district market	82	33
Total	250	100

Table A 6.35: Type of medicines

	Frequency	Percent
Vitamin	50	20
Anthelmetic	66	26
Antibiotic and athelmetics	78	31
Vitamin and athelmetics	56	22
Total	250	100

Table A 6.36:The main medicine supplier and reason for using them

Supplier	Reason			Total
	Main dealers and professional	Close to location and easy access	Government project	
Local agricultural store	125	72	0	197
	64%	37%	0%	100%
Government	0	0	53	53
	0%	0%	100%	100%
Total	125	72	53	250
	50%	29%	21%	100%

Table A 6.37: Challenge in obtaining the dairy medicines

	Frequency	Percent
Expensive	196	78
Lack of medicine store	54	22
Total	250	100

Table A 6.38: Source of training and information for growing vegetable

Source	Frequency	Percent
Government, extension services	121	48
Own observation	85	34
Farmers	39	16
Traders [buyers]	5	2
Total	250	100

Table A 6.39: Kind of training services that needed for growing vegetable

Training topic	Frequency	Percent
Pest and disease control	139	56
Cultivation technique	54	22
Land conservation and water management	29	12
Standard and regulation	16	6
Method of using pesticide and fertilizer	12	5
Total	250	100

Table A 6.40: Source of training for keeping dairy

	Frequency	Percent
Government, extension services	120	80
Own observation	21	8
Farmers	19	8
Farmer group	10	4
Total	250	100

Table A 6.41: Type of dairy training

Training topic	Frequency	Percent
Food (*dangke*) preservation technique	76	30
Pest and disease prevention	73	29
Artificial insemination	37	15
Biogas production and organic manure	32	13
Training on concentrate feeding	25	10
Market information	7	3
Total	250	100

Table A 6.42: The average distance of transporting from the place that mostly sells of both vegetable and dairy

Distance (km)	Minimum	Maximum	Mean	Std. Deviation
Vegetable	1	39	13.02	12.9
Dairy	0	4	2.23	1.43

Table A 6.43: Problem in bringing the vegetable to the area of selling vegetable

Problem	Frequency	Percent
High cost for transportation	140	56
Lack of public transportation	64	26
Irregular public transport services	46	18
Total	250	100

Table A 6.44: Problem when selling dairy products

Problem	Frequency	Percent
Lack of public transportation	55	22
Inadequate refrigeration	195	78
Total	250	100

Table A6.45:Sources of water

Type of water source	Vegetable Frequency	Percent	Dairy Frequency	Percent
Rain-fed	119	48	19	8
River or stream	64	26	5	2
Ground water	52	21		
Mountain spring	15	6		
Irrigation of farmer group	-	-		
Artesian well from ground water	-	-	226	90
Total	250	100	250	100

Table A6.46: Distance of water sources (meters)

Distance (km)	Minimum	Maximum	Mean	Std. Deviation
Vegetable	40	2 700	1 29	0.59
Dairy	0.01	0.8	0.12	0.17

Table A 6.47:Sources of assistance for water

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Own Investment	122	50	243	97
Relatives and friends	62	25	7	3
Land owner	19	8		
Capital providers	47	19		
Total	250	100	250	100

Table A 6.48: Main problems regard to source of water for vegetable and dairy farm

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
High operational cost	112	45		
No dam facility	71	28		
No government assistance	30	12		
No permanent irrigation	22	9		
No problem			186	74
Water contamination	15	6	64	26
Total	250	100	250	100

Table A 6.49: The usefull of communication facility

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Price information	119	48	42	17
Marketing transaction	41	16	106	42
Solving pest disease	10	4		
Without aceess	80	32	102	41
Total	250	100	250	100

Table A 6.50: Usual buyers of vegetable production

Buyer type	Frequency	Percent
Inter-island traders	101	40
Wet market retailers	56	22
Agents or Collectors	49	20
Regional traders	44	18
Total	250	100

Table A 6.51: Solutions to vegetable marketing problems

Solutions	Frequency	Percent
Marketing contract	174	70
Providing price information	50	20
Providing market infrastructure	26	10
Total	250	100

Table A 6.52: The usual buyers of dairy production

Buyers	Frequency	Percent
Local trader	181	72
Directly selling	60	24
Wet market	9	4
Total	250	100

Table A 6.53: Problem in selling dairy products to market

	Frequency	Percent
Lack of potential market	169	68
Poor quality standard	81	32
Total	250	100

Table A 6.54: Solutions to dairy marketing problems

Strategy	Frequency	Percent
Introducing of quality standard	107	43
Linkage to potential buyers	104	42
Improve promotion	39	16
Total	250	100

Table A6.55: Sources of finance

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Informal banks	106	42		
Formal banks	73	29	250	100
No access to financial sector	71	28		
Total	250	100	250	100

Table A6.56: Main purposes of vegetable farmers for borrowing money

Reason	Frequency	Percent
Buying fertilisers, pesticides and seeds	170	68
Irrigation infrastructure	26	10
Agricultural machine	5	2
Rental land	2	1
Never used credit	47	20
Total	250	100

