Muresk Institute of Agriculture

Role of Agricultural Extension Workers in Horticultural Agribusiness in Nusa Tenggara Timur Province, Indonesia

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Declaration

I certify that this thesis is truly original of my own work and not any part of this thesis has been previously published or already been submitted for any degree. This thesis is also not currently being submitted for any other degree.

I hereby declare that, to the best of my knowledge, any help received in preparing this thesis, and all sources used have been acknowledged.

Leta Rafael Levis

Signed :

Date: 26 September 2002

Abstract

Despite the abundance of horticultural crops, farmers in the Nusa Tenggara Timur province of Indonesia (NTT) are still living under poverty level. The Indonesian government has identified agricultural extension workers as a 'point of spear' of agricultural development and given them 12 roles. Horticultural agribusiness would certainty be able to increase farmers' standard of living if agricultural extension workers can perform their roles effectively. However, in 1997, the average production of fruits was only 3.8 tonnes per hectare and 1.9 tonnes per hectare of vegetables. Ashraf (1993) has suggested that inefficiency of agricultural extension workers is one of the reasons why agricultural production does not improve to its full capacity.

A study investigating the roles of Agricultural extension workers in horticultural agribusiness in Nusa Tenggara Timur (NTT) Indonesia was conducted. Interviews were conducted of 223 farmers, 46 agricultural extension workers and 32 government officers. A literature search suggests this is the first study ever done in Indonesia particularly in NTT which involved farmers, agricultural extension workers and government officers to investigate: 1) what roles were expected of agricultural extension workers by farmers, government officers and agricultural extension workers, 2) the perceptions of these groups about the effectiveness of agricultural extension workers in performing their roles, and 3) factors that impede agricultural extension workers' ability to perform their roles effectively.

While the views of the three groups did not coincide, all three expected agricultural extension workers to use examples and demonstrations. All farmers expected agricultural extension workers to deliver extension in the right time. Both farmers and government officers expected agricultural extension workers to increase farmers' knowledge and skills, empower farmers and their group, and to be a part of farmers' community. Meanwhile, the roles of running activities that only deal with the agricultural activities, to support research recommendation, and to be the bridge between farmers and government were expected by government officers and agricultural extension workers. Farmers and agricultural extension workers have the same expectation for agricultural extension workers to transfer programs that suit farmers' needs and problems, and to bring the programs as promised.

The respondents perceptions about the effectiveness of agricultural extension workers in fulfilling their 12 roles were as follows: 1) farmers were dissatisfied with the roles for running plot demonstrations, program planning, using a brochure and running a field school; 2) agricultural extension workers were dissatisfied with the roles of making a brochure, running a field school, and delivering government projects; and 3) government officers were dissatisfied with the roles to encourage farmers' participation, finding and solving farmers' problems, agricultural extension workers as trainers, and running field schools. A Chi-square test found a significant difference between the groups in their perceptions of agricultural extension workers performance of their roles.

The eight main constraints that impede agricultural extension workers' ability to perform their roles were the repeated restructuring of the Agricultural Department, low award or salary, lack of training, lack of transport, unclear job direction, geographical conditions, lack of authority, and bureaucratic complexity.

In conclusion, while the results of this study support the hypothesis that agricultural extension workers are not performing their roles effectively there are a number of reasons for this, many of them beyond the responsibility of agricultural extension workers. A key reason appears to be system failure. While the NTT province is supposedly following the Training and Visit model, very little effective training appears to be taking place and agricultural extension workers lack transport and other facilities to conduct effective visits and demonstrations. Another key deficiency is locally relevant research findings.

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Glossary

AAET	Agency for Agricultural Education and Training - an extension institution that runs Educational and Training for AEWs. This institution is located at national and province level.
AAETE	Agency for Agricultural Education, Training and Extension.
AARD	Agency for Agricultural Research and Development - an agricultural research institution. This institution is located at national and province level.
AES	Agricultural Extension Specialist - extension worker who has Bachelor or Post-graduate degree.
AEW	Agricultural Extension Worker - people who work at the front line in the extension services.
APBD II	'Anggaran Pendapatan dan Belanja Daerah' - an Annual District Government Routine Expenditure.
BAPPEDA	'Badan Perencana Pembangunan Daerah' - an institution functioned to design all government development projects. This institution is located at province and district level.
BIMAS	'Bimbingan Massal', or The Mass Guidance - a special program designed by the Indonesian government which intends to increase rice production.
BIPP	'Balai Informasi Penyuluhan Pertanian' - an institution for Agricultural Extension Information. This institution is located at district level and to coordinate all extension service activities at district level (in page 24 called DAIEC)
BPP	'Balai Penyuluhan Pertanian' - a Rural Extension Centre. This institution is located at sub-district level to coordinate all extension service activities at sub-district level.
BUPATI	is a person who works as a head of a district.
CAE	Centre for Agricultural Extension - an extension institution located at national level.
CFE	Centre for Forestry Extension - an forestry extension institution is located at national level.
Contact Farmer	member of farmer's group in the T&V system who works as contact person between AEWs & farmers.
DAIEC	District Agricultural Information and Extension Centre which is located at district level.

DGA	Directorate General of Agriculture – the second highest agricultural institution in Agricultural Department.
FAO	Food and Agriculture Organisation.
FEW	Field Extension Worker - extension worker who has High School or Diploma level of education.
INSUS	'Intensifikasi Khusus' - a specific intensification program which intends to increase rice production.
Jeruk keprok	specific local orange variety which is grown by farmers in the district of 'Timor Tengah Selatan' (TTS).
Kanwil	'Kantor Wilayah' - a regional office of Agricultural Department which is located at province level.
KCL	Kalium Chloride - a kind of fertilizer used by farmers in Indonesia.
KTNA	'Kelompok Tani-Nelayan Andalan' - a special term for a group of farmers and fisherman in Indonesia.
KUD	'Koperasi Unit Desa' - Village Cooperative Unit as a cooperation for rural economic development system.
MHA	Ministry of Home Affair.
MOA	Ministry of Agriculture.
NFCEP	The National Forestry and Crops Extension Project - an extension project under T & V model funded by The World Bank through growing food crops, real estate crops, livestock and inland fisheries.
NGO	Non Government Organisation.
NTT	Nusa Tenggara Timur - the name of a province in Indonesia.
PIS	Price Information System.
PPL	'Penyuluh Pertanian Lapangan' - a person who works as Field Extension Worker.
PPS	'Penyuluh Pertanian Spesialist' - a person who work as AEW educated at honor degree or 'sarjana'.
PT	'Perseroan Terbatas' - a name of private company.
SBBO-PPL	'Sistem Bayar Biaya Operasional – Penyuluhan Pertanian Lapangan' - a payment system of Operational Funding for extension service which is directly to PPL account.
SMS	Subject Matter Specialist - extension worker who has expertise in a specific area of agriculture in the T&V system.

SPSS	Statistic Program for Social Science.
Surat Keputusan Bersama	*letter of intent* released by the Minister of Agricultural and the Minister of Home/State Affair in terms of managing the role of AEWs.
T & V model	Training and Visit model which applied for extension activities in increasing the effectiveness of extension service by regular Training and Visits.
TSP	Three Sulfate Phosphate – a kind of fertilizer used by farmers in Indonesia.
TTS	'Timor Tengah Selatan' - a name of a district in NTT which is one of the study locations.
TTU	' Timor Tengah Utara - a name of a district in NTT.
WKPP	'Wilayah Kerja Penyuluhan Pertanian' - an institution of extension services that is located at village level. This institution coordinates all extension services at the village level.

Chapter 1: Introduction

1.1 Research background

Despite the abundance of fruit, vegetables and cash crops, East Nusa Tenggara (NTT) province is still the third poorest province in Indonesia. About eighty percent of the population of this province are small farmers with an average of approximately 0.5 hectare of land (Agricultural Statistic of NTT 1995). Farmers in this area are the lowest income-earning farmers in Indonesia. The average income per capita in 1996 was Rp.465,500 (Statistic of NTT 1998). Hence, all villages in this province are targeted in the national and provincial governments' poverty alleviation program.

According to Adar (2001) high poverty levels and the low income of farmers are caused by twelve factors). These are: 1) limited sources of income, 2) a low level of competitiveness in agribusiness, 3) low technical skills, 4) a traditionally orientated way of life, 5) low skill and knowledge for adoption of practical technology, 6) low agricultural prices, 7) low agricultural production, 8) topographical conditions, 9) the dominance of small-scale and subsistence farming systems, 10) little knowledge of effective agribusiness, 11) small regional demand for agricultural commodities, and 12) poor infrastructure.

A horticultural agribusiness sector would certainly be able to overcome some of the problems mentioned above. The national and local government believe that horticultural agribusiness is economically important and is expected to become a leading economic sector for overcoming poverty and low incomes of farmers. Hence, in the last 20 years, the government of NTT through agribusiness projects has planted 18,495 hectares of vegetables and 82,012 hectares of fruit. Fruit includes 6,616 hectares of oranges, and vegetables includes 1,680 hectares of onions, 740 hectares of leafy vegetables, 2,352 hectares of garlic, and 1,954 hectares of cabbages. The major sources of both commodities are in the Kupang district (799 hectares of oranges, and 2,228 hectares of vegetables), and in the Timor Tengah Selatan (TTS) district (1,981 hectares of oranges and 1,980 hectares of vegetables) (Agricultural Statistic of NTT 1998). However, the production of oranges and onions in Kupang in 1997 was only 278 tonnes of oranges and 2,612 tonnes of onions, whilst in TTS in 1997 the production of oranges and onions

was 9,316 tonnes and 107 tonnes respectively. One of the reasons that fruits and vegetables are not produced to full capacity is the lack of farmers' production skills. Farmers' skill can be improved if AEWs can undertake their role effectively. Therefore, it can be said that the production of fruits and vegetables and hence farmer income in this province can be increased if AEWs undertake their roles effectively.

Oranges, watermelons and selected vegetables have been chosen for focus in this project. The main reasons for this are:

1. Most farmers in Kupang and TTS, in particular, have planted and cultivated predominantly oranges, watermelons, chillies, cabbages, and some other vegetables.
2. The familiarity of these commodities to farmers in NTT, and oranges with the specific variety called *"jeruk keprok"*, which has become a special trademark of West Timor fruits.
3. Oranges and watermelons formed 23% by weight of the total production of six main fruits for NTT in 1997, whilst cabbages, chillies and carrots contributed 36% to the total of the sixteen vegetables (Agricultural Statistic of NTT 1998).
4. The greater ease in marketing horticultural commodities compared to other agricultural commodities sold at both the local and national level.
5. The ease of obtaining and cultivating the seed of these commodities (Statistic of Food and Horticultural Crops of NTT 1998).

There are at least six main factors involved in the horticultural agribusiness system in NTT, namely: availability of input factors, the farming systems, post harvest technology, marketing, technological adoption and availability of supporting institutions (Statistic of Food and Horticultural Crops of NTT 1998). The input factors are supported by the KUD (Village Cooperative Unit). The farming systems and technological diffusion are supported by Agricultural Extension Workers (AEW) and field workers from other institutions. Post harvest systems are supported by the Local Industrial Department, and marketing is supported by at least four enterprises such as: CV Simpatik in Kupang , PT Sarana NTT Ventura in Kupang, PT Prima Indonesia in Denpasar-Bali and unregistered local traders. All of these stakeholders in this province only help farmers that participate in their horticultural enterprises (Statistic of Food and Horticultural Crops of NTT 1998).

The Indonesian government regards agricultural extension workers as *'a point of spear'* (front line or the first point of contact) in agricultural programs designed to help farmers (Agricultural Department of NTT 1996). Their most important role is to change farmer behaviour through education and communication so that farmers reach a satisfactory level of better farming, better business and better living. To obtain this level in NTT, there are 1,198 AEWs. Of this number, as many as 139 persons are working in Kupang and 136 persons are working in TTS (Agricultural Department of NTT 1998).

There are two categories of AEWs based on their educational level, namely, Field Extension Workers (FEW) or *Penyuluh Pertanian Lapangan* (PPL) and Agricultural Extension Specialists (AES) or *Penyuluh Pertanian Specialist* (PPS). In practice, the AES are not the same as Subject Matter Specialists (SMS) in the Training & Visiting system. Both FEW and AES are situated in villages or at the sub-district level and in the case of AES at the district or provincial level. They have to undertake their roles in accordance with their level of education as revealed in Table 1.1.

Table 1.1: Matrix of extension workers and their roles

AEW's Roles	High School (FEW)	Diploma (FEW)	Bachelor (AES)	Post Graduate (AES)
Increasing farmers knowledge and skill	X	X	-	-
Conduct plot demonstration	-	X	X	X
Encouraging farmers	X	X	X	X
Program planning	X	X	X	X
Input delivery	X	X	-	-
Monitoring and evaluation	-	X	X	X
Help farmers to find problems	X	X	X	X
Help farmers to solve problems	-	X	X	X
Training other AEWs	-	X	X	X
Produce Brochure	X	X	-	-
Conducting Field School	X	X	X	-
Delivering government projects	-	X	X	X

X indicates this is their role.
Source: Agricultural Department of NTT 1996

Up to now, the Indonesian government has been using an agricultural extension system based on the Training and Visit (T & V) model. In this approach farmers are grouped in accordance with their settlement area not their enterprises. For this purpose, local government has founded around 7,000 groups of farmers called KTNA (group of farmers and fishermen). Extension workers are required to meet farmers either through the group or as individual farmers (Agricultural Department of NTT 1998).

To support the role of AEWs, the Indonesian Government has decentralised authority to local governments. Two important objectives of this policy are to: 1) bring authority for decision making closer to local communities and local resources so as to be more responsive to local needs and problems, and 2) to increase the level of local participation in agricultural and rural development. These objectives support the primary mission of agricultural extension which is to promote the development of human resources, encourage higher levels of local participation and self reliance, and assist in the transfer of agricultural technology (Home Affairs Department of Indonesia 1999).

In reality, in association with horticultural and other commodities development in NTT, the AEWs are facing some serious problems such as: 1) The NTT government does not promote either the skill development or authority of AEWs; 2) the AEWs have responsibility, but not authority and credibility; 3) there is duplication of workers in the same specific programs within departments and between departments; and (4) there is insufficient facilities, lack of professional development, low levels of education and low incomes (E. B. Eha 2000, pers. comm.). These problems cause AEWs confusion and lack of motivation so that they cannot undertake their role effectively. As a result, productivity levels of many crops are low, particularly with horticultural commodities, and farmers' incomes have not increased.

1.2 Research problems

There is a general perception by farmers and the government that extension workers are not performing their role effectively (Agricultural Department of Indonesia 1998). Therefore, the main problem to be addressed in this project is to ascertain if this is the case and if so, why agricultural extension workers do not undertake their role effectively.

1.3 Research objectives

Based on the problem above, the objectives of this project are to evaluate:

1. The role expected of AEWs by farmers, government officers, and AEWs themselves.

2. The perceptions of farmers, government and extension workers of the degree to which AEWs are fulfilling their role;
3. If appropriate, find out the reasons why AEWs are not able to carry out their role effectively.

It is not proposed to evaluate the T & V system in a specific project but rather to evaluate its implementation as a whole extension system. In this study, AEWs refers to both Field Extension Workers and Agricultural Extension Specialists.

1.4 Hypotheses

It is important to examine the perception of farmers, AEWs and government officers towards the roles performed by AEWs and the factors that impede AEWs from effectively carrying out their roles. Therefore, the hypotheses used in this project are:

1. Farmers, extension workers and the government have different perceptions of the roles of AEWs.
2. While AEWs understand their role, there are constraints which impede their ability to deliver these roles. The constraints include: inadequate training, the restructuring of agriculture department, problems with local language, poor access due to geographical conditions, lack of authority, poor salary, poor transport, and bureaucratic processes.

1.5 Summary of methodology

1.5.1 Research framework

This research used Bennet's model of evaluation and a service quality model. Bennet's model (Bennet 1979 as cited by Dart et all, 1998) suggests guidelines for evaluation of extension activities whilst the service quality model (Chakrapani 1998) identifies factors influencing farmer's satisfaction with service provided by extension.

1.5.2 Location of interest

This research was carried out in Kupang and TTS districts of NTT. Six villages in six sub-districts in Kupang and TTS districts were selected. They are 1) Kupang Timur (village Oesao), Kupang Tengah (village Noelbaki) and Kupang Barat (village Sumlili), Molo Utara (village Netpala), Amanuban Barat (village Nusa), and Kopeta Soe (village Oebesak). The main reason why these districts were selected is that the production of

vegetables in Kupang district is the biggest (24%) of total horticultural production of NTT province, whilst the production of fruits in TTS district is the biggest (16%) of the total fruits production of NTT province (Statistic of Food and Horticultural Crops of NTT 1998).

1.5.3 Populations of interest and sample size

The populations for this research consist of three groups, namely 1) farmers, 2) extension workers and 3) government officers. All government officers (32) who are directly responsible for extension services and 46 of the 58 AEWs working under BIPP Kupang and TTS districts supervision were interviewed. Finally, a sample of 223 farmers were interviewed. There were two criteria for selecting farmers, namely: 1) they plant or cultivate horticultural crops, and 2) they are the main farm decision maker.

1.5.4 Design and conduct of survey

The research was conducted in five stages: 1) preliminary investigation including literature review and expert interviews, 2) survey of government officers, 3) survey of farmers, 4) survey of AEWs, 5) follow-up investigation of smaller sample of government and AEWs to verify responses. Pre-testing of all survey questionnaires with the population of interest was carried out before conducting the survey. Letters of permission from the government were sent to participants prior to making appointments to conduct the interview. Information was recorded on tape and in writing.

1.5.5 Data required

Secondary data came from a literature review and Agricultural Division and BIPP, BPPs in Kupang and TTS, Agricultural Department and Agricultural Statistic of NTT, and Agricultural Department of Indonesia.

Primary data was collected from interviews of AEWs, farmers and government officers. Apart from demographic information, the survey included information on satisfaction with roles, performance of roles, involvement in extension activities, and suggestions for improvement. Farmers were also asked about the questions relating to their farming activities and satisfaction with the quality of extension services.

1.5.6 Data collection and analysis

Primary data was collected by semi-structured face-to-face interviews with respondents.

Data was entered into the SPPS program. Categories were developed for open-ended questions. Initially, data analysis used descriptive statistics such as numerical and graphical techniques for organising and presenting data, averages, percentages, proportions and frequency distributions, (Argyrous 1996; Malhotra, et al., 1996).

Cross tabulations and Chi-square tests were conducted based on hypotheses identified from the literature, worked stages of the study and observations made during the interview process.

1.6 Concluding remarks

The role of agricultural extension and AEWs is important in improving farmer capability in growing their crops. As noted by Obbine (1992) the AEW has a strategic position as a link between research and farm families and is crucial in promoting rapid acceptance and utilisation of improved farm technology. In addition, Ashraf (1993, p. 71-73) noted that 'inefficiency of extension workers is highlighted as one of the reasons why agricultural production does not improve to full capacity'.

So far, in the NTT province there is no local research to provide relevant technological information to those who are involved in extension services. Therefore, the finding of this project will be important information to the government to refine and improve extension services in NTT.

1.7 Structure of the thesis

Chapters 2 and 3 contain the study site and literature review which provide information about the survey area, operation of the T & system, organisation of agricultural extension in Indonesia, and factors influencing the effectiveness of extension services. In Chapter 4, the research methodology is discussed. Chapter 5 contains the results organised into main sections, demographic information, perception of AEWs roles, evaluation of service delivery, factors influencing AEWs effectiveness, and suggestions for improvement. Finally in Chapter 6 and 7 the findings are discussed and conclusions are outlined.

Chapter 2: Study Site

2.1 Introduction

This chapter contains general information about the research location. It comprises of the general information on East Tenggara Timur (NTT) province, the general information on Kupang and TTS districts including horticultural crops, livestock, and the population.

2.2 East Nusa Tenggara (NTT)

Nusa Tenggara Timur (NTT) province is one of 29 provinces in Indonesia and consists of 14 districts and 563 islands. The 14 districts are Kota Madya Kupang; Kupang; Timor Tengah Selatan (TTS); Timor Tengah Utara (TTU); Belu; Sumba Barat; Sumba Timur; Manggarai; Ngada; Ende; Sikka; Flores Timur; Alor, and Lembata. The first five districts are located in West Timor. In addition, there are nine other inhabitated islands, such as Flores, Sumba, Palue, Komodo, Alor, Solor, Adonara, and Lembata (Figure 2.1).

Nusa Tenggara Timur province is a semi-arid area with two seasons, a wet season lasting from November until March and a dry season lasting from April until October (Meteorology Bureau of Kupang 1998). In the wet season rainfall ranges from 1000 mm to 2500 mm with an average of 1500 mm. The highest temperature in the dry season reaches 36 degrees Celsius and the lowest temperature in the wet season can fall to 10 degrees Celsius, as occur in TTS and Ngada districts. In the dry season the wind blows hard, whereas in the wet season the rain is intense, but variable, with little wind. These two factors both cause a decrease in land fertility in that top soil is lost by wind in the dry season and by floods in the wet season.

Farmers can only run their farms effectively in the wet season. They plant corn, legumes, and horticultural products such as, oranges, mangoes, bananas, garlic, onions, carrots, and leafy vegetables. In the dry season, many farmers have no farming activity except growing amaranth and watermelons. However, some creative farmers undertake cattle, pig, and goat raising (Statistic of Food and Horticulture Crops of NTT 1998).

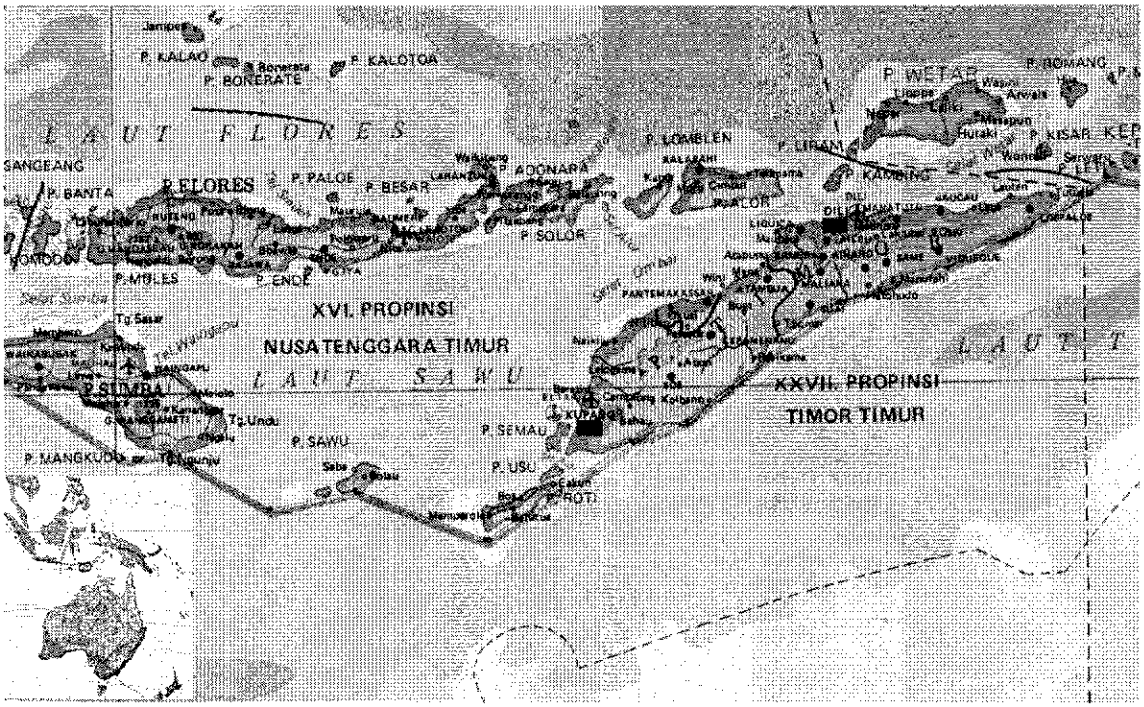

Figure 2.1. Map of the NTT province

A shifting and mixed farming system is common for most farmers. In this system they plant different seeds together such as corn, legumes and sorghum in one hole (i.e., the one hole system), shifting the cultivation plot after five years or more, and returning five or more years later. Usually this system is subsistence oriented. On the other hand, in the same district, there are some market oriented commodities such as oranges, garlic, onions, coconuts, bananas, carrots, oranges, cabbages, cucumbers, watermelons, chokoes and chilies. The farmers cultivate and plant these commodities in a dry-land garden.

In NTT the total area of dry land planted for all commodities mentioned above is 626,000 hectares, leaving 902,000 hectares uncultivated (Statistic of Food and Horticulture of NTT 1998). Among the cultivation area 82,012 hectares are fruit crops and 18,495 hectares are vegetables crops.

There are nine main cash crops in NTT that are sources of income for farmers. These are coconuts, coffee, cacao, cloves, cashews, cotton, vanilla, tobacco, and areca nuts. The majority of coconuts crops are planted in Sumba, Sikka and Ende, whilst coffee, cloves and vanilla are planted in Manggarai, Ngada, Ende, Sikka and Belu districts. The majority of cashews are planted in Flores Timur, Belu and Kupang districts. Kinds of cash crop in NTT are shown in Table 2.1.

Table 2.1: Cash crops in NTT

Types of crops	Harvested Area (ha)	Yield (tonnes/ha)	Production (tonnes)
Coconuts	170,235.20	0.349	59,553.15
Candle Nuts	71,108.64	0.181	12,518.67
Coffee	58,339.24	5	12,163.61
Cashews	124,790.41	0.085	10,960.25
Areca Nuts	30,841.63	0.194	4,092.66
Cacao	30,119.29	0.27	3,089.05
Kapok	28,173.70	0.092	2,425.50
Cloves	11,241.58	0.08	897.48
Vanilla	1,608.39	0.007	312.79
Tobacco	2,592.70	0.02	45.5
Cotton	806.58	0.063	44.47
Total	529,857,360	6.341	105,973.85

Source: Agricultural Statistic of NTT 1998

Food crops are cultivated by farmers in all districts, but the majority of rice is cultivated in Sumba, Manggarai, Ngada, Ende and Kupang districts, whilst most maize is cultivated in Kupang, TTS, TTU and Belu districts (Agricultural Statistics of NTT 1998). The main food crops cultivated by farmers are shown in Table 2.2. Due to the utility of these crops, they are the main foods of the people.

Table 2.2: Main food crops in NTT.

Type of Crops	Area Harvested (ha)	Yield (tonnes/ha)	Production (tonnes)
Cassava	72,847	9.5	689,373
Maize	231,981	2.1	483,793
Paddy	165,540	2.6	432,219
Rice	93,459	3.2	297,724
Sweet Potatoes	8,783	7.6	66,644
Green peas	24,246	.8	19,580
Peanuts	9,980	1	9,797
Sorghum	7,066	.8	5,414
Soybeans	3,850	.8	2,917
Total	61,7752	24.99	200,7461

Source: Agricultural Statistics of NTT 1998

There are also eight main fruits and 14 vegetables that are planted and cultivated by farmers. fruits are cultivated by farmers in all districts, but each districts has a particular fruit that is well renowned such as mangoes in Kupang, Sikka and Flores Timur; oranges in TTS, Bananas in Ende, and watermelons in Kupang (Agricultural Statistic of NTT 1998).

Among the fruits are avocado, oranges, mangoes, jack fruits, pineapples, papaya, watermelons and bananas as shown in Table 2.3.

Table 2.3: Main fruit crops in NTT

Type of fruits	Harvested Area (ha)	Yield (tonnes/ha)	Production (tonnes)
Mangoes	8,143	4.08	33,186
Bananas	4,501	4.48	20,155
Oranges	2,018	4.28	8,637
Papaya	1,788	4.06	7,251
Jack fruits	1,119	4.06	4,542
Avocados	837	4.84	4,050
Pineapples	961	3.45	3,317
Watermelons	382	4.53	1,726
Total	19,749	33.78	82,414

Source: Agricultural Statistic of NTT 1998

The 14 main vegetables are onions, garlic, potatoes, cabbages (*sawi*), carrots, red-beans, long-beans, chilies, tomatoes, egg plants, cucumbers, squash (*labu siam*), leafy vegetables (*kangkung)* and amaranth (*bayam*). The total area and production of these vegetables for 1998 are shown in Table 2.4. All of these vegetables are spread over 14 districts in NTT and sold at the local markets, except chilies, onions, and garlic which are also sold at national market level. However, cabbages, carrots, potatoes, garlic and onions are mostly cultivated in Kupang, TTS, Belu, Ende, Ngada, Manggarai and West Sumba (Agricultural Statistic of NTT 1998).

Table 2.4: Main vegetables in NTT

Type of vegetables	Harvested Area (ha)	Yield (tonnes/ha)	Production (tonnes)
Cabbages	759	4.03	3,935
Onions	979	3.36	3,293
Red-beans	1,592	1,999	3,183
Egg-plants	574	4.79	2,748
Cucumbers	501	4.73	2,371
Long-beans	1,100	1.99	2,186
Tomatoes	473	4.13	1,954
Garlic	487	3.5	1,705
Potatoes	347	4.38	1,518
Amaranth	645	1.81	1,169
Carrots	254	4.43	1,124
Chilies	639	1.48	947
Squash	147	4.66	688
Leafy vegetables	388	1.16	448
Total	8,885	2,043	27,269

Source: Agricultural Statistic of NTT 1998

2.3 General description of study districts

Kupang and Timor Tengah Selatan (TTS) districts are located in West Timor in East Nusa Tenggara province (Figure 2.2).

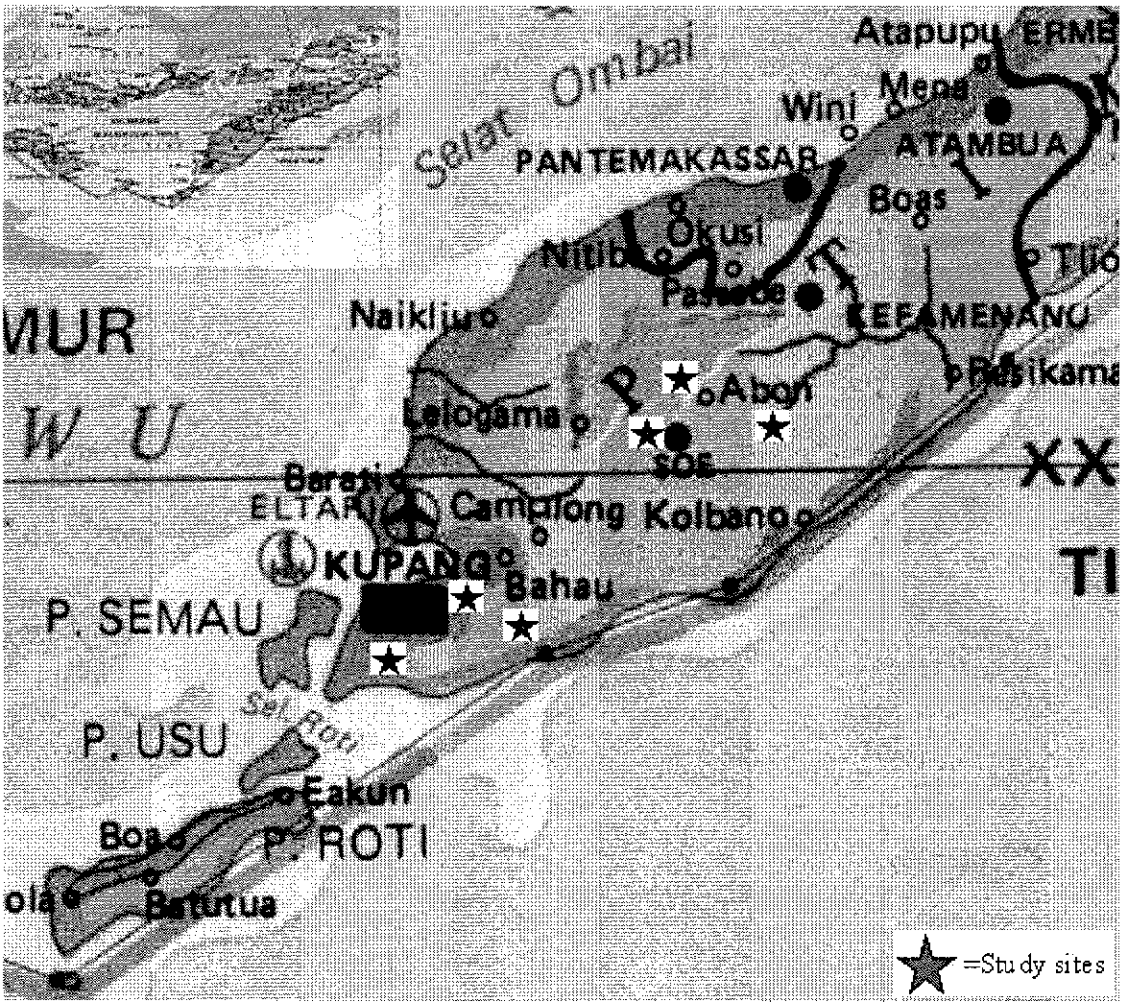

Figure 2.2. Map of West Timor and location of the study sites

The area of Kupang is 7,178 sqkm and TTS is 3,947 sqkm (Statistic of NTT 1998). Around 92% of the area is dry land . In 1999, the populations in Kupang and TTS districts were 384,638 people and 382,701 people respectively. At the same time, the total number of economically active people in Kupang and TTS was approximately 118,621 people and 149,72 people respectively. Another employment sector in these districts is the civil service, which absorbs 6% in Kupang and 3% in TTS. This sector is currently the main target sector the younger career aspirants but it only 6% for Kupang and 3% for TTS (Statistic of NTT 1998).

Agricultural production is central to the economic structure of both districts. The contribution of the agricultural sector to the regional net income of these areas is 45% and 60% respectively (Statistic of NTT 1998). The economic structure of both districts is shown in Table 2.5.

Table 2.5: Contribution of sector to the net income of Kupang and TTS in 1998

District	Kupang(%)	TTS(%)
Agriculture	45.1	60.1
Public service	26.2	16.7
Industry	2.2	10.9
Trading	17.1	8.4
Construction	9.0	5.4
Transportation	13.9	4.5
Finance	4.9	2.8
Mining	0.6	0.9
Electricity & water	0.4	0.4
Total	100	100

Source: Statistic of NTT 1998

Most people who work in the agricultural sector are farmers. In 1998, around 80% of the population of each district were small farmers who owned land averaging approximately 0.5 ha. The income level of Kupang was only about Rp.2 million per capita per year and this income was the highest income in NTT. Meanwhile, farmers in TTS earned Rp.937,000 per capita per year (Statistic of NTT 1998). Despite the abundance of fruit and vegetables, these districts still have a high poverty level (Statistic of NTT 1998). Therefore, they are still the main target of national and provincial programs to increase farmers' income.

Farmers in both districts, like the farmers in other districts in NTT, grow cash crops, food crops and horticultural crops. Generally, farmers in this area grow crops, using a mixed farming system called '*tumpang sari*' or '*tanam campur*', and the *one hole system* called '*salome*' that stands for '*satu lobang rame-rame*'. Such inter cropping systems are typical of the agricultural systems in these areas, however, in wet areas, farmers also run mono-culture systems such as rice. The main crops cultivated by farmers in Kupang and TTS are dry land rice, corn, vegetables, fruits, coconuts, coffee and cashews are shown in Table 2.6. As can be seen in Table 2.6, corn is one of the favorite crop in these areas with planting size in Kupang 18,354 ha and in TTS 46,436 ha. This is because this crop is used as the main food for the people of West Timor. A typical food made of corn called *succotash* has long been very popular with the people

of these districts. Even so, farmers here also grow rice, coffee, cashews and horticultural crops.

Table 2.6: Kinds of crops in Kupang and TTS districts for 1999

Kind of crop (ha)	Kupang	TTS
Dry land rice	4,767	176,000
Corn	18,354	46,436
Vegetables	2,228	1,980
Fruits	4,373	1,224
Coconuts	15,890	4,774
Coffee	189,150	10,412
Cashews	5,181	619,600
Total	239,943	760,426

Source: Statistic of NTT 1998

In the interest of increasing the income, farmers in these areas also raise domesticated livestock, such as cows, pigs, goats and poultry. The kinds of livestock cultivated by farmers are shown in Table 2.7. The four greatest numbers of livestock in Kupang are domestic hens, laying hens, pigs and goats whilst domestic hens, cows, pigs, and horses make up the greatest numbers in the district of TTS. Nevertheless, these two areas are both well known as sources of cows for NTT province, especially for West Timor.

Table 2.7: Kinds of livestock in Kupang and TTS districts in 1999

District	Kupang	TTS
Livestock (number)		
Cows	236,022	244,790
Buffaloes	32,272	2,858
Horses	17,361	18,111
Pigs	496,421	186,507
Goats	354,270	61,253
Lambs	130,729	
Domestic hens	1,835,727	657,478
Laying hens	819,548	
Ducks	16,935	7,667
Total	3,939,285	1,178,664

Source: Statistic of NTT 1998

2.4 Concluding remarks

It is important to know that this research has taken place in West Timor, a part of NTT province. West Timor consists of five districts namely, Kodya Kupang, Kupang, TTS, Timor Tengah Utara (TTU) and Belu. The last district borders East Timor.

The district of Kupang is the closest distance to the capital city of NTT, Kupang. Farmers in this district have a high motivation to grow vegetables such as, chillies, cabbages, long beans, and cucumbers, because the main market for these vegetables is the people of Kupang city. Most vegetables sold in the city come from farmers in this district.

Meanwhile, the district of TTS borders the district of Kupang. The capital city of TTS called Soe is about 110 km away from Kupang city. Most farmers grow vegetables and oranges. Farmers from this district are well known as orange producers. However, they also produce onions, cabbages, chokoes and carrots. Oranges from this district are sold at the local, regional and national market level whilst vegetables are sold at the local and regional market level.

Chapter 3: Literature Review

3.1 Introduction

This chapter contains a review of literature concerning agricultural extension and the roles of agricultural extension workers (AEWs). The purposes of this review are to provide background about the function of agricultural extension and to outline the features of the T & V system along with its advantages and disadvantages. The organisation of agricultural extension in Indonesia and the roles of AEWs are also discussed

3.2 Defining agricultural extension

It is important to define agricultural extension, because as a branch of scientific knowledge and endeavour, this describes its characteristics such as goals, philosophy, methodology and strategy.

Mardikanto (1982) and Adams (1982) state that agricultural extension is a kind of non-formal education which is given to farmers and their families, who live in villages. Agricultural extension is also defined as education for rural communities which could be undertaken at home and other places where farmers live (Ganardi 1971). Furthermore, Kartasapoetra (1987, p.11) noted the aim of agricultural extension is to 'teach people living in rural areas how to raise their standard of living, by their own effort, using their own sources of manpower and materials, with minimum assistance from government'.