Table A6.57: Main purpose of dairy farmers for borrowing money

Purpose	Frequency	Percent
Providing the heifers	180	72
Improve business capacity	52	21
Equipment	18	7
Total	250	100

Table A 6.58: Using and without using credit program for growing vegetable

	Frequency	Percent
Without using credit program	180	72
Used credit program	70	28
Total	250	100

Table A 6.59: Reason to do not use credit programs

		Reasons				
		more convenient with money lender	lack of government information	difficult to access to banks	only the crops that have high potential market	Total
Without using the program credit	#	91	12	63	14	180
	%	51%	7%	35%	8%	100%
	#	91	12	63	14	180
	%	51%	7%	35%	8%	100%

Table A 6.60: Types of credit program for growing vegetable

	Frequency	Percent
People business credit	65	93
Food Security and energy credit	5	7
Total	70	100

Table A 6.61: Types of credit program and reason to use types of credit for growing vegetable

		Reasons			Total
		Low interest rate	without collateral for small credit	Facilitated by government	
People Business Credit	#	53	12	0	65
	%	82%	18%	0%	100%
Food security and energy credit	#	0	0	5	5
	%	0%	0%	10%	100%
Total	#	53	12	5	70
	%	76	17%	7%	100%

Table A 6.62: Using and without using credit program for keeping dairy cattle

	Frequency	Percent
Using credit program	136	54
Without using credit program	114	46
Total	250	100

Table A 6.63: Types of credit program for keeping dairy cattle

	Frequency	Percent
People business credit	111	82
Food security and energy credit	25	18
Total	136	100

Table A 6.64: Types of credit program and reason to use types of credit for keeping dairy cattle

		Reasons		Total
		Low interest rate	Facilitated from the government	
People business credit	#	111	0	111
	%	100%	0%	100%
Food security and energy credit	#t	8	17	25
	%	32%	68%	100%
	#	119	17	136
	%	88%	13%	100%

Table A 6.65: Reason to do not use type of credit program for keeping dairy cattle

		Reason		Total
		Lack of information	Inadequate collateral	
Without using credit program	#	24	90	114
	%	21%	79%	100%
	#	24	90	114
	%	21%	79%	100%

Table A 6.66:Number of bedrooms

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
One bed room	31	12	23	9
Two bed room	56	22	118	47
Three bed room	94	38	90	36
More than three	69	28	19	8
Total	250	100	250	100

Table A 6.67: Number of bedrooms by net income for vegetable respondents

		Net income				
		Under Rp 1m	Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
One	#	18	12	1	0	31
	%	58%	39%	3%	0%	100%
Two	#	3	46	4	3	56
	%	5%	82%	7%	5%	100%
Three	#	0	2	64	28	94
	%	0%	2%	68%	30%	100%
> 3	#	0	0	22	47	69
	%	0%	0%	32%	68%	100%
Total	#	21	60	91	78	250
	%	8%	24%	36%	31%	100%
P-value	0.000					

P-value for chi-square test

Table A 6.68: Number of bedrooms by net income for dairy respondents

		Net income			
		Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
one	#	6	17	0	23
	%	26%	74%	0%	100%
Two	#	9	97	12	118
	%	8%	82%	10%	100%
Three	#	0	0	90	90
	%	0%	0%	100%	100%
> 3	#	0	0	19	19
	%	0%	0%	100%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.000				

P-value for chi-square test

Table A 6.69: Main energy source for lighting

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Electricity	229	92	250	100
Paraffin	21	8		
Gas				
Total	250	100	250	100

Table A 6.70: Lighting power source by net income for vegetable respondents

		Net income				
		Under Rp 1m	Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
Electrical	#	0	60	91	78	229
	%	0%	26%	40%	34%	100%
Paraffin	#	21	0	0	0	21
	%	100%	0%	0%	0%	100%
Total	#	21	60	91	78	250
	%	8%	24%	36%	31%	100%
P-value	0.000					

P-value for chi-square test

Table A 6.71: Type of energy for cooking at home

Energy Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Gas	208	83	235	94
Firewood	42	17	15	6
Electricity				
Charcoal				
Total	250	100	250	100

Table A6.72: Energy for cooking by net income for vegetable respondents

		Net income				
		Under Rp 1m	Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
Gas	#	0	39	91	78	208
	%	0%	19%	44%	38%	100%
Firewood	#	21	21	0	0	42
	%	50%	50%	0%	0%	100%
Total	#	21	60	91	78	250
	%	8%	24%	36%	31%	100%
P-value	0.000					

P-value for chi-square test

Table A6.73: Energy for cooking by net income for dairy respondents

		Net income			
		Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
Gas	#	2	112	121	235
	%	1%	48%	52%	100%
Firewood	#	13	2	0	15
	%	87%	13%	0%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.000				

P-value for chi-square test

Table A6.74:Type of toilet used

Toilet type	Vegetable Frequency	Percent	Dairy Frequency	Percent
Flush toilet private	215	86	250	100
Flush toilet public	35	14		
Bush				
River				
Total	250	100	250	100