It is clear that there are different views about what agricultural extension is. However, there are some critical points to include in agricultural extension: non-formal education, rural community, and technology or new practice. The subject of extension, the communication method, the right time and the principles of learning by doing can also be included. Oakley and Garforth (1985) conceded there are eight factors within agricultural extension: social, cultural, extension method, personal, planning, subject or material, evaluation and extension agenda. Hossain and Crouch (1992) suggested that AEWs have to introduce appropriate practices while respecting the local customs, traditions, values and attitudes of farmers.

Based on the criteria above, it could be concluded that agricultural extension is non-formal adult education, which is intended to help farmers and their families who live in villages, by introducing appropriate technologies or specific subjects at the right time. This definition suits the extension philosophy as suggested by Samsuddin (1982). First, extension is an educational process; second, extension is democratisation of people to use materials suggested by extension officers and third, extension is an on-going process.

Agricultural extension has both short-term and long-term objectives. The long-term objective is that of helping farmers to choose an appropriate technology or practice which can lead to better farming, better business and better living. The short-term objectives are for farmers to change their attitudes, knowledge and skills. Farmers will not reach a satisfactory level of farming, business and living unless they have reached these short-term objectives (Mardikanto 1982). On the other hand, Hawkins et al. (1982) suggested that there are three objectives of agricultural extension: 1) primary extension goals including: increasing living levels, develop commercial orientation, increase evaluative ability, increase production, increase productivity, and increasing innovativeness; 2) secondary extension goals including: meeting client's needs, serving as change agency and understanding client; and 3) tertiary extension goals including: adoption of innovations, using methods skilfully and avoiding conflict. Those goals can only be reached in conditions that include a good atmosphere for running extension services, good capability of AEWs, good facilities and farmers having a good level of education, owning land, cosmopolitan, and business oriented.

According to Van den Ban and Hawkins (1996), in developing countries including Indonesia, agricultural extension faces problems such as: 1) lack of appropriate technology available to extend; 2) absence of clear linkages between extension organisations and agricultural research institutions; 3) limited training by extension workers in practical technology, extension methods and communication skills; 4) insufficient transport facilities to reach farmers; 5) lack of visual aids by extension workers for essential teaching of farmers with low levels of education; 6) excessive tasks of extension workers besides extension work; 7) lack of communication media such as bulletins, demonstration materials, and brochures by extension workers.

Despite problems faced by developing countries, the extension goals can be reached if the government has a strong commitment to help farmers and is prepared to release projects or money oriented for the purpose of running agricultural development (Howell 1983). The government also requires understanding of the important issues on extension: 1) the philosophy of extension; 2) strategy of development in small-scale; and low-income agriculture; 3) organisation and management under a Training and Visit (T & V) system; 4) standardisation of the criteria for assessing the success of the T & V implementation.

In order to help farmers, Van den Ban and Hawkins (1988, 1996) suggested agricultural extension should be a process of helping farmers to be aware of their present and future situation, helping farmers become aware of problems and develop insight into problems, helping farmers to increase their existing knowledge, helping farmers find certain knowledge in relation to specific problems, encouraging farmers to choose alternatives suitable with their situation, encouraging farmers to implement their choice, and helping farmers to evaluate their opinion-forming and decision-making skills.

To obtain those objectives, Van den Ban and Hawkins (1988, p. 24) suggested that extension organisations have the choice of three different strategies:

1. The development and influence strategy, 'doing to', or working to get the farmers in a situation considered desirable by the extension agent.
2. The social marketing strategy, 'doing for', or working for the farmers' interest.
3. The problem solving strategy, 'doing with', or working jointly with the farmers to solve their problem.

The strategy of 'doing to' should only be undertaken in circumstances in which farmers are locally minded, are not yet aware of their interests and problems. This situation is frequently found in developing countries (Blackenburg 1982; Van den Ban and Hawkins 1996; Ferreira 1997). The second strategy, 'doing for' can be run in the market-oriented communities aware of their interests and problems but lacking knowledge and skills. They need a facilitator to work with them. The strategy of 'doing with' can be undertaken in a community aware of their interests and problems, who have knowledge and skills, but no experience to solve their problems. In this situation, AEWs should facilitate farmers with respect to improving local knowledge, skills, status

and role of local people. As all Indonesian communities face all the problems above, the extension service should combine the three strategies.

Although extension may use a combination of strategies to be effective, Van den Ban and Hawkins (1988, 1996) suggest an effective extension program requires understanding of local area problems, appreciation and understanding of farmers' capability, commitment and responsibility of agricultural extension institution, appropriate policies of government, understanding social ethos of the extension agent, and understanding of social and cultural systems of the local society.

It is difficult to ascertain the achievements of extension services in Indonesia, because: 1) extension services are based on project needs; 2) evaluation is on official management of funding for projects, not on farmers' activities; 3) few linkages between project goals and follow-up extension activities; and 4) farmers' previous data are not used for program planning for extension service. To measure the achievement of agricultural extension objectives, Bennett (1979) suggested a hierarchy of objectives and evidence for program evaluation in agricultural extension. These are 1) allocation of resources, 2) plans for specified activities, 3) farmer's participation in extension activities, 4) farmer's reactions to extension activities, 5) changes in farmers' knowledge, attitude, skills, and aspirations 6) changes in practices, 7) effects on target groups in the broader society (Dart et al. 1998).

3.3 Agricultural extension policy in general

FAO (1984) suggested that rural development is biased in many developing countries due to the centralisation of top-down or exogenous planning. Sprague (1986) conceded that 'top-down' planning drives agricultural development. Furthermore, Bauer et al., (1997) claimed that in developing countries extension is driven by 'top-down' approaches and based on the government interest, but not farmer interests. According tp Ferreira (1997), because of this approach, two main problems arise, namely: farmers' experience and knowledge are not included in extension approaches, and misunderstandings occur between farmers, AEWs and scientists. In addition, Phiri (1986) found bad coordination between agricultural researchers of different institutions and AEWs, researchers, planners and government policy (e.g. pricing policy).

Nowadays, to overcome these problems, new approaches in rural development are practiced such as planning and enhancement of endogenous development, bottom-up efforts and location and culture-specific appropriate technology (Schneider, 1993). Tola (1988) suggested that to improve the extension services, the government policy should enable the rural economy to produce a marketable surplus by stimulating small farmers to grow more food in order to meet rural needs, allowing individual farmers to produce a surplus for local requirement, and permit sales in urban centres and outside rural areas. Additionally, Currle (1998) suggested it is important that all levels of extension institutions should be involved in introducing, understanding and accepting the program to be delivered. Furthermore, extension workers have to be supervised over the introduction period. Moreover, Sprague (1986) suggested integration among researchers, AEWs, farmers, economists, national planners in providing seed production, input supply, credit and marketing. Also, researchers must conduct research to provide practical technologies to increase production.

Van den Ban and Hawkins (1988, 1996) suggested the government should undertake four roles to manage the system by empowering Rural Extension Centres to: 1) create vital support to the extension system so everybody knows what they have to do; 2) arrange the support system to empower the extension workers so they can understand their role and do their work well; 3) control how well the extension workers undertake their role and help them increase their capability to do their work better; (4) develop a good coordination system between extension agents, research, provision of supplies and marketing.

3.4 Agricultural extension in Indonesia

3.4.1 History

Historically, agricultural extension in Indonesia started before 1969, but received increased attention in the early 70s with the special name 'Mass Guidance in Indonesia' called *Bimbingan Massal* (BIMAS) (Darmawan 1992). At the time, extension services only focused on achieving the national goal of rice self-sufficiency. In 1974, the Department of Agriculture was changed with the creation of the Agency for Agricultural Education, Training and Extension (AAETE). Then, in 1979, extension services began to provide some information on marketing with the establishment of the

Price Information System (PIS) and the Specific Intensification in Indonesia called *Intensifikasi Khusus* (INSUS). These two institutions only concentrated on rice production. Therefore, the extension services in other commodities and marketing were given less attention (Darmawan 1992).

With the aim of improving the effectiveness of extension services, in the 1980s, the Indonesian government adopted the T & V system. With respect to this system, the government through the State Minister and Agriculture Minister released extension rules called '*Surat Keputusan Bersama*'. This rule stated (Agricultural Department of Indonesia 1986):

1. AEWs in Indonesia have multi functions called *Polly vallen*;
2. A group of AEW called Agricultural Extension Coordinating Forum will be formed;
3. The Mass Guidance in Indonesia called *Bimbingan Massal* (BIMAS) will be responsible for extension administration; and
4. Rural Extension Centre (REC) in Indonesia called *Balai Penyuluhan Pertanian* (BPP) will be managed by the Indonesian central government.

In 1991, the government released a new rule to refine the extension services. This rule stated that Rural Extension Centres will be managed by district governments, in particular, the Food Crop Division of each district (Agricultural Department of Indonesia 1991). Finally, in 1996, the government released a new rule for the extension service which was intended to revitalise extension activities. It included the following features (Agricultural Department of Indonesia 1996):

1. An Agricultural Information and Extension Centre (AIEC) in Indonesia called *Balai Informasi Penyuluhan Pertanian* (BIPP) was formed.
2. BPP or Rural Extension Centre must be controlled by the BIPP or AIEC.
3. All divisions dealing with agricultural production such as Food Crops Division, Cash Crops Division, Livestock Division and Fisheries Division have only a coordinating function.
4. The BIPP leader is directly responsible to the *Bupati* (or head) of the district through an assistant of the *Bupati*.

3.4.2 Introduction of T & V model

Since the 1980s, the agricultural system in Indonesia has been dominated by the Training and Visit (T & V) system introduced by the World Bank through the National Food Crops Extension Project (NFCEP). This system was implemented in three phases. First, the project only covered food crops in 13 provinces. Secondly, this system was implemented through a project called the National Agricultural Extension Project (Agricultural Department of Indonesia 1985) in another 13 provinces. In this stage the system included food crops, as well as small-holder estate crops, livestock and inland fisheries. Thirdly, the National Agricultural Extension Project was formed to strengthen extension services based on integrated T & V system for all sub-sectors in all provinces (Agricultural Department of Indonesia 1992).

Although the T & V model has been successful in some countries, it has some weaknesses such as: 1) it uses a top-down approach; 2) it is characterised by one-way communication; 3) it is expensive to run; 4) it needs a lot of AEWs; 5) it is difficult to apply in dry-land areas; and 6) it gives poor attention to local conditions and needs. To be effective, it appears a T & V system requires a number of factors to be in place including convenient geographical conditions, good facilities, high specialisation of human resources in agriculture, and a good managerial government. These conditions do not exist in some states in Indonesia, such as NTT province. According to Agricultural Department of NTT (1999) the system needs:

1. Professional staff who have good knowledge and deep understanding of agricultural research, farmer's experience and the limiting factors in agricultural productivity.
2. Extension staff or AEWs who are only responsible for extension, not for other services such as distribution of inputs, marketing of products and credit provision.
3. Only one system of technical and administrative support.
4. Better communication between AEWs and higher level extension officers in order to enable the service to solve farmers' problems entirely.
5. All staff in connection with extension services must be trained.
6. Supporting research recommendations.
7. Recommendations of research have to be tried by farmers on a small scale.
8. Evaluation and monitoring are very important to improve the quality and efficiency of extension services.

3.4.3 The institutional framework of agricultural extension

There are two departments supporting the agricultural system in Indonesia, namely; Ministry of Agriculture and Ministry of Home Affairs. These two departments are responsible for policy formulation, technical guidance and monitoring functions related to agricultural extension.

There are also some institutions at a provincial level involved in agricultural extension services. First, regional government offices (provincial, district and sub-district, including regional agricultural technical agencies in Indonesia called *dinas* (provincial and district) with technical guidance and coordination functions, Mass Guidance in Indonesia called *Bimbingan Massal* (BIMAS) and The Regional Planning Bureau in Indonesia called *Badan Perencanaan Pembangunan Daerah* (BAPPEDA) at provincial and district levels. Second, to implement the function of extension services the Rural Extension Centre (REC) in Indonesia called *Balai Penyuluhan Pertanian* (BPP) has been created with specialised technical units such as cash crop implementation units, livestock health centre, fishery marketing centre, and villages institutions including, Village Cooperative Unit (KUD), farmers' groups and Water Users Association.

In 1991, collaboration occurred between the Ministry of Agriculture (MOA) and the Ministry of Home Affairs (MHA), ruling on agricultural extension to support the realisation of regional autonomy (Agricultural Department of Indonesia 1991). This was intended to expand the role of the district level government and agricultural line agencies to handle extension services as follows.

1. The Rural Extension Centre (BPP) AEWs in Indonesia called *Penyuluh Pertanian Lapangan* (PPL) with civil service status, and the authority for placing AEWs in the Extension Working Areas in Indonesia called *Wilayah Kerja Penyuluhan Pertanian* (WKPP) were all transferred to and put under the administrative and management responsibility of the district government.
2. An annual central subsidy for running the Rural Extension Centre (BPP) and for salaries and field activities of the AEWs called SBBO-PPL was transferred to the district government to be officially arranged by the sub-sector agencies for their respective REC and AEWs.

3. Responsibility for operational components of agricultural extension services was divided into the four sub-sector agencies, i.e., food and horticultural crops, estate and cash crops, fisheries and livestock sectors.

In 1996, to increase the effectiveness of extension services to meet farmers' needs and problems, the Minister of Agriculture and the Minister of Home Affairs refined the structure of extension service guidance as shown in Figure 3.1. The structure shows that the agricultural extension framework in Indonesia consists of six levels. They are:

1. Ministry of Agriculture (MOA), Ministry of Home Affairs (MHA), and Ministry of Forestry;
2. Directorate General of Agricultural (DGA). At the national level, Directorate Generals provide technical guidance by sub-sector. The Mass Guidance in Indonesia called *Bimbingan Massa* (BIMAS) supports the food crop intensive guidance strategy;
3. Regional offices of central agency called *Kantor Wilayah Pertanian* situated at provincial level and BIMAS situated at provincial and district levels for supporting the food crop intensive guidance strategy;
4. Regional and local division called *dinas* situated at provincial and district levels;
5. Government for district level;

Figure 3.1 also shows there are five technical divisions to support agricultural extension. They are:

1. Centre for Agricultural Extension (CAE) at national level;
2. The Agency for Education and Training (AAET) at national and provincial level;
3. Agency for Agricultural Research and Development (AARD) at national and provincial level;
4. District Agricultural Information and Extension Centre (DAIEC) called 'BIPP' situated at district level;
5. Rural Extension Centre (BPP) situated at village level.
6. Government for sub-district level and village level.

From 2001 onwards the BPP and the District Agricultural Information and Extension Centre in Indonesia called *Balai Informasi Penyuluhan Pertanian* (BIPP), especially in Kupang and TTS districts, have been restructured. The head of the Local Government (*Bupati*) has established a District Agricultural Information and Extension Centre (BIPP) as an agency directly under *Bupati*. Since the implementation of this new

regulation, all administrative affairs of AEWs and BPP were transferred from four sub-sectors of agriculture - Food Crop Division, Fishery Division, Cash Crop Division, and Livestock Division - to the District Agricultural Information and Extension Centre (BIPP). This new organisation handles the management of all extension resources, development and regular activities at the district level. On the other hand, the extension activity at the BPP level would be undertaken by a team consisting of AEWs with different experts as needed by the farming activity in the sub-district.

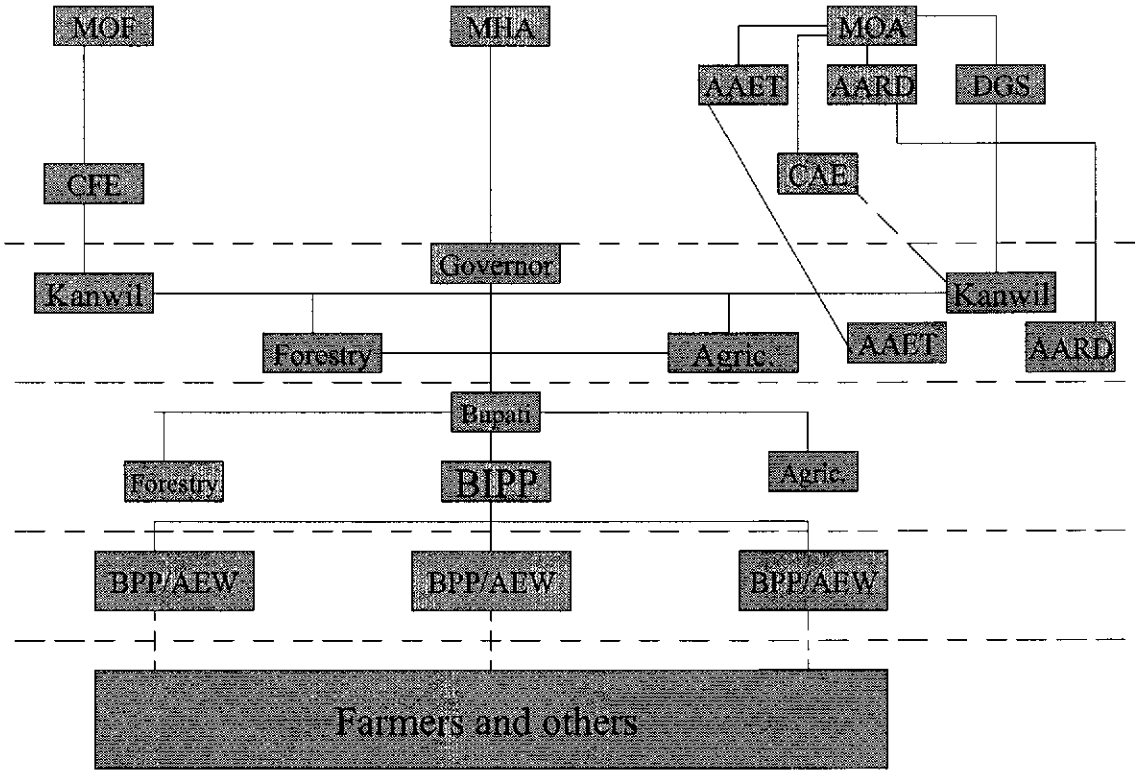

Figure 3.1. The extension framework under the 1996 decree of MOA and MHA

Source: Agricultural Department of Indonesia 1996

There are some problems created by this structure (Agricultural Department of NTT 1999). It seems that the government is mostly concentrated on building up the extension framework rather than concentrating on the service of extension. The function of the Forestry Department in running an extension service is not yet clear. Operationally, this department is totally separated from the agricultural extension service. Overlaps occur in the roles of *BIMAS* and agricultural divisions either in supervising AEWs or undertaking extension programs.

Based on the explanation above, it seems that the structure of the agricultural extension institutional framework is very complicated. The effect of this complicated organisation

to the extension services are: 1) it becomes a very complicated bureaucracy; 2) bad coordination; 3) many AEWs have no chance for promotion and lack rewards; 4) AEWs loose their meeting coordination; 5) mismanagement by BPP; 6) increasing sector rivalries; 7) role competition among the AEWs who work with the different divisions such as: Food and Horticultural Crops, Cash Crops, and Livestock Division (Agricultural Department of NTT 1999).

In this structure the Rural Extension Centre (BPP) is located closer to the village and officially functions as a base camp for AEWs' activities in all villages including in sub-districts. For their weekly activities, AEWs must spend four days supervising farmers and two days in the BPP office. Also, AEWs meetings are undertaken fortnightly to evaluate and to monitor AEW activities (Agricultural Department of NTT 1999). However, Agricultural Department of NTT (1999) claimed that so far AEWs are reluctant to do their job as stated above. The reasons include:

1. BIPP and BPP lack power to support AEW activities because they are not responsible for money;
2. Villages have not been a base-camp for AEW activities because AEWs do not live in the village. They live away from villages under their jurisdiction;
3. Difficulty in controlling AEW activities and lack of facilities, such as motor cycles and typewriters, by AEWs;
4. Difficult to gather AEWs in BPP office (indicate why).

The government has also tried to run extension services based on the *Pancasila* approaches. These approaches require equality among farmers, AEWs and researchers, feedback from farmers and the monitoring of adoption rates to see if recommendations are adopted completely, and the role of farmer groups in building up monitoring systems and accountability. However, there are some constraints to the *Pancasila* namely: a) there is a gap between national targets versus farmers needs; b) the complexity of the agricultural institutional structure; c) the need for a whole-farm approach and consultation framework; and d) the feudal top-down approach in running research and extension services (Padmanegara1985).

3.4.4 Agricultural extension workers and their roles in Indonesia

In Indonesia, there are two categories of extension workers based on their educational level (Agricultural Department of Indonesia 1986). They are: Field Extension Workers

(FEWs) called *Penyuluh Pertanian Lapangan* (PPL) and Agricultural Extension Specialists (AES) *Penyuluh Pertanian Specialist* (PPS). Field Extension Workers are situated in villages or at the sub-district level and the PPS at the district or provincial level.

The government does not recruit PPS based on specialist expertise. The criteria for selecting FEWs are the same for selecting PPS except for the level of education. PPS are graduates of Bachelor or higher degrees in general agriculture, such as social-economy of agriculture, agronomy, livestock and fishery. Hence, the local government does not want to treat a PPS as a Subject Matter Specialist as envisaged in the T & V model. In some cases, a PPS works as an FEW (Agricultural Department of NTT 1999).

The FEWs are recruited by the national government and placed at district level under local government administration. The educational level of an FEW is equal to High School, or Diploma, whilst a PPS is a University or College graduate. FEWs are placed at sub-district level and PPS are placed at district or provincial level. The salary for all AEWs is covered by the Annual District Routine Expenditures called *Anggaran Pendapatan dan Belanja Daerah* (APBD II) which belongs to the district. Operationally all AEWs are working under an assistant *Bupati* and Food Crops Division II management. These two institutions are directly responsible for extension activities including facilities and financial support (Agricultural Department of Indonesia 1986).

The Indonesian government has stated that the agricultural extension worker is a 'point of spear' or the front line in the implementation of agricultural programs. To strengthen AEWs position, the government stated the 12 roles for AEWs as shown in Table 1.1. They are: 1) increasing farmers' knowledge and skills; 2) conducting plot demonstration; 3) encouraging farmers to participate in extension activities; 4) planning of extension programs; 5) input delivery; 6) monitoring and evaluation; 7) helping farmers identify problems; 8) helping farmers solve problems; 9) training other AEWs; 10) producing brochures; 11) conducting field school; and 12) delivering government projects.

Officially, as shown in Table 1.1, the roles undertaken by AEWs depend on their level of education. For example, AEWs who graduated at Diploma and High School level are officially not allowed to undertake the role of project delivery. But, in fact as has been

noted, AEWs from all levels of education deliver all roles (Agricultural Department of NTT 1999)

3.4.5 Agricultural extension policy in East Nusa Tenggara (NTT)

Referring to the national policy, the local government of NTT has issued an extension policy to increase the role of extension services through group approaches under the T & V system. For the sake of this objective, the local government has created extension guidelines for extension officers. This guideline emphasises the following points: 1) farmer understanding and to increase farmer motivation; 2) supervising farmers' activity in their groups in terms of planning (including need identification); implementation and evaluation; 3) giving direction for farmers to adopt new technology; 4) supporting farmers in problem solving, in particular farm credit, input usage and marketing; 5) encouraging contact-farmers' leadership and group development; 6) cooperation and coordination with other department field workers; 7) monitoring and reporting regularly (Agricultural Department of NTT 1996).

This direction is basically influenced by a top-down approach which ignores existing knowledge and skills in agriculture. Therefore, it is very difficult to involve farmers in any activity, including extension service (Padmanegara 1985). In addition, the government seems reluctant to apply the rules they make and there are contradictions between the promise and what they do (Regional Planning Bureau of NTT 1998).

In NTT, there are four conditions that impede the quality of extension services: 1) uncertain numbers of farmers to be supervised by AEWs; 2) no SMS because of lack of specialisation of AEWs on technical aspects of agriculture; and 3) in some cases PPS or AES also work as FEW or PPL; and 4) many AEWs do not understand their roles (Eha 2000, pers.comm.).

3.4.6 Educational level of AEWs in NTT

Based on the level of education, most government officers fall into three public-service levels namely, Degree I, Degree II, and Degree III. Those in Degree I are educated at Junior High School, Degree II are educated at Senior High School (SHS) and Diploma, Degree III and IV are educated at university level (Bachelor). However, based on their experience, officers educated at SHS or Diploma can reach Degree III and those

educated at Bachelor can reach Degree IV (Home Affairs Department of Indonesia 1980).

The numbers of AEWs at different levels and their location in BIPP and BPP institutions are shown in Table 3.1.

Table 3.1: Numbers of AEWs, BPPs and BIPPs by district in NTT for 1999.

	Degree					
District	**IV**	**III (AES/PPS**	**II(FEW)**	**Total**	**BPP**	**BIPP**
Kodya Kupang	1	2	1	4	4	1
Kupang	1	15	123	139	9	1
Timor Tengah Selatan	-	13	126	136	7	1
Timor Tengah Utara	-	3	53	69	4	1
Belu	-	7	51	69	4	1
Alor	-	4	47	60	3	1
Flores Timur	-	5	59	73	8	1
Sikka	-	9	68	85	4	1
Ende	-	4	89	100	6	1
Ngada	-	20	59	99	9	1
Manggarai	-	12	127	155	11	1
Sumba Timur	-	7	61	80	7	1
Sumba Barat	-	9	78	102	8	1
Total	2	110	941	1,053	82	13

Source: Agricultural Department of NTT 1999
AEWs: Agricultural Extension Workers
AES : Agricultural Extension Specialist or PPS/ FEW : Field Extension Worker or PPL
*BPP: Balai Penyuluhan Pertanian (*Rural Extension Centre)
*BIPP: Balai Informasi Penyuluhan Pertanianm (*District Agricultural Information and Extension Centre)
PPS : Penyuluh Pertanian Specialis (Agricultural Extension Specialist)

Most AEWs in NTT are at Degree II or equal to High School level of education. More details of AEW educational levels are shown in Table 3.2. It shows that 767 AEWs (64%) graduated from Senior High School (SHS) whilst four Agricultural Extension Specialist (AES), or *Penyuluh Pertanian Spesialis* (PPS), have Masters degrees. About 31% (375) of Agricultural Extension Workers aregraduates of a Diploma degree and 6% (72) have a Bachelor's degree.

Table 3.2: Educational level of agricultural AEWs in NTT.

District	Level of education				Total
	Masters(AES)	Bachelor(AES)	Diploma(FEW)	SHS(FEW)	
Kodya Kupang	-	2	1	1	4
Kupang	1	7	42	89	139
TTS	-	6	51	79	136
TTU	-	3	27	39	69
Belu	-	3	38	28	69
Alor	-	4	21	35	60
Flotim	-	4	20	49	73
Sikka	-	5	25	55	85
Ende	-	2	25	73	100
Ngada	-	2	27	70	99
Manggarai	-	5	39	111	155
Sumba Timur	-	5	25	55	80
Sumba Barat	-	4	29	69	102
Provinces	3	20	-	14	27
Total	4	72	375	767	1.198

Source: Agricultural Department of NTT 1998

It is apparent that the low levels of education of AEWs in this region may result in problems such as, lack of communication skills, lack of knowledge for planning and evaluation, lack of knowledge and skills in agriculture and lack of leadership competencies. Those problems might cause AEWs to lack capability or performance. AEWs educated at Senior High School are unlikely to get promoted (Home Affairs Department of Indonesia 1980). Haynes (2000) found demographic characteristics including tenure, had a significant impact on the competencies of leadership, development of coworkers, and behavioural flexibility.

3.5 Development of the T & V model

Benor created and tried the T & V system in Turkey in the 1970s (Benor and Harrison 1977) and later this system has been applied in India on crops under irrigation (Pickering 1983 as cited by Van Wateren and Botha 1992). In the last few decades, since 1975, the T & V system has been developed by the World Bank into the most significant organizsational development of extension (Van den Ban and Hawkins 1996). At the beginning of its application, it spread over South and South-East Asia. By enhancing the effectiveness of extension services, this system has significantly increased agricultural production, particularly in irrigated areas (Van den Ban and Hawkins 1996). By contrast, the system has not been successful in Africa. The main goal of a T & V system is to change agricultural production technology. To achieve that

goal, it focuses on training extension workers to assist farmers and establishing close links to agricultural research.

3.5.1 Characteristics of the T & V model

The T & V system has five main characteristics namely, training, visiting farmers, and farmer groups, contact farmers, research recommendations, and management of the system.

Training

The most important thing in a T & V system is to run training for AEWs regularly. Russel (1983) suggested that a key component of a T & V system is running regular trainings for AEWs. Every two weeks extension workers have to be trained in order to support them for the next fortnight (Williams and Bembridge 1990). Others are not so prescriptive but still argue that to obtain good performance from AEWs in running their role, they have to be trained regularly in combination with standard assessment (Fradkin and Fradkin 1982; Sundaraswamy and Perumal 1992).

Visiting

According to Benor et al. (1984) one AEW reaches 500 to 1,200 farm families and AEWs must spend eight days in every two weeks visiting farmers. AEWs should have a schedule for visiting contact farmers and groups (Williams and Bembridge 1990)

Research support

The T & V model needs two-way communication between farmers, AEWs, researchers and administration staff (Johnston and Clark 1982; Van den Ban and Hawkins 1988); and links with research recommendations (Williams and Bembridge 1990). Onazi (1992), Kartasapoetra (1987) and Obbine (1992) suggest the T & V system can promote rapid acceptance and utilisation of improved farm technology by linking researchers, farm families and planners. Additionally, Sprague (1986) believes extension needs not only research recommendations but also support by other institutions such as planners, economists, input providers and marketing.

Contact farmers (CF)

Pickering (1983) suggested that each group of 10 farmers have one contact farmer. To facilitate farmer visits by AEWs, each ten farmers chooses one contact farmer who is visited by the AEW every two weeks on a predetermined day. AEWs use a contact

farmer selected to support their tasks (Williams and Bembridge 1990). Muhamad and Graforth (1998) believe that contact farmers should have a good level of education.

Farmers' groups

According to Van den Ban and Hawkins (1988, 1996) each AEW is responsible for 800 farmers and eight AEWs are supervised by an Agricultural Extension Officer (AEO), The number of farmers' groups must be limited so extension workers can visit and train farmers easily. On the other hand, Benor et al. (1984) suggest that one AEW reaches 500 to 1,200 farm families.

Subject Matter Specialists (SMS)

Technical support is provided to AEWs by Subject Matter Specialists. A Provincial Extension Officer (PEO) with the assistance of three to five Subject Matter Specialists (SMS) control eight Field Extension Workers (Van den Ban and Hawkins (1988, 1996).

Management of the system

The model is centred on providing farmers with relevant, clear, and sensible advice (Johnson and Clark 1982; Van den ban and Hawkins 1996), a clear description and responsibility, undertaking services at the right time and a few activities at a time (Benor et al. 1984; Feder et al. 1985). Pickering (1983) suggests demonstration is the quickest and most successful method of persuading farmers in this system. Hence, Williams and Bembridge (1990) suggest that extension staff must be integrated in extension work, and the extension workers should compile an extension program plan in which effort concentrates on only one enterprise.

There are conditions needed to run this system effectively: 1) the capability of contact farmers to deliver a message to other farmers; 2) motivation of extension staff; 3) training qualifications of field staff supervisors and subject matter specialists; 4) transport facilities for staff; 5) access to the results of new research; 6) commitment from government to undertake the system effectively (Blanckenburg 1982); 7) close links with research institutions; 8) job direction is simple and clear; 9) AEWs who visit farmers frequently are regularly trained; 10) a suitable location for the extension office and extension workers living in the villages where they serve (Kumuk 1992); 11) contact farmers should have an education level to at least primary level, be older, be owner cultivators with either formal or informal social status and good access to

resources and are easy to approach by the extension workers (Muhamad and Garforth (1998), 12) need university support (Seepersad 1993), Rao and Rao (1998) suggest that AEWs should have the authority to make decisions on the merits of the problem, and Librero and Broonrung (1978) suggested that guidance and direction of extension requires careful study, because extension service involves a variety of extension institutions.

3.5.2 Evaluation of T & V model performance

Because the T & V model has been so widely used, its successes and failures have been documented. Rouse et al. (1995) suggest it has led to dramatic increases in per capita cereal production in the early years of the system implementation in some developing countries such the Philippines, India and Pakistan. However, they also found it to be more useful for farmers who had large and medium size land holdings (Rouse et al. 1995). It has also led to improved communication of innovations to enhance agricultural production by contact farmers (Sherief et al. 1993). This finding was backed up by Bajaj (1989) who found that in India this system had a close linkage between extension officers and researchers, and there was frequent communication between extension workers and contact-farmers.

Some researchers also conceded two main constraints faced by this system. They are a top-down approach and high cost. The top-down approach may lead it to becoming overly dependent on routine diffusion of messages and generally unsuccessful in taking farmer constraints and priorities into account (Chowhury and Gilbert 1996). Then in developing countries it was dominated by 'top-down' approaches, where the system was driven by extension services or government interests not farmers' interests, and farmer aspirations were manipulated and changed for reasons which were not clear (Bauer et al. 1997). Despite the election of contact-farmers, many farmers got information from non-contact farmers (Sherief et al. 1993). This system faced lack of regularity of visiting farmers to select contact farmers, and the extension workers could not cover a large number of farmers (Sharma 1992).

It is also conceded by Blanckenburg (1982), Abdul et al. (1991), Panghal et al. (1994), in Bangladesh and India that this system has many challenges including the capability of contact farmers to deliver a message to other farmers, training qualification of supervisors for field staff and subject matter specialists, transport for staff; research

results, a commitment from government to undertake the system effectively, marketing, poor technical guidance, and needed big investments and huge numbers of manpower. Asiabala and Basimile (1991) also noticed, in India, this system faced a complex bureaucracy. The big investment was backed up by (Abdul et al. 1991) who claimed that the system has high costs and needs a lot of extension workers.

3.5.3 Summary of T & V models

In the Indonesian context, it has been suggested (Agricultural Department of NTT 1999) that the government should pay more attention to: 1) the function of contact farmers; 2) apply awards and punishment system to push AEW motivation; 3) regularly undertake training for all AEWs; 4) Research Bureau should back up extension activity with new research results; 5) government should be concerned with extension activity; 6) provide marketing information of inputs, price and other factors; 7) each AEW should be responsible for one village.

It seems that what is important in extension services is not necessarily the model of extension being used. However, an effective extension system has to meet certain conditions, such as: 1) the extension activities must be based on local needs; 2) farmers have to be involved in planning, implementation, and evaluation of the extension activities; 3) more appreciation on farmer's knowledge and skills required; 4) enable farmers to access easily the agricultural production inputs; 5) access to marketing information, and 6) AEWs should undertake the roles of facilitators and communicators of farmers activities.

3.6 Contribution of AEWs to agricultural extension

All programs designed to improve the quality of rural community life will be more effective if extension agencies undertake their work in a well-informed way. Agricultural extension becomes a bridge between the agricultural or rural program planner, agricultural system researchers and farmers (Onazi 1982, Kartasapoetra 1988). The important contribution of agricultural extension to agricultural development has been recognised around the world, in particular in the Third World (Van den Ban and Hawkins 1988, 1996). This is because extension services help promote rapid acceptance and utilisation of improved farm technology by linking researchers and farm families (Obbine 1992).

3.6.1 Expected Roles for AEW

How AEWs undertake their roles will determine the success of the extension services. Northouse and Northouse (1992) as cited by Van den Ban and Hawkins (1996) mentioned that there are four expected roles to be undertaken by AEWs, namely: 1) help farmers with a beneficial decisions; 2) focus on what farmers need and not be paternalistic; 3) allow farmers to make decisions based on their own autonomy; and 4) be honest, and mention advantages and disadvantages of the new practices that will be given to the farmers.

Van den Ban and Hawkins (1988, 1996) noted that by sharing the roles farmers and AEWs can help each other as shown in the Table 3.3. The only aspect which is totally provided by AEWs is the interest and expertise of an extension agent. AEWs should learn from farmers' knowledge of current situation, desired situation knowledge, chose exactly desired situation, and farmer's knowledge of effects of previous extension services.

Table 3.3: Contribution of farmers and AEWs in planning extension program

Activities	Farmers	AEWs
Current situation knowledge	xxx	X
Knowledge of situation expected to be achieved	x	xxx
Factual farmers problems	xxx	X
Knowledge of alternative solutions for these problems	x	xxx
Desired situation knowledge	xxx	X
Chose exactly desired situation	xxx	X
Chose exactly target group	xx	Xx
Knowledge of consequences of innovation adoption by farmers	xx	Xx
Knowledge of effects of using different extension methods	xx	Xx
Farmers knowledge of previous extension effected	xxx	X
Knowledge of extension resources	x	xxx
Interest and expertise of extension agents		xxxx
Effective procedures for extension planning program	x	xxx

Source: Van den Ban and Hawkins (1988 p. 223; 1996 p. 222)

3.6.2 Expected skills

AEWs must have special skills to carry out their role of enhancing diffusion of innovations. There are skills expected to be achieved by AEWs: 1) understanding farm management skills and appropriate technical innovation (Dorward 1986); 2) able to inform conventional researchers about farmers needs and problems encountered during farmer experiments; 3) can communicate the potential solutions from researchers to farmers for testing and adaptation (Waters and Farrington 1993). In addition, the International Rice Research Institute (1990) suggested six expected skills to be achieved

by AEWs namely: 1) adoption of the current research and understanding the trend of rural development; 2) understanding the social system of the target people; 3) understanding the agricultural production system; 4) ability to acknowledge the effect of bio-physical and natural environmental factors in agricultural production; 5) good knowledge of management and economic aspects of agricultural production; 6) understanding the linkages between agricultural production systems and farming income.

Levis (1996) outlined other categories of skills for AEWs namely, skills capacity. Operational skills are the capacity in which AEWs can undertake their role either individually or as groups. Managerial technique is the capacity in which AEWs can organise and evaluate to avoid bias in their activity. Intellectual capacity is the capacity through which AEWs can make a decision precisely related to the problem as it is faced by farmers. Empathy capacity is the ability to understand the technique of rural social system communication and understanding the social-psychology of rural communities. Loyalty and friendliness is where AEWs have to be closer to local people through sitting together, asking for local experience and listening to local people. AEWs also have to understand how to encourage local people to be involved and participate in extension activities and how to plan programs in the relevant area. They also need to be professional, responsible and caring towards local people.

3.6.3 The AEW training

Axinn and Thorat (1972) stated that the vitally important aspects of extension services is effective training of extension staff who work directly in the field. Meanwhile, Sundaraswamy and Perumal (1992) showed the regular training for AEWs affected AEW performance. Fradkin and Fradkin (1982) noted AEWs really need practical training with a standard assessment.

There are different perceptions about training subjects. For example:

- Schwass and Allo (1982) suggested that AEWs should be trained in social sciences, pedagogy, public administration, policy and communication, while Pease (1976) adds agricultural credit and Yuan (1977) farm management.
- Obbine (1992) suggest they should be trained at universities.

- Social, cultural, extension methods, personal, planning, and evaluation of extension program Oakley and Garforth (1985).
- Communication skills, general knowledge of rural people and environment, and practical communication system of villages selected (Shija 1985)
- How to diffuse information, farming techniques, rural catalyst in technology packages implementation (Salinas 1995).
- Rationalising family size related to farmer income and using better methods on farm enterprises (Ashraf (1993).

In the case of USA, the subjects of training are history, philosophy, methods of extension organisation, economics, rural sociology, agriculture and home economics. Students also undertake workshops for extension administration, for state leaders, for supervisors, for specialists, for editors, for visual education workers, and for those involved in extension research and evaluation (Axin and Thorat 1972).

In India, all AEWs have to be trained in the following subjects: 1) working through village leaders, 2) working with groups, 3) introducing new ideas and getting them accepted, 4) motivating people, 5) putting community -into action, 6) introducing improved agricultural practices, 7) conducting result demonstrations, 8) executing programs, 9) giving method demonstrations, 10) following up, 11) helping people in problem solving, 12) building confidence, 13) maintaining good relations with villagers, and 14) maintaining office discipline (Axinn and Thorat 1972). Axinn and Thorat (1972) also suggest that soil identification, fertilisers and use of pesticides have to be included in the training materials. For subject matter specialists, six months training included principles and methods of extension, agriculture, public heath, social education, cooperative, and actual work in the villages. For extension officers, the training material is program planning, communication, subject matter in agriculture, understanding social systems, the educational process and extension methods, evaluating and reporting, organisation and administration, principles of extension, rural sociology, educational psychology, comparative extension work and extension evaluation. All college and universities in India teach extension as a part of the program (Axin and Thorat 1972).

3.6.4 The perception and AEWs' current conditions

Perception and attitude will shape job performance (Ribeaux and Poppleton 1983). AEWs perceptions of their job satisfaction will affect their performance because perception is an inner reaction which affects external actions. Luthans (1972) defined perception as a particular attitude and a basic cognitive process that will determine behaviour.

The AEWs' performance can be influenced by experience and regular training (Sundaraswamy and Perumal 1992, Pillegowda et al. 1997). Authors have also examined other factors influencing AEW job perception such as age, education, mass media use, rural urban background, achievement motivation and organisation participation, knowledge about T & V system of extension, job satisfaction, job involvement, job autonomy, identify task, personal importance, organisational climate and organisational commitment.

According to Cumming and Schwab (1973) and Herzberg, Mausner and Snyderman (1959) as cited by Ribeaux and Peppleton (1983) the satisfaction with their job may drive job performance. The satisfaction could be driven by two factors namely favourable job conditions and unfavourable job conditions. Favourable job conditions include achievement, recognition (awards), kinds of works, responsibility/authority and advancement/promotion. Meanwhile, unfavourable conditions are company policy, administration/bureaucracy, supervision, working condition/geographical condition. According to these authors these favourable and unfavourable conditions will influence workers' goal aspirations and motivation. Positive motivation combined with ability will enhance performance of workers.

According to Kassa (1999), in Ethiopia AEWs have not been participating in rural development because of low qualifications and communication skills, and a lack of facilities such as transportation and housing. FAO (1984) conceded that there are five real conflicting conditions faced by AEWs in developing countries. They are: 1) lack of agricultural specialist education; 2) they belong to a group of government officials with the lowest salaries; 3) lack of opportunities to attend meetings for sharing of thinking and experience; 4) lack of capability to handle various work from input supply to farmers welfare; and 5) lack of understanding of the directions from high level officials.

In addition, Kassa (1999) believes rural people look upon AEWs not as facilitators but as government officers.

In addition, FAO (1984) mentioned two opposite conditions faced by AEWs under the T & V system namely: satisfactory and unsatisfactory conditions. The satisfactory conditions include:

- There is much cooperation from colleagues in the performance of their duties.
- A congenial atmosphere to exchange ideas freely with superiors.
- Enough opportunity to express grievances.
- Authority to take decisions based on the merits of the problems;
- Having a chance to demonstrate plus points in their job.
- Meanwhile, the dissatisfaction aspects are difficulty in understanding the local language, earning insufficient incentives in their jobs, and lack of support for a better position.

Rolling (1993) commented that AEWs often seem to know little about integrated agriculture, cannot step out of their customary 'expert' role, and seem unwilling and unable to work as facilitators with farmers in a joint search for alternatives. Kumuk (1992) proved that Village AEWs do not have sufficient knowledge about technical and financial aspects of extension.

Currle (1998) noted the existing weakness of agricultural extension officers were: low effectiveness, no feedback communication, and the contents of extension services were unsuitable for local needs. Then Kumuk (1992), referring to Turkey's extension service, indicated that AEW roles could not cover all crops, and lacked knowledge of technical and financial aspects of extension. In remote area, Kalshoven (1978) urged that AEWs does not work effectively because geographical environment, social composition and lack of research support.

Clearly, researchers have different perceptions of AEW conditions because they have worked in different countries. Despite this, it is possible to show that the conditions of AEWs are reducing the effectiveness of transferring quality extension services and the weaknesses need to be eliminated by the government. The conditions as mentioned by Rolling (1993) can be overcome by enhancing the levels of education of AEWs and building in regular training. These ways can also overcome AEWs problems mentioned

by Kumuk (1992). Meanwhile, the weaknesses of AEWs mentioned by Currle (1998) can be overcome by reducing the top-down approach because those conditions found in running extension programs were driven by top-down planning. In other ways inter-agency coordination and complementary and multilevel training might also overcome the weaknesses for AEWs. Guidance and direction of the policy content requires a careful study because of the variety of extension organisations. The AEWs should only be expected to allocate their time to extension activities and not be expected to take responsibility for other rural development actions (Bajaj 1989).

3.7 Concluding remarks

The account above provides some useful guidelines to support the research goals and hypotheses. It provides information that was used in development of research instruments with respect to:

1. Expectations of roles to be undertaken by AEWs.
2. Perception of AEWs roles and suggestions to improve the quality of extension services.
3. Factors influencing farmers' satisfaction with the extension service.
4. The T & V system performance which includes training, AEWs satisfaction with the training, visiting, motivation of AEWs, contact farmers, farmers group activities, constraints factors, and AEWs conditions.
5. How government officers manage the system which includes tasks of government officers, government officers' views about the tasks of agricultural extension, and research recommendation.

Chapter 4: Research methodology

4.1 Introduction

This chapter presents information in relation to the research methodology. The information provided in this chapter consists of selection of methodology, design of questionnaire, preliminary investigation, pre-test, designing a formal survey on government officer, AEWs and farmers, a follow-up investigation, and data analysis.

4.2 Selection of methodology

With the purpose of reaching the research goals and hypothesis, a combination of qualitative and quantitative approaches has been applied. Operationally, the framework of the Bennett model and the Services Quality (SERVQUAL) model were used. Bennet's model describes a chain of extension activities which consists of seven levels of objectives and evaluative evidence (Dart, et al. 1998). Basically, this research intends to evaluate the extension activities of AEWs. To reach this goal, Bennett's Hierarchy is used as guideline for formulation of the questions for farmers and AEWs.

Zeithaml, Parasuraman and Berry (1990) have formed a survey instrument called the SERVQUAL model (Lovelock 1991) which measures customers' satisfaction with services. This model operates by recording consumers' perceptions of the company performance based on some elements. If the rating of perceived performance is lower than expected performance it indicates poor quality while similar or better ratings indicate a good quality of service (Lovelock 1991). Additionally, Chakrapani (1998) suggests that this approach intends to know the difference between what consumers expect of the various aspects of service delivery and their perceptions of what they receive. It means this approach will show the gap between the standard and current performance of the service.

The Services Quality (SERVQUAL) approach is adapted for this study as a framework for gaining the perceptions of farmers about the quality of the extension services delivered by AEWs.

Farmers' perceptions about the quality of extension services have been measured by 10 elements (Zeithaml, Parasuraman and Berry 1990) or 11 elements (Baron and Harris 1995) namely: 1) delivering information on time; 2) delivering what has been promised; 3) being willing to help; 4) instilling self-confidence; 5) politeness; 6) knowledge to answer questions 7) being able to be contacted; 8) having farmers best interests at heart; 9) understanding farmers specific needs; 10) providing sufficient information; and 11) providing relevant information. However, this research also used two others elements namely helping to find the problem and finding a solution to the problem. These two criteria were included in this study because problem identification and its solution are important roles for extension service and those expected by farmers.

This research was conducted in five stages as follows: 1) preliminary investigation including a literature review and expert interviews; 2) survey of government officers; 3) survey of farmers; 4) survey of AEWs; and 5) a follow-up investigation using a smaller sample of government officers and AEWs to clarify outstanding issues.

4.3 Preliminary Investigation

4.3.1 Literature review

A review of literature was conducted to provide a theoretical background and previous studies related to this research. The theoretical background includes general knowledge of agricultural extension, the T & V model, agricultural extension policy in Indonesia including East Nusa Tenggara, the agricultural extension policies in general; the expected or perceived role of AEWs, and role of agricultural extension in Indonesia including the roles of AEWs, their expected skills and training, and current conditions for AEWs.

The extension theory has been obtained through such sources as books and journals, and extension proceedings mainly through searches of CAB abstracts Tropag and Rural. Key words used were 1) extension*, 2) agricultur*, 3) T and V system*, 4) role*, 5) worker*, 6) Training and Visit*, and 7) government* polic*. Other sources also selected to provide secondary data were documents from Agricultural Division and BIPP, BPPs in Kupang and TTS, Agricultural Department and Agricultural Statistic of NTT, and Agricultural Department of Indonesia.

4.3.2 Preliminary Interview (pre-test) and discussion

Preliminary interviewing started with semi-structured interviews with two government officers, three AEWs, and eight farmers between July and August 2000. The information obtained through this informal consultative process with policy makers (government officers) and AEWs has been incorporated in the final questionnaire on the role of AEWs, role expectation and perception towards the role of AEWs, especially in relation to horticultural crop enterprise, and the constraints impeding AEWs' abilities in fulfilling their roles effectively.

4.4 Formal survey design

This survey was conducted in three villages in Kupang district and three villages in TTS district in East Nusa Tenggara province, Indonesia. The survey was carried out between September 2000 and February 2001. There were three groups interviewed namely: 1) farmers who grow horticultural crops, 2) AEWs who work in the six sub-districts, and 3) government officers.

4.4.1 Selection of location of survey

This research was carried out in six sub-districts within two districts in the West Timor part of NTT province of Indonesia. The locations were chosen in the following steps (see Figure 4.1).

There were three steps in selecting the sample. Firstly, Kupang and TTS districts were selected because the production of vegetables in Kupang district is the biggest (24%) of the total horticultural production for NTT province, and the production of fruits in TTS district is the biggest (16%) of the total fruit production for NTT province (Statistic of Food and Horticultural Crops of NTT 1998). Secondly, three sub-districts were chosen in Kupang namely, Kupang Timur, Kupang Tengah and Kupang Barat, and three sub-districts were selected in TTS district namely, Amanuban Barat, Kopeta Soe and Molo Utara. These six sub-districts were selected because:

1. They were a potentially important source of horticultural production for the two districts selected,
2. They were the main target areas for increasing horticultural production for NTT province.

3. In these three sub-districts the government of NTT, through the local government, requested agricultural extension services to supervise intensively those farmers who cultivate or plant horticultural crops (BIPP of Kupang 2000 and BIPP of TSS 2000).

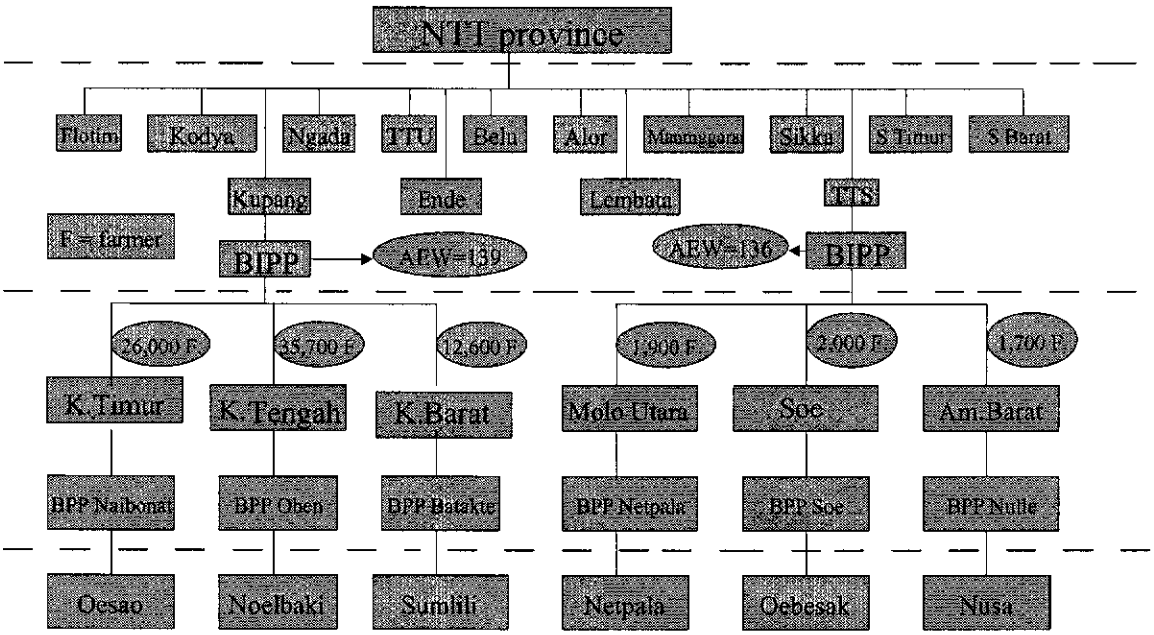

Figure 4.1. Steps in choosing districts, sub-districts, BIPP, BPP and villages

Thirdly, six villages from each sub-district that had the highest production of horticultural crops and the largest horticultural crop areas were chosen to be included. These were the village of Nusa to represent Amanuban Barat sub-district, the village of Oebesak to represent Kopeta Soe sub-district, the village of Netpala to represent Molo Utara sub-district, the village of Oesao to represent Kupang Timur sub-district, the village of Noelbaki to represent Kupang Tengah sub-district, and the village of Sumlili to represent Kupang Barat sub-district.

Each sub-district selected has a BPP or Rural Extension Centre. These are as follows: BPP Nulle located in Amanuban Barat sub-district, BPP Soe located in Kopeta Soe sub-district, BPP Netpala located in Mollo Utara sub-district, BPP Naibonat located in Kupang Timur sub-district, BPP Oben located in Kupang Tengah sub-district and BPP Batakte located in Kupang Barat sub-district.

BPP Nulle

The BPP of Nulle is comprised of 6,500 ha of extension service area spread over 20 villages. Located in the sub-district of Amanuban Barat, the population of this extension service area is 39,000 people. Of the total population, 83% are farmers. Around 37% of

farmers were educated at primary school level (BPP Nulle 2000b). Farmers here grow cabbages, chinese cabbages and carrots (BPP Nulle 2000a).

BPP Soe

The BPP of Soe has an area of extension services of about 2,090 ha of dry land. In 2000, the population in this area was around 28,000 people. The number of farmers in this BPP was 1978 all of whom are settled in the marginal area of the town (Extension Program Planning of BPP Soe 2000). This BPP is located in the Kopeta Soe sub-district and consists of 11 villages. One of them, namely Oebesak, was chosen as a sample area for this research because most farmers in this village grow cabbages and chinese cabbages.

In addition, the villages of Nusa and Oebesak are considered representative of the BPP of Nulle and the BPP of Soe respectively because farmers in these villages are predominantly known as producers of cabbage, chinese cabbage and carrots, and these villages are government target areas for producing these vegetables (District Planning Bureau of TTS 1999; Agricultural Division of TTS 1999).

BPP Netpala

The BPP of Netpala is located in the Molo Utara sub-district and has an area of extension services of roughly 16,360 ha of dry land. In 1999, the population in this extension services area was about 33,000 people spread over 23 villages. Of this number, about 90% were farmers (BPP Netpala 1999). The village of Netpala was taken as a sample location for this survey because: 1) this village has been very famous for its orange production, *'jeruk keprok'*, 2) the government of TTS stated that this village is the main target of fruit production, especially oranges, to increase farmers' income (District Planning Bureau of TTS 1999; Agricultural Division of TTS 1999). There are two kinds of horticultural crops in this village currently grown by farmers. These are oranges, the local orange called *'jeruk kepok'* and chokoes.

BPP Naibonat

The BPP of Naibonat is located in the sub-district of Kupang Timur consisting of roughly 575,480 ha spread over 22 villages. Around 16% of the area or 92,067 ha is rice fields. In 1999, the population in this location was around 37,000 people. About 26,000 of these were farmers (Statistic of Kupang Timur sub-district 1999; BPP Naibonat

2000). The village of Oesao was chosen as a research sample because 1) people in NTT and particular in West Timor, obtain most of their vegetables from this village, and 2) the government of Kupang district stated that this village is the main source of chllies, long beans and tomatoes (District Planning Bureau of Kupang 2000; Agricultural Division of Kupang 2000).

BPP Oben

The BPP of Oben is located in the sub-district of Kupang Tengah and the extension service serves all farmers in this sub-district. This area consists of 12 villages. The total area of extension services of this BPP is roughly 219,310 ha. Approximately 10% or 21,931 ha of this area is allocated to rice fields and the rest is dry land (Statistic of Kupang Tengah sub-district 1999; BPP Oben 2000). The population in 1999 was 457,000 people spread among 12 villages. Of these, as many as 35,700 (78%) are farmers. The village of Noelbaki was taken as a research sample area because this village has a high production of watermelons and leafy vegetables. In 2000, roughly 75% of watermelons sold in Kupang were supplied by farmers from this village. Noelbaki farmers also planted other vegetables such as long beans and cabbages (Statistic of Kupang Tengah sub-district 1999). The government of Kupang stated this village is the main source of watermelons and leafy vegetables (District Planning Bureau of Kupang 2000; Agricultural Division of Kupang 2000).

BPP Batakte

The BPP of Batakte is located in Kupang Barat sub-district. The area of this BPP is 251,110 ha spread among 20 villages. There are roughly 1,250 ha of field rice and the rest is dry land. In 1999, there were approximately 18,000 people settled in this extension services area of which about 70% were farmers (Statistic of Kupang Barat sub district 1999; BPP Batakte 2000). The village of Sumlili was taken as a sample site for this research because this village is highlighted as source of horticultural production, especially chillies. However, there are also other vegetables cultivated by the farmers of this village, such as long beans and egg plants (District Planning Bureau of Kupang 2000; Agricultural Division of Kupang 2000).

4.4.2 Selection of survey samples

This study used three populations; namely government officers, AEWs and farmers. These groups of people are involved because they have the potential to influence gains

from the extension process. Consequently, these three groups of interest were interviewed. The NTT's government officers were chosen because the extension services are controlled, planned and funded by them. Their policies and plans affect the success of the extension services. Agricultural Extension Workers (AEWs) were chosen because they deliver the extension program to farmers and the Indonesian government has described AEWs as 'a point of spear' for agricultural development. Farmers were chosen because: 1) the objectives of this research are to identify the efficacy of extension workers through farmers' perceptions and expectations about AEWs roles, 2) farmers are the main targets of extension services designed to increase farmers income by enhancing their agricultural production, and 3) the main contribution to these farmers' income is horticultural production.

Government officers

This group includes government officers who are directly involved in the extension services in this region. There are two main groups of government officers responsible for extension services, that is government officers who are responsible for policy issues of providing funds, extension facilities and staff development; and government officers who are responsible for the field operations of extension services, such as conduct of training, staff development, designing technical guidelines, supervising AEWs, and conducting research.

The first group comprises the Governor of NTT province and legislative members at the provincial level, the mayor of Kupang and TTS, and legislative members at the district level. The second group comprises the Head and the Vice Head of the Agricultural Department of NTT; the Head of the Food Crops Division of NTT, Kupang and TTS districts; the Fishery Division of Kupang and TTS districts; the Livestock Division of NTT, Kupang and TTS districts; the Estate Crops Division of NTT, Kupang and TTS districts; the Horticultural Division of NTT; the BIMAS for NTT province, Kupang and TTS districts; the research center of the Agricultural Department of NTT, the Head and Vice Head of the AEWs Training Center (BLPP), of NTT; the BIPP of Kupang and TTS districts; and the Regional Planning Bureau of NTT, Kupang and TTS districts (Agricultural Department of NTT 1996).

Hence, there were 32 government officers interviewed in this study. Their job either implicitly or explicitly, related to the agricultural extension services. They have the

roles of policy makers, legislative members, money providers, researchers, guideline makers, field supervisors, training designers, AEW trainers, extension staff administrators and AEW supervisors.

Agricultural Extension Workers (AEWs)

Agricultural extension workers of interest included those employed by the NTT local government, working full time in the selected districts. Those chosen were working for the BPPs of Nulle, the BPP of Soe, the BPP of Netpala, the BPP of Naibonat, the BPP of Oben and the BPP of Batakte. The first three BPPs are located in the BIPP of Kupang and the last three BPPs are located in the BPP of TTS.

There were 58 AEWs who run the extension service under the six BPPs (*Balai Penyuluhan Pertanian* = Rural Extension Center) mentioned above. The number of AEWs working with these six BPPs is shown in Table 4.1.

Table 4.1: Number of AEW working in the six BPP in 2000

Number of AEW	Nulle	Soe	Netpala	Naibonat	Oben	Batakte	Total
Working with BPP	6	4	7	17	12	12	58
Interviewed	5	4	7	15	8	7	46
Percentage interviewed	83	100	100	88	67	58	83

While officially 58 AEWs were working with the six BPPs of the six sub-districts the researcher could only interview 46 (83%) AEWs. Some could not be interviewed because: 1) AEWs were reluctant to be interviewed, 2) the researcher found it difficult to interview them face-to-face, and 3) AEWs do not live in villages but live in towns or cities.

Farmers

The third group of respondents was the farmers who live in these six sub-districts. It was planned that as many as 240 farmers in those six villages would be interviewed which would include 40 farmers from each village. However, there were two villages, Nusa and Sumlili, where only 34 and 28 farmers were interviewed respectively. The reasons why 18 farmers in these two villages could not be interviewed were because either they lived in a very isolated area or they were reluctant to be interviewed. Hence, 223 farmers (93%) of those planned were interviewed. There were two steps in choosing them to be the interviewees. Firstly, they had to be listed as growing

vegetables or fruit, and secondly they had to be agreeable to a face-to-face interview. A random sampling technique was applied. The number of farmers from each village is shown in Table 4.2.

Table 4.2: Number of farmers selected from six villages in the six BPP in 2001

Village	Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Farmer	102	125	111	332	431	118	1,245
Horticultural farmer	96	102	90	176	201	89	754
Number of farmer' group	2	2	3	22	3	5	37
Interviewed	34	40	40	40	41	28	223

Table 4.2 above shows that the number of farmers in a group in each village is diverse, even in the same village. Consequently, it might be difficult for an AEW to arrange meetings or any other activity, for example to arrange credit. For instance, the number in the *Lokman Barat* farmer's group in Oesao village is only seven, while in Noelbaki village, there are 179 farmers in the *Rindu Sejahtera* group.

4.4.3 Selection and design of survey method

In this research, quantitative and qualitative data were to be collected. To ensure data accuracy and confidentiality this survey used face-to face interviews. Telephone or mail surveys were not appropriate in Timor. This structured interview is based on the questionnaire that was previously constructed. Fieldwork was a part of this data collection effort because it helped the researcher to have informal conversations with the respondents and to observe and understand the phenomenon experienced by them (Leedy 1997).

4.4.4 Research clearances

This research was participated in by human respondents, such as farmers, AEWs and government officers. Hence, before conducting data collection the researcher received a permission letter from the local government. This letter was used to introduce the researcher and give permission to conduct fieldwork interviewing farmers in six villages, AEWs and government officers.

There were six steps in obtaining the ethics clearance.

1) As a lecturing staff at the Agricultural Faculty of Nusa Cendana University, the researcher got a letter of recommendation from the Dean.

2) This recommendation letter was sent to the governor of NTT through the Head of the Social and Political Affairs of NTT.

3) The letter of recommendation issued by the governor via the Social and Politic Affairs of NTT was sent to: the Social and Political Affairs of Kupang and TTS districts; the Head of Agricultural Department of NTT province, Kupang and TTS districts; Food Crops Division of NTT, Kupang and TTS districts; Livestock Division of NTT, Kupang and TTS districts; Fishery Division Kupang and TTS districts; Horticultural Division of NTT; Regional Planning Bureau of NTT, Kupang and TTS districts; BIMAS of NTT, Kupang and TTS; Estate Crops of NTT, Kupang and TTS districts; Research Center of Agricultural Department of NTT, BLPP of NTT, and BIPPs of Kupang and TTS districts.

4) Based on the letter of recommendation from the NTT's governor, the Social and Political Affairs of Kupang and TTS districts issued a new letter of recommendation for three sub-districts in each district selected.

5) Based on the letter from their district government, the sub-district administrator (*Camat*) of the sixth sub-districts selected, issued a new letter of recommendation for each village selected. This letter was addressed to the village administrator (*Kepala Desa*).

6) By holding copies of these letters, the researcher was allowed to meet farmers in each village that was selected to conduct the interviewing.

4.5 Farmer survey

4.5.1 Design and development of questionnaire

The questions addressed to farmers consists of seven parts. These are: 1) general information of farmers' characteristics; 2) information on their horticultural enterprise; 3) marketing outlet information; 4) expectations of AEWs roles by using an open-ended questions and farmers' satisfaction with the 12 roles undertaken by AEWs; 5) farmers perception on the service quality of the extension delivered by AEWs; 6) involvement in group activities; and 7) suggestions for improvement (Appendix A1.2).

The questions for evaluating the extension activities included inputs or sources of planning, activities, participation, and reaction were designed in reference to Bennet's hierarchy. For example, member of a farmer group and attended a group meeting, subjects discussed in this meeting, and how many times have you been visited by AEW in the last 6 months. Activities included attending the meeting, and group activities while participation included farmers' participation in extension service and reaction include farmers' satisfaction with the quality of extension service, suggestions for improvement and farmers' rating of AEWs level of performance in certain activities.

The questions for obtaining farmers perceptions about the quality of extension services and about the 12 roles performed by AEWs were designed in reference to SERVQUAL model. This model uses Likert scales. Some researchers in industrialised countries use seven levels of perception. However, based on the local conditions of the respondents, this research used five levels of perception; 1 (strongly dissatisfied), 2 (dissatisfied), 3 (neutral), 4 (satisfied), and 5 (strongly satisfied). Similarly, Likert scales (Best, 1977; Rauniyer and Parker 1999) was applied to obtain the perception of farmers on the role undertaken by AEWs. The five point Likert scales were also used for level of agreement with the performance of AEWs in helping farmers on seed, fertiliser, weeds or diseases, irrigation management, and marketing information outlet.

However, five other questions have been addressed in detail as follows:

1. The information about farmers' characteristics included age, level of education, family size, and attended a course or training. Meanwhile, the information about their horticultural enterprises included land ownership, kinds of fruit or vegetables they grow, production problems, used extension services to solve farming problems, how to overcome that problem, areas helped by AEWs.
2. Inputs which includes seed, fertiliser, weeds or diseases, irrigation management, land conservation, and level of agreement with the performance of AEWs in helping farmers on seed, fertiliser, weeds or diseases and irrigation management.
3. The marketing information outlet which includes where to get a good price for the horticultural products, the main place you sell your horticulture products, and level of agreement with the performance of AEWs in helping you with marketing information.

4. The expectations of AEWs roles by using open-ended questions. Also measured was satisfaction with the 12 roles undertaken by AEWs which included increasing knowledge and skills of farmers, conduct plot demonstrations, encourage farmers participation in any extension activity, planning of extension programs, inputs delivery (seed, fertilizer, pesticide), monitoring and evaluation, help farmer to finding problems, finding solution to farmers' problems, training other AEWs, produce a brochure, conduct field school, and delivering government projects.
5. The suggestion for improvement by using an open-ended question.

4.5.2 Pre-test

The pre-test was conducted between July and August 2000 with eight farmers. Comments from the pre-test of farmers on question wording, layout and missing elements were incorporated in the final questionnaire.

4.5.3 Conduct of interview

This survey was conducted between September 2000 and February 2001. The survey started by making an appointment with farmers. Based on the appointments, the researcher interviewed farmers by visiting them either in a group meeting or in their house.

4.6 AEW's survey

4.6.1 Design and development of questionnaire

The questions addressed to the AEWs consists of nine parts. These are: 1) the characteristics of AEWs and work experience, 2) extension task, 3) perception of 12 roles given by the government, 4) level of satisfaction with training to perform their 12 roles, 5) AEWs actual role or level of involvement in roles, 6) visits, 7) factors constraining their performance, and 8) contact farmers, and 9) suggestions for improvement (Appendix A1.3).

Bennet's hierarchy was used to evaluate extension service at four levels. They are inputs or sources of planning, farmers' activities, farmers' participation and farmers' reactions.

1. The demographics information and work experience included age, level of education, family size, attended any training, the last subject of training, time as an AEW, time in the district, and their motivation.

2. The perception of their roles given by the government which includes increasing knowledge and skills of farmers, conduct plot demonstrations, encourage farmers participation in any extension activity, planning of extension programs, inputs delivery (seed, fertilizer, pesticide), monitoring and evaluation, help farmer to finding problems, finding solution to farmers' problems, training other AEWs, produce a brochure, conduct field school, and delivering government projects.
3. Level of involvement of AEWS in conducting their roles which includes conducting demonstrations, encouraging farmer participation in extension activities, program planning, input delivery, identifying farmers' problems, finding solutions to the problems, production of brochures, and delivering government projects.
4. Level of satisfaction with training provided by the government which includes training on conducting demonstrations, encouraging farmer participation in extension activities, program planning, input delivery, identifying farmers' problems, finding solutions to the problems, production of brochures, and delivering government projects.
5. Factors constraining their performance which includes authority, appreciation (salary), bureaucracy, facility, chance for training, direction, local language, restructure of Department of Agriculture, and geographical conditions.
6. Finally suggestions for improvement was an open-ended question.

The questions for point 2 and point 4 used the Likert scales. This scale offered five levels of perception, namely 1 (strongly dissatisfied), 2 (dissatisfied), 3 (neutral), 4 (satisfied), and 5 (strongly satisfied) (Best 1977; Rauniyer and Parker 1999).

4.6.2 Pre-test

The pre-test was conducted between July and August 2000 with three AEWs. Comments from the pre-test of AEWs on question wording, layout and missing elements were incorporated in the final questionnaire.

4.6.3 Conduct of interview

This survey was conducted between September 2000 and February 2001. Two steps were necessary to conduct the interview namely: 1) a recommendation letter from the Head of the Agricultural Department of NTT was sent to each BPP administrator, and

2) an appointment was made with all AEWs within each BPP. The interview was conducted either in a BPP office or the AEWs house.

4.7 Government Officers survey

4.7.1 Design and development of questionnaire

The questionnaire addressed to the government officers consisted of five parts. These were: 1) demographics and job description information; 2) knowledge of the T & V system; 3) roles expected of AEWs and satisfaction with the 12 roles performed by AEWs; 4) constraints to delivery of extension services; and 5) plans for development of staff (Appendix A1.4).

1. The demographics of respondents included age, level of education, and current position. Meanwhile, the information on job description included; main tasks, the relevance of tasks to extension service, activities to fulfil their tasks, proportion of time devoted to extension activities, collaboration with other institutions in relation to extension services, opinions about the main task and goal of extension services, rating of AEWs' performance, current extension model being used, responsiblity for recruiting AEWs, the criteria currently used for selecting AEWs, incorporate research into extension to meet farmers needs, and the obstacles in incorporating research into extension to meet farmer needs,
2. Knowledge of the T & V system included understanding of the T & V system, the main task of T & V system, how to manage this system, the average number of farmers in T & V groups, the main criteria for allocating farmers to the T & V groups, farmers and groups are the responsibility for one AEW, the criteria for choosing contacts farmer, and the tasks of contact farmers.
3. Roles expected of AEWs was an open-ended question. Satisfaction with the roles performed by AEWs included the roles expected to be delivered by AEW and satisfaction with the roles performed by AEWs about increasing knowledge and skills of farmers, conduct plot demonstrations, encourage farmers participation in any extension activity, planning of extension programs, input delivery (seed, fertilizer, pesticide), monitoring and evaluation, help farmer to find the problem, finding solution to the problems, training other AEWs, produce a brochure, conduct field school, and deliver government project.

4. The constraints to delivery of extension services according to government officers included the major constraints in performing their tasks with respect to agricultural extension, the major constraints that impede AEWs in performing their tasks with respect to agricultural extension, comments in regards to the T & V system, and suggestions to improve the quality of extension services.
5. The government plans for development of staff included plans to improve the knowledge and skills of AEWs, the subjects of training needed by AEWs to be able to perform their tasks effectively (future subjects of training), and plans to improve the extension service in NTT.

The questions for point 2 (the satisfaction with 12 roles performed by AEWs) used a Likert scales. This scale offered five levels of perception, namely 1 (strongly dissatisfied), 2 (dissatisfied), 3 (neutral), 4 (satisfied), and 5 (strongly satisfied) (Best 1977; Rauniyer and Parker 1999).

4.7.2 Pre-test

The pre-test was conducted between July and August 2000 with two government officers. Comments from the pre-test on question wording, layout and missing elements were incorporated in the final questionnaire.

4.7.3 Conduct of interview

This survey was carried out between September 2000 and February 2001. The survey started by making an appointment either by telephone or visiting the office of government worker. To obtain data from respondents, a face-to-face interview was used.

4.8 Follow-up investigations

To check the accuracy of the primary data and to clarify outstanding interviews some elements were rechecked with the government officers and AEWs. These follow-up interviews were conducted in February 2001 with two government officers and two AEWs by using personal communication.

4.9 Data analysis

Initially the data was analysed using descriptive statistics such as percentages, proportions, frequency distributions, and tables (Argyrous 1996). Categories for the open-ended questions were developed to be mutually exclusive and exhaustive based on themes that emerged from the literature review and preliminary stages of the study and themes in the replies. Discreet single answer categories were sometimes combined into more general categories for cross-tabulation purposes.

Cross tabulation and Pearson Chi-square tests for independence of variables were conducted in SPSS (Norusis 1986; Argyrous 1996; Sidney 1996). This tool of analysis was used to examine the hypotheses that the three populations would have different perceptions about to the roles undertaken by AEWs. It was also used to examine the farmers' perception about the quality of extension service (SERVQUAL) by village and the perception of AEWs of their 12 roles by their level of education.

4.10 Concluding remarks

In conducting the interviews, there were both supporting factors and constraints. The supporting factors including: 1) the researcher understood the social-cultural background of the population; 2) most respondents could speak Indonesian; 3) most AEWs and government officers could be reached by visiting their home and office while most farmer could be reached by visiting their homes or farms. The constraints factors faced by the researcher were:

1. The researcher found it difficult to meet farmers who lived in isolated areas, and AEWs who lived in cities.
2. In interviewing some farmers, the researcher needed three local people to translate Indonesian into the local languages and to arrange the visits to farmers' houses or farms.
3. The government bureaucracy required many 'office hours' to obtain the research clearance *refers*.
4. A few government officers could not mention their tasks properly.
5. Government officers and AEWs had little knowledge of agricultural extension and the role of AEWs.
6. Many AEWs were unsure of their roles as given by the government.

This research used quantitative and qualitative analysis based on Bennet's hierarchy and the SERVQUAL framework for questionnaires. Bennet's hierarchy was used for questioning farmers and AEWs, while the SERVQUAL model was used for farmers. This research was able to apply levels 1,2,3 and 4 of Bennet's hierarchy. These are input or sources of planning, activities, participation and reaction of farmers to the extension activities. Levels 5, 6 and 7 were not used because this study did not examine specific projects but assessed general information about extension activities. An additional factors was that the government of Indonesia does not state the level of KASA (knowledge, attitude, skills and aspirations), or practice change and existing conditions of target groups of farmers before applying the agricultural extension programs. In addition, there was no an evaluation on particular extension service activities.

Chapter 5: Results

5.1 Introduction

This chapter on the results of the study consists of respondent information, the tasks of agricultural extension and AEWs roles, satisfaction with the extension service, factors associated with the effectiveness of extension services, perceptions of constraints and areas for improvement.

Information on the roles expected of AEWs is included in the section on the tasks of agricultural extension and AEWs roles. Included in the satisfaction with the extension service are farmers' perceptions about the quality of extension services and the level of respondent satisfaction with the roles undertaken by AEWs. This is followed by an account of factors associated with effectiveness of extension services which includes training, visiting, group activities, contact with farmers and understanding of the T & V system. Constraints to effectiveness as perceived by AEWs and government officers are explained in the next section.

5.2 Characteristics of farmer respondents

5.2.1 Location of interviewees

The survey was conducted between August 2000 and February 2001 in three villages of the TTS district and three villages of the Kupang district. As outlined in Chapter 4, there were 223 horticultural farmers interviewed. Of that number, 114 respondents came from the villages of Nusa, Oebesak and Netpala in the TTS district, while 109 respondents came from the villages of Naibonat, Noelbaki and Sumlili in the Kupang district. The number of farmers interviewed in each village and the horticultural crops they grow are shown in Table 5.1.

5.2.2 Horticultural production

As shown in Table 5.1, the main crops grown in TTS include white cabbage halves (43%), oranges (32%) and cabbages (32%), whereas the main crops grown in Kupang include chillies (54%), long beans (50%), tomatoes (36%) and watermelons (25%). Additionally, farmers interviewed in TTS district did not grow bitter fruits, water

melons, cucumbers and leafy vegetables whilst farmers in Kupang did not grow oranges.

Table 5.1: The number of farmers interviewed in each village and the horticultural crops grown

	TTS district				Kupang district					
Horticulture crops	Nusa	Oebesak	Netpala	%	Oesao	Noelbaki	Sumlili	%	Total	%
Chillies	9	7		14	29	8	22	54	75	34
Long beans		3		3	23	25	6	50	57	26
Cabbages	1	29	7	32		14	5	17	56	25
White cabbages	21	21	7	43			1	1	50	22
Oranges			36	32				0	36	16
Tomatoes		6		5	21	2	5	26	34	15
Watermelons				0	3	24		25	27	12
Carrots	12	8	2	19	1			1	23	10
Chokoes		2	17	17		1		1	20	9
Bitter fruits				0	16		1	16	17	7
Eggplants			7	6			9	8	16	7
Cucumbers				0		14		13	14	6
Leafy vegetables				0	1	9	3	12	13	6
Onions	5	6		10			1	1	12	5
Chinese cabbages	3	1		4			3	3	7	3
Total	34	40	40	100	40	41	28	100	223	100

Valid cases 223;
(%) percentage of farmers who grew each kind of horticultural crop.