Table A6.75: Type of toilet used by net income for vegetable respondents

		Net income				Total
		Under Rp 1m	Rp 1m – Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Flush toilet private	#	0	46	91	78	215
	%	0%	21%	42%	36%	100%
Flush toilet public	#	21	14	0	0	35
	%	60%	40%	0%	0%	100%
Total	#	21	60	91	78	250
	%	8%	24%	36%	31%	100%
P-value	0.000					

P-value for chi-square test

Table A6.76: Main water source for home

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Tap/piped water	58	23	20	8
Bore hole	16	6	230	92
Protected well/spring	8	3		
Rain water	64	26		
Mountain water source	104	42		
Total	250	100	250	100

Table A6.77. Main water source by net income for vegetable respondents

		Net income				Total
		Under Rp 1m	Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Tap/piped water	#	0	13	25	20	58
	%	0%	22%	43%	35%	100%
Bore hole	#	0	1	7	8	16
	%	0%	6%	44%	50%	100%
Protected well/spring	#	0	2	4	2	8
	%	0%	25%	50%	25%	100%
Rain water	#	11	22	21	10	64
	%	17%	34%	33%	16%	100%
Mountainous water source	#	10	19	44	31	104
	%	10%	18%	42%	30%	100%
Total	#	21	57	101	71	250
	%	8%	23%	40%	28%	100%
P-value	0.005					

P-value for chi-square test

Table A6.78: Main water source by net income for dairy respondents

		Net income			
		Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
Tap/piped water	#	2	11	7	20
	%	10%	55%	35%	100%
Bore hole	#	13	103	114	230
	%	6%	45%	50%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.405				

P-value for chi-square test

Table A6.79: Information communication technologies

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
TV	94	38	140	56
DVD Player	78	31	51	20
Satellite channel	56	22	37	15
Radio	22	9	22	9
Total	250	100	250	100

Table A6.80: Ownership of ICTs by net income for vegetable respondents

		Net income				
		Under Rp 1m	Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	Total
Radio	#	21	1	0	0	22
	%	96%	5%	0%	0%	100%
TV	#	0	31	62	1	94
	%	0%	33%	66%	1%	100%
DVD	#	0	23	23	32	78
	%	0%	30%	30%	41%	100%
Satellite channel	#	0	2	16	38	56
	%	0%	4%	29%	68%	100%
Total	#	21	57	101	71	250
	%	8%	23%	40%	28%	100%
P-value	0.000					

P-value for chi-square test

Table A6.81: Ownership of ICTs by income level for dairy respondents

		Net income			Total
		Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Radio	#	15	7	0	22
	%	68%	32%	0%	100%
TV	#	0	64	76	140
	%	0%	46%	54%	100%
DVD player	#	0	36	15	51
	%	0%	71%	29%	100%
Satellite channel	#	0	7	30	37
	%	0%	19%	81%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.000				

P-value for chi-square test

Table A6.82: Telephone ownership

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Mobile phone	155	62	198	79
Fixed phone				
No mobile phone	95	38	79	21
Total	250	100	250	100

Table A6.83:Type of communication facility in regard to income level at vegetable respondents

		Net income				Total
		Under Rp 1m	Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Mobile phone	#	8	25	67	55	155
	%	5%	16%	43%	36%	100%
No mobile phone	#	13	32	34	16	95
	%	14%	34%	36%	17%	100%
Total	#	21	57	101	71	250
	%	8%	23%	40%	28%	100%
P-value	0.000					

P-value for chi-square test

Table A6.84:Type of communication facility in regard to income level at dairy respondents

		Net income			Total
		Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Mobile phone	#	14	92	92	198
	%	7%	47%	47%	100%
No phone	#	1	22	29	52
	%	2%	42%	56%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.258				

P-value for chi-square test

Table A6.85: Vehicle ownership

Source	Vegetable		Dairy	
	Frequency	Percent	Frequency	Percent
Motor cycle	233	93	216	86
Car	8	3	34	14
Bicycle				
No Vehicle	9	4		
Total	250	100	250	100

Table A6.86: Vehicle ownership by net income for vegetable respondents

		Net income				Total
		Under Rp 1m	Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Motor cycle	#	13	57	99	64	233
	%	6%	25%	43%	28%	100%
Car and Motorcycle	#	0	0	1	7	8
	%	0%	0%	13%	88%	100%
No vehicle	#	8	0	1	0	9
	%	89%	0%	11%	0%	100%
Total	#	21	57	101	71	250
	%	8%	23%	40%	28%	100%
P-value	0.000					

P-value for chi-square test

Table A6.87: Vehicle ownership by net income for dairy respondents

		Net income			Total
		Rp 1m - Rp 2m	Rp 2m – Rp 3m	Rp 3m and up	
Car	#	0	0	34	34
	%	0%	0%	100%	100%
Motor cycle	#	15	114	87	216
	%	7%	53%	40%	100%
Total	#	15	114	121	250
	%	6%	46%	48%	100%
P-value	0.000				

P-value for chi-square test