The most widely grown crop was chillie (34% of farmers) and the least was Chinese cabbage (3%). The most widely grown horticultural crops for farmers in the village of Nusa were white cabbages (62%) and carrots (35%). Farmers in the village of Oebesak mainly planted cabbages (73%) and Chinese cabbages (53%). Oranges were important to farmers in Netpala village (90%) with 17 (43%) farmers planting chokoes. Around 73% and 58% of farmers in the village of Oesao planted chillies and long bean vegetables respectively. The main crops grown by farmers in the village of Noelbaki were long beans (61%) and watermelons (59%) while chillies were easily the most important crop (79%) for farmers in Sumlili village.

Another perspective is given by the total production of horticultural crops shown in Table 5.2. By weight the top four crops were cabbages (47,000 kg), oranges (46,000 kg), chillies (42,000 kg) and white cabbages (38,000 kg). Of these products, around 92% were sold (ranging from 30% to 98%) and around 9% were used for family daily needs. Family consumption ranged between 2% and 70%. The value of each horticultural crop is presented in Table A3.1

Table 5.2: The production of horticultural crops in 2000 for surveyed farmers

Horticultural crops	Production (Kgs)
Cabbages	47,000
Oranges	46,960
Chillies	42,000
White cabbages	38,000
Long beans	21,252
Chinese cabbages	21,000
Chokoes	18,500
Cucumber	17,000
Bitter fruits	12,000
Tomatoes	11,000
Carrots	9,700
Water melons	9,000
Eggplants	9,000
Leafy vegetables	8,000
Onions	3,000
Total	325,523

5.2.3 Land ownership

The two main types of land owned by farmers were dryland and irrigated rice fields. Dryland owned by farmers ranged from 0.1 hectares (10 *are*) to five hectares (500 *are*) with an average size of 1.02 hectares (102 *are),* whilst the size of rice fields ranged from 0.3 hectares (30 *are*) to 2.5 hectares (2,500 *are*) with an average size of 1.51 hectares (151 are). There were 179 (80%) farmers who owned dryland only, 38 (17%) farmers who owned both dryland and rice fields and only six (3%) farmers who owned rice fields only (Table 5.3).

Table 5.3: Types of land owned by farmers in 2000

Types of land	Frequency	%
Dryland only	179	80
Dryland and rice fields	38	17
Rice fields only	6	3
Total	223	100

Valid cases 223

5.2.4 Livestock

To support their income, farmers also owned some livestock as is shown in Table 5.4, with the main livestock being chickens (52%), cows (29%), pigs (24%) and goats (23%).

Table 5.4: Domesticated livestock owned by farmers in 2000

Livestock	Frequency	% of responses	% of respondent
Chickens	115	40	52
Cows	65	23	29
Pigs	54	19	24
Goats	51	18	23
Total	285	100	128

Valid cases 223

5.2.5 Demographic information of farmer respondents

In this section the gender, age, education and family size of respondents are given including details on courses attended by farmers. Of the 223 farmers interviewed, 208 (93%) were males and 15 (7%) females. The average age of farmers was 39 years with a range of 16 years to 74 years (Table A2.1).

The level of education of farmers (Table 5.5) ranged from no education (8%) to bachelor degree (0.5%). The biggest number of respondents were educated to primary school (43%) with 30% educated to junior high school.

Table 5.5: The educational level of farmers

Educational level	Frequency	%
Never attended school	17	8
Primary school	96	43
Junior high school	67	30
Senior high school	39	18
Academy/Diploma	3	1
Bachelor degree	1	0.5
Total	223	100

Valid cases 223

The size of farmer families ranged from one to 12 with an average of approximately five (Table A2.2).

5.3 Characteristics of agricultural extension worker (AEW) respondents

There were 46 AEWs interviewed for this research, with 16 AEWs working for the BPPs of Nule, Soe and Netpala in TTS district, and 30 AEWs working for the BPPs of Naibonat, Oben and Batakte in Kupang district.

5.3.1 Demographics of AEW respondents

The demographic information collected for AEWs consists of gender, age, education and family size. More than half (57%) the AEWs were male and 43% were female. Their average age was 38 years, and ranged between 28 and 50 years (Table A2.1).

The highest educational level of most AEWs was Senior High School (69%) with the remaining 31% having a diploma or higher. The level of education of AEWs are shown in Table 5.6.

Table 5.6: The education level of AEWs

Educational level	Frequency	%
Senior high school	32	69
Academy/Diploma	10	22
Bachelor degree	4	9
Total	46	100

Valid cases 46

The average family size of AEWs was five people, ranging from two to 11 (Table A2.2).

The average length of time AEWs had been working with extension services was 12.3 years with the shortest time of four years and the longest 24 years (Table A4.1). In addition, AEWs had worked with their extension service in the district for an average 3.1 years with the shortest time of one year and the longest four years (Table A4.2).

5.4 Characteristic of government officer respondents

There were 32 government officers interviewed in this research. The number of government officers in each position are given in the chapter on methodology.

5.4.1 Demographics of government officer respondents

The demographic detail for government officers consists of gender, age and level of education. Of the 32 government officers, most were males (94%), only 6% were females. The average age of respondents was 46 years ranging from 34 years to 65 years old (Table A2.1).

As shown in Table 5.7, most respondents (88%) were educated to bachelor degree. There were also two respondents (6%) educated to Masters degree.

Table 5.7: Education level of government officer respondents in 2001

Educational level	Frequency	%
Senior high school	1	3
Bachelor	28	88
Masters	2	6
Doctoral	1	3
Total	32	100

Valid cases 32

5.4.2 Tasks of government officers

This section will briefly outline the tasks of government officers, government officers activities to fulfil their tasks, training for farmers, managing the T & V system, coordination with other institutions, AEWs' recruitment and government activities to increase AEWs' skills and knowledge.

Based on the relevance of their tasks in relation to agricultural extension services, there are three groups of government officers. They are: all relevant – two (6%); partly relevant - twenty-seven (84%); and mostly irrelevant - three (9%). The first group whose work was 'all relevant', allocated more than 50% of their time to extension services. Their tasks were program training design and running the training for AEW or Agricultural Department staff. The second group whose work was 'partly relevant', allocated between 25% and 50% of their time for extension services. Their tasks included services to livestock, fishery, cash crops and food crops besides extension services. The third group, whose work was 'mostly irrelevant' to extension, allocated less than 25% of their time to extension services. They worked as policy makers, legislative members and researchers.

To cater for their tasks, government officers ran activities which were related to the extension services. Data in Table 5.8 reveal that 59% of government officers ran coordination meetings with other cooperative institutions and one officer undertook research and gave technical advice or training. There were also government officers who ran activities such as evaluating; monitoring and reporting of the Extension Services (16 or 50%); supervising AEWs (12 or 38%); planning (7 or 22%); supervision and control (6 or 19%); and providing funds and official administration for AEWs (5 or 16%).

Table 5.8: Government activities to fulfil their tasks

Activities	Frequency	% of response	% of respondent
Coordinating meetings	19	29	59
Evaluation, monitoring and reporting	16	24	50
Supervising AEWs	12	18	38
Planning, supervising and controlling	7	10	22
Providing funds	6	9	19
Official/administration	5	8	16
Giving technical advice/training	1	2	3
Provide extension material to be delivered by AEWs	1	2	3
Undertaking research	1	2	3
Total	66	100	213

Valid cases 32; 1 officer indicated more than 1 activity

The tasks of government officers as mentioned by the respondents (Table 5.9) were to advise farmers on increasing agricultural production (50%); to coordinate AEWs (22%); to make decisions or policies (19%) and to provide facilities for AEWs (19%).

Table 5.9: The tasks of government officers in NTT province in 2000

Tasks of government officers	Frequency	% of response	% of respondent
Advise farmers on increasing agricultural production	16	21	50
AEW coordinators	7	9	22
Policy makers/decision makers	6	8	19
Provide AEW facilities	6	8	19
Technical advice to farmers	5	7	16
AEW trainer	5	7	16
Supervise/monitor extension service	4	5	13
Regional development planning	3	4	9
Cash crop responsibility	3	4	9
Extension guideline/direction maker	2	3	6
Training designer	2	3	6
Livestock extension responsibility	2	3	6
Fishery responsibility	2	3	6
Research and technology recommendation	1	3	3
Supervise horticultural production	1	3	3
Total	76	100	203

Valid cases 32; more than response allowed

Training for farmers

To improve farmers' skills and knowledge, the provincial and district government ran courses for farmers (Table 5.10). The most popular course in terms of attendance was farm management (21% of farmers). Other courses offered were horticulture (9% of farmers), livestock (8% of farmers), credit management (3% of farmers) and others (2% of farmers). Slightly less than half (43%) of the farmers had attended a course.

Table 5.10: Attendance by farmers at courses ran by the government

Subjects	Frequency	%
Never attended	127	57
Farm management	47	21
Horticultural	20	9
Livestock	17	8
Credit management	8	3
Others	4	2
Total	223	100

Valid cases 223

Managing the T & V system

Officially, government officers manage the T & V system in three ways: that is by coordinating meetings (100% of government officers), supervising the BPP (19%) and evaluation and reporting (19%) (Table 5.11).

Table 5.11: The way to manage the T & V system

T& V Management	Frequency	% of responses	% of respondent
Coordinating meetings	32	73	100
Supervising BPP	6	14	19
Evaluation and Reporting	6	14	19
Total	44	100	138

Valid cases 32

Coordination with other institutions

The government officers have involved other relevant institutions such as the local university and NGOs (Table A5.1). Around 63% of government officers hold coordination meetings with other institutions, 9% with universities, with NGOs (9%) and 19% have no interaction.

AEWs recruitment

Nine (28%) government officers are involved in AEW recruitment. The government officers held slightly different views on the criteria used for AEW recruitment. Thirty-two (100%) government officers mentioned educational background, 17 (53%) government officers mentioned passing a test and six (19%) government officers had no particular comment.

Government activities to increase AEWs skills and knowledge

The effectiveness of the T & V system depends on how well AEWs undertake their roles. Agricultural Extension Workers are the front line of the implementation of the system so they must have adequate skills and knowledge to deliver the extension program successfully. The two main activities undertaken by government officers to

increase AEWS skills and knowledge during the last three years were running seminars and workshops (25%) and training session (25%) (Table 5.12). However, 53% of government officers did nothing to increase AEWs skills and knowledge during this period.

Table 5.12: The government officers activities in the last three years to increase AEWs skills and knowledge

Government officers activities	Frequency	% of response	% of respondent
Nothing	19	53	59
Seminar/workshop	9	25	28
Training	8	22	25
Total	36	100	112

Valid cases 32 ; more than 1 response allowed.

5.5 Tasks of agricultural extension and AEWs roles

The Bahasa Indonesian words used to express the concepts of task and role in the questionnaire were *tugas* and *peranan*. However, it is apparent from the replies that task and role have a similar meaning. Hence, for practical purposes in this study the meaning of these words is considered to be the same. This section presents the information about the tasks of agricultural extension according to the government officers and AEWs. It also provides information about the actual roles undertaken by AEWs and the expected roles of the AEWs.

The government has suggested 12 different tasks for agricultural extension. Most government officers (66%) believed a task was to increase agricultural production, while slightly less than half (44%) believed a task was to help increase income. A further 41% believed a task was to refine the farming system, 37% believed it was to give information to farmers. The diversity of their opinion is shown in Table 5.13.

Table 5.13: Government officers' views about the tasks of agricultural extension

Task of agricultural extension	Frequency	% of response	% of respondent
Help farmers increase agricultural production	21	20	66
Help farmers increase their income	14	13	44
Refine farming system	13	13	41
Provide information to farmers	12	12	37
Technology transfer/bridge	9	9	28
Create conducive environment for farmers	8	8	25
Motivate farmers	8	8	25
Increase farmers' knowledge and skills	7	7	22
Run demonstrations at village level	4	4	13
Persuade farmers to apply better practices	3	3	9
Serve as agents of change/change farmer behaviour	3	3	9
Advise farmers	2	1	6
Total	104	100	325

Valid cases 223; more than one reply allowed

Despite working in the same area of services, AEWs had different opinions about the importance of the tasks of extension services (Table 5.14). There were three top tasks of agricultural extension according to the AEWs. Approximately 30% of AEWs believed the top task of agricultural extension was to increase farmers' income, 22% believed it was to change farmers' behaviour or act as a change agent and 20% mentioned that it was to increase agricultural production. Disturbingly, 11% of AEWs had no idea.

Table 5.14: Important tasks of agricultural extension according to AEWs

Most important task	Frequency	% of respondent
Increase farmer income	14	30
Change agent	10	22
Increase agricultural production	9	20
Help farmers	8	17
Others	5	11
Total	46	100

Valid cases 46

5.5.1 The twelve roles of AEWs stated by the government

The Indonesian government has stated that the agricultural extension worker is a 'point of spear' or front line of agricultural implementation programs. Officially, AEWs conduct their roles based on the twelve roles given by the government. These roles are: 1) increasing farmers' knowledge and skills; 2) conducting plot demonstration(s); 3) encouraging farmers' participation in extension service; 4) planning extension program; 5) input delivery (seed, fertiliser, pesticide); 6) monitoring and evaluation; 7) helping farmers identify problems; 8) helping farmers find solution(s) to problems; 9) training other AEWs; 10) producing brochure(s); 11) conducting field school and 12) delivering government projects (Table 3.3) .

As can be seen from Table 3.3 the roles undertaken by AEWs depend on their level of education. For example, AEWs who graduated at Diploma and High School level are not expected to undertake roles on project delivery. But, in practice, AEWs from all levels of education undertake all roles.

5.5.2 Role expectation by farmers, government officers and AEWs

Despite government expectations about the roles of AEWs, government officers, farmers and AEWs have their own expectations about the roles that should be undertaken by AEWs. Results from an open-ended question were categorised into 12 roles expected by farmers, 13 expected by government officers and seven expected by AEWs (Table 5.15).

Table 5.15: Comparison of roles expected of AEW's by farmers, government officers and AEWs

Expected roles	Farmers	GOF	AEWs
1. Use examples and demonstrations	84	82	60
2. Conduct field school			89
3. Evaluate farmers' enterprises		60	
4. Facilitator, dynamist and communicator		60	
5. Teach farmers business principles		85	
6. Advise farmers about horticultural crops		50	
7. Run program(s) that suit farmers' problems and needs	92		96
8. Increase farmers' knowledge & skills	98	94	
9. Empower farmers and their groups	80	70	
10. Be part of farmers' community	95	70	
11. Supervise, evaluate farmers' activities		60	
12. Bridge between farmers and input source	70		
13. Collect statistics on farmers' activities		40	
14. Coordinate with other agents in village	85		
15. Run activities that only deal with agriculture		70	65
16. Support research recommendations		90	40
17. Deliver latest information on horticulture	60		
18. Provide marketing outlet information	80		
19. Bridge between government and farmers		91	70
20. Provide horticultural seeds	80		
21. Bring program as promised	83		60
22. Run extension service at the right time	100		

As shown in Table 5.15, the only role expectation where all three groups have the same expectation is that of using examples and demonstrations. Farmers and government officers share the same expectation that AEWs should: 1) increase farmers knowledge and skills; 2) empower farmers and their group and 3) be a part of the rural community. Likewise, government officers and AEWs have the same expectation that AEWs should: 1) run activities that only deal with agriculture; 2) support research

recommendations and 3) act as a bridge between farmers and government officers. Farmers and AEWs have the same expectation that AEWs should: 1) run programs that suit farmers needs and problems and 2) deliver the program as promised.

5.5.3 Involvement of AEWs in conducting their roles

Although AEWs could not perform all their roles effectively, there were some actual roles in which AEWs were involved such as: conducting demonstrations, encouraging farmer participation in extension activities, program planning, input delivery, identifying farmers' problems, finding solutions to the problems, production of brochures and delivering government projects.

Plot demonstration

One approach to persuade farmers to adopt a new practice is for AEWs to conduct demonstration activities. Table 5.16 indicates the subject of the last demonstration plots they ran. Slightly over one-third (37%) of AEWs ran a demonstration on how to grow food crops (especially corn in *Palagung Project),* 34% on how to grow horticultural crops (especially watermelons and oranges), 15% on mixed farming a combination of livestock and food crops (corn) and 13% on other enterprises.

Table 5.16: Subjects of demonstration plots run by AEWs

Type of demonstration	Frequency	% of respondent
Food cropping	17	37
Horticultural crops	16	34
Mixed farming	7	15
Other	6	13
Total	46	100

Valid cases 46

All AEWs acknowledged that the demonstration was undertaken with the participation of farmers. AEWs had different opinions about the goal of demonstrations. Three main goals of these demonstration plots were (Table 5.17) to transfer technology, to increase farmers' knowledge and skills and to create a medium for farmer learning processes.

Table 5.17: Main goals of running demonstration plots according to AEWs

Goal	Frequency	% of response	% of respondents
Technology transfer	32	37	70
Increase farmer skills and knowledge	26	31	57
Medium for farmers learning processes	26	31	57
Persuading farmers	1	1	2
Total	85	100	186

Valid cases 46: more than one response allowed

Encouraging farmers' participation

With respect to the role of encouraging farmers' participation in extension, the communication media used by AEWs (Table A4.3)were group approaches (70% of AEWs) and a combination of individual and group approach (30% of AEWs). However, there were three main factors constraining AEWs in encouraging farmers' involvement in extension activities. They were:

- Farmers live far away from one another (10% of AEWs),
- Lack of farmers support for farmers (68% of AEWs), and
- Running the service at inappropriate times (22% of AEWs).

As shown in Table 5.18, 50% of AEWs agreed that farmers participate in the planning of extension programs. However, 30% of AEWs said that farmer participation involves working together in a group activity to plan, whereas 20% said farmers participate in planning the annual program. There were 19 (41%) of AEWs who said that farmers participate in organising extension programs, and 46 (100%) AEWs said that farmers participate in the implementation of extension programs. By contrast, all AEWs said that there was no farmer involvement in evaluation of the extension program.

Table 5.18: Farmer participation in extension services activities

Activities	Farmer involved *				
Planning	**Working together**	**%**	**None**	**%**	**Total AEWs**
Group planning	14	30	23	50	46
Annually planning	9	20			
Organizing	19	41	27	59	46
Implementing	46	100			46
Evaluation			46	100	46

Valid case 46;

* Farmer involved means all example farmers participated

According to AEWs, there are five activities that farmers are most likely to participate in (Table 5.19). These are: viewing *palawija* crops (corn, rice, cassava), horticultural crops and livestock; attending demonstrations of any kind of either crops or livestock;

and business meetings. Business meetings are meetings conducted by the Department of Agricultural of NTT and businessmen who run a business involving agricultural products. This meeting is usually held at the village level. Farmers involved in these meetings will usually receive inputs from the businessman, especially seeds.

Table 5.19: AEWs view of activities farmers are most likely to attend

Activities	Count	%
Palawija growing	3	6
Horticultural growing	6	13
Livestock	6	13
Demonstrations	15	33
Business meeting	16	35
Total	46	100

Valid cases 46

Program planning

According to the government, AEWs should plan activities that help them to undertake their roles. As can be seen from Table 5.20, in the last three years, six (13%) AEWs carried out an activity on crop disease treatment, nine (20%) AEWs on application of organic fertiliser and nine (20%) AEWs on livestock development. By contrast, there were 22 (47%) AEWs who did not plan any activity.

Table 5.20: AEWs activities in the years 1998, 1999, 2000

Activities	Frequency	%
No activity	22	47
Application of organic fertiliser	9	20
Livestock development	9	20
Crop disease treatment	6	13
Total	46	100

Despite having run these activities, five (21%) AEWs said that the activities have never been evaluated. Nine (37%) AEWs mentioned that there was a slight increase in farmers' income earnings and a further 10 (42%) AEWs conceded that they could not see any result from those three activities.

The constraining factors that faced AEWs who planned programs were: 1) lack of funds or award; 2) lack of any authority and 3) the complexity of bureaucracy.

Input delivery

Most AEWs conceded that most farmers have good skills in relation to horticultural enterprises. However, there are at least three skills that farmers must have to be

successful in their horticultural enterprises. They are choosing seed, crop nurture and marketing. Of these, choosing seed is the biggest problem faced by farmers.

Seeds

Farmers have three alternative sources of seed: buying through private merchants, purchase on credit from the local government through a revolving system; and natural seed or retaining their own seed. When seed is given on credit by the government, farmers are required to give the same amount of seed back to the government after harvest to be distributed to other farmers. The sources of seed for farmers are shown in Table 5.21.

Table 5.21: Sources of seeds for farmers in 2000

Source	Frequency	% of responses	% of respondent
Private merchant	181	71	81
Own seed	39	15	17
Credited by the government	37	14	17
Total	257	100	115

Valid cases 223; more than one response allowed

In 2000, 181 (81%) farmers obtained horticultural seed from private merchants, while 37 (17%) were credited with seed by the local government. In the last season, July to December 2000, the average seed needed for a farmer was roughly three kilograms, with the least amount one kilogram and the biggest amount four kilograms. At the same time, the average expense for seed was 37,380 rupiah, with the least expense nil and the biggest expense 275,000 rupiah.

Fertiliser

There were several kinds of fertiliser applied by farmers to increase horticultural production, such as organic, urea, TSP and KCL (Table A3.2). Roughly 80% of farmers apply urea while around 23% of farmers apply organic fertiliser. However, three farmers never applied any kind of fertiliser.

In applying fertiliser most farmers (94%) used family labour, while only 6% used hired labour. As many as 57% of farmers have relied on personal or self experience when applying fertiliser. A further 46% were advised by AEWs and 13% received advice from their friends (Table 5.22).

Table 5.22: Sources of skills in fertiliser application for farmers

Source	Frequency	% of responses	% of respondent
Self experience	126	49	57
AEW	103	40	46
Friend	29	11	13
Other EW	1	0	15
Total	259	100	131

Valid cases 223 ; more than one response allowed; EW= extension worker

According to 66% of the farmers, they understand the skills of fertiliser application given by AEWs because the AEWs used a demonstration method after running a lecture. A further 34% neither understood nor were able to understand the information given by AEWs. Based on this data, AEWs are still important agents of change for farmers, especially in regard to fertiliser application.

Pesticides

Farmers in running their horticultural crops apply chemicals to kill disease or weeds that attack their crops. There are four diseases (Table A3.3) and one weed faced by farmers in 2000. Around 34% of farmers mentioned that the most serious problem they faced was weeds such as *alang-alang,* while 15% of farmers stated that the main problem was White Spot which is a particular problem for horticultural products such as chillies, watermelons and tomatoes. There were 31% of farmers who said the main problem was Black Spot which has affected their vegetables such as cabbages, Chinese cabbages, eggplant and long beans. Then, 18% of farmers mentioned that they faced a serious problem with ants which attacked plants such as chillies and long beans. Eighteen per cent of farmers faced Rush disease which attacked vegetables such as chillies, cabbages, tomatoes and bitter fruits.

To overcome all those diseases and weeds farmers applied pesticides as shown in Table A3.4. Farmers obtained pesticides in two ways, either by buying (82%) or by receiving on credit from the government (18%) (Table 5.23). The expenditure for pesticides is shown in Table A3.5.

Table 5.23: Ways farmers obtain pesticides

Source of pesticide	Frequency	%
Buying	182	82
Credited by government	41	18
Total	223	100

Valid cases 223

As shown in Table 5.24, when applying pesticides farmers obtained advice from friends (37%), AEWs (23%) and others (40%) such as non government organisations and sub-district officers.

Table 5.24: Sources of skills for pesticide application

Source of skills	Frequency	%
Friends	83	37
AEWs	51	23
Others	89	40
Total	223	100

Valid cases 223

Irrigation problems

According to farmers, the main problems encountered in relation to irrigation of their horticultural crops in 2000 were lack of water (68%), bad irrigation systems (12%) and bad irrigation management (12%) (Table A3.6). To overcome their irrigation problems, 15% of farmers asked for the help of their friends and 4% asked for the help of AEWs. However, 83% of farmers never asked for help from anyone. For this particular question, more than one response was allowed.

Marketing Aspect

Data gained in this research shows that almost all farmers (74%) mentioned that they have never received market information from AEWs. Seventy-four per cent of farmers had information about market outlets given by their friends, 17% of farmers had information given by other agents including NGO officers while only 9% of farmers had information given by AEWs.

The place of sale of the product might cause the price of horticultural products to change. In this area, there was a disorganised market place. There were six marketing places for farmers to sell their product (Table A3.7). In many cases, farmers sold their product based on their need for money. As many as 51% of farmers sold their horticultural products on the farm, 20% in the cities, 16% in the village level, 11% at district level, 2% at sub district level and 1% at the farmers' house.

Identifying farmers' problems

In 2000, the government required AEWs to interview farmers to identify farmers' problems and 24 (52%) of AEWs in this survey did identify farmers' problems while 22 (48%) did not. However, of the 24 who did identify problems, 37% had involved farmers in the process but 63% had not involved farmers in the process of problem identification. AEWs mentioned three main obstacles to identifying farmers' problems:

- Farmers answered dishonestly (63% of AEWs),
- Lack of time and funds (22% of AEWs),
- Farmers avoided answering the questions (15% of AEWs).

With respect to overcoming those constraints, AEWs;

- Reported to a higher level officer (46% of AEWS), and
- Questioned the farmers' group leader (37% of AEWs).

About 17% of AEWs had not done any activity.

Problems in horticultural enterprise

Farmers met some problems either with disease or input provision in undertaking their horticultural enterprises. The problems faced by farmers in 2000 were mainly poor seed quality, ants, rust and white spot disease (Table A3.8).

Most farmers (96%), including those who grew cabbages, Chinese cabbages, carrots and oranges, faced the problem of obtaining the best quality seed. Rush disease was the second biggest problem faced by 80% of the farmers particularly those who grew chillies, long beans and tomatoes. Meanwhile, the problem of excessive rain was only faced by a few (9%) farmers.

Finding solution to the problems

Methods used by AEWs to solve farmers' problems included :

- Coordinating with the relevant division(15% of AEWs);
- Consultation with higher level officers (26% of AEWs);
- Running an extension service based on farmers' needs (20% of AEWs); and
- Doing nothing (39% of AEWs).

Four activities undertaken by AEWs to solve problems of farmers dealing with horticultural enterprise are presented in Table 5.25. The greatest number of farmers

(46%) mentioned that AEWs have helped in fertiliser application, 30% farmers said that AEWs helped to get good seed and 23% conceded getting advise from AEWs in applying pesticides. Despite the fact that farmers see AEWs as an important source of inputs, especially seed, the government in 2000 never requested AEWs to deliver any kind of seed. This is one of the study's weaknesses, i.e., that the questions did not mention a time frame for AEWs to solve farmers' problems.

Table 5.25: AEW activities to solve problems faced by farmer in relation to horticultural enterprises

AEW activities	Frequency	%
Assist to apply fertiliser	103	46
Assist to obtain good seed	68	30
Assist to apply pesticide	51	23
Assist in land conservation	1	0
Total	223	100

Valid cases 223

Production of brochures

All AEWs believed they knew what a brochure was, but only 11% of AEWs have ever made a brochure. However, as many as eight AEWs said they learnt how to make a brochure at BLPP and three AEWs learnt from some other source. Nevertheless, all AEWs have read at least one extension brochure in the last year. The frequency of reading brochures, as shown in Table 5.26, was that 24% of AEWs have read one whilst 13% have read more than four times. The average frequency of brochure reading was two with a range of one to more than four times.

Table 5.26: Times AEWs read extension brochures in the last year

Frequency of reading	Frequency	%
1	11	24
2	14	30
3	7	15
4	12	26
More than 4	6	13
Total	46	100

Valid cases 46

According to AEWs there are four functions of the brochures (Table 5.27):

- As a learning media (35% of AEWs);
- To add to their experience (28% of AEWs);
- To increase skills and knowledge (20% of AEWs); and
- As a communication media (17% of AEWs).

Table 5.27: Function of brochures according to AEWs

Function	Respondent	%
Learning media	16	35
Add experience	13	28
Increase skills and knowledge	9	20
Communication media	8	17
Total	46	100

Valid cases 46

Conducting field school

A field school is run by farmers with support from government officers and AEWs in terms of seed, fertiliser and pesticides. In other words, a field school means the government officers, through AEWs, run an activity in the village based on farmers' needs, knowledge and decisions. This role requires AEWs to live close to the farmers' community because while learning they also act as advisers. According to the data gained in this study, no field school was run by AEWs in 2000. The reasons given were that the government lacked the funds to run a field school. Field schools are still dependent on being run through a government project.

Delivering government projects

In the year 2000, there were four government projects delivered by AEWs (Table 5.28) as listed below:

1. An artificial insemination project, which aimed to increase livestock production.
2. A food crop project, which aimed to increase horticultural production.
3. IFAD (*IFAD = International Fund for Agricultural Development,- this project was sponsored by the Japanese government*) which aimed to increase horticultural crops production.
4. An orange enterprise project which aimed to increase orange production.

In 2000, 20 AEWs (43%) delivered government projects while 26 AEWs (57%) were not involved in these activities (Table 5.28). Thirteen AEWs (28%) were involved in a food crop project that ran over several years.

Table 5.28: Government projects delivered by AEWs in 2000

Projects	Frequency	% of respondent
No involvement	26	57
Food crop	13	28
Artificial insemination	4	9
Orange enterprises	2	4
IFAD	1	2
Total	46	100

Valid cases 46

The roles of AEWs in the projects were as facilitator (95%), caretaker (5%) and monitor (80%). According to AEWs, farmers also participated in these projects as nurturer (care for demonstration = 19% of AEWs) and participant (take part in running demonstration = 6% of AEWs). However, 15% of AEWs conceded that they had nothing to do in the projects. The role of AEWs and farmers are shown in Table 5.29.

Table 5.29: AEWs and farmer role in the projects

	Roles	Frequency	%
AEWs			
	Nothing	3	15
	Monitoring	16	80
	Facilitator	19	95
	Care taker	1	5
	Total	46	195
Farmers			
	Nurturer	19	95
	Participant	6	30
	Total	25	125

Valid cases 20; more than 1 response allowed

There were three main activities that AEWs undertook to achieve project objectives. These were:

- Conducting a demonstration (mentioned by 85% of AEWs).
- Monitoring and evaluation (mentioned by 60% of AEWs).
- Tutoring (mentioned by 16 (80%) of AEWs).

A further 15% did not mention any activity.

AEWs used three main ways to monitor the projects: farm visits, which was carried out by 70% of AEWs; monitoring and evaluation (45%) and group visits (100%).

5.6 Satisfaction with the extension service

This section gives the level of satisfaction of farmers towards the quality of the extension service, the level of satisfaction of three groups of population towards 12 roles performed by AEWs, government officers rating of AEWs and farmers' views about the level of performance of AEWs in carrying out their roles.

5.6.1 Farmers' perceptions about the quality of the extension service

Thirteen indicators based on the SERVQUAL instrument were used to determine the quality of extension services delivered by AEWs. They were: 1) delivering information on time; 2) delivering what has been promised; 3) being willing to help; 4) instilling confidence; 5) being consistently polite; 6) the ability to answer questions; 7) able to be contacted; 8) having farmers best interests at heart; 9) understanding farmers specific needs; 10) providing sufficient information; 11) providing relevant information; 12) helping farmers find the cause of the problem and 13) helping farmers solve problems. Farmers were asked whether the extension service met their expectations on each of these indicators using a five-point scale ranging from 1(strongly dissatisfied) to 5 (strongly satisfied).

In general, the average score of farmers' perception about the extension SERVQUAL undertaken by AEWs was 2.6. This means that the average perception of farmers about the quality of the extension service was in between dissatisfied and neutral. The fact that farmers had a dissatisfied or neutral perception indicates that farmers have had different experiences with the performance of AEWs. This was because: 1) some farmers had received unexpected services by AEWs; 2) during the last two years preceding data collection, some farmers especially those in the villages of Nusa and Sumlili, had never received any extension service delivered by AEWs and 3) some farmers from the villages of Netpala, Oesao, Oebesak and Nolebaki had received advice from AEWs. In detail, the average score for each indicator was as follows (Table 5.30): delivering information on time (2.7); delivering what has been promised (2.4); being willing to help (2.9); instilling confidence (2.8); being consistently polite (3.1); the ability to answer questions (2.3); able to be contacted (2.5); having farmers best interests at heart (2.7); understanding farmers specific needs (2.6); providing sufficient information (2.2); providing relevant information (2.6); helping farmers find the cause of the problem (2.6) and helping farmers to solve problems (2.5).

Table 5.30: Farmers' perceptions about the quality of the extension services they receive

SERVQUA indicators	Strongly dissatisfied	Dissatisfied	Neutral	Satisfied	Strongly Satisfied	Average scores
Delivering information on time	44	85	44	50	0	2.7
	20%	*38%*	*20%*	*22%*	*0%*	
Delivering what has been promised	36	105	47	35	0	2.4
	16%	*47%*	*21%*	*16%*	*0%*	
Being willing to help	32	42	74	64	11	2.9
	14%	*19%*	*33%*	*29%*	*5%*	
Instilling confidence	23	62	68	69	1	2.8
	10%	*28%*	*30%*	*31%*	*0%*	
Consistently polite	18	35	79	70	21	3.1
	8%	*16%*	*35%*	*31%*	*9%*	
Ability to answer questions	15	61	92	49	6	2.3
	7%	*27%*	*41%*	*22%*	*3%*	
Able to be contacted	44	59	89	16	15	2.5
	20%	*27%*	*40%*	*7%*	*7%*	
Having my best interest at heart	35	55	84	39	10	2.7
	16%	*25%*	*38%*	*18%*	*5%*	
Understanding of my specific needs	33	63	90	26	11	2.6
	15%	*28%*	*40%*	*12%*	*5%*	
Providing sufficient information	31	54	94	36	8	2.7
	14%	*24%*	*42%*	*16%*	*4%*	
Providing relevant information	32	65	97	26	3	2.5
	14%	*29%*	*44%*	*12%*	*1%*	
Help to find the problem	30	63	97	20	13	2.6
	14%	*28%*	*44%*	*9%*	*6%*	
Help to solve problems	36	75	85	21	6	2.5
	16%	*34%*	*38%*	*9%*	*3%*	

On average farmers did not rate any of the indicators as satisfactory. The two indicators with which they were most satisfied were willingness to help and being consistently polite. Neutral indicators were instilling confidence and the ability to answer questions. All other indicators received a more negative rating. To examine the hypothesis that there might be differences in the rating of quality of extension services between villages a Chi-square tests for independence of attributes were used with the results in Table A7.1 to Table A7.13.

Villages were expected to have different perceptions about the quality of extension services because farmers have had different experiences with the extension service. For example, there were no AEWs in the villages of Sumlili and Nusa for the last two years. The average score for farmers from each village toward the quality of extension service were 2.7 (Nusa), 3.4 (Oebesak), 2.7 (Netpala), 2.6 (Oesao), 2.9 (Noelbaki), and 2.3 (Sumlili). A statistically significant difference was found for each quality measure (Table 5.31). Farmers from the village of Oebesak may be more satisfied with the quality of extension services because their village is located near the BIPP Soe office and hence they may receive more regular visits by AEWs. Farmers from the village of Sumlili were the most dissatisfied with the extension service perhaps because there was no AEW for their village for the last two years.

Table 5.31: Chi-square tests for differences in satisfaction with the quality of extension service among the villages[a]

Perceptions	Group	Count (% of total) Dissatisfied	Neutral	Satisfied	Total	Pearson χ^2
Delivering information on time	Oebesak	8(4)	11(5)	21(9)	39(18)	p = .000
	Noelbaki	18(8)	3(1)	-	41(18)	V=64.434[a]
	Sumlili	25(11)	3(1)	-	28(13)	df =10
Delivering what has been promised	Oebesak	9(4)	7(3)	24(11)	39(18)	p= .000
	Nolebaki	39(18)	1(.4)	1(.4)	41(18)	V=106.813[a]
	Sumlili	-	5(2)	27(9)	28(13)	df=10
Being willing to help	Oebesak	4(2)	5(2)	31(14)	39(18)	p= .000
	Noelbaki	9(4)	11(5)	21(9)	41(18)	V=75.219[a]
	Sumlili	17(8)	11(5)	-	28 (13)	df= 10
Instilling confidence	Oebesak	7(3)	7(3)	26(12)	39(18)	p= .000
	Noelbaki	13(9)	10(5)	18(8)	41(18)	V=50.840[a]
	Sumlili	3(1)	15(5)	14(5)	28(13)	df =10
Consistently polite	Oebesak	3(1)	1(.4)	36(16)	39(18)	p= .000
	Noelbaki	3(1)	15(7)	23(10)	41(18)	V=88.580[a]
	Sumlili	3(1)	14(5)	15(5)	28(13)	df=10
Ability to answer questions	Oebesak	10(5)	9(4)	20(9)	39(18)	p= .000
	Noelbaki	4(2)	11(5)	26(12)	41(18)	V=106.492[a]
	Sumlili	15(9)	13(6)	-	28(13)	df=10
Able to be contacted	Oebesak	16(7)	7(3)	17(8)	39(18)	p= .000
	Noelbaki	14(6)	25(11)	2(1)	41(18)	V=60.762[a]
	Sumlili	20(9)	8(4)	-	28(13)	df=10
Having my best interest at heart	Oebesak	13(6)	6(3)	21(9)	39(18)	p= .000
	Noelbaki	12(5)	28(13)	1(0)	41(18)	V=60.188[a]
	Sumlili	16(7)	12(5)	-	28(13)	df=10
Understanding of my specific needs	Oebesak	15(7)	2(1)	23(10)	39(18)	p= .000
	Noelbaki	14(6)	26(12)	1(0)	41(18)	V=81.302[a]
	Sumlili	16(7)	12(5)	-	28(13)	df=10
Providing sufficient information	Oebesak	15(7)	5(2)	20(9)	39(18)	p= .000
	Noelbaki	12(5)	26(12)	3(1)	41(18)	V=62.208[a]
	Sumlili	19(9)	9(4)	-	28(13)	df=10
Providing relevant information	Oebesak	10(5)	9(4)	21(9)	39(18)	p= .000
	Noelbaki	24(11)	17(8)	-	41(18)	V=95.365[a]
	Sumlili	20(9)	8(4)	-	28(13)	df=10
Help to find the problem	Oebesak	10(5)	10(5)	20(9)	39(18)	p= .000
	Noelbaki	21(9)	20(9)	-	41(18)	V=74.103[a]
	Sumlili	18(8)	10(5)	-	28(13)	df=10
Help to solve problem	Oebesak	15(7)	6(3)	18(8)	39(18)	p= .000
	Noelbaki	19(9)	22(10)	-	41(18)	V=73.216[a]
	Sumlili	20(9)	8(4)	-	28(13)	df=10

[a] Only three villages shown to simplify table; Oebesak which has the best rating, Noelbaki with a middle rating and Sumili which has the lowest rating and has not had an extension worker for the past two years.

p = probability; V= value of χ^2; and a = cell have expected count less than 5.

5.6.2 Perceptions of the roles undertaken by AEWs

Officially, there were 12 roles outlined by the government for duties to be performed by AEWs. To help understand how well AEWs performed those roles, similar questions were addressed to farmers, government officers and AEWs to gain their perceptions of their satisfaction with the roles of AEWs. There were two questions that were not relevant to farmers, questions about the roles for training other AEWs and producing brochures. However, the feedback from farmers to these questions will not affect the finding of this study.

The average score for farmers was 2.7 which means their satisfaction ranged from dissatisfied to neutral, while the average scores for AEWs was 3 and government officers was 3.7 which means they were neither satisfied nor dissatisfied.

To examine the association between the population and their perceptions, Chi-square tests were conducted. The results indicate that there was a significant difference at alpha 5% between groups in their perceptions of roles (Table A6.1 to Table A6.12). In other words the perception of three groups towards the roles performed by AEWs is different. A summary of the Pearson Chi-square tests is shown in Table 5.32.

Data in Table 5.32, show that the role with the highest level of dissatisfaction for all three groups was that of running a field school. Around 70% of farmers were strongly dissatisfied, while 78% of AEWs and 72% of government officers were dissatisfied. Furthermore, the roles of increasing knowledge and skills; monitoring and evaluation; and undertaking a plot demonstration were rated the highest level of satisfaction for AEWs and government officers, whilst there was only one of 12 roles undertaken by AEWs that satisfied farmers namely deliver government projects.

Chi-square tests were also used to examine the association between AEWs education level and their perceptions of their roles. The results indicate that there was no significant difference between levels of education of AEWs and their perceptions of their roles (Table A8.1 to Table A8.12).

Table 5.32: Level of satisfaction of farmers, AEWs and government officers with the roles of AEWs

Roles	Group	(%) SD	D	N	S	SS	Average scores
Increasing farmers' knowledge and skills	Farmer	0	27	45	26	2	3.0
	AEW	0	0	6	18	76	3.4
	GO	3	9	37	41	10	4.7
Undertake plot demonstration	Farmer	15	42	39	4	0	2.3
	AEW	0	0	2	*43*	*54*	4.1
	GO	0	0	16	*56*	*28*	4.5
Encourage farmer to participate in extension service	Farmer	4	20	46	30	0	3.0
	AEW	0	0	5	43	52	2.2
	GO	16	62	16	3	3	4.5
Program planning	Farmer	6	39	43	12	0	2.6
	AEW	2	0	28	44	26	3.4
	GO	0	9	47	41	3	3.9
Input deliverer	Farmer	6	45	37	12	0	2.5
	AEW	4	20	57	15	4	3.4
	GO	0	9	44	41	6	2.9
Monitoring and evaluation	Farmer	13	33	36	18	0	2.6
	AEW	0	0	4	35	61	4.4
	GO	0	3	3	41	53	4.6
Help farmer to find cause of Problem	Farmer	5	26	40	29	0	2.9
	AEW	0	2	4	39	55	2.5
	GO	6	53	28	13	0	4.6
Help farmer to solve that problem	Farmer	13	26	37	22	2	2.7
	AEW	0	0	0	50	50	2.2
	GO	3	78	16	3	0	4.5
AEW trainer	Farmer	1	41	53	5	0	2.6
	AEW	0	0	9	52	39	2.5
	GO	0	69	16	16	0	4.3
Make a brochure	Farmer	22	45	33	0	0	2.1
	AEW	24	41	31	4	0	3.7
	GO	3	9	16	53	19	2.1
Run a field school	Farmer	18	52	30	0	0	2.1
	AEW	26	52	22	0	0	2.4
	GO	0	72	16	12	0	1.9
Deliver government project	Farmer	0	1	13	63	23	4.1
	AEW	6	50	28	9	7	3.7
	GO	3	12	16	50	18	2.6

Valid cases 223 for farmers; 46 for AEWs and 32 for government officers

SD = Strongly dissatisfied
D = dissatisfied
N = Neutral
S = satisfied
SS = strongly satisfied

Table 5.33: Chi-square tests for differences in satisfaction between farmers, AEWs and government officers with respect to the roles undertaken by AEWs

		Count (% of total)			Total	Pearson
Perceptions	**Group**	**Dissatisfied**	**Neutral**	**Satisfied**		**X^2**
Increasing farmer' knowledge and skills	Farmer	60(20)	101*(34)*	62*(21)*	223*(74)*	P = .000
	AEWs	-	3*(1)*	43*(14)*	46*(15)*	V=70.93[a]
	GO	4*(1)*	12*(4)*	16*(5)*	32*(11)*	df = 4
Undertake plot demonstration	Farmer	127*(42)*	87*(29)*	9*(3)*	223*(74)*	P= .000
	AEWs	-	1*(.3)*	45*(15)*	46*(15)*	V=232.47[a]
	GO	-	5*(2)*	27*(9)*	32*(11)*	df=4
Encourage farmer to participate in extension Service	Farmer	53*(18)*	103*(34)*	67*(22)*	223*(74)*	P=.000
	AEWs	-	2*(1)*	44*(15)*	46*(15)*	V=121.59[a]
	GO	25*(8)*	5*(2)*	2*(1)*	32*(11)*	df= 4
Program planning	Farmer	101*(34)*	95*(32)*	27*(9)*	223*(74)*	P=.000
	AEWs	1*(.3)*	13*(4)*	32*(11)*	46*(15)*	V=86.76[a]
	GO	3*(1)*	15*(5)*	14*(5)*	32*(11)*	df =4
Input deliverer	Farmer	115*(38)*	82*(27)*	26*(9)*	223*(74)*	P=.000
	AEWs	11*(4)*	26*(9)*	9*(3)*	46*(15)*	V=41.11[a]
	GO	3*(1)*	14*(5)*	15*(5)*	32*(11)*	df=4
Monitoring and evaluation	Farmer	102*(34)*	80*(27)*	41*(14)*	223*(74)*	P=.000
	AEWs	-	2*(1)*	44*(15)*	46*(15)*	V=143.44[a]
	GO	1(.3)	1*(.3)*	30*(10)*	32*(11)*	df=4
Help farmer to find a problem	Farmer	70*(23)*	89*(30)*	64*(21)*	223*(74)*	P=.000
	AEWs	1*(.3)*	2*(1)*	43*(14)*	46*(15)*	V=85.25[a]
	GO	19*(6)*	9*(3)*	4*(1)*	32*(11)*	df=4
Help farmer to solve that Problem	Farmer	86*(29)*	82*(27)*	55*(18)*	223*(74)*	P=.000
	AEWs	-	-	46(15)	46(15)	V=127.99[a]
	GO	26*(9)*	5*(2)*	1*(.3)*	32*(11)*	df=4
AEW trainer	Farmer	94*(31)*	118*(39)*	11*(4)*	223*(74)*	P=.000
	AEWs	-	4(1)	42(14)	46(15)	V=197.61[a]
	GO	22*(7)*	5*(2)*	5*(2)*	32*(11)*	df=4
Made a brochure	Farmer	149*(50)*	73*(24)*	1*(.3)*	223*(74)*	P=.000
	AEWs	30*(10)*	14*(5)*	2*(1)*	46*(15)*	V=182.88[a]
	GO	4*(1)*	5*(2)*	23*(8)*	32*(11)*	df=4
Run a field school	Farmer	156*(52)*	66*(22)*	1*(.3)*	223*(74)*	P=.000
	AEWs	36*(12)*	10*(3)*	-	46*(15)*	V=28.31[a]
	GO	23*(8)*	5*(2)*	4*(1)*	32*(11)*	df=4
Deliver government project	Farmer	3*(1)*	28*(9)*	192*(64)*	223*(74)*	P=.000
	AEW	26*(9)*	13*(4)*	7*(2)*	46*(15)*	V=135.73[a]
	GO	5*(2)*	5*(2)*	22*(7)*	32*(11)*	df=4

p = probability; V= value of X^2; and a = cell have expected count less than 5.

5.6.3 Government officers rating of AEWs

Government officers were asked to rate how well AEWs fulfilled the goal of extension. Their rating was overwhelmingly negative with 76% giving them a rating of less than 50% (Table 5.34).

Table 5.34: Government officers rating of how well AEWs fulfilled their roles and goals

Level of believing	Frequency	% of respondent
Less than 25%	12	38
Between 25 and 50%	12	38
Between 50 and 75%	8	24
More than 75%	0	0
Total	32	100

Valid cases 32

5.6.4 Farmers views about the level of AEWs performance in conducting certain activities

Farmers were also asked to rate the level of performance of AEWs in relation to input delivery and organisation of group activities. The five activities for input delivery were supplying seed, helping use fertiliser, helping with chemical application, helping with irrigation management and helping with marketing information. Farmers were asked to rate AEWs performance on a 5-point scale from 1(strongly disagree) to 5(strongly agree) (Table 5.35).

As data in Table 5.35 reveal, 53% of farmers considered that AEWs performed poorly in supplying seed with 6% strongly disagreeing that they provide help in this area. However, in the provision of guidance for fertiliser use, AEWs were perceived positively with 52% of farmers agreeing and even 27% strongly agreeing. Forty-eight per cent of farmers agreed that AEWs provided help with irrigation management while 33% were neutral. In the provision of pesticide help, AEWs were perceived poorly with 77% of farmers disagreeing and 17% neutral. AEWs providing marketing outlet information were also perceived poorly with 42% of farmers disagreeing and even 13% in strong disagreement.

Table 5.35: Farmers rating of AEWs performance for five main activities expressed in percentage

Activity	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Guidance for fertiliser use	0	3	18	52	27
Assist in irrigation management	18	44	33	48	0
Assist in supplying seeds	6	53	27	14	0
Provide pesticides	9	68	17	6	0
Provide marketing information	13	42	37	8	0

Farmers were asked for their perception about the opportunity to express opinions in farmer group activities and the organisation of the meetings, using a scale of 1 (strongly disagree) to 5 (strongly agree) (Table 5.36). In general, farmers agreed that they had the opportunity to express their opinions in the meetings, which was indicated by an average score of 3.9. Expressed as a percentage, 50% of farmers agreed whilst 5% disagreed. Meanwhile, farmers' satisfaction with the organisation of the meeting was indicated by an average score of 3.7. Table 5.35 also shows that 48% of farmers agreed that the meeting were well organised whilst 2% strongly disagreed. However, 22% of farmers were neutral.

Table 5.36: Farmers attitude to group meeting expressed as a percentage

Attitude	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Express idea	0	5	24	50	20
Meeting organisation	2	15	22	48	14
Total	2	20	46	98	34

5.7 Factors associated with effectiveness of extension delivery

This part consists of factors associated with the effectiveness of extension delivery, such as: training and development for AEWs, contact with farmers, understanding of the T & V system and extension; the linkage between research and extension and AEWs' motivation.

5.7.1 Training and development for AEWs

Training provided by the government

For the last 1-3 years the government of NTT province had provided courses to increase AEWs' knowledge and skills. The courses run by the government according to government officers are shown in Table 5.37.

Table 5.37: Subjects of courses run by government in the last 1-3 years according to government officers

Subjects of course	Response	% of responses	% of respondents
Agribusiness	24	27	75
Application of Bonza fertiliser	20	23	63
Participatory Rural Appraisal (PRA)	13	14	41
Livestock development	12	14	38
Farming systems analysis	12	14	38
Impact point identification	7	8	22
Total	88	100	277

Valid cases 32: 1 officer more than 1 response

AEWs satisfaction with training

AEWs were asked to rate the training they received to perform their roles. Using a 5-point scale from 1 (strongly dissatisfied) to 5 (strongly satisfied), the level of AEWs satisfaction with the training given by the government is shown in Table 5.38. The average score for satisfaction with training across all roles was 2.3 which means AEWs were dissatisfied with the training. AEWs were dissatisfied with the training to undertake a plot demonstration (100% of AEWs), produce a brochure (100% of AEWs), increase skills and knowledge (93% of AEWs) and undertake a field school (65% of AEWs). In contrast, 78% of AEWs were satisfied with the training for program planning. AEWs were neutral with the training on encouraging farmer involvement in extension activities, input delivery and monitoring and evaluation.

Training attended by AEWs

According to government officers, AEWs had received training to improve their skills, but according to 59% of AEWs, in the last two years preceding data collection, they did not attend any courses. For those who did, the last course they attended was of three types. These were Participatory Rural Appraisal (39% of AEWs), Bonza fertiliser application (37% of AEWs) and agribusiness (10% of AEWs) (Table 5.39).

Although this research had obtained the subjects of training attended by AEWs and the training provided by the government, it did not ask AEWs their priorities for training. This is one weakness of the research.

Table 5.38: AEWs satisfaction with the training they received to conduct the roles given them by the government officers

Roles	Strongly dissatisfied	Dissatisfied	Neutral	Satisfied	Strongly dissatisfied	Average scores
Increasing skills and knowledge	30	13	3	0	0	1.4
	65%	*28%*	*7%*	*0%*	*0%*	
Undertake plot demonstration	0	100	0	0	0	2.0
	0%	*100%*	*0%*	*0%*	*0%*	
Encourage farmers involvement in extension activity	5	16	19	6	0	2.5
	11%	*35%*	*41%*	*13%*	*0%*	
Program planning	0	3	7	31	5	3.8
	0%	*7%*	*15%*	*67%*	*11%*	
Inputs deliverer	0	0	100	0	0	3.0
	0%	*0%*	*100%*	*0%*	*0%*	
Monitoring and evaluation	4	15	21	6	0	2.6
	9%	*33%*	*46%*	*13%*	*0%*	
Help to find the cause of problems	9	14	15	7	1	2.5
	20%	*30%*	*33%*	*15%*	*2%*	
Help to solve problems	7	24	14	1	0	2.2
	15%	*52%*	*31%*	*2%*	*0%*	
Training for other AEWs	3	22	21	0	0	2.3
	6%	*48%*	*46%*	*0%*	*0%*	
Making a brochure	23	23	0	0	0	1.5
	50%	*50%*	*0%*	*0%*	*0%*	
Undertake a field school	10	20	16	0	0	2.1
	22%	*43%*	*35%*	*0%*	*0%*	
Deliverer of government projects	5	23	18	0	0	2.3
	11%	*50%*	*39%*	*0%*	*0%*	

Valid cases 46

Table 5.39: The subject of the last courses attended by AEWs in 1999/2000

Subject	Frequency	% of responses	% of respondent
Participatory Rural Appraisal	18	28	39
Bonza fertiliser application	17	27	37
Agribusiness	5	8	10
Never attended any course	27	42	59
Total	64	100	145

Valid cases 46 more than 1 response

5.7.2 Contact with farmers

This section presents the activities within farmers and farmer's group which describe contact with farmers.

Visits to farmers

The question of the amount of farmer visits by AEWs over the last month did not produce meaningful results for the following reasons: 1) AEWs did not usually visit farmers or farmer groups unless the government requested them to do so for a particular purpose; 2) most AEWs do not live in or around villages; 3) bad geographical conditions and lack of facilities for transport especially bikes; and 4) the distance between some villages and AEWs settlement is up to 60 km.

However, according to the farmers surveyed, in the six months preceding data collection AEWs visited them on average as follows: 1) 80 farmers who came from the villages of Netpala and Oebesak said that they had been visited an average of 10 times, 2) 81 farmers who came from the villages of Oesao and Noelbaki said that they had been visited by AEWs an average 8 times; 3) 28 farmers who came from the village of Sumlili said that they had been visited by AEWs once; and 4) 34 farmers who came from the village of Nusa said that they had never been visited by AEWs.

Farmers' group activities

On average, farmers had been members of a group for roughly five years with the shortest period of time one year and the longest period of time 18 years. The average number of farmers in a group was 69 with a minimum of 10 farmers and a maximum of 200 farmers. Each farmer group stated a group meeting time. Most meetings were held in the evening because of the farmers need to work during daylight hours. The frequency of farmer group meetings in 2000 are presented in Table A3.10.

Each group appointed one contact farmer; usually the group leader or a successful farmer. The two main tasks of contact farmers according to government officers and AEWs are shown in Table 5.39. Eighty-eight per cent of government officers said that the task of the contact farmer was to coordinate all group activities while 63% said they were to act as communicators either internally for the group or externally with AEWs or other officers who had work links with farmers. On the other hand, 96% of AEWs stated that the task of the contact farmer was as a communicator, while 65% of AEWs said that the task of the contact farmer was to coordinate all group activities.

Table 5.41: Tasks of contact farmer according to government officers and AEWs

Tasks of CF	Communicator	Coordinator	Total
Government			
Response	20	28	48
% of response	42	58	100
% of respondent	63	88	143
AEWs			
Response	44	30	74
%of response	59	41	100
% of respondent	96	65	161

According to the farmers, in 2000, meetings were conducted 2.2 times on average , with a minimum of once and a maximum of 11 times (Appendix A3.10). Data in Table 5.42 show that the main subjects of meetings were crop preparation (31% of farmers), how to obtain credit from the government (31%), evaluation of the last season (19%) and land preparation (17%).

There were three main activities carried out at meetings, discussion (mentioned by 71% of farmers), field demonstrations (25%) and study visits (4%).

As shown in Table 5.43, there were 10 reasons given by farmers for attending meetings. The most popular of these were how to obtain credit (50% of farmers), disease and weed treatment (45%), how to grow successful crops (22%), sharing experience (22%) and as a media for learning (20%).

Table 5.42: Subject of farmer's group meetings in 2000

Subject	Responses	% of responses	% of respondent
Preparing crop	70	26	31
Credit	70	26	31
Evaluation of the last season	42	15	19
Land preparation	37	14	17
Fertilization	31	11	14
Fencing	18	7	8
Choose good seed	2	1	1
Five fold growing activity	2	1	1
Total	272	100	122

Valid cases 223 and 272 responses

Table 5.43: Farmer's reasons for attending a meeting in 2000

Reason	Responses	% of responses	% of respondent
How to obtain credit	112	23	50
Disease/weed treatment	100	20	45
How to grow crop successfully	49	10	22
Sharing experience	50	10	22
As a media for learning	45	9	20
Improve fertiliser skill	37	7	17
Getting price information	35	7	16
Increase on five effort skills	34	7	15
Land preparation	24	5	11
Getting best seed/pesticide	10	2	4
Total	496	100	207

Valid cases 223; more than one response allowed

AEWs contact with farmers

All farmers (34 farmers) who came from the village of Nusa said that they had not had an AEW working with them for two years. All 28 farmers who came from the village of Sumlili said that AEWs had been working with their group for one month. The eighty farmers who came from the villages of Oebesak and Netpala said that AEWs had been working with their group for less than five years, while the 81 farmers who came from the villages of Oesao and Noelbaki said that AEWs had been working with their group for less than one year. In the five years from 1995 to 2000, farmers from the villages of Nusa, Oebesak, Netpala and Sumlili (142 farmers) stated that there was only one AEW working with their group whilst the 81 farmers from the villages of Oesao and Noelbaki said that there were two AEWs working with their group.

5.7.3 Understanding of the T & V system and extension

Government officers knowledge of extension model

Government officers were asked what extension model was being used. Their responses were: the T & V model (63% of government officers), running a Field School (16%),

Farmer Field Day (9%) and giving Radio talks (6%). However, a further 25% did not know the model being used (Table 5.44).

Table 5.44: Extension model being used in NTT in 2000 according to the government officers

Extension model	Frequency	% of response	% of respondent
T & V	20	53	63
Field school	5	13	16
Farmer field day	3	8	9
Radio	2	5	6
Do not know	8	21	25
Total	38	100	119

Valid cases 32; more than one response allowed

The government officers did not have the same level of knowledge on the T & V system. There were four categories of government officers in terms of understanding the T & V system including its goals, role of contact farmers and farmers' groups. These were: 1) those who could fully understand and answer all the questions; 2) partly understand and answer two or three questions; 3) understand a bit and answer one question; 4) not understand at all and answer no question.

Data in Table 5.45 show that there were 16% of government officers who fully understood what the T & V system was. They were the officers who worked with the BLPP (*Pusat Latihan Penyuluhan Pertanian = Center for AEW Training*). About 28% partly understood; they worked with the Agricultural Department, Horticultural Division, Livestock Division and Fishery Division. Around 31% of government officers had a little understanding. They worked with providing facilities for AEWs and policy makers. However, there were 25% of government officers working as policy makers who did not know anything about the T & V system.

Government officers have different views about the tasks of the T & V model. Of the 32 government officers, there were 55 responses on the main tasks of the T & V system, divided into four categories (Table 5.46). They mentioned three tasks of the T & V system: 1) training followed by visiting, which was the response of 22 (40%) government officers; 2) each AEW should supervise farmer groups, which was the response of 18 (33%) government officers; and 3) monitoring of technology application which was the response of 10 (18%) government officers. Five (9%) government officers gave no response.

Table 5.45: Government officers' knowledge level on extension model being used

Level of knowledge	Frequency	% of respondent
Fully understand	5	16
Partly understand	9	28
A little understanding	10	31
Do not understand	8	25
Total	32	100

Valid cases 32

Table 5.46: The tasks of T & V according to government officers

Goal of T &V system	Frequency	% of response	% of respondent
Training followed by visiting	22	40	69
AEWs supervise farmer groups	18	33	56
Monitoring of technology application	10	18	31
Do not know	5	9	16
Total	55	100	172

Valid cases 32

Government views of the T & V system

With respect to the implementation of the T & V system, 24 (75%) government officers conceded that this system had some weaknesses such as: 1) the number of AEWs needed; 2) needs much money; and 3) the fact that it is not suitable for the dryland farming system which dominates farming in NTT. A further eight (25%) government officers had no idea of the performance of the T & V system. However, government officers also asserted that conceptually, the system had some advantages such as: 1) gradual training; 2) it was easier to control AEWs; 3) regular meetings were run; and 4) AEWs reported farmers' activities regularly.

Government officers knowledge about T & V groups

Although some government officers worked in relation to agricultural development, they had different opinions of the number of farmers in each farmer group. Based on data gained in this study, they believed the average number of farmers in a group was 30 with a variation of 10 to 200. Forty-four per cent of government officers said there were 10 to 25 farmers in a group, 38% said between 25 and 50 farmers and 19% said there were more than 50 farmers in a group (Table A5.2).

There were two criteria government officers believed were used to put farmers in a group, area of settlement mentioned (by 91%) and the same commodity or enterprise (by 81%).

According to AEWs, the average number of farmers in a group was well over 36 with a minimum of 7 farmers and a maximum number of 125.

In the T & V system, each AEW should supervise a certain numbers of farmer groups in their daily activities. Forty-one per cent of government officers said that each AEW should supervise in the range of 11 to 20 farmer groups, 31% said that each AEW should supervise less than 11 farmer groups and 28% of government officers said that each AEW should supervise more than 20 farmer groups (Table A5.3).

5.7.4 Reasons for becoming AEWs

AEWs had been working with extension services for an average of three years ranging from one year to 24 years. They have different motivations for becoming an AEW as given in Table 5.47. Most AEWs had more than one reason to become an AEW, but becoming a civil servant was the most common motivation (87%).

Table 5.47: Reasons for becoming an AEW

Motivation	Frequency	% of responses	% of respondents
To become a civil servant	40	40	87
To apply agricultural knowledge	29	29	63
To help farmers	23	23	50
Farmer family back ground	9	9	20
Total	101	100	220

Valid cases 46; more than one response allowed

5.8 Perception of constraints to effectiveness of extension service

5.8.1 Constraints faced by AEWs according to government officers

According to the government officers interviewed there were 15 factors that impeded AEWs' ability to perform their tasks (Table 5.48). The nine main constraints were: the bureaucratic processes (56% of government officers); salary (50%); facilities (50%); a lack of funds for demonstration (47%); a lack of motivation (38%); a lack of training (34%); lack of research recommendations (28%); poor direction (19%) and lack of authority (19%).

Table 5.48: Constraints impeding AEWs' ability to perform tasks according to government officers

Constraints	Response	% of response	% of respondent
Bureaucracy	18	14	56
Lack of appreciation	16	12	50
Insufficient facilities	16	12	50
Limited funds for demonstration	15	12	47
Low motivation	12	9	38
Lack of training	11	9	34
Lack of research support	9	7	28
Lack of skills in local language	9	7	28
Poor direction	6	5	19
Lack of authority	6	5	19
Low level of education	5	4	16
Changeable structure of AEWs	4	3	13
Poor geographical conditions	2	2	6
Total	129	100	404

Valid cases 32; 1 officer more than 1 response

5.8.2 Linkages between research and extension

Government officers found it difficult to incorporate research recommendations into extension services because they faced some constraints dealing with research in this region. The research constraints faced by government officers to support extension services are shown in Table 5.49. As many as 56% of government officers said there was no research on extension in this region, 38% said there was a lack of funds, 28% said research was badly coordinated and 13% said research topics conducted by the *BPTP* were based on central government interests and not from farmers.

Table 5.49: Research constraints faced by government officers

Constraining factors	Frequency	% of response	% of respondents
No research on extension	18	42	56
Lack of funds	12	28	38
Bad coordination	9	21	28
Research topic based on government needs	4	9	13
Total	43	100	109

Valid cases 32; more than one response allowed.

Besides the constraints on the research programs, government officers also faced problems related to the extension service. Eighty per cent of government officers mentioned the change of structure and function in the agricultural department and 70% mentioned bad coordination among the divisions. A further 60% of government officers said the district governments did not understand about the extension services. Lastly the lack of funds and poor quality manpower were seen as problems by 69% of government officers.

5.8.3 AEWs perception of constraints

AEWs faced constraints that impeded their ability to deliver on their roles. In response to an open-ended question AEWs named 13 constraints that impeded their ability. These were: authority, salary, bureaucracy, facilities, job direction, local language, AEWs position in Agricultural Department structure, chance for training, subject of training, frequency of training, trainer quality, training methods and geographical conditions.

Thirteen questions were addressed to AEW respondents to gain their perceptions on each of the constraint factors. Slightly different categories of perception were used in this survey. These were: 1) a scale of very good to very bad, used for authority, appreciation (salary), facilities and geographical conditions; 2) a scale of strongly satisfied to strongly dissatisfied, used for training frequency, trainer quality and change of agricultural department structure; 3) a scale of strongly agree to strongly disagree, used for bureaucracy and local language; 4) a scale of very clear to very unclear, used for job direction; 5) a scale of very suitable to very unsuitable, used for method of training; and 6) a scale of strongly relevant to strongly irrelevant, used for subject of training. AEWs perception of the constraints are shown Table 5.50.

The average score for AEWs perception of the constraint factors was 2.4 which means AEWs were dissatisfied with the constraints. The worst constraints were as follows: 100% of AEWs were dissatisfied with their position in the agricultural structure (average score of 1.4); 98% were dissatisfied with appreciation (salary) (average score of 1.8); 92% were dissatisfied with the frequency of training (average score of 2.4); 78% were dissatisfied with the facilities (average score of 2.1); 74% were dissatisfied with the extension direction (average score of 2.2); 65% were dissatisfied with the subjects of training (average score of 2.2); 63% were dissatisfied with the chance for attending training (average score of 2.4); 63% were dissatisfied with geographical conditions in the service areas (average score of 2.3); 61% AEWs were dissatisfied with their authority to run the service (average score of 2.2); and 57% were dissatisfied with the bureaucratic processes (average score of 2.5). The average scores for method of training, quality of trainer and local language were 3.0; 3.0 and 3.1 respectively.

Table 5.50: AEWs' perceptions on the constraints that impede their ability to deliver on their roles

Constraints factors	1	2	3	4	5	Average scores
Authority	7	21	18	0	0	2.2
	15%	*46%*	*39%*	*0%*	*0%*	
Appreciation (salary)	11	34	1	0	0	1.8
	24%	*74%*	*2%*	*0%*	*0%*	
Bureaucracy processes	5	21	14	6	0	2.4
	11%	*46%*	*30%*	*13%*	*0%*	
Facilities	12	24	6	4	0	2.0
	26%	*52%*	*13%*	*9%*	*0%*	
Extension direction	8	26	9	3	0	2.2
	17%	*57%*	*20%*	*6%*	*0%*	
Local language	0	13	22	11	0	2.9
	0%	*28%*	*48%*	*24%*	*0%*	
AEWs position in Agricultural Department structure	30	16	0	0	0	1.3
	65%	*35%*	*0%*	*0%*	*0%*	
Chance for training	6	23	12	5	0	2.3
	13%	*50%*	*26%*	*11%*	*0%*	
Subjects of training	8	22	13	3	0	2.2
	17%	*48%*	*28%*	*7%*	*0%*	
Training frequency	24	18	2	2	0	1.6
	53%	*39%*	*4%*	*4%*	*0%*	
Trainer quality	0	1	41	4	0	3.0
	0%	*2%*	*89%*	*9%*	*0%*	
Training method	0	1	42	3	0	3.0
	0%	*2%*	*91%*	*7%*	*0%*	
Geographical conditions	10	19	11	6	0	2.3
	22%	*41%*	*24%*	*13%*	*0%*	

Valid cases 46

5.9 Areas for improvement

In response to questions to government officers, AEWs and farmers about what areas of the extension service need to be improved, the following list was compiled: 1) AEWs need to know how to produce a brochure and how to use this visual aid to support their tasks or roles; 2) regular training for AEWs; 3) constraints that impede the ability of AEWs need to be reduced; 4) better selecting procedures for contact farmers are needed, 5) the government needs more knowledge of extension; 6) the number of farmers and farmer groups to be supervised by AEWs needs to be reduced; 7) AEW skills and knowledge need to be increased; 8) research recommendations are needed to support the extension service; 9) the motivation of AEWs need to improved, and 10) more attention is needed to solve the problems faced by farmers in their horticultural production.

5.9.1 Suggestions for improvement

To strengthen the extension services under T & V system and the extension service in general, farmers, AEWs and the government officers gave suggestions to improve the quality of the extension services as shown in Table 5.51. Farmers had 18 suggestions to improve the quality of the extension service, AEWs had 11 suggestions and government officers had 20 suggestions. The three groups had some similar suggestions for running demonstrations, giving information that farmers need, delivering service at the right time and better coordination at the village level.

5.9.2 Government officers plans to improve extension service

The government officers were asked about their plans to improve the extension service (Table 5.52). As many as 13% of government officers planned to increase the quality of human resources, 13% planned to increase the level of education for AEWs, 9% planned to apply bottom-up planning in extension service, 6% planned to run a field school, 6% planned to refine the subjects of training and 6% planned to increase funding for extension services. However, 85% of government officers did not have any plans.

Table 5.51: Suggestions for improving the quality of extension service

Suggestions	Farmers	AEWs	GOF
1. Run the T & V as previously done			40
2. Provide facilities for AEWs		84	68
3. Supervise AEWs			90
4. Increase AEWs level of education		90	80
5. Good coordination at village level	80	95	60
6. Reactivate visiting	70		40
7. Simplify bureaucracy		90	
8. Reward and punishment system		95	90
9. Regular meetings for AEWs			40
10. Improve the position of AEWs in the structure		96	
11. AEWs should be active	84		70
12. AEWs provide seed, fertilizer, pesticides	82		
13. AEWs settle in village	90		90
14. Give information as farmers need	95	85	80
15. Deliver service at the right time	90	65	60
16. Deliver new information	40		
17. Provide marketing outlet	80		75
18. Understand farmers problems	95		95
19. AEWs should know local culture	95		90
20. Advice on horticultural crops	84		
21. Advice all farmers	70		90
22. Decrease project focus			70
23. AEWs easily contacted	80		84
24. Run plot demonstrations	95	90	80
25. AEWs should cooperate with farmers	80		
26. AEWs must be experts	90		
27. AEWs have same chance for training		94	82
28. Give to farmers as promised	96		
29. AEWs need to be trained on PRA		87	

Table 5.52: Government officers' plans to improve extension service in NTT in 2000

Government officers' plans	Frequency	% of response	% of respondent
No plans	27	50	85
Human resource development	4	7	13
Improve AEW education level	4	7	13
Bottom up planning	3	6	9
Run field school	2	4	6
Refine subject of training	2	4	6
Provide funds	2	4	6
Total	54	100	138

Valid cases 32; more than one response allowed

For the purpose of increasing AEWs skills and knowledge, government officers planned activities such as 1) all AEWs must be educated at diploma level (29%), 2) training on Participatory Rural Appraisal (25%), and 3) seminars and workshops (30%) (Table 5.53). However, 16% of government officers had no plans for improving AEWs' skills and knowledge.

Table 5.53: Government officers' plans to increase AEW skills and knowledge

Government planning	Frequency	% of response	% of respondent
Seminar and workshop	17	30	53
All AEW must be at diploma level of education	16	29	50
Training on PRA for AEWs	14	25	47
No plans	9	16	28
Total	56	100	178

Valid cases 32; more than one response allowed

The government officers were asked about their opinions for future subjects of training (Table 5.54). The top five subjects they suggested were: 1) socio-cultural system of local people (53%); 2) Participatory Rural Appraisal (PRA) (47%); 3) agribusiness (47%); 4) methodology and strategy of extension (31%); and 5) farm management (25%).

Table 5.54: The future subjects of training needs for AEWs as perceived by government officers

Subject of training	Frequency	% of response	% of respondent
Socio-cultural system of local people	17	21	53
Participatory Rural Appraisal (PRA)	14	17	47
Agribusiness	14	17	47
Methodology and strategy of extension	10	12	31
Farm management	8	10	25
Extension program planning	7	9	22
Five efforts of agriculture enterprises	6	7	19
Communication method and skill	6	7	19
Total	82	100	220

Valid cases 32; more than one response allowed

Chapter 6: Discussion

6.1 Introduction

The discussion centres on tasks and roles of agricultural extension, which includes the government officers' and AEWs' views about the role of agricultural extension, the roles expected of AEWs by farmers, AEWs and government officers, and the roles expected by government officers. Included in the different perceptions about the roles delivered by AEWs are the levels of respondent satisfaction with the roles undertaken by AEWs and farmers' satisfaction with the quality of extension services. This is followed by an account of factors associated with the effectiveness of the extension services, which includes training, visiting, group activities, contact with farmers, and understanding of the T & V system. The chapter concludes with the performance of the T & V system in NTT.

6.2 Task and roles of agricultural extension

The Bahasa Indonesian words used to express the concepts of task and role in the questionnaire were '*tugas*' and '*peranan*'. However, it is apparent from the replies that task and role have a similar meaning. Hence, for practical purposes the meaning of these words is the same. This part intends to present the information about the task of agricultural extension according to the government officers and AEWs. It also provides information about the actual roles undertaken by AEWs and the expectations of roles that should be undertaken by AEWs.

6.2.1 Government and AEWs views on the role of agricultural extension

Government officers and AEWs have the same views about four tasks of agricultural extension whilst eight other tasks are only viewed as tasks of agricultural extension by the government officers (Table 5.13). In order of importance, government officers saw increasing agricultural production (66%), increasing farmers' income (44%) and refining the farming system (41%) as tasks of agricultural extension, whereas, AEWs viewed increasing farmers' income (30%), acting as a change agent (22%), increasing agricultural production (20%), and helping farmers as the most important tasks. It seems that the task of agricultural extension as viewed by both groups focuses on the result or

target of the service. This result seems to be dissimilar to the tasks of agricultural extension mentioned by Van den Ban and Hawkins (1988; 1996) that agricultural extension should be a process of helping farmers to be aware of their present and future situation, helping farmers to become aware of problems and develop insight into problems, helping farmers to increase their existing knowledge, helping farmers to find certain knowledge in relation to specific problems, encouraging farmers to choose alternatives suitable to their situation, encouraging farmers to implement their choice, and helping farmers to evaluate their opinion-forming and decision-making skills.

In the questionnaire, the government and AEWs were asked slightly different questions. The AEWs were asked about the main tasks of agricultural extension while the government officers were asked about the tasks of agricultural extension. Therefore, the results of these questions are slightly different. However, their views for the tasks of agricultural extension are basically the same and can be grouped into three main points. These are: 1) to help farmers increase their income; 2) to help farmers increase agricultural production; and 3) to act as change agents. The variation in agricultural tasks mentioned by government officers and AEWs might be a result of what jobs they were required to do by the government. Similarly, government officers are also unlikely to have standard criteria for evaluating extension activities. The government runs the extension service mostly based on project needs and evaluation of financial management for the projects, not on farmers' activities. There were few links between project goals, and the following extension service and farmers previous data in planning the program for extension service (Agricultural Department of Indonesia 1999).

6.2.2 Roles expected of AEWs by farmers, AEWs and government officers

Farmers, AEWs and government officers were chosen for this project because their occupation is related to the extension activity. Farmers in the extension system act as receivers, AEWs act as extension program deliverers or a bridge between farmers and government officers, and government officers act as program planners of the extension service and all policies dealing with extension activity. Therefore, the involvement of these groups will enable this project to reach its goals.

All three groups expected AEWs to use example and demonstration (Table 5.15). Farmers and AEWs had similar expectations, that programs to suit farmers' problems and needs would be delivered as promised (Table 5.15). These two roles were not

expected by the government officers, perhaps because, based on their planning, the government officers believed that all programs delivered by AEWs would meet farmers' needs and problems as promised (Table A5.4). Providing information to meet farmers' needs was considered an important area for improvement by 95% of farmers, 85% of AEWs and 80% of government officers (Table 5.49). This is in line with the roles suggested by Van den Ban and Hawkins (1988; 1996) for AEWs to transfer a program suitable to farmers' problems and needs. However, these expectations seem hard to implement in the T & V system which is driven by top-down planning. As argued by Chowhury and Gilbert (1996) the T & V system was often overly dependent on routine diffusion of messages and generally unsuccessful in taking account of farmers' constraints. Furthermore, Bauer et al. (1978) stated that in developing countries the system of extension was dominated by a 'top down' approach, that is a system was driven by the extension service or government interests rather than farmers' interests. These authors go on to say that farmers' aspirations were manipulated and changed for reasons that were not clear. The consequences of these conditions include one-way communication with limited feedback, ignorance of farmers' participation, and poor attention to local conditions and needs.

Meanwhile, farmers and government officers also expected AEWs to increase farmers' knowledge and skills; empower farmers and their groups; and be a part of the farmers' community.

Government officers and AEWs had similar expectations about running activities dealing with agriculture, supporting research recommendations and acting as a bridge between government and farmers (Table 5.15). These three roles were not expected by farmers who had a slightly different focus in believing that AEWs should be a bridge for farmers and input sources, especially in terms of providing horticultural seed and marketing outlet information (Table 5.15).

All farmers expected extension programs to be run at the right time because they felt extension programs were often delivered at an inappropriate time (Table 5.15). For example, farmers need seed for their horticultural crops in May, but AEWs were often late, informing farmers in August or September about how and where to get the best quality horticultural seed. Data in Table 5.49 indicates that 90% of farmers, 65% of AEWs and 60% of government officers suggested that AEWs should deliver services at the right time.

Problems with untimely distributions of inputs by AEWs are not confined to the NTT as Asiabaka and Bamisile (1991) found the same problem in India. Some of these problems occurred because of the bureaucratic system faced by AEWs. As Figure 6.1 reveals, when AEWs found a problem which threatened farmers crops (e.g. disease), AEWs then reported to a high level official such as the coordinator of BPP. The BPP coordinator then reported it to the BIPP and to the relevant division and so on - in some cases up to the governor. Hence, despite farmers and AEWs facing problems that need to be overcome quickly, they have to wait for a decision from a high level official whether or not or how the problem should be overcome. As Figure 6.1 indicates, AEWs need to take many steps and thus time to overcome farmers' problems. As the above-mentioned example shows, this often causes late information or action.

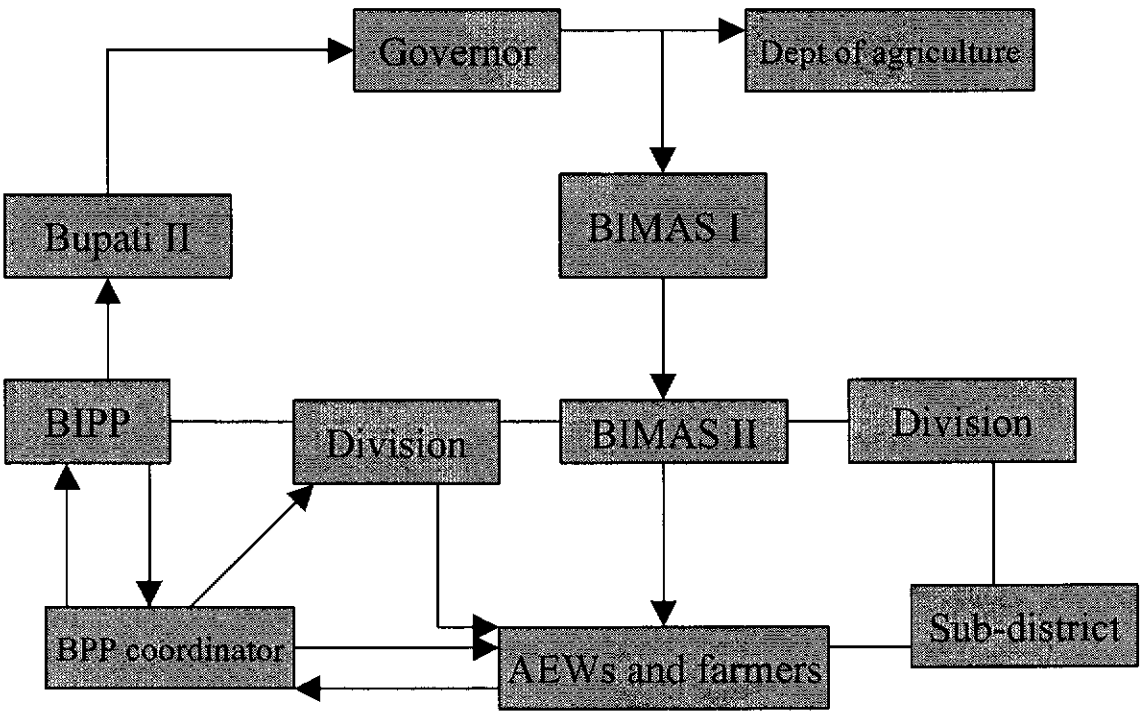

Figure 6.1: Model of extension bureaucracy

The populations expectations gained in this research could be met if the BPPs were used as a base camp of all AEWs activity. However, BPP coordinators found it hard to gather AEWs into the BPP office as required by the government because AEWs are reluctant to live in villages (Agricultural Department of NTT 1999; Agricultural Department of Indonesia 1998). As suggested by Kumuk (1992), AEWs should be part of the rural community and support research recommendations. Currle (1998) further suggested that AEWs should be supervised over an introduction period. This means that these results are not in line with Kumuk's (1992) and Currle's (1998) views.

6.2.3 Role expected by the government and what they stated

The government officers surveyed suggested 13 roles to be carried out by AEWs (Table 5.15). If these are compared to the 12 roles outlined by the government (Table3.3) there appears to be a difference in expectations. There were only five roles that were the same as those the government expected and stated. These are: 1) to use example and demonstration; 2) to increase farmers' skills and knowledge; 3) to empower farmers; 4) to monitor and evaluate; and 5) to act as a bridge between farmers and government officers (e.g. Project delivery). The roles expected and stated by the government are shown in Table 6.1.

Table 6.1: The roles stated and expected by the government that should be delivered by AEWs

Roles stated in government plans	Roles expected by government officers
1. **Increase farmers skills and knowledge***	1. **Use example and demonstration**
2. **Undertake demonstration**	2. **Evaluate farmers' enterprise**
3. **Empower farmers**	3. Facilitator, dynamist and communicator
4. Program compilation	4. Teach farmers business principles
5. **Input deliverer**	5. Advise farmers on horticultural crops
6. **Monitoring and evaluation**	6. **Increase farmers skills and knowledge**
7. Finding problems	7. **Empower farmers and their group**
8. Problem solution	8. Should be part of farmers' community
9. Training other AEWs	9. Advise and evaluate farmers activities
10. Produce brochure	10. Collect statistics on farmers activities
11. Field school	11. Run activities only dealing with agriculture
12. **Deliver government project**	12. Support research recommendations
	13. **Bridge between government and farmers**

* Bolded roles are similar in both cases.

Two roles, input delivery and delivery of government projects are similar to the role of a bridge between farmers and government officers, which is expected by the government officers.

Other roles stated by the national government which are not expected by the NTT' government officers include undertaking field schools, producing extension brochures, training other AEWs, problems solution, finding problems, and program planning. These roles were not expected possibly because there was insufficient funds to run a field school, lack of capability by AEWs to train other AEWs, lack of written communication necessary to produce a brochure, and AEWs lacked the capability to undertake the roles of finding and solving farmers' problems and program planning. While AEWs were reasonably satisfied with the role of program planning, government officers were dissatisfied because they thought programs planned by AEWs are inappropriate or wrong (Table A5.4). However, this finding needs further examination

because the roles of finding and solving farmers' problems, and program planning are important to the efficacy of AEWs.

Two roles expected by the government officers appear similar. These are to evaluate farmers' enterprises (2) and to supervise and evaluate farmers' activities (9). However, there is a slight difference, i.e., the role of evaluating a farmer's enterprise concentrates more on evaluating the profitability of horticultural crops, the problems faced by farmers, and the way to overcome the problems. On the other hand, the role of supervising and evaluating farmer activity means to evaluate all farmers' activities, either horticultural or other crops. This role is meant to make farmers aware that they have the alternative of better practices to replace their traditional practices. Then it is necessary to persuade them to choose a better farming system as provided by the government through AEWs or by contact farmers. The finding of this research are similar to Van den Ban and Hawkins (1988, 1996), who argued that agricultural extension should be a process of helping farmers to be aware of their present and future situation, and encouraging farmers to implement their choice. While the last stated role by the government, delivering government project, appears similar to the last role expected by AEWs, the latter refers more to the delivery of programs the government or AEWs promised to deliver.

6.2.4 Comparison of role expected of AEWs and what they do

As mentioned in section 5.5.2, AEWs see themselves as performing seven main roles (Table 5.15). When these are compared with the roles given by the government (Table 3.3) there were three similar roles expected by AEWs, with four roles obliged by the government (Table 6.2). These were demonstration, input delivery, field school and delivery of government projects. The role of bridging between farmers and government is similar to the input delivery and delivery of government project roles stated by the government. The roles expected and what they do are shown in Table 6.2.

Table 6.2: Role stated by the government and expected by AEWs

Roles stated in government plans	Roles expected by AEWs
1. Increase farmers skills and knowledge	1. **Use example and demonstration**
2. Undertake demonstration*	**2. Conduct field school**
3. Empower farmers	3. Transfer programs suitable with farmers' problem and needs
4. Program compilation	4. Run activities dealing with agriculture
5. Input delivery	5. Support research recommendations
6. Monitoring and evaluation	**6. Bridge between farmers and government**
7. Identifying problems	7. Deliver program as promised
8. Problem solution	
9. Training other AEWs	
10. Produce brochures	
11. Field school	
12. Deliver government project	

* Bolded roles are similar in both cases.

Using example and demonstration, and conducting field schools are suitable methods to persuade farmers. Usually, these activities are linked with a special government project (Table 5.31). This means that AEWs do not need to have experience in analysing problems and solutions that are very difficult for them. However, these roles, especially running a field school, need a considerable amount of money, which is one of the problems faced by the government.

There are five roles expected by AEWs which are not included in the 12 roles stated by the government. They are: 1) transfer programs suitable to farmers problems and needs (see also Table 5.49); 2) run activities only dealing with agriculture; 3) support research recommendations; 4) act as a bridge between farmers and government; and 5) bring programs as promised (see also Table 5.49). As can be seen in Figure 6.1, clearly AEWs need simple steps to deal quicker with farmers' problems. A simpler bureaucratic procedure will allow AEWs to respond in a timely manner and allow them to deliver programs which suit farmers' problems and needs, also deliver them as promised (Table 5.15).

In summary, it was hypothesised that there would be differences in roles expected of AEWs by farmers, AEWs and government officers. The evidence supports this hypothesis. However, given the similar expectations in key roles it is not clear that these differences are a major reason for deficiencies in delivering extension services.

6.3 Perceptions of the roles delivered by AEWs

Farmers, AEWs and government officers were asked to rate their level of satisfaction with the 12 roles expected of AEWs by the government. Whilst the questions were initially the same, it is recognised that the contexts were different. The SPSS program for Pearson Chi-square test indicates that perceptions of the groups towards the roles they perceived as undertaken by AEWs were significantly different at the 5% level (Table A 6.1 to Table A6.12). When asked of farmers and government officers, it is a measure of AEWs performance, but when asked of AEWs the implication is slightly different. It could be a measure of their performance or their ability to do the roles or the appropriateness of the roles.

6.3.1 Role for increasing farmers skills and knowledge

The average scores for satisfaction with the role of increasing farmers' skills and knowledge when undertaken by AEWs were 3.0 for farmers, 4.7 for AEWs and 3.4 for government officers (out of 5 being the most satisfied). The result shows that farmers and government officers have similar perceptions on this issue. Perhaps farmers doubt whether their knowledge and skills in horticultural production were increased by AEWs. Many farmers are probably gaining skills and knowledge from AEWs but most farmers are *'dirt farmer'*, which means they run their enterprise based on years of personal experience (Agricultural Department of NTT 1999). Government officers are not satisfied that AEWs have increased farmers' skills and knowledge in horticulture because they believe that there are only a few AEWs who have good skills and knowledge in this area. Most AEWs have a lack of skills and low educational level with little background in agricultural production, especially horticulture (Table 5.6, Table 5.45). Conversely, AEWs appear to be satisfied with their performance. For example, before they run a demonstration (Table 5.16) they actually explained to farmers how to apply a specific skill dealing with the demonstration.

6.3.2 Role of conducting plot demonstrations

The average scores for the role were 2.3 for farmers, 4.5 for AEWs and 4.1 for government officers (out of 5 being the most satisfied). This indicates that most farmers were disappointed with the plot demonstrations delivered by AEWs, perhaps since during the 12 months prior to data collection, 80% of farmers had never seen an AEW run a demonstration. Meanwhile, AEWs and government officers appeared satisfied

with the role of conducting plot demonstrations. This result contrasts with the result in Table 5.16, which reveals that, on average, AEWs ran only one demonstration in 1999. AEWs and government officers were possibly satisfied with demonstrations run for a specific project in a village under the BPP. These activities are attended by all AEWs who work at that BPP and the government officers have tasks dealing with the project. AEWs run plot demonstrations dealing with the specific project because the government lacks funding. Nevertheless, conducting demonstrations were perceived as important by farmers, AEWs and government officers (Table 5.15 and Table 5.49).

6.3.3 Role of encouraging farmers to participate in extension service

The average scores for this role were 3.0 for farmers, 4.5 for AEWs and 2.1 for government officers. According to AEWs they were satisfied because farmers were involved in their routine activities. As can be seen in Table 5.31, AEWs were satisfied with this role. AEWs had involved farmers in areas of: 1) planning for a group working plan and an annual working plan; 2) organising activities; and 3) implementation and evaluation. Although farmers' participation in activities was not evaluated, AEWs were satisfied with the level of farmer participation (Table 5.31). On the other hand, government officers were dissatisfied because AEWs seemed to be reluctant in involving farmers in the extension service, whilst farmers said that not all farmers were involved in extension activities. To enable AEWs to encourage farmers' participation in extension activities they need training in Participatory Rural Appraisal (PRA). Data in Table 5.49 reveals that 87% of AEWs desire training in PRA.

6.3.4 Role of extension program planning

The average satisfaction scores for this role were 2.6 for farmers, 3.9 for AEWs and 3.4 for government officers. It can be understood that AEWs were reasonably satisfied with this role because they were asked to plan an annual extension program (see the role of encouraging farmers). Meanwhile, government officers were satisfied with the role of extension program planning run by AEWs, although not all AEWs plan an extension program in their service area. Reasons for the lack of planning may be that AEWs lack education and that many live away from farmers' activities (Table 5.6).

6.3.5 Role of input delivery

The average scores for this role were 2.5 for farmers, 2.9 for AEWs and 3.4 for government officers. It suggests that farmers were dissatisfied, AEWs were neutral and

government officers were satisfied with the role of input delivery. This can be understood because this role is recognised by the government in cases where the government runs a specific project, such as with corn seed. Around 80% of farmers expect horticultural seeds to be provided by AEWs (Table 5.15). It appears that farmers are dissatisfied because AEWs rarely deliver inputs at the appropriate time (Table 5.49).

AEWs were neutral as perhaps not all AEWs have the same chance of delivering inputs but they will deliver inputs (e.g. seed, fertilizer and pesticide) if they are requested to do so by the government officers. Government officers were satisfied with this role perhaps because they believed that the programs they planned, including input delivery would be successfully received by farmers at the right time. In addition, government officers thought that most farmers could get the seed by themselves.

6.3.6 Role of monitoring and evaluation

The average scores for this role were 2.6 for farmers, 4.4 for government officers and 4.6 for AEWs. Farmers appeared dissatisfied with the role of monitoring undertaken by AEWs, whilst AEWs and government officers were satisfied with this role (Table 5.31). A neutral score for farmers can be understood because they do not know whether their enterprise is being monitored and evaluated by AEWs. This role was only known by AEWs and government officers. Usually, the government asked AEWs to report the success of a program but not the failure. For the security of their jobs both government officers and AEWs have an incentive to evaluate a program as a success. Therefore, the government expects AEWs to collect statistics on farmers' activities (40%), evaluate farmers' enterprises (60%) and supervise farmers' activities (60%) (Table 5.15).

6.3.7 Role of helping farmers identify problems

The average scores for this role were 2.9 for farmers, 4.4 for AEWs and 2.3 for government officers. This means that on average farmers were neither satisfied nor dissatisfied with this role, while AEWs expressed confidence that they had satisfied this role, probably because they believed they had helped farmers to identify problems dealing with their enterprise. By contrast, the government officers were dissatisfied with this role because they know that farmers find it difficult to contact AEWs (see Table 4.5). Both farmers (80%) and government officers (84%) believe AEWs should be easily contacted (see Table 5.49).

6.3.8 Role in solving farmers' problems

As can be seen in Table 5.31 the average satisfaction scores for this role were 2.7 for farmers, 4.5 for AEWs and 2.2 for government officers. The same pattern is apparent for this role as the role of identifying problems, with AEWs satisfied, farmers neutral and government officers dissatisfied.

6.3.9 Role of training other AEWs

The average scores for this role were 2.6 for farmers, 4.3 for AEWs and 2.5 for government officers. It could be expected that farmers' response would be neutral for this role because they are not in a position to know whether AEWs could or could not train other AEWs. However, AEWs were satisfied with this role despite having never trained other AEWs (Table 5.31). It is unclear from the evidence why this is so. The government officers were dissatisfied with this role perhaps because they know that most AEWs do not have enough skills and knowledge to do so. As can be seen in Table 5.6 approximately 69% of AEWs were educated to Senior High School level. Also, many of them did not have background knowledge in agriculture and social-culture. This result seems to be dissimilar with the roles stated by the government in Table 3.3 in that one of the roles that should be performed by AEWs is to train other AEWs.

6.3.10 Role to create extension brochures

The average scores for this role were 2.1 for farmers, 2.1 for AEWs and 3.7 for government officers. Farmers and AEWs were both dissatisfied whilst the government officers were satisfied. Farmers expressed dissatisfaction with this role because AEWs had never used an extension brochure to support their communication during their activities (Table 5.31). Additionally, when AEWs ran extension activities, farmers mainly listened and watched. Hence, it is hard for farmers to remember and implement all information given by AEWs. They would be better able to apply the skills given by the AEWs if they were also given written information such as brochures or folders to be used as guidance for implementation. However, because of low literacy levels amongst farmers extensive use would need to be made of pictures and diagrams rather than words. Producing these can be expensive and requires considerable experience. Meanwhile, AEWs were also dissatisfied with this role because the government does not provide money and facilities for AEWs to create brochures and many of the AEWs were not given training in the area of creating an extension brochure. By contrast, the government officers were satisfied with this role because they had provided courses in

creating brochures, which was conceded by some AEWs (see section 5.5.3.G). However, the training was not given to all AEWs.

6.3.11 Role of running a field school

The average satisfaction score for this role were 2.1 for farmers, 1.9 for AEWs and 2.4 for government officers (Table 5.31). All groups were dissatisfied with this role. Conceptually, this role is in line with principles of adult learning. While 89% of AEWs expected to run a field school (Table 5.15), few did and most were not satisfied with the training they received to run these schools. A lack of funds might be the reason why AEWs rarely run field schools.

6.3.12 Role to deliver government projects

The average scores for this role were 4.0 for farmers, 2.5 for AEWs and 3.7 for government officers. Its means that farmers and government officers were satisfied, whilst AEWs were dissatisfied with this role (Table 5.31). That farmers and government officers were satisfied could be understood because when running a project the government officers, through AEWs, supply seed and or money to farmers. In this case farmers get advantages such as inputs and money, while government officers get political advantage. The government officers who are able to run the project will be promoted (no matter if the project is successful or not). Conversely, AEWs were dissatisfied, because by running a project they have to comply with what the government wants. In addition, if the project is successful they will not be given recognition but if the project fails they will be blamed by the community and especially by the government officers (Herman S, 2000, pers. com., Head of BPP Oben). The finding of this study seems to be dissimilar to the role of government project delivery stated by the government as shown in Table 3.3.

6.4 Assessing the performance of extension service delivery

The performance of AEWs in delivering extension services was assessed by farmers through questions based on the SERVQUAL criteria. Questions were asked about the delivery of the five main activities of AEWs, the availability of AEWs and their ability to give marketing outlet information.

6.4.1 Farmers perceptions of the quality of the extension service

Farmers' perceptions about the quality of extension service delivery by AEWs was assessed by 11 SERVQUAL criteria and two extra criteria relating to finding and solving problems. A five-point scale ranging from 1 (strongly dissatisfied) to 5 (strongly satisfied) was used. The average score across all the criteria was 2.7, indicating overall a lack of satisfaction with the quality of extension service delivery by AEWs.

A key problem with the extension service appears to be that it is not being delivered on time (average score 2.7) or as promised (average score 2.4). A majority of farmers expressed dissatisfaction with performance on these indicators (Table 5.30). These ratings are consistent with other farmer responses about the role of AEWs (Table 5.15) and their suggestions for improvement (Table 5.49). The bureaucratic structure (see Figure 6.1) is just one cause of this problem.

Another problem area is that AEWs rated poorly when it came to having 'knowledge to answer questions' (average score 2.3) and 'helping farmers solve problems' (average score 2.5). One explanation for this result is that most AEWs have a low level of formal education and expertise in agriculture (Table 5.6). It also appears that the training part of the T & V system is not operating effectively with AEWs not receiving the regular training they require to perform effectively (Table 5.36). Another cause for the poor performance in 'solving problems' may be that farmers find it hard to meet AEWs.

There was a link between farmers dissatisfaction with AEWs' 'willingness to help' (average score 2.9) and 'being able to be contacted' (average score 2.5). This finding supported the hypothesis that farmers were dissatisfied with the poor performance of AEWs. The poor performance of AEWs indicated by these factors perhaps caused farmers and government officers to suggest that AEWs should advise all farmers and should be easy to contact (Table 5.4; Table 5.15). Other factors indicating the poor performance of AEWs and farmers dissatisfaction were 'understanding farmers specific needs' (average score 2.6) and 'delivered on time or as promised' (average score 2.4). This result is in line with farmers, AEWs and government officers' suggestions (Table 5.49 and Table 5.15). Additionally, farmers were dissatisfied with 'providing sufficient information' (average score 2.7) and 'providing relevant information' (average score 2.5). This finding is consistent with these two factors mentioned as a cause of the poor performance of AEWs and is also in line with farmers', AEWs' and government officers' suggestions (Table 5.49).

Three other SERVQUAL criteria are, 'instilling confidence' (average score 2.8), 'consistently polite' (average score 3.1) and 'having farmers' best interest at heart' (average score 2.7). These factors are not mentioned in AEWs' duty statement but influence farmers' feeling as to how AEWs perform in undertaking their roles. Farmers' perceptions of these criteria ranged from dissatisfied to neutral. These criteria are also used to assess the performance of AEWs in fulfilling their roles.

6.4.2 Effect of AEWs availability

Based on data gained in this study it seems that the quality of the extension service varied by village (Table A.12b) and this appeared to be due to the presence of AEWs. When farmers were asked how long AEWs had worked with their group the answers varied. Thirty-four farmers who came from the village of Nusa said there was no AEW during the last two years, 28 farmers from the village of Sumlili said AEWs had worked with their group for one month, 80 farmers from the villages of Oebesak and Netpala said that AEWs had worked with their group for less than five years, and 81 farmers from the villages of Oesao and Noelbaki said that AEWs had worked with their group for less than one year. Farmers from the village of Sumlili and Nusa rated them poorly whilst farmers from the village of Oebesak rated them highly. There was no data collected to find the relationship between farmers rating on quality and the period by which AEWs have worked in their village.

Farmers differed in their response to the question about the number of AEW visiting during the last five years. Farmers from the villages of Nusa, Oebesak, Netpala and Sumlili (142 farmers) said they had one AEW, while 81 farmers from the villages of Oesao and Noelbaki said they had two AEWs who worked with their group.

Additionally, farmers also had different responses to the question about AEWs visits to them during the last six months. Thirty-four farmers said that AEWs had never visited them, 28 farmers stated that AEW had visited them once, 81 farmers reported that AEWs had visited them eight times, and 80 farmers declared that AEWs had visited them 10 times. Farmers from the village of Sumlili and Nusa rated them poorly whilst farmers from the village of Oebesak rated them highly. There was no data collected to find the relationship between farmers rating of quality and the frequencies with which AEWs visited their village.

6.4.3 Farmers attitude towards delivery by AEWs

Data gained in this study revealed that there were five main activities delivered by AEWS that most concerned farmers (Table 5.34). They were: 1) seed provider, 2) help for irrigation management, 3) fertiliser provider and advice on use of fertiliser, 4) pesticide provider, and 5) marketing information provider.

The following information describes farmers' attitudes towards AEWs in performing these five activities (Table 5.34). Farmers were positive in their attitude towards AEWs as advisers on fertilizer applications and irrigation systems. Around 79% and 48% of farmers were satisfied with the role of fertilizer and irrigation system advisers undertaken by AEWs respectively. Conversely, farmers were negative in attitude towards AEWs performance of the roles of providing seeds, pesticides and marketing information. Around 59% of farmers were dissatisfied with the AEWs' role of providing seed, 77% were dissatisfied with the AEWs' role of providing pesticides, and 55% were dissatisfied with the AEWs role of providing marketing information.

A key problem found from this study is that farmers found it hard to get good quality seed. They were in reality eager to get horticultural seed from the local government through AEWs, as they believed that if the seeds were given by AEWs, the quality would be guaranteed (Table A3.9). However, this study indicated that the government does not provide seed directly for them. Farmers purchased the seed from the market with no guarantee from government or the AEWs about the quality of the seed. There is no control over the sale of seed for any kind of horticultural plant. Another problem found from this research is that farmers used pesticides without any recommendation either from AEWs or government officers. The kinds of pesticides used by farmers are presented in Table A3.4. This result is consistent with Blankerburg (1982), Panghal et al. (1994); and Abdul (1991) who found in India and Bangladesh that the T & V system has limited communication of input use, marketing, and production. However, this result suggests that the extension service in this province has a problem because there is expectation that AEWs should provide this service to farmers in order to increase agricultural production to full capacity. Therefore, the role of AEWs in communication of input use, marketing and production should be incorporated in AEWs' roles.

6.4.4 AEWs provision of marketing information

AEWs provide little marketing information to farmers. As revealed in Table 5.34, 55% of farmers admitted that they have never been given prices for horticultural products by AEWs. Further shown in Table 5.49, 80% of farmers and 75% of government officers suggested that AEWs should provide marketing outlet information as part of extension service. Only 8% of farmers interviewed said AEWs gave them market information. Although the government has stated that the Village Cooperative Unit called 'KUD' (Koperasi Unit Desa) should help farmers in marketing, this institution does not work as designed. This is perhaps why AEWs, farmers, and government officers suggested that AEWs need to provide marketing information for farmers (Table 5.49).

However, the finding of this research was in line with the weaknesses of the T & V system as conceded by Blankerburg (1982), Panghal et al. (1994); Abdul (1991) who found in India and Bangladesh that the T & V system has limited communication of marketing information.

Based on this finding, the government officers should pay more attention to the marketing aspect of the extension service. This could help the rural economy by helping farmers to produce a marketable surplus as suggested by Tola (1988).

6.5 Factors constraining AEWs effectiveness

In this section factors that impede AEWs ability to perform their roles effectively are discussed.

A range of factors was identified by AEWs (Table 5.48) and government officers (Table 5.46) that impeded AEWs ability to undertake their roles. The government officers identified constraints based on an open-ended question, while AEWs were asked structured questions. Despite the questions being slightly different, both groups named similar constraining factors they perceived as impeding AEWs ability. They were: the bureaucracy, lack of appreciation, facility, and training, poor direction, a lack of authority, the restructure of the agriculture department and geographical conditions. In addition, AEWs listed some constraints that were not perceived by government officers. They were the subjects of training, and the frequency of training. Similarly, the government officers named some constraints that were not perceived by AEWs, such as

the lack of funds, lack of motivation of AEWs, lack of research support, and low level of education.

The nine top constraints according to AEWs were: the change of agricultural structure (100% of AEW), lack of appreciation or salary (98%), lack of training (92%), lack of facilities (78%), poor direction (74%), geographical condition (63%), lack of authority (61%), the bureaucracy (57%) and difficulty with the local language (28%). Meanwhile, the nine top constraints according to government officers were: the bureaucracy (56% of government officers), lack of appreciation or salary (50%), lack of facilities (50%), lack of funds (47%), lack of AEWs' motivation (38%), lack of training (34%), lack of research support (28%) and local language (28%).

Whilst all AEWs considered that the change of agricultural department structure, especially their position in the government structure, was the most constraining factor, 97% of government officers did not see this factor as impeding the AEWs' ability. In addition, the government officers put the bureaucracy as the first serious problem, whilst AEWs put it eighth. The government officers admitted that the change of structure of the Agricultural Department caused problems for agricultural development in NTT (see in section 6.6.7: Government management of the T & V system) but believed it would not affect the ability of AEWs because they were civil servants paid by the government. Hence, despite all AEWs rating the restructure as the most constraining factor impeding their ability, they still found it hard to overcome because the government officers who act as policy makers did not see it as a serious problem. However, it seems that other constraining factors such as salary, facilities, lack of training and the bureaucracy, could be overcome because the government officers also saw them as serious constraints.

To overcome the constraint factors, especially the bureaucratic processes and unclear or poor direction, the government could apply the strategies suggested by Curcle (1998). That is, all levels of the extension service should be involved in introducing, understanding and accepting the program which is to be delivered, and AEWs should be supervised over the introductory period.

Each of the constraining factors that impede AEWs ability in performing their roles effectively is discussed in the following section.

6.5.1 Lack of facilities

AEWs considered that the lack of facilities to support their tasks in the villages presents a main constraint in the performance of their role. Each BPP, which is used as an AEW base, has its own office with one meeting room, one typewriter and one motorbike. However, these facilities were mostly used by the BPP coordinator. These facilities, of course, are not enough for five to 17 AEWs who work with a BPP. This finding is similar to Blakenburg (1982) who considered that AEWs should have enough facilities (e.g., transport facility) and to Van den Ban and Hawkins (1988; 1996) and Kassa (1999) who found that AEWs faced a lack of transport facilities to reach farmers. Both AEWs (84%) and government officers (68%) suggested that the government should provide facilities to be used by AEWs (Table 5.40). This result is related to the suggestion that AEWs should live in villages. To meet this point, the government has two alternatives. These are: 1) the government may act to meet this requirement (e.g., provision of incentives for AEWs to live in the villages such as monetary, points for promotion or another form of reward system); or 2) if living in the village is not possible or desirable, the government may provide facilities for AEWs such as a motor bike for each AEW to improve communication and accessibility of AEWs to the farming community.

6.5.2 Low salary

Ninety-eight percent of AEWs were very dissatisfied with the salary given by the government. The government and others often blamed AEWs if a program was not successful. Conversely, AEWs are seldom rewarded but government officers are promoted if a program is successful. This result is consistent with FAO (1984), Rao and Rao (1998), and Asiabaka and Bamisile (1991) who mentioned that AEWs belong to government officials with the lowest earning or earn insufficient incentives in their jobs. The lack of rewards found in this study perhaps caused AEWs to suggest that the government officers should apply the awards and punishment system for AEWs (Table 5.49).

6.5.3 The restructure of agricultural institutions

The Agricultural Department of Indonesia has been restructured four times since 1980, that is in 1980, 1991, 1996 and 2001. The instability of the economy and politics has had a negative effect on agricultural policy including the change of the AEWs position in the Agricultural Department structure. Since the implementation of the rule for

regional autonomy on July 1st, 2001, the provincial Department of Agriculture and BIPP at the district level have been restructured. The implementation of this policy has put AEWs in a very difficult situation within their administrative system. Its also impacts on AEWs chain of command for promotion which has been moved from the Agricultural Department officer to the Regional Secretary (called *Sekretaris Daerah*) at provincial and district level (Agricultural Department of Indonesia 2001). This seems to conflict with Van den Ban and Hawkins (1988; 1996) suggestions that government should have the commitment and responsibility for agricultural extension institutions. Sundaraswamy and Perumal (1992) also asserted that the organisations climate and commitment can lead to AEW satisfaction. Ninety-six percent of AEWs appear to agree with the suggestions that the government should pay more attention to their policy of restructuring agricultural institutions (Table 5.49).

6.5.4 Act without authority

Many AEWs suggested that they undertook their roles/tasks almost without authority, especially when making a decision. As can be seen in Figure 6.1, when AEWs encounter farmers' problems they have to inform the BPP coordinator and so on. While waiting for a government decision to solve farmers' problems, in theory AEWs should do nothing (Figure 6.1). As a consequence, AEWs expressed their dissatisfaction with the authority given to them by the government. AEWs' attitudes are supported by Rao and Rao (1998) who suggest that AEWs should have the authority to make decisions on the merits of the problem, because a lack of job authority may affect the AEWs' performance (Sundaraswamy and Perumal (1991).

6.5.5 Geographical condition

AEWs also felt geographical conditions made it very hard for them to reach farmers in a village. The settlement area of farmers in a village spreads, in some groups, over a distance of up to 20 km in a village and up to 30 km between villages. Beside that, there is no permanent road and some villages can only be reached by foot. This finding is consistent with Kalshoven (1978) that in remote places, AEWs can not work effectively because of bad geographical conditions.

6.5.6 Lack of training

In this study, AEWs were asked about their perceptions on training including training frequency, opportunities to attend training, subjects of training, trainer quality, and training methods. This section is discussed in detail in section 6.6.1.

6.5.7 Bureaucratic processes and unclear direction

With respect to the bureaucracy dealing with AEWs roles/tasks, most AEWs were dissatisfied with the bureaucratic system within the government. Pathways in Figure 6.1 and the Department of Agriculture structure in Figure 3.1 show clearly that the bureaucracy is very complicated. This is supported by Padmanegara (1985) who argued that the agricultural institutions in Indonesia were very complicated. AEWs seem to support this finding with 90% of them suggesting that the government needs to simplify bureaucracy (Table 5.49). It is also supported by Kumuk (1992) who said that job direction should be simple and clear.

AEWs were also dissatisfied with the directions given by the government in running their tasks (see Figure 6.2). For example, in the villages, it was often difficult to follow government directions. Each division has its own directions to deal with its own program (see Figure 6.2). However, it becomes very hard to understand when high level officials supervise a particular program and they do not adhere to the directions compiled. In the village they give directions based on their own interpretation. In other words they do not read the stated directions. . To support this finding, 80% of farmers, 95% of AEWs and 60% of government officers suggest that the government should improve the coordination at the village level (Table 5.49). Others researchers (Rao and Rao, 1998) have found that extension workers lack understanding of directions from high level officials. Another problem with government directions found by Panghal, et al., (1994) in India was that the T & V system lacked technical guidance. To overcome this problem, Librero and Broonrung (1978) suggested that guidance and direction of extension requires careful study, because extension service involves a variety of extension institutions.

The factors outlined above interact to decrease the level of AEWs effectiveness as outlined in Figure 6.2.

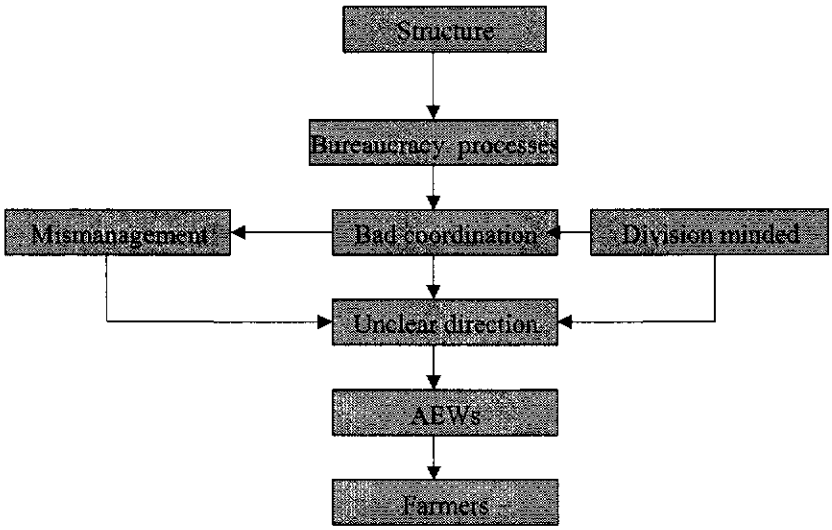

Figure 6.2. Direction model for extension activity

6.5.8 Motivating factors

Despite AEWs facing many unfavourable or constraining factors as mentioned above, there are some positive aspects such as: 1) receiving tolerance and respect from the village community when undertaking their role and some farmers show appreciation for achievement in the form of vegetables, corn, oranges or chicken; 2) many people in this area are still requesting their help; and 3) the government acknowledges that AEWs are still important agents to accelerate the process of improving farmers' productivity (Table 5.9; Table 5.14, Table 5.15; 5.49). This result seems to be in line with Ribeaux and Poppleton (1983) who mention that favourable factors, including achievement and recognition, can lead to improved motivation for AEWs.

6.5.9 Educational level of AEWs

Most AEWs surveyed (69%) were educated to High School level (Table 5.6) which is consistent with the statistics for NTT that 64% of AEWs are educated to High School level (Table 3.2). In addition, this study indicates that 31% of AEWs achieved an educational level of Diploma degree or higher, which is similar to NTT with a diploma level of 31% and a Bachelor of 2%. AEWs educated at Diploma or High School have the same requirement to deliver government projects. In NTT there are no Subject Matter Specialists because government officers do not recruit AEWs with specialist expertise. This is a key deficiency for a T & V system which is supported by Subject Matter Specialists each of whom should work with about eight AEWs (Van den Ban and Hawkins (1988; 1996).

AEWs who are recruited by the government with expertise in livestock, agronomy, fishery, and even from non-agriculture backgrounds have been given the same tasks in the village (Emman N. Eha, 2000, pers. comm.). Consequently, AEWs lack specialisation on technical aspects of agriculture. This result is similar with the opinions of FAO (1984), Rao and Rao (1998) and Kassa (1999) who state that AEWs often lack agricultural specialist education.

According to Asiabaka and Bamisile (1991), Sundaraswamy and Perumal (1992), and Haynes (2000) AEWs education level is related to their performance. However, this study did not find any significant association between AEWs education level and their perception of their role (Appendix 8).

6.5.10 Motivation to work as AEWs

Table 5.45 reveals that AEWs have more than one motivation to become extension workers. Data reveal that most AEWs (87%) are motivated to work in the civil service while 20% of them have farming family background. Their motivation to help farmers and to apply agricultural knowledge was 50% and 63% respectively. This finding is strengthened by the commonly held view of people in this location, that civil servants will obtain social acknowledgment. Despite this sector providing low salary or income, the future guarantee of retirement benefits makes it attractive.

Blankerburg (1982), Panghal et al (1994) and Abdul (1991) found in India and Bangladesh that the motivation of extension staff is one of the T & V system challenges.

6.5.11 Lack of written technical sources

Although AEWs claim they have read extension brochures, they could not name the topics they have read. Before 2001, the Department of Agriculture in NTT did not have a regular brochure to be read by AEWs. While, there is an extension journal called '*Extensia*' issued by the central Department of Agricultural of Indonesia situated in Jakarta, it is kept in the Department of Agriculture library in Kupang. Clearly, at this stage, AEWs have little chance to increase their skills and knowledge through reading.

6.5.12 Location of AEWs

AEWs are reluctant to live in villages. The finding of this study shows that from 46 AEWs, only three live in the village where they serve; namely one in BPP Naibonat and two in BPP Netpala. This result is the reverse to Kumuks (1992) suggestion that AEWs should live in the village where they serve. This finding is linked to Table 5.49 which shows that 90% of farmers and 90% of government officers suggest that AEWs should live in the village where they serve.

There are certain arguments for having AEWs live in the villages. For example, they will be in a better position to meet local people and understand their social system (IRRI 1990, Levis 1996). This can lead to improved communication. However, AEWs also need to be able to meet and communicate with their peers, subject-matter specialists and researchers. This is generally not possible while living in a village which may leave them isolated and stagnating. The solution would appear to be not so much in where the AEWs live, but in supplying the transport and programs so that they will be easier to be contacted by farmers and thus can achieve both these goals.

6.5.13 Opportunity for promotion

The government of Indonesia has two groups of civil servants known as structural and functional officers (Home Affairs Department of Indonesia 1980). Structural officers will be promoted to better positions but not functional officers, which include AEWs. Under this condition, AEWs in this region have little chance to advance to a better position in the government structure. Others authors (FAO 1984; Rao and Rao 1998) have noted that AEWs lack opportunities to gain better positions. Haynes (2000) found that tenure had a significant impact on the competencies of leadership, development of co-workers and behavioural flexibility. Working in a better position can lead AEWs to greater experience which can improve their performance in fulfilling their roles (Pillegowa et al., 1997).

6.6 Performance of T & V system in NTT

Since the 1980s, the government of Indonesia, including NTT, has applied the T & V system as an extension model. The tasks of the T & V system according to the government in NTT are monitoring technology or better practices, training followed by visiting, and supervising farmer groups. However, there were 16% of government

officers who did not know the tasks of the T & V system (see Table 5.54). An effective T & V system relies on a few key pillars, including relevant research, effective training and communication with farmer groups through visiting and contacting farmers. The results of this study, as discussed in this section, suggest a problem with these issues in NTT.

Since implementation of the T & V system in 1980 (Agricultural Statistic of NTT 1998), the government of NTT has found that it needs many AEWs, a significant amount of money, and is not suitable for a dry farming system area. However, in the beginning they also recognised some advantages such as regular training, AEWs are easier to control, regular meetings, and regular reporting of farmers activities. As can be seen from the land size owned by farmers (well under 0.5 hectares of dry land) this system is hard to implement profitably. This result is in the line with Rouse et al. (1985) who mentioned that the T & V system is only useful for farmers who have large and medium-sized land. Also, Van den Ban and Hawkins (1996) assert that the system has significantly increased agricultural production in irrigated areas. Therefore, it seems more suited to irrigated or larger farms.

6.6.1 Effectiveness of training

This section is discussed in two parts: opportunity or frequency of training and subjects of training.

Opportunity for training

As concerns training frequency, most AEWs expressed dissatisfaction because in 2000 they were only able to attend one training session, while 42% (see Table 5.37) had never attended any course. As to the chance for attending a training session, most AEWs expressed their dissatisfaction because the government only invites AEWs who work with a specific project to attend the training/course (see also Table 5.48). Data in Table 5.37 showed that most AEWs (59%) never attended any course in the last three years, while 95% of AEWs considered that the frequency of training is one of the constraints that impede their ability. This research indicates that training is very important to the ability of AEWs, especially in the area of fertiliser advice. Therefore, 94% of AEWs suggested that all AEWs should have the same opportunity to attend training (Table 5.49).

Data in Table 5.37 reveal that 42% of AEWs did not attend any course in 1999/2000. There appears to be no regular training for AEWs except for particular projects. It is perhaps not surprising that performance is poor as research by Pillegowa et al. (1997) and Sundaraswamy and Perumal (1992) suggests that regular training is needed and may positively affect AEWs performance. Axin and Thorat (1972) also suggest that to make the extension service more effective more training of extension staff who work directly in the field is needed.

Similarly, AEWs also expressed dissatisfaction with the subjects of training, because the government ran subjects of training based on specific projects and not on the local needs (Table 5.37 and Table 5.48). The findings of this study reveal that when data in Table 5.37 is compared with the data of AEWs ability to identify farmers' problems, it seems that there is a positive relationship between the number of AEWs attending a course in Participatory Rural Appraisal (37%) and the number of AEWs successfully identifying farmers' problems (52%). Despite AEWs expression of satisfaction with the methods used in training, they were neither satisfied nor dissatisfied with the quality of the trainer staff.

AEWs were dissatisfied with the training in making an extension brochure. The average score of increasing knowledge and skills, for making a brochure was one (scale of 1 – 5). This means that AEWs were strongly dissatisfied with the training in this area. Van den Ban and Hawkins (1996) mentioned that AEWs lack communication media such as bulletins, demonstration materials, and brochures. In contrast, the average score for training in program planning was four, which means AEWs, were satisfied with the training in this area (see Table 5.36). In addition, the average score for input delivery (see Bonza fertiliser apply) and evaluation and monitoring was 3. This means that AEWs were neither satisfied nor dissatisfied.

Based on evidence in this research it could be concluded that one of the reasons that AEWs were not visiting farmers was because they did not receive regular training. As mentioned by Axin and Thorat (1972) training for extension workers is a vitally important aspect of the extension service. To obtain a good performance from AEWs they need to be trained regularly with a standard assessment (Sundaraswamy and Perumal 1992; Fradkin and Fradkin 1982). In addition Russel (1983) suggested that one of the uncountable assets of the T & V system is the running of regular training sessions for AEWs. Furthermore, Williams and Bembridge (1990) urged that AEWs need to be

trained every two weeks to support them for the next fortnight of visiting. These are supported by the evidence from this study that farmers are most satisfied with the help they receive from AEWs on fertiliser treatment, which coincides with the fact that the only technical training given is on fertiliser. This means that a positive link between training and AEWs performance can be made (Table 5.37; Table 5.25 and Table 5.34).

Subjects of training

The data from this study suggests that the government, especially the Agency for Education and Training (AAET), runs training that is project-oriented, not according to local needs (Table 5.37 and Table 5.48). All subjects mentioned in Table 5.37, and 5.38 were related to projects run by the government. Both tables also indicate that government officers do not share the same opinions on the subjects. This means that there was a lack of coordination among them. There were only three courses attended by AEWs in 1999/2000. They were Participatory Rural Appraisal (PRA), Bonza fertilizer application and agribusiness. Training subjects found for AEWs in this research were different to training subjects expected by previous researchers. For example, Axin and Thorat (1972) and Schwaas and Allo (1982) suggested such subjects as social sciences, pedagogy, public administration, policy and communication; Obbine (1992) and Pease (1976) suggested agricultural credit; Oakley and Garforth (1985) suggested local social and cultural, extension methods, personal communication, planning, and evaluation of extension programs; Yuan (1977) suggested farm management; Shija (1985) suggested communication skills, general knowledge of rural people and its environment, and practical communication system for villages selected; Salinas (1995) suggested how to disseminate information, farming techniques, and rural catalyst in technology packages implementation; and Ashraf (1993) suggested rationalising family size related to farmer income and using better methods for farm enterprises.

The subjects of training attended by AEWs were also different to the training run in the USA and India. These included, according to Axin and Thorat (1972), history, philosophy, methods of extension organisation, economics, rural sociology, agriculture and home economics. However, given the focus on assessing local needs, PRA should continue to be included as a subject of training (see Table 5.52).

6.6.2 Visiting

Visiting farmer groups is one of the most important tasks of AEWs in the T & V system. Benor et al., (1984) suggested that AEWs should spend eight days out of 14 visiting farmers. Williams and Bembridge (1990) also suggest that AEWs should have a time schedule for visiting contact farmers and the groups. Unfortunately, farmer visits could not be assessed effectively in this study because of a limitation with the question wording which asked for the number of visits in the last month. It did not work because: 1) AEWs usually only visit farmer or farmers' groups when the government requests them to do so for a special interest project (Table 5.49); 2) Most AEWs do not live in the villages (Table 5.49); 3) Bad geographical condition and a lack of facilities especially for bikes make visiting difficult; 4) The distance of some villages from the AEWs settlement is up to 60 km (Statistic of NTT 1978). Consequently, few visits were recorded in that month. A longer time frame should have been used for the question. This result is similar to that by Sharma (1992) who found that in India the system faced a lack of regularity in visiting farmers. This finding is supported by government officers and farmers (Table 5.49).

6.6.3 Contact farmers

Farmers were asked about the number of contact farmers in their group. Data gained in this research shows that each farmer group had one contact farmer. In this case, there were two criteria used for selecting a contact farmer, namely that the contact farmer be a group leader and a successful farmer. On average the number of contact farmers per group (specify how many farmers per group) found in this study was one. In this regard, the result was dissimilar with Pickering (1983) who suggested that each group of 10 farmers have one contact farmer. Beside the two main criteria mentioned above for choosing a contact farmer, Muhamad and Graforth (1998) suggested a good level of education at least primary school up to matriculation level is also necessary in order to support the task of AEWs and deliver messages to other farmers (Blackenburg 1982; Williams and Bembridge 1990).

Despite different criteria for choosing contact farmers, generally the same view is held as to the main tasks of contact farmers, that is as communicator and coordinator of all group activities (see Table 5.39). A communicator in this instance means that a contact farmer receives the message from AEWs or other sources, then disseminates the information to other farmers, while a coordinator means that a contact farmer either

with or without AEW support, acts to manage the group activities, such as group meetings. Data in Table 5.39 shows that twenty-eight (58%) of government officers said that the task of a contact farmer is to coordinate all group activities and 20 (42%) of government officers said that the task is to communicate either internally or externally to the group, including with AEWs or other officers who work with farmer enterprises. Most AEWs (86%) agreed with the tasks of the contact farmer and 14% did not agree.

Based on the data in this study, it can be said that the tasks of the contact farmer found in this research seemed to be similar with the tasks of the contact farmer as suggested by Williams and Bembridge (1990); that is, to support the task of AEWs and Blackenburg (1982); that is, to deliver messages to other farmers. As stated by Sherief et al., (1993) the T & V system is very useful in terms of the communication between AEWs and farmers of innovations to enhance agricultural production. Bajaj (1989) also found that in India there was frequent communication between extension workers and contact farmers. However, despite the election of contact farmers, many farmers got information from non-contact farmers. As reported by Sherief et al., (1993) there appears to be a high level of communication among farmers.

6.6.4 Organisation of farmers' groups

Government officers had a range of views about the number of farmers in a group (Table A5.2). The reasons given for the number of farmers suggested per group were location of farmers' enterprises, farmers' settlement and farmers' interests or kinds of crops. However, according to AEWs, in their extension services area, the average number of farmers in a group was well over 36 farmers with the minimum number in a group being 7 farmers and the maximum number 125.

According to the government officers, the reasons for the number in a farmer's group included: more effective supervision (16% of government officers), and a dependence on local conditions (84%). Most government officers (78%) said that the main criterion for allocating farmers to a group is that they come from the same farming area. However, there were two other criteria stated to put farmers in a group: 1) twenty-nine (91%) government officers mentioned the same area of settlement; and 2) twenty-six (81%) government officers mentioned the same commodity or enterprise. By contrast Williams and Bembridge (1990) mention that the number of farmers in a group must be

limited in order to be more easily visited and trained by AEWs. Also, Sharma (1992) proved that in India AEWs cannot cover a large number of farmers.

In the T & V system, each AEW should service a certain number of farmers' groups in their daily activities (Table A5.3). The number of farmers in these six BPPs was 138,350 and the number of AEWs was 56. Hence, each AEW supervised 2,470 farmers on average. This means that the ratio between farmers and AEWs found in this study was double that suggested by Benor et al. (1984) that is one AEW per 500 to 1,200 farm families and triple the number suggested by Van den Ban and Hawkins (1996; 1988) that is 800 farmers. This can be understood because the NTT has difficult geographical conditions, a dry farming system, and a lack of manpower especially AEWs. Nevertheless, based on the farmers' point of view, the performance of AEWs in this region needs to be improved (see section 6.5.2).

Farmers were also asked about their attitude to the opportunity to express opinions and to the organisation of the meeting. Farmers were generally satisfied with the opportunity they had to express opinions and with the organisation of the meetings (Table 5.35). In detail, Table 5.35 shows that 50% of farmers felt that they had the opportunity to express opinions in the meeting and 48% were satisfied with the meeting organisation.

6.6.5 Training for farmers

Only nine percent of farmers had attended the course on Horticultural Enterprise whilst 91% of farmers had never attended a course on subjects related to horticultural crops (see Table 5.10). Farmers do not have the same chance to attend a course because the government provides courses just for contact farmers or some other farmers who are involved in projects or village administration.

6.6.6 Lack of research outcomes and linkages between research and extension

Little evidence was found of research on horticultural issues or extension issues run by the Agency for the Agricultural Research and Development (AARD) to support the extension activities. Lack of appropriate technology, lack of funds, bad coordination, and research topics totally based on central government interests were key factors. This result is typical of the problems faced by extension activity in developing countries. Van den Ban and Hawkins (1996) also found in their research a lack of appropriate technology; no linkage between research institutions and extension organisations;

limited training for AEWs in practical technology, extension methods and communication skills; a lack of transport facilities to reach farmers; lack of visual aids, and the fact that AEWs had many other tasks beside extension work.

The findings of this research strengthens the experts' view that in the T & V system there is bad coordination (Figure 6.2) between agricultural researchers and AEWs, researchers and planners and also with the government policy. Phiri (1986) and Kalshoven (1978) also found that there was ineffective communication between extension officers and researchers in collecting necessary data. This is further supported by Seegers and Kaimowitz (1989) and Maglinao et al., (1997) who carried out research in the Philippines and Thailand. They found ineffective links between extension and research, and that AEWs had a poor understanding of the farmers' situation and a fragmented extension approach. In this research 95% farmers and 95% government officers suggested that AEWs should have a better understanding of farmers problems (see Table 5.49).

Some authors suggest that the extension service needs to follow local research recommendations in order to meet farmers or local needs and provide practical technology. For example, Sprague (1986) suggests that extension not only needs research recommendations but, support by other institutions, such as planners, economists, input providers and marketing. Bajaj (1989) found that a close linkage between research and extension officers in India due to the T & V, system but this does not appear to be happening in NTT. Onazi (1982); Kartasapoetra (1988); and Obbine (1992) found that the T & V system can promote rapid acceptance and utilisation of improved farm technology by linking researchers, and farming families and planners.

6.6.7 Government management of the system

In order to manage the T & V system, government officers must coordinate with other institutions such as the local university and NGOs (Table A5.1).

In Table 5.38, there was only one of the government officers interviewed whose work dealt with extension research and one who dealt with horticultural enterprises. On the other hand, there were 11 (35%) working in relation to AEWs salary and or administration. These data show that in carrying out their duties AEWs need to deal with many levels of administration to run the service, receive their salary or gain promotion (Agricultural Department of Indonesia 1986). For example, to work with the

BIPP office in each district, AEWs must have a letter of recommendation from a high level officer to prove that they are an AEW. They then go to the Division of Livestock, or Food Crops, or Fisheries, or Cash Crops; some of them even receiving salary from the Agricultural Department at state level (Agricultural Department of Indonesia 1986). A similar thing also happens in preparing administrative conditions for promotion. These issues are caused by the complexity of the bureaucracy (see Table 5.46 and Figure 6.2).

There are also five obstacles faced by government officers in managing the T & V system (Agricultural Department of NTT 1999). These are:

Firstly, assistant *Bupatis* pay little attention to extension activity. Officially, an assistant *Bupati* should be responsible for extension activity in the district. However, the person holding this position rarely has any agricultural background.

Secondly, the agricultural department has been restructured five times, especially the AEWs position. The change of the structure has confused not only AEWs but also government officials in the region.

Thirdly, there is bad coordination between divisions and division-oriented programs. Each division plans and runs the extension service based on their needs. Therefore, in one village there may be agricultural programs with different goals, strategies and field workers. Therefore, the extension programs run in this area do not suitably take account of local needs or communicate these to the proper channels so programs are disjointed, conflicting or even redundant. Based on this result, it is suggested that better coordination is needed and the division must plan and run extension services based on local needs.

Fourthly, there is a lack of funds and quality manpower. As can be seen from the evidence gained in this research, the government faces problems dealing with funding in running the extension service.

Lastly it appears the T & V system may only be successfully undertaken in a place which has a convenient geographical condition, good facilities, a high specialisation of human resources in agriculture, and a good managerial government. According to the Agricultural Department of NTT (1999), the tasks of extension are very difficult to run properly in some states of Indonesia, such as the NTT province, because they need: (1)

professional staff who have a deep knowledge of agricultural research, farmer's experience and the limiting factors in agricultural productivity; (2) all aspects of agricultural production have to be served by one AEW; (3) the extension staff or AEW needs to be only responsible for extension, not for other services like distribution of inputs, marketing of products and credit provision; (4) only one system of technical and administrative support; (5) increasing agricultural production in existing conditions to become a main focus; (6) better communication between AEWs and high level extension officers in order to enable the service to solve farmers' problems; (7) all staff in connection with extension services to be trained; (8) good coordination between AEWs and researchers to solve farmers production problems; (9) the recommendations of research to be tried by farmers on a small scale; (10) evaluation and monitoring to improve the quality and efficiency of extension services.

A highlight of this study is that it strengthens the evidence given by Van den Ban and Hawkins (1996). They argued that in developing countries, including Indonesia, agricultural extension faces problems such as: 1) lack of appropriate technology available to extension, 2) absence of clear linkages between extension organisations and agricultural research institutions, 3) extension workers having a limited training in practical technology, extension methods and communication skills), 4) extension workers lack sufficient transport facilities to reach farmers, 5) extension workers lack visual aids for essential teaching of farmers with low levels of education, 6) extension workers have many others tasks besides extension work, and 7) extension workers lack communication media such as bulletins, demonstration materials, and brochures.

6.7 Concluding remarks

Based on the information given in the discussion chapter there are some points to be highlighted. These points are extended in the conclusion chapter. They are:

- Farmers, AEWs and government officers had the same role expectations of AEWs in that AEWs should provide examples and run plot demonstrations.
- Farmers were dissatisfied with the roles of running demonstrations, program planning, using brochures, and running a field school. There was no satisfaction for any roles performed by AEWs. AEWs were satisfied with their roles for increasing farmers knowledge and skills, giving demonstrations, encouraging farmers to

participate in extension activity, program planning, monitoring and evaluation, finding and solving farmer's problems, and AEW training. However, they were dissatisfied with their ability to make brochures, run a field school, and deliver government projects. Government officers were dissatisfied with the roles for encouraging farmer participation, finding and solving farmers' problems, AEWs training, and running a field school.

- The SPSS for Chi square test to examine the hypotheses (I) indicates significantly different perceptions among the groups towards the 12 roles they perceived AEWs perform.

This study found eight main constraints that impede AEWs ability in performing their roles. They were: the repeated restructuring of the Agricultural Department, low awards or salary, lack of training, lack of facilities, unclear job direction, geographical conditions, lack of authority, and a complex bureaucracy. The performance of the T & V system is hampered by lack of facilities, training and appropriate technology, inappropriate training subjects and research recommendations, and lack of communication media.

Chapter 7: Conclusion and implications

7.1 Introduction

NTT has a high natural potential for horticultural crops. However, farmers in NTT are still living under the poverty level. Partly in response to this problem, AEWs were identified by the Indonesian government as a 'point of spear' of agricultural development. It was considered that horticultural agribusiness would be more able to increase farmers' standard of living if AEWs were able to perform their roles effectively. However, in 1997, the average production of fruits was only 3.8 tonnes per hectares and 1.9 tonnes per hectares of vegetables. One of the explanations given for this is that AEWs in this province do not perform their roles effectively.

Consequently, the objectives of this research were:

1. To assess the roles expected of AEWs by farmers, government officers, and AEWs;
2. To determine the perceptions of farmers, government and extension workers of the degree to which AEWs are fulfilling their role; and
3. If appropriate, to find out the reasons why AEWs are not able to effectively carry out their role.

The questions were addressed to three population groups, farmers, AEWs and government officers (Table A1.2; Table A1.3; Table A1.4). All these questions were designed to meet the research objectives. Personal interviews were conducted with 223 farmers, 32 government officers and 46 AEWs.

This final chapter contains the conclusions of this research with respect to these objectives, the implications of the results and the limitations of the research.

7.2 What did farmers, AEWs and government officers believe should be the role of AEWs?

All three groups expected AEWs to use examples and demonstrations. Important aspects of AEWs' roles for farmers, AEWs and government officers was that the extension service be run at the right time with programs suitable to farmers' problems and needs, which also increase farmers' knowledge and skills respectively. Farmers

expected the extension services to be delivered at the right time and as promised, as in the past farmers perceived that they were delivered at inappropriate times and not as promised. Farmers considered that these expectations would solve their problems dealing with horticultural enterprises. On the other hand, farmers and AEWs had the same expectations of roles such as transferring programs suitable to farmers' problems and needs, and delivering programs as promised.

AEWs and the government officers had the same expectations of running activities that only deal with agriculture, supporting research recommendations and acting as a bridge between government officers and farmers. However, government officers did not expect AEWs to undertake the roles of running field schools, producing extension brochures, training other AEWs, finding and solving problems, and program planning, despite these roles being stated as official roles by the government.

7.3 How satisfied are farmers, AEWs and government officers with the roles undertaken by AEWs?

Overall farmers were dissatisfied with the roles for running demonstrations, program planning, using brochures and running field schools. Farmers were generally not satisfied with the performance of AEWs in any of their roles.

AEWs were satisfied with their roles in increasing farmers knowledge and skills, demonstration, encouraging farmers to participate in extension activity, program planning, monitoring and evaluation, finding and solving farmer's problems, and AEWs training. They were dissatisfied with their training and ability to make brochures, run field schools, and deliver government projects.

Government officers were dissatisfied with the roles of AEWs in encouraging farmers' participation, finding and solving farmers' problems, running field schools and the training of AEWs.

The study found out that farmers, AEWs and government officers had different expectations about AEWs' roles. The results indicate that among the groups there were significantly different perceptions towards the 12 roles they perceived as performed by AEWs. However, as mentioned in section 6.3, whilst the questions were initially the same, it is recognised that the contexts were different. When asked of farmers and government officers, they were a measure of AEWs performance, but when asked of

AEWs the implications were slightly different. It could be that the questions were a measure of their performance or their ability to do the roles or the appropriateness of the roles.

All three groups of population were dissatisfied with the role of running field schools, perhaps because of a lack of funds. Although this study found no evidence to justify that AEWs were dissatisfied with the role of producing brochures, AEWs lacked the skills to produce a brochure, due to a lack of training, and the higher level officers did not provide extension brochures for them. The other roles of helping farmers to identify the cause of problems, helping farmers to solve problems, and program planning have not satisfied the government officers. This is perhaps because the government officers believe that AEWs lack the required level of education, knowledge and skills to carry out these tasks.

7.4 How satisfied are farmers with the quality of extension services?

The results showed that the extension service appears to be not delivering on time or as promised. These ratings are consistent with farmers' other responses about the roles expected of AEWs and their suggestions for improvement. The bureaucratic structure is perhaps one cause of this problem.

AEWs were perceived poorly in 'their ability to answer questions' and in 'helping farmers to solve problems'. One explanation for this result is that most AEWs have a low level of formal education and expertise in agriculture. It also appears that the training part of the T & V system is not operating effectively with AEWs not receiving the regular training they require to perform effectively. Another cause for this poor performance in 'solving problems' may be that farmers find it hard to meet AEWs.

Farmers were also dissatisfied with their ability to contact AEWs. However, some villages have not had AEWs which accentuated this issue, as did the fact that most AEWs did not live in their village and did not have ready access to transport. AEWs also performed poorly in 'understanding farmers specific needs' and 'delivering as promised'.

However, farmers were most positive in their perception of the quality of extension services in two indicators: 'being willing to help' and 'consistently polite'. Meanwhile,

farmers were neutral in the indicators of instilling confidence and having knowledge to answer questions, but negative in other indicators. This means that overall farmers were not satisfied with the quality of extension services.

Meanwhile, AEWs performed poorly in the provision of seed with 6% strongly disagreeing that they provide help in this area. However, in the provision of guidance for fertiliser use, AEWs were perceived positively with 52% of farmers agreeing and even 27% strongly agreeing that AEWs performed well. Forty-eight percent of farmers agreed that AEWs provided help with irrigation management, while 33 % were neutral. In the provision of pesticide help, AEWs were perceived poorly with 77% of farmers disagreeing and 17% neutral. AEWs were perceived poorly in providing marketing outlet information with 42% of farmers disagreeing and even 13% in strong disagreement that AEWs provide help in this area.

Farmers had the highest satisfaction with the help given by AEWs in the key input area of fertilisers. This raises the suggestion that there is a link between farmers' satisfaction with AEWs in fertiliser advice and the training AEWs received in this area. There was no evidence of training in other areas, such as seed, pesticides, irrigation and marketing were AEWs performed poorly.

7.5 Why were AEWs performing their roles poorly

The poor performance of AEWs was due to a range of factors - many of them beyond the control of AEWs. The following factors are suggested as the cause of the poor performance of AEWs.

7.5.1 Poor implementation of T & V model

The general finding of this study is that the poor T & V performance in NTT is due to a lack of training, a lack of farmer visits, bad coordination, no linkages between research and extension activities, a lack of funds, and poor attention to marketing information.

Training is the key component of the T & V system. However this study found that AEWs lacked training, with 42% of AEWs having never attended any course in 1999/2000. The training run by the government was based on specific projects. Hence, the subjects included in the training were not based on local conditions but on the needs of the project. On the other hand, as mentioned in section 7.4, this study found that there

were links between AEWs' performance in advising on use of fertilisers and the training they received on technical aspects of fertiliser application.

Visiting is another key point in the T & V system. This study found that visiting was also inadequate mostly because of the distance of some villages from the AEWs settlement (up to 60 km), bad geographical conditions, and inadequate transport facilities. The implication of this finding is that the government should provide adequate transport facilities for AEWs to reach farmers and their groups.

A further key point of the T & V system is support for research recommendations. This project found no links between research and extension activities. This is perhaps because no research is run by the Agency for Agricultural Research and Development (AARD) that supports extension activities. The reasons were: 1) no research on extension; 2) lack of funds; 3) bad coordination; and 4) research topics totally based on central government interests. The implication of this result is that the implementation of extension services needs to follow local research recommendations in order to meet farmers and/or local needs by providing practical technology. Therefore, running research on horticultural production (e.g. on quality control issues) and extension that incorporates an evaluation and needs analysis will be very useful for future extension activity.

Seventy-four percent of farmers claimed that they have never received market information from AEWs. Hence, it can be concluded from the findings of this research that extension services in this region pay little attention to marketing outlet information. The implication of this result is that the government, through AEWs, could better support farmers' enterprises by providing price information (e.g. price of horticultural products, seeds, fertiliser and sources). This could be done on a daily morning radio program.

Another problem of the T & V system, particularly as it is implemented in Indonesia, is that it is run with a top-down planning process. This planning affects extension programs as it is not based on farmers' problems and needs, but on government interests. The government's ignorance of farmers' aspirations and poor farmer participation are two of the top-down planning weaknesses. Perhaps the government needs to consider modifying the T&V system to put greater emphasis on bottom-up planning, which is intended to provide an extension service closer to farmers' needs.

The government could consider modifying the T&V system to incorporate elements of the model of 'Participatory on-Farm Training' to improve the extension service. This model should be based on local conditions, and farmers needs and problems (Hossain and Crouch 1992; Schneider 1993; Bauer and Keller 1997) in order to create farmer participation in extension services (refer to page 4). This model is in line with the adult learning process named 'learning by doing'.

7.5.2 Poor management

The bureaucratic processes found in this study, which deal with AEWs' roles/tasks dissatisfied most AEWs. Pathways in Figure 6.1 and the Department of Agriculture structure in Figure 3.1 show very clearly that the bureaucracy is complicated. The implication of this result is that the government should simplify bureaucratic processes so that management of extension activities would be more effective.

AEWs were also dissatisfied with the directions given by the government to run their tasks. As discussed in section 6.5.11, that each division has its own directions to deal with its own program. AEWs suggested that they undertook their roles/tasks almost without authority, especially when making a decision. Consequently, AEWs expressed their dissatisfaction with the authority given by the government. Moreover AEWs in this region have little chance to better their position in the government structure because of constraints on their career path.

7.5.3 Poor performance of AEWs

The main motivation of 80% of AEWs to work as an AEW is merely to belong to the civil service. This finding strengthens the commonly held view of people in this location, that civil servants will obtain social acknowledgement. Despite this sector awarding a low salary or income, it provides a future guarantee of retirement.

Sixty-nine percent of AEWs surveyed were educated at High School, which is similar to the NTT statistic of 64%. A further 31% of AEWs had an educational level of Diploma degree or higher, which again is similar to the NTT with a diploma level of 31% and a Bachelor level of 2%. AEWs, whether educated at Diploma level or High School, have the same requirement to deliver government projects. In NTT there are no Subject Matter Specialists, because government officers do not recruit AEWs with specialist expertise. This is a key deficiency for a T & V system which relies on support from

Subject Matter Specialists, each of whom should work with approximately eight AEWs (Van den Ban and Hawkins 1988; 1996).

AEWs are reluctant to live in villages, with only three out of 46 AEWs, living in the village where they serve. While it would cursorily appear that it is desirable for AEWs to live in the villages, this is not easy to implement due to various reasons mentioned in section 6.5.12 (i.e.. lack of incentives to relocate, family reasons, etc.). Moreover, living in the village may mean that AEWs will miss out on provincial coordination meetings and other trainings. Hence, the solution would appear to be not so much in where the AEWs live, but in supplying the transport and programs so that they will be easier to be contacted by farmers, thus achieving two goals. The implication is that AEWs should be easily contactable despite not living in the villages. Therefore, it is suggested that government officers provide facilities as required by AEWs and the government itself.

Further implications of this study for the government officers to improve the quality of extension services are for greater attention to running demonstrations, using brochures and running field schools.

7.6 Summary

Based on the performance of AEWs mentioned above these findings support those of Van den Ban and Hawkins (1996), in that agricultural extension in developing countries, including Indonesia, face problems such as lack of appropriate technology available to extend, absence of clear linkages between extension organisations and agricultural research institutions, extension workers having limited training in practical technology, extension methods and communication skills), extension workers lacking sufficient transport facilities to reach farmers, extension workers lacking visual aids for essential teaching of farmers with low levels of education, extension workers having many other tasks besides extension work, extension workers lacking communication media such as bulletins, demonstration materials, and brochures.

7.7 Implications of this research for government policy

A key issue identified by the research was that the AEWs lacked suitable knowledge, information and skills to deliver to farmers. To address these there is a need for the government to establish a research and development program to support agricultural

development. This should be combined with a program of regular training for AEWs on the outcomes of the research and development program and that is relevant to the AEWs and the farmers. Another issue is to address the bureacratic and top-down processes ot the T&V model and government. They should start to apply the service of extension based on the farmer's needs, in line with the government policy to apply 'bottom-up' development planning. Bureaucratic processes need to be simplified so that extension programs can be delivered at the right time. An effort also needs to be undertaken to clarify the roles of AEWs so that government officers and AEWs have similar perceptions of their role. To help with the problem of visiting farmers the government should redirect funding to provide facilities for AEWs (i.e. motorbikes).

7.8 Limitations of the study and areas for future research

The first limitation of this study is that it was conducted in only two districts of 14 districts in NTT with only 301 respondents interviewed. However, these two districts produce the highest horticultural production for NTT and the conditions for farmers in NTT are homogenous. Even so, follow-up research in other potential districts is suggested to confirm the findings.

Secondly, AEWs' desire for more training was not included in this research. This is because training was not an objective of this research. However, given the finding that 87% of AEWs suggested training or further training on PRA, it is suggested that further research be conducted on AEWs requirements for training in specific subjects.

Thirdly, while an attempt was made to collect data on AEWs visits to farmers and farmers' group, this was not successful. Therefore further research is suggested in this area to know the frequency of AEWs visits to farmers.

Fourthly, this study only used four levels of the Bennett's hierarchy namely, inputs or sources of planning, activities, participation and reaction to the extension service. This was mainly because the purpose of this study was not to examine a specific project but to gain general information on extension activities. Therefore further research evaluating the extension service on a specific project within an NTT context is needed to apply the seven levels of Bennet's hierarchy and to provide more detailed information.

7.9 Conclusion

AEWs and the extension system in NTT appear to be performing poorly, but the lack of success is not due only to AEW performance, but also to system failure. While it can be argued that the top-down T & V model may not be the most appropriate, its implementation in NTT is not a fair test. Many of its key elements, which would be required for any successful extension operation, do not appear to be in place. There is a lack of relevant local research, resources, planning, marketing outlet information, facilities, and control; and AEWs are not receiving sufficient training in appropriate technology. The bureaucratic processes and bad geographical conditions also impede AEWs, who do not appear to be making sufficient visits to farmers or delivering services on time.

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Appendix 1: Survey Questionnaires

Introduction

- Excuse me, my name is Leta Rafael Levis, I am a postgraduate student of Muresk Institute of Agriculture, Curtin University of Technology, Perth, West Australia.

- I am coming here with intends to ask for your help in completing of my studying. I will interview you in relation to the role of agricultural extension workers, particularly in horticultural agribusiness. However, individuals details collected by the researcher no details identifying individuals will be recorded. Your individual identify and location details will be recorded separately during the interview process and will be destroyed.

Thank you

A1.2: Farmer questionnaire

Part I. Farmer characteristics

1.1 What is your age? (Table A.3a)

1.2. What level of education have you achieved?... *(Table 5.5)*

how many years schooling?.....

1.3. How many people are you supporting in your family? *(Table A2.2)*

1.4. Have you attended any course or training? Y/N(*Table 5.10)*

If yes: What was the last one about?.....

Part II. Information on Farmers' Enterprises

Land ownership questions (Table 5.3 and 5.4)

2.1 How many and what types of parcels of land do you have?

Parcel of land	Ownership (tenancy/ owner-rent-leave	Total Size (Ha)	Livestock (Type)
1. 2. 3. 4.			

Fruit (Table 5.1)

2.3 What kinds of fruit do you grow?

a. *oranges*
b. *mango*
c. *avocado*
d. *banana*
e. *water melons*
f. *Other*.....
g. .....

Table A3.1

5 Main fruits of the 3 last seasons	Production (kg)	Proportion sold	Sales revenue	Portion consumed
1. 2. 3. 4. 5.				

Production problems

2.4 So far, have you ever faced problems in fruit production? Y/N
If Yes: What problems?..*(Table A3.8)*
If no: why not?

2.5 Have you used extension services to solve farming problems?

If Yes: How many times ?
If no: How did you overcome that problem ?

2.6 In what area did AEWs help you ? *(Table 5.25)*

Seed

2.7 What were your sources of seed/planting materials last season?*(Table 5.21)*
Why from there?
If from AEWs: Could you rate your level of agreement with the performance of AEWs in supplying seed? *(Table 5.34)*
5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)
Why?

Fertilizer

2.8 Did you use fertiliser in your fruit crops last season? Y/N.

If Yes: What kind of fertiliser did you use ? *(Table A3.2)*

2.9 Do you know how to use fertiliser? Y/N

If Yes: From where did you learn how to use it?...*(Table 5.22)*
AEWs; Friends in farmer group; Friends out group; Contact farmers; Other
If from AEWs:

2.10 Did you understand the information given by the AEWs?

If Yes: why?

If no: why not?

2.11 Could you rate your level of agreement with the performance of AEWs in helping you to use fertiliser? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

Weeds/diseases

2.12 What weeds and diseases do you get on your fruit crops? *(Table A3.3)*

2.13 Who helped you to overcome these problems? *(Table 5.24)*

AEWs; Friends in farmer group; Friends out group; Contact farmers; Other

2.14 What kind of chemicals did you use*? (Table A3.4)*

2.15 How did you get chemicals? *(Table 5.23)*

a. buying,

b. given by government through AEW

2.16 *If from AEWs*: Could you rate your level of agreement with the performance of AEWs in helping you with chemical application? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

Irrigation management

2.17 Which parts of irrigation management can AEWs help with?

2.18 What were the main irrigation problems you faced last season? *(Table A.9)*

2.19 If you have a problem with irrigation management who are most helpful?

AEWs; Friends in farmer group; Friends out group; Contact farmers; Other

2.20 *If from AEWs*: Could you rate your level of agreement with the performance of AEWs in helping you irrigation management? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

VEGETABLES (Table 5.1)

2.21 What kind of fruit do you grow ?

a. cabbages
b. leafy vegetables
c. cucumber
d. garlic
e. onions
f. chilies
g. long beans
h. bitter fruits
i. chokoes

Table A3.1

5 Main vegetables of the 3 last seasons	Production (kg)	Proportion sold	Sale revenue	Portion consumed	Portion exincreasing d
1. 2. 3. 4. 5.					

Is there any other high value crops not included above or areas of crops recently planted but not yet ready for harvest ?

Production problems

2.4 So far, have you ever faced problems in vegetables production? Y/N
If Yes: What problems?..*(Table A3.8)*
If no: why not?

2.5 Have you used extension services to solve farming problems?

If Yes: How many times ?
If no: How did you overcome that problem ?

2.6 In what area did AEWs help you ? *(Table 5.25)*

Seed

2.7 What were your sources of seed/planting materials last season?(*Table 5.21)*
Why from there?
If from AEWs: Could you rate your level of agreement with the performance of AEWs in supplying seed? *(Table 5.34)*
5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)
Why?

Fertilizer

2.8 Did you use fertiliser in your vegetables crops last season? Y/N.

If Yes: What kind of fertiliser did you use ? *(Table A3.2)*

2.9 Do you know how to use fertiliser? Y/N

If Yes: From where did you learn how to use it?...(*Table 5.22*)
AEWs; Friends in farmer group; Friends out group; Contact farmers; Other

If from AEWs:

2.10 Did you understand the information given by the AEWs?

If Yes: why?
If no: why not?

2.11 Could you rate your level of agreement with the performance of AEWs in helping you to use fertiliser? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

Weeds/diseases

2.12 What weeds and diseases do you get on your vegetables crops? *(Table A3.3)*

2.13 Who helped you to overcome these problems? (*Table 5.24)*

AEWs; Friends in farmer group; Friends out group; Contact farmers; Other

2.14 What kind of chemicals did you use*? (Table A3.4)*

2.15 How did you get chemicals? *(Table 5.23)*

a. buying,

b. given by government through AEW

2.16 *If from AEWs*: Could you rate your level of agreement with the performance of AEWs in helping you with chemical application? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

Irrigation management

2.17 Which parts of irrigation management can AEWs help with?

2.18 What were the main irrigation problems you faced last season? (*Table A3.6)*

2.19 If you have a problem with irrigation management who are most helpful?

AEWs; Friends in farmer group; Friends out group; Contact farmers; Other

2.20 *If from AEWs*: Could you rate your level of agreement with the performance of AEWs in helping you irrigation management? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)
Why?

Part III. MARKETING INFORMATION

3.1 Did you get advice from AEWs about where to get a good price for your horticultural products?

3.2 Where was the main place you sell your horticulture products? *(Table A3.7)*

3.3 *If received advice from AEWs*: Could you rate your level of agreement with the performance of AEWs in helping you with marketing information? *(Table 5.34)*

5(strongly disagree), 4(disagree), 3(neutral), 2 (agree), 1(strongly agree)

Why?

Part IV. Satisfaction with AEWs performance of their roles

In this part I would like to ask you to rate your satisfaction with how well AEWs are performing their roles. Rate the degree of satisfaction of the following roles/tasks of AEWs on a scale of 1-5 with 1: strongly dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: strongly satisfied *(Table 5.31)*

4.1 Increasing knowledge and skills of farmers

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.2 Conduct plot demonstrations

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.3 Encourage farmers participation in any extension activity

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.4 Planning of extension programs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.5 Inputs delivery (seed, fertilizer, pesticide).

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.6 Monitoring and evaluation

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.7 Help farmer to finding problems

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.8 Finding solution to farmers' problems

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.9 Training other AEWs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.10 Produce brochure

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.11 Conducting field school

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

4.12 Delivering Government projects

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

Part V. Evaluation of Extension service quality (*Table 5.30*)

In this part I would like to ask you to rate your satisfaction with the quality of extension service given by AEWs. Rate the degree of satisfaction on the following issues for AEWs on a scale of 1-5 with 1: strongly dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: strongly satisfied.

Did extension workers meet your expectations for:

5.1 Delivering information on time 1 2 3 4 5 why ?

5.2 Delivering what has been promised 1 2 3 4 5 why?

5.3 Being willing to help 1 2 3 4 5 why ?

5.4 Instilling confidence 1 2 3 4 5 why ?

5.5 Consistently polite 1 2 3 4 5 why?

5.6 Have knowledge to answer question 1 2 3 4 5 why ?

5.7 Being able to contacted 1 2 3 4 5 why ?

5.8 Having my best interests at heart 1 2 3 4 5 why ?

5.9 Understanding my specific needs 1 2 3 4 5 why ?

5.10 Providing sufficient information 1 2 3 4 5 why ?

5.11 Providing relevant information 1 2 3 4 5 why ?

5.12 Helping to find problem 1 2 3 4 5 why ?

5.13 Helping to solve problem 1 2 3 4 5 why ?

Part VI. Group activities

6.1 Are you a member of a farmer group? Y/N

6.2 Are you a contact farmer? Y/N

How many contact farmer in your group ?

If yes: What is your task?

6.3 How many years have you been involved in this group?

6.4 How many farmers in your group?

6.5 Have you ever attended a group meeting?

Why?

If Yes:

6.6 How many times in the last year? (*Table A3.10*)

6.7 When was the last meeting you attended?

6.8 What issues/subjects were discussed in this meeting ? (*Table 5.40)*

6.9 What are the reasons you attending the meeting? *(Table 5.41)*

6.10 What types of activities took place?

6.11 How many farmers involved?

6.12 Who organised that meeting ?

AEW, Contact farmers, Others

6.13 Did you agree with opportunity you had to express your opinions?

5 4 3 2 1 , why ? *(Table 5.35)*

6.14 Did you agree with the how the meeting was organized? *(Table 5.35)*

5 4 3 2 1, why ?

6.15 How long has the current extension worker been with this group?.

6.16 How many extension workers been working with this group in the past 5 years?

Part VII. Expectation roles (Table 5.15)

7.1 What's roles do you expect to be delivered by AEWs?.....

Why ?

Part VIII. Suggestions for improvement

8.1 How many times have you been visited by AEW in the last 6 months? (see group activities)

8.2 What is your suggestion, if any, to improve the quality of extension services? *(Table 5.49)*

A1.3: AEW questionnaire

Part I. AEW characteristics

1.1 What is your age ? (*Table A2.1*)

1.2 What level of education have you achieved?... *(Table5.6)*

how many years schooling?.....

1.3 How many people are you supporting in your family ? *(Table A2.2)*

1.4 Have you attended any course or training in the last two years? Y?N?

If yes, what was the last one about? *(Table 5.38)*

Was it useful ?

1.5 What is your current position – job category?

1.6 How long have you been in this position?

1.7 How long have you been an extension worker? *(Table A4.1)*

1.8 How long have you been in this district? (*Table A4.2)*

1.9 Why did you choose to become an AEW? *(Table 5.45)*

a). to become a government officer

b) helping farmers

c) coming from farmer family

d) no other choice

e) applying of my agricultural knowledge

Part II. Extension tasks

2.1 What do you see are the important tasks of agricultural extension ? *(Table 5.14)*

2.2 If you tun your tasks, what media did you use to diffuse information? *(Table A4.3).*

a) individual

b) group

c) mass

Part III. Perception on 12 roles given AEWs by the government

What is your perception on the following roles undertaken by you? Rate the degree of satisfaction of the following roles/tasks of AEWs on a scale of 1-5 with 1: strongly dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: strongly satisfied. Why? *(Table 5.31)*

3.1 Increasing knowledge and skills of farmers

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.2 Conduct plot demonstrations

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.3 Encourage farmers' participation in extension activities

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.4 Planning extension programs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.5 Inputs delivery (seed, fertilizer, pesticide) .

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.6 Monitoring and evaluation

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

3.7 Help farmer to find problem

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.8 Help farmer to find solution to problems

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.9 Training other AEWs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

3.10 Produce brochure

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

3.11 Field school

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

3.12 Government project deliver

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why?

3.13 What do you believe the role of extension workers should be?

Why ? *(Table 5.15)*

Part IV. Perception on training

How would you rate your level of satisfaction of training, knowledge and skills to perform the following roles? *(Table 5.36)*

4.1 Increasing knowledge and skills of farmers

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.2 Conduct plot demonstrations

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.3 Encourage farmers participation in any extension activity

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.4 Planning of extension programs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.5 Inputs delivery (seed, fertilizer, pesticide) .

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.6 Monitoring and evaluation

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.7 Finding problem

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.8 Finding solution farmers problems

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.9 Training other AEWs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.10 Produce brochure

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.11 Field school

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

4.12 Government project deliver

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

Part V. AEWs actual role

5.1 Please list the 3 most important skills farmers need to be successful in their horticultural enterprises ?

Conduct of Plot Demonstration

5.2 Have you ever tried a demonstration plot? Y/N

5.3 How many plots in the last 5 years?

5.4 What was demonstrated in last plot? *(Table 5.16)*

5.5 What was the purpose of this plot demonstration? *(Table 5.17)*

5.6 Did farmers participate in the planning and/or implementation of the plot demonstration? How?

Encourage Farmers Participation in Extension Services

5.7 Can you give me a specific example of how farmers participated in *(Table 5.18)*

- planning
- organizing
- implementation
- evaluation

5.8 What kind of activity do farmers appear most likely to attend? *(Table 5.19)*

5.9 How do you encourage farmers to attend activities? *(Table A4.3)*

5.10 What are some obstacles discouraging farmers attending?

5.11 How do you overcome these obstacles? *(Table A4.4)*

Planning of Extension Program

5.12 During the last 3 years what, if any, programs did you conceive, plan and implement based on needs identified in your district? *(Table 5.20)*

If yes: What were they?

5.13 What was the result of these programs?

5.14 Were there any constraints to conducting these programs?

Input Delivery

For the following inputs:

a. seed ?

b. fertilizer ?

c. herbicide /pesticide?

5.15 Have you been required by government to provide these inputs to farmers in the last year?

5.16 How important do farmers see you as a source of these inputs?

very important(5), important (4), neutral (3), unimportant (2), and very unimportant (1).

Why? *(Table 5.34)*

5.17 Have you given horticultural price information to farmers in the last year?

5.18 Have you given advice about marketing outlets in the last year?

Identifying farmer problems requiring action by government

5.19 Over the past year what farmer problems, if any, have you identified that require action by government?

5.20 What action did you take in response to each of these problems?

5.21 How were farmers involved in identifying the problems?

5.22 What obstacles did you face in identifying problems?

5.23 How did you overcome these obstacles?

Finding solution to farmers problems

5.24 Refer to 8.19 could you please mention the solutions to each of the problems?

a.....

b. .....

If none, why ?

Production of brochure

5.25 Do you know what an extension brochure is? Y/N

5.26 In the last year have read an extension brochure ? Y/N

How many? *(Table 5.26)*

About what ?

What was the function of brochure to reach your tasks ? *(Table 5.27)*

5.27 Have you made an extension brochure in the last year? Y/N

If yes: What was it about?

If none: why?

Field School

5.28 Do you know how to conduct a field school?

5.29 Where did you learn how to conduct a field school?

5.30 Have you conducted a field school in the last year? Y/N

If yes,

How many times?

What was it about?

Where?

Result?

If no: why not?

Deliver Government project

5.31 What are the five main projects/programs you have been working in the last three years? *(Table 5.28)*

5.32 What is the objective of the program?

5.33 What proportion of your time was spent on each?

5.34 What was your task in this project? *(Table 5.29)*

5.35 What were the farmers' tasks in this project? *(Table 5.29)*

5.36 What were the main activities conducted to achieve the objectives of the project?

5.37 How were these projects monitored and evaluated?

Part VI. Visits

6.1 How many times did you visit farmers in the past month?

6.2 What proportions to:

a) Fields

b) Farmer' Group

c) House

d) other

6.3 How many farmers are there in the groups?

6.4 How many contact farmers in a group?

6.5 What were the main reasons for making these visits?

6.6 How many of these were contact farmers?

6.7 What were the main reasons for these meetings?

6.8 What obstacles, if any, do you face in dealing with the role of farmer visits?

6.9 How did you overcome this obstacle?

Part VII: Constraint factors

7.1 What things support you in achieving your role?

7.2 What things are important obstacles/constraints to you achieving your role? *(Table 5.48)*

7.3 How often did you receive training in the last two years? *(Table 5.37)*

None in the last two years

Once

Twice

More often

7.4 What were the subjects of the last of your training? *(Table 5.37)*

I will now get you to rank your level of satisfaction with the training:

7.5 Subject area: *(Table 5.36)*

very usefulness(5), usefulness (4), neither useful nor useless (3), useless (2), very useless (1), why ?

7.6 Relevance: *(Table 5.36)*

strongly relevant (5), relevant (4), neither relevant nor irrelevant (3), irrelevant(2), strongly irrelevant (1), why ?

7.7 Quality of staff/trainer: *(Table 5.36)*

strongly satisfied(5), satisfied(4), neither satisfied nor dissatisfied (3), dissatisfied (2), strongly dissatisfied (1), why ?

7.8 Method : *(Table 5.36)*

strongly suitable (5), suitable(4), neither suitable nor unsuitable (3), unsuitable (2), strongly unsuitable(1), why ?

Authority

7.9 What is your perception of the level of control and authority you have over your role in conducting extension in your district? *(Table 5.36)*

5(very good), 4(good), 3(neutral), 2(bad), 1(very bad) Why?

7.10 What is the effect of your authority to undertake your roles ?

Salary

7.11 What is your opinion on your salary ? *(Table 5.36)*

5 (very good) 4(good) 3(neutral) 2 (bad) 1(very bad)

why?.....

Bureaucracies

7.12 What is your perception on government bureaucracy processes? *(Table 5.36)*

5 (strongly agree), 4(agree), 3(neutral), 2(disagree),1(strongly disagree)

Why ?

Direction

7.13 What is your perception on extension direction? *(Table 5.36)*

5(very clear), 4(clear), 3(neutral, 2(unclear), 1(very unclear)

Why ?

Facilities

7.14 What is your perception on facilities ? *(Table 5.36)*

5(very good), 4(good), 3(neutral), 2(poor), 1(none)

Why ?

7.15 Could you please inform me of available facilities support your roles ?

7.16 What kind of facilities that are very important ?

Local language (Table 5.36)

7.17 Do you feel local language impede your ability to undertake your role?

1(strongly agree), 2(agree), 3(neutral), 4(disagree), 5(strongly disagree)

Why ?

7.18 Can you speak the local language?

Lack of training

7.19 What is your perception on chance for training? *(Table 5.36)*

5(very good), 4(good), 3(neutral), 2(less), 1(nothing)

Why ?

Geographical conditions

7.20 Do you perceive that the geographical condition influence your roles?

5(very bad) 4(bad), 3(neutral), 2(good), 1(very good) *(Table 5.36)*

Why?

Part VIII. Contact Farmers

8.1 What is the task of contact farmers?

8.2 Do you agree with their responsibility?

5(strongly agree), 4(agree), 3(neutral), 2(disagree), 1(strongly disagree)

Why?

Part IX. Suggestions (Table 5.49)

9.1 What is your suggestion, if any, to improve the quality of extension service?

A1.4: Government officer questionnaire

Part I. Government officers Characteristics

1.1 What is your age? *(Table A2.1)*

1.2 What level of education have you achieved *(Table 5.7)*

1.3 What is your current position *(see point 4.4.2 in Research Method)*

Part II. Job description

2.1 What are your main tasks in your position? *(Table 5.9)*

2.2 Are these tasks relevant to extension service? *(Respondent to indicate whether task is relevant, partly relevant, not relevant) (see on government activities)*

2.3 What activities do you undertake to fulfill your tasks? *(Table 5.8)*

2.4 Approximately what proportion of your time is devoted to extension activities?

<25%; 25-50; 50-75; 75+

2.5 What activities do you hold in collaboration with other institutions in relation to extension services? (e.g: with Research division, Universities, others) *(Table A5.1)*

2.6 In your opinion, what are the main tasks of extension services? (*Table 5.13*)

2.7 In your opinion, what are the main goals of extension services?

2.8 Who do you think are the people who should be responsible for achieving these goals?

2.9 What model of extension services are you currently using? (e.g., T & V system, PRA, etc) *(Table 5.42)*

2.10 Rate how well extension workers are fulfilling the goals of extension services? *(Table 5.40)*

<25%; 25-50; 50-75; 75+

Why?.....

2.11 Are you responsible for recruiting AEWs?.....

2.12 What are the criteria currently used for selecting AEWs?

2.13 How do you incorporate research into extension to meet farmers needs?

2.14 What are the obstacles in incorporating research into extension to meet farmer needs? *(Table 5.47)*

Part III. Expectation roles

3.1 What's roles are expected to be delivered by AEW ?

Why *(Table 5.15)*

Part IV. Training and Visit System

4.1 What do you understand by the Training & Visit system? *(Table 5.43)*

4.2 What are the main tasks of T & V system ? *(Table 5.44)*

4.3 How do you manage this system? *(Table 5.11)*

4.4 What is the average number of farmers in T&V groups in the areas under your control?

Why this number?

4.5 What are the main criteria for allocating farmers to the T&V groups?

Whether a member of a group or not?
Which group are allocated to?

4.6 How many farmers and groups are the responsibility for one AEW? *(Table A5.2; Table 5A.3)*

4.7 What are the criteria for choosing contact farmer?

4.8 What are the responsibilities/task of contact farmers? (Table 5.39)

Part V. PERCEPTION on the 12 roles undertaken by AEWs

In this part I would like to ask you to rate your satisfaction with how well AEWs are performing their roles. Rate the degree of satisfaction of the following roles/tasks of AEWs on a scale of 1-5 with 1: strongly dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: strongly satisfied. *(Table 5.31)*

5.1 Increasing knowledge and skills of farmers

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.2 Conduct plot demonstrations

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.3 Encourage farmers participation in any extension activity

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.4. Planning of extension programs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.5 Inputs delivery (seed, fertilizer, pesticide) .

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.6 Monitoring and evaluation

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.7 Finding problem

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.8 Finding solution farmers problems

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.9 Training other AEWs

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.10 Produce brochure

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.11 Field school

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

5.12 Government project deliver

Strongly satisfied (5), satisfied *(4)*, neutral (3), dissatisfied (2), strongly dissatisfied (1)

Why ?

Part VI. Constraints

6.1 What things are the major obstacles/constraints in performing your task with respect to agricultural extension?

6.2 What do you think are the major obstacles/constraints that impede AEWs in performing their tasks with respect to agricultural extension? *(Table 5.46)*

6.3 What are your comments in regards to the T & V system ?

6.4 What is your suggestion to improve the quality of extension service ? (Table 5.49)

Part VII. Develop of Staff

7.1 What activities, if any, have you conducted in the past 1-3 years to improve the knowledge and skills of AEWs? *(Table 5.12)*

7.2 What subject of training did you give to AEW in the last 1-3 years? *(Table 5.38)*

7.3 What plans, if any, do you have in the next year to improve the knowledge and skills of AEWs? *(Table 5.51)*

7.4 What do you think are the subjects of training courses needed by AEWs to be able to perform their tasks effectively? *(Table 5.52)*

7.5 What are your plans, if any, to improve the extension service in NTT? *(Table 5.50)*

Part VIII. Suggestions (Table 5.49)

8.1 What is your suggestion, if any, to improve the quality of extension service?

Appendix 2: Respondents' demography

Table A2.1: Ages of respondents from three population

Ages	Farmers	AEWs	Government	Total
16 - 30	64	2	0	66
30 - 45	107	43	14	164
45 - 60	39	1	17	57
60	13	0	1	14
Total	223	46	32	301

Valid cases 301

Table A2.2: Number in family

	Farmer		AEWs	
Family number	Number	%	Number	%
1. 2 – 4	88	39	19	41
2. 5 – 7	90	40	24	52
3. 8 and more	45	21	3	7
Total	223	100	46	100

Valid cases 269

Appendix 3: Farmers' responses

Table A3.1: Value of horticultural crops in 2000

Horticultural crops	Prices of each kgs	Value
Chili	10,000	420,000
Orange	5,000	234,800
Cabbage	3,000	141,000
Chinese cabbage	3,000	114,000
Long bean	3,500	74,382
White cabbage	2,000	42,000
Carrot	4,000	38,800
Water melon	4,000	36,000
Cucumber	2,000	34,000
Tomato	3,000	33,000
Bitter fruit	3,000	24,000
Egg plant	2,000	18,000
Choke	950	17,575
Leafy vegetable	2,000	16,000
Onion	3,250	9,750
Total	-	1,253,307

Table A3.2: Kinds of fertilizer used by farmers in 2000

Kind of fertilizer	Frequency	% of responses	% of respondent
Urea	176	33	80
TSP	147	34	67
KCL	59	14	27
Organic	52	12	23
Nothing	3	1	1
Total	437	100	198

Valid cases 223; more than one response allowed

Table A3.3: Kind of disease and weeds attacked farmers crops in 2000

Kind of disease	Frequency	% of responses	% of respondent
Weeds	75	27	34
Rush disease	69	24	31
White spot	41	14	18
Black spot	40	14	18
Ant	33	12	15
Other	24	9	11
Total	282	100	137

Valid cases 223 ; more than one response allowed

Table A3.4: Kinds of pesticide used by farmers for horticultural enterprises in 2000

Kinds of pesticide	Frequency	% of responses	% of respondent
Curacron	60	19	27
Saprodin	1	0	1
Gusadrin	41	13	18
Prince	6	2	3
Assodrin	4	1	2
Kiltop	4	1	2
Desis	13	5	6
Polaris	110	35	49
Furadan	53	17	24
Darmabag	5	2	2
Antrokol	11	4	5
Dusban	4	1	2
Total	312	100	141

Valid cases 223; more than one response allowed.

Table A3.5: The average of pesticide expenditure

Expenditure	Frequency	%
Less than 50,000	89	39.91
50,000 - 100,000	83	37.22
101,000-150,000	32	14.35
151.000-200000	15	6.73
More than 200,000	4	1.79
Total	223	100

Valid cases 223

Table A3.6: Irrigation problems faced by farmers in Kupang and TTS in 2000

Problem	Frequency	%
Lack of water	152	68
Bad irrigation management	27	12
No problem at all	26	12
Bad irrigation system	18	8
Total	223	100

Valid cases 223

Table A3.7: The main place for farmers to sale their product

Place of sale	Frequency	%
On farm	113	51
City or state market level	44	20
Village market level	35	16
Town or district market level	24	11
Sub district market level	5	2
Farmer's house	2	1
Total	223	100

Valid cases 223

Table A3.8: Problems in relation to horticultural enterprises in 2000

Problems	Frequency	% of response	% of respondent
Poor quality seed	215	22	96
Rust disease	179	18	80
White Spot	115	12	52
Ant	98	10	44
Lack of water	81	8	36
Lack of money	75	8	34
Low price	70	7	31
High prices of fertilizer	69	7	31
Disease	65	7	31
Excess rain	19	1	9
Total	986	100	398

Valid cases 223; more than one response allowed.

Table A3.9:Farmer comments on the quality seeds provided by AEWs

Quality seeds	Frequency	% of response
Good	39	85
Bad	0	0
Do not know	7	15
Total	46	100

Valid cases 46

Table A3.10: Frequency of group meeting farmers attend in 2000

Frequency of meeting	Number of attendance	% of respondent
Never	17	8
1	78	38
2	27	13
3	51	25
4	33	16
8	2	1
9	4	2
10	1	1
11	10	5
Total	223	100

Valid cases 223

Appendix 4: AEWs' responses

Table A4.1: AEW has been an extension worker

Years	Frequency	%
4	1	2
5	2	4
6	2	4
7	5	11
8	1	2
9	3	7
10	3	7
11	4	9
12	4	9
13	1	2
14	5	11
15	3	7
16	4	9
17	4	9
20	1	2
21	2	4
24	1	2
Total	46	100

Valid cases 46

Table A4.2: AEWs had worked with the district

Years	Frequency	%
1	1	2
2	9	19
3	21	46
4	15	33
Total	46	100

Valid cases 46

Table A4.3: The media used by AEWs to diffuse extension program project and encourage farmers' participation Media of communication used by AEWs

Communication media used	Frequency	%
Individual approach	0	0
Farmer' group approach	32	70
Combination of individual farmer' group approaches	14	30
Total	36	100

Valid cases 46

Table A4.4: Three groups of AEWs with respect to overcome the constraints in encouraging farmers participation.

The overcoming ways	Frequency	%
Persistent persuasion	14	30
Approaching the group leader and/or local elite	11	24
Never tried	21	46
Total	46	100

Valid cases 46

Appendix 5: Government officers' responses

Table A5.1: Government coordinate with other institutions

Coordination activity	Frequency	% of respondent
Coordinating meeting	20	63
Cooperative with university	3	9
Cooperative with NGO	3	9
No participation	6	19
Total	32	100

Valid cases 32

Table A5.2: Number of farmer in a farmer's group according government

Number of farmers	Frequency	% of respondent
10 to 25	14	44
More than 25 to 50	12	38
More than 50	6	19
Total	32	100

Valid cases 32

Table A5.3: Government view about the number of farmer group should be supervised by AEW

Number of farmer's groups	Frequency	% of respondent
< 11	10	31
11-20	13	41
> 20	9	28
Total	32	100

Valid cases 32

Table A5.4: Government comments that extension program designed to meet farmers needs

Extension program	Frequency	% of response	% of respondent
Based on farmers need	17	41	53
Based on specific project	16	38	50
Other	9	21	28
Total	42	100	131

Valid cases 32; more than one response allowed.

Appendix 6: The summary of Chi-square tests about the association between the groups and perceptions

Table A6.1: Chi-square test for perception to the role of increasing farmers' skills and knowledge

Role1 * Population		Groups of Population			
		Farmer	AEWs	Government	Total
Dissatisfied	count	60		4	64
	% within Role1	93.8		6.3	100
Neutral	count	101	3	12	116
	% within Role1	87.1	2.6	10.3	100
Satisfied	count	62	43	16	121
	% within Role1	51.2	35.5	13.2	100
Total	count	223	46	32	301
	% within Role1	74.1	15.3	10.6	100

$X^2 = 70.932^a$ (.000)

Table A6.2: Chi-square test for perception to the role of conducting plot demonstration

Role2 * Population		Groups of population			
		Farmer	AEWs	Government	Total
Dissatisfied	count	127			127
	% within Role2	100			100
Neutral	count	87	1	5	93
	% within Role2	93.5	1.1	5.4	100
Satisfied	count	9	45	27	81
	% within Role2	11.1	55.6	33.3	100
Total	count	223	46	27	301
	% within Role2	74.1	15.3	10.6	100

$X^2 = 232.468^a$ (.000)

Table A6.3: Chi-square test for perception to the role of encouraging farmers' participation in extension service

Role3 * Population		Groups of population			
		Farmer	AEWs	Government	Total
Dissatisfied	count	53		25	78
	% within Role3	67.9		32.1	100
Neutral	count	103	2	5	110
	% within Role3	93.6	1.8	4.5	100
Satisfied	count	67	44	2	113
	% within Role3	59.3	38.9	1.8	100
Total	count	223	46	32	301
	% within Role3	74.1	15.3	10.6	100

$X^2 = 121.597^a$ (.000)

Table A6.4: Chi-square test for perception to the role of program planning

		Groups of population			
Role4 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	101	1	3	105
	% within Role4	96.2	1.0	2.9	100
Neutral	count	95	13	15	123
	% within Role4	77.2	10.6	12.2	100
Satisfied	count	27	32	14	73
	% within Role4	37.0	43.8	19.2	100
Total	count	223	46	32	301
	% within Role4	74.1	15.3	10.6	100

$X^2 = 86.760^a$ (.000)

Table A6.5: Chi-square test for perception to the role of inputs delivery

		Groups of population			
Role5 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	115	11	3	129
	% within Role5	89.1	8.5	2.3	100
Neutral	count	82	26	14	122
	% within Role5	67.2	21.3	11.5	100
Satisfied	count	26	9	15	50
	% within Role5	52.0	18.0	30.0	100
Total	count	223	46	32	301
	% within Role5	74.1	15.3	10.6	100

$X^2 = 41.111^a$ (.000)

Table A6.6: Chi-square test for perception to the role of monitoring and evaluation

		Groups of population			
Role6 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	102		1	103
	% within Role6	99.0		1.0	100
Neutral	count	80	2	1	83
	% within Role6	96.4	2.4	1.2	100
Satisfied	count	41	44	30	115
	% within Role6	35.7	38.3	26.1	100
Total	count	223	46	32	301
	% within Role6	74.1	15.3	10.6	100

$X^2 = 143.442^a$ (.000)

Table A6.7: Chi-square test for perception to the role of help farmers to find cause the problems

		Groups of population			
Role7 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	70	1	19	90
	% within Role7	77.8	1.1	21.1	100
Neutral	count	89	2	9	100
	% within Role7	89.0	2.0	9.0	100
Satisfied	count	64	43	4	111
	% within Role7	57.7	38.7	3.6	100
Total	count	223	46	32	301
	% within Role7	74.1	15.3	10.6	100

$X^2 = 85.249^a$ (.000)

Table A6.8: Chi-square test for perception to the role of help farmers to solve the problems

		Groups of population			
Role8 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	86		26	112
	% within Role8	76.8		23.2	100
Neutral	count	82		5	87
	% within Role8	94.3		5.7	100
Satisfied	count	55	46	1	102
	% within Role8	53.9	45.1	1.0	100
Total	count	223	46	32	301
	% within Role8	74.1	15.3	10.6	100

$X^2 = 127.798^a$ (.000)

Table A6.9: Chi-square test for perception to the role of training other AEWs

		Groups of population			
Role9 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	94		22	116
	% within Role9	81.0		19.0	100
Neutral	count	118	4	5	127
	% within Role9	92.9	3.1	3.9	100
Satisfied	count	11	42	5	58
	% within Role9	19.0	72.4	8.6	100
Total	count	223	46	32	301
	% within Role9	74.1	15.3	10.6	100

$X^2 = 197.607^a$ (.000)

Table A6.10: Chi-square test for perception to the role of producing a brochure

		Groups of population			
Role10 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	149	30	4	183
	% within Role10	81.4	16.4	2.2	100
Neutral	count	73	14	5	92
	% within Role10	79.3	15.2	5.4	100
Satisfied	count	1	2	23	26
	% within Role10	3.8	7.7	88.5	100
Total	count	223	46	32	301
	% within Role10	74.1	15.3	10.6	100

$X^2 = 182.874^a$ (.000)

Table A6.11: Chi-square test for perception to the role of running field schools

		Groups of population			
Role11 * Population		Farmer	AEWs	Government	Total
Dissatisfied	count	156	36	23	215
	% within Role11	72.6	16.7	10.7	100
Neutral	count	66	10	5	81
	% within Role11	81.5	12.3	6.2	100
Satisfied	count	1		4	5
	% within Role11	20.0		80.0	100
Total	count	223	46	32	301
	% within Role11	74.1	15.3	10.6	100

$X^2 = 28.309^a$ (.000)

Table A6.12: Chi-square test for perception to the role of delivering government project

Role12 * Population		Groups of population			
		Farmer	AEWs	Government	Total
Dissatisfied	count	156	36	23	215
	% within Role12	72.6	16.7	10.7	100
Neutral	count	66	10	5	81
	% within Role12	81.5	12.3	6.2	100
Satisfied	count	1		4	5
	% within Role12	20.0		80.0	100
Total	count	223	46	32	301
	% within Role12	74.1	15.3	10.6	100

$X^2 = 28.309^a$ (.000)

Appendix 7: Summary of Chi-square tests about the quality of extension services by villages

Table A7.1: Farmers perception to the quality of extension service based on deliver program on time

		Village						
Serqua1		Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	9	8	10	19	18	25	89
	% within serqua1	10.1	9	11.2	21.3	20.2	28.1	100
Neutral	count	15	11	19	16	20	3	84
	% within serqua1	17.9	13.1	22.6	19	23.8	3.6	100
Satisfied	count	10	21	11	5	3		50
	% within serqua1	20	42	22	10	6		100
Total	count	34	40	40	40	41	28	223
	% within serqua1	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 64.434^a$ (.000)

Table A7.2: Farmers perception to the quality of extension service based on bringing the program as promised

		Village						
Serqua2		Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	15	9	28	28	39	22	141
	% within serqua2	10.6	6.4	19.9	19.9	27.7	15.6	100
Neutral	count	9	7	12	12	1	6	47
	% within serqua2	19.1	14.9	25.5	25.5	2.1	12.8	100
Satisfied	count	10	24			1		35
	% within serqua2	28.6	68.6			2.9		100
Total	count	34	40	40	40	41	28	223
	% within serqua2	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^3 = 106.813^a$ (.000)

Table A7.3: Farmers perception to the quality of extension service based on AEWs being willing to help

		Village						
Serqua3		Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	14	4	14	16	9	17	74
	% within serqua3	18.9	5.4	18.9	21.6	12.2	23.0	100
Neutral	count	17	5	20	10	11	11	74
	% within serqua3	23.0	6.8	27.0	13.5	14.9	14.9	100
Satisfied	count	3	31	6	14	21		75
	% within serqua3	4.0	41.3	8.0	18.7	28.0		100
Total	count	34	40	40	40	41	28	223
	% within serqua3	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 75.219^a$ (.000)

Table A7.4: Farmers perception to the quality of extension service based on instilling confidence

Serqua4		Village						
		Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	19		13	16	13	17	85
	% within serqua4	22.4	8.2	15.3	18.8	15.3	20.0	100
Neutral	count	14	7	14	12	10	11	68
	% within serqua4	20.6	10.3	20.6	17.6	14.7	16.2	100
Satisfied	count	1	26	13	12	18		70
	% within serqua4	1.4	37.1	18.6	17.1	25.7		100
Total	count	34	40	40	40	41	28	223
	% within serqua4	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 50.840^a$ (.000)

Table A7.5: Farmers perception to the quality of extension service based on AEWs being constantly polite

Serqua5		Village						
		Nusa	Oebesak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	10	3	8	14	3	15	53
	% within serqua5	18.9	5.7	15.1	26.4	5.7	28.3	100
Neutral	count	17	1	23	10	15	13	79
	% within serqua5	21.5	1.3	29.1	12.7	19.0	16.5	100
Satisfied	count	7	36	9	16	23		91
	% within serqua5	7.7	39.6	9.9	17.6	25.3		100
Total	count	34	40	40	40	41	28	223
	% within serqua5	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 88.580^a$ (.000)

Table A7.6: Farmers perception to the quality of extension service based on having knowledge to answer questions

Serqua6		Village						
		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	5	10	24	17	4	15	75
	% within serqua6	6.7	13.3	32.0	22.7	5.3	20.0	100
Neutral	count	29	9	16	14	11	13	92
	% within serqua6	31.5	9.8	17.4	15.2	12.0	14.1	100
Satisfied	count		20		9	26		55
	% within serqua6		36.4		16.4	47.3		100
Total	count	34	39	40	40	41	28	222
	% within serqua6	15.3	17.6	18.0	18.0	18.5	12.6	100

$X^2 = 106.492^a$ (000)

Table A7.7: Farmers perception to the quality of extension service based on being able to contacted

Serqua7		Village						
		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	17	16	10	26	14	20	103
	% within serqua7	16.5	15.5	9.7	25.2	13.6	19.4	100
Neutral	count	13	7	23	13	25	8	89
	% within serqua7	14.6	7.9	25.8	14.6	28.1	9.0	100
Satisfied	count	4	17	7	1	2		31
	% within serqua7	12.9	54.7	22.6	3.2	6.5		100
Total	count	34	40	40	40	41	28	223
	% within serqua7	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 60.762^a$ (.000)

Table A7.8: Farmers perception to the quality of extension service based on having farmers best interest at heart

Serqua8		Village						
		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	21	13	12	16	12	16	90
	% within serqua8	23.3	14.4	13.3	17.8	13.3	17.8	100
Neutral	count	9	6	17	12	28	12	84
	% within serqua8	10.7	7.1	20.2	14.3	33.3	14.3	100
Satisfied	count	4	21	11	12	1		49
	% within serqua8	8.2	42.9	22.4	24.5	2.0		100
Total	count	34	40	40	40	41	28	223
	% within serqua8	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 60.188^a$ (.000)

Table A7.9: Farmers perception to the quality of extension service based on understanding farmers' specific needs

Serqua9		Village						
		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	13	15	15	23	14	16	96
	% within serqua9	13.5	15.6	15.6	24.0	14.6	16.7	100
Neutral	count	17	2	16	17	26	12	90
	% within serqua9	18.9	2.2	17.8	18.9	28.9	13.3	100
Satisfied	count	4	23	9		1		37
	% within serqua9	10.8	62.2	24.3		2.7		100
Total	count	34	40	40	40	41	28	223
	% within serqua9	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 81.302^a$ (.000)

Table A7.10: Farmers perception to the quality of extension service based on providing sufficient information

Serqua10		Village						
		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	11	15	11	17	12	19	85
	% within serqua10	12.9	17.6	12.9	20.0	14.1	22.4	100
Neutral	count	21	5	15	18	26	9	94
	% within serqua10	22.3	5.3	16.0	19.1	27.7	9.6	100
Satisfied	count	2	20	14	5	3		44
	% within serqua10	4.5	45.5	31.8	11.4	6.8		100
Total	count	34	40	40	40	41	28	223
	% within serqua10	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 62.208^a$ (.000)

Table A7.11: Farmers perception to the quality of extension service based on providing relevant information

		Village						
Serqua11		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	6	10	18	19	24	20	97
	% within serqua11	6.2	10.3	18.6	19.6	24.7	20.6	100
Neutral	count	28	9	17	18	17	8	97
	% within serqua11	28.9	9.3	17.5	18.6	17.5	8.2	100
Satisfied	count		21	5	3			29
	% within serqua11		72.4	17.2	10.3			100
Total	count	34	40	40	40	41	28	223
	% within serqua11	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 95.365^a$ (.000)

Table A7.12: Farmers perception to the quality of extension service based on helping farmers to find cause of problems

		Village						
Serqua12		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	8	10	16	20	21	18	93
	% within serqua12	8.6	10.8	17.2	21.5	22.6	19.4	100
Neutral	count	26	10	19	12	20	10	97
	% within serqua12	26.8	10.3	19.6	12.4	20.6	10.3	100
Satisfied	count		20	5	8			33
	% within serqua12		60.6	15.2	24.2			100
Total	count	34	40	40	40	41	28	223
	% within serqua12	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 74.103^a$ (.000)

Table A7.13: Farmers perception to the quality of extension service based on helping farmers to solve problems

		Village						
Serqua13		Nusa	Oebeasak	Netpala	Oesao	Noelbaki	Sumlili	Total
Dissatisfied	count	18	16	16	22	19	20	111
	% within serqua13	16.2	14.4	14.4	19.8	17.1	18.0	100
Neutral	count	16	6	23	10	22	8	85
	% within serqua13	18.8	7.1	27.1	11.8	25.9	9.4	100
Satisfied	count		18	1	8			27
	% within serqua13		66.7	3.7	29.6			100
Total	count	34	40	40	40	41	28	223
	% within serqua13	15.2	17.9	17.9	17.9	18.4	12.6	100

$X^2 = 73.216^a$ (.000

Appendix 8: Summary of Chi-square tests of AEWs perception to the roles they received by level of education

Table A8.1: Chi-square test for AEWs perception to the role of increasing farmers' skills and knowledge

		Education			
Role1 * Education		SHS	Diploma	Bachelor	Total
Neutral	count	3			3
	% within Role1	100			100
Satisfied	count	29	10	4	43
	% within Role1	67.4	23.3	9.3	100
Total	count	32	10	4	46
	% within Role1	69.6	21.7	8.7	100

$X^2 = 1.404^a$ (.496)

Table A8.2: Chi-square test for AEWs perception to the role of conducting plot demonstration

		Education			
Role2 * Education		SHS	Diploma	Bachelor	Total
Neutral	count		1		1
	% within Role2		100		100
Satisfied	count	32	9	4	45
	% within Role2	71.1	20.0	8.9	100
Total	count	32	10	4	46
	% within Role2	69.6	21.7	8.7	100

$X^2 = 3.680^a$ (.159)

Table A8.3: Chi-square test for AEWs perception to the role of encouraging farmers' participation in extension service

		Education			
Role3 * Education		SHS	Diploma	Bachelor	Total
Neutral	count	2			2
	% within Role3	100			100
Satisfied	count	30	10	4	44
	% within Role3	66.2	22.7	9.1	100
Total	count	32	10	4	46
	% within Role3	69.6	21.7	8.7	100

$X^2 = .915^a$ (.633)

Table A8.4: Chi-square test for AEWs perception to the role of program planning

		Education			
Role4 * Education		SHS	Diploma	Bachelor	Total
Dissatisfied	count	1			1
	% within Role4	100			100
Neutral	count	8	3	2	13
	% within Role4	61.5	23.1	15.4	100
Satisfied	count	23	7	2	32
	% within Role4	71.9	21.9	6.3	100
Total	count	32	10	4	46
	% within Role4	69.6	21.7	8.7	100

$X^2 = 1.482^a$ (.830)

Table A8.5: Chi-square test for AEWs perception to the role of inputs delivery

		Education			
Role5 * Education		SHS	Diploma	Bachelor	Total
Dissatisfied	count	4	5	2	11
	% within Role5	36.4	45.5	18.2	100
Neutral	count	22	3	1	26
	% within Role5	84.6	11.5	3.8	100
Satisfied	count	6	2	1	9
	% within Role5	66.7	22.2	11.1	100
Total	count	32	10	4	46
	% within Role5	69.6	21.7	8.7	100

$X^2 = 8.594^a$ (.072)

Table A8.6: Chi-square test for AEWs perception to the role of monitoring and evaluation

		Education			
Role6 * Education		SHS	Diploma	Bachelor	Total
Neutral	count	1	1		2
	% within Role6	50.0	50.0		100
Satisfied	count	31	9	4	44
	% within Role6	70.5	20.5	9.1	100
Total	count	32	10	4	46
	% within Role6	69.9	21.7	8.7	100

$X^2 = 1.065^a$ (.587)

Table A8.7: Chi-square test for AEWs perception to the role of help farmers to find cause the problems

		Education			
Role7 * Education		SHS	Diploma	Bachelor	Total
Dissatisfied	count	1			1
	% within Role7	100			100
Neutral	count	2			2
	% within Role7	100			100
Satisfied	count	29	10	4	43
	% within Role7	67.4	23.3	9.3	100
Total	count	32	10	4	46
	% within Role7	69.6	21.7	8.7	100

$X^2 = 1.404^a$ (.843)

No statistics are computed for role of help farmers to solve the problems (roles 8) because role 8 is a constant.

Table A8.9: Chi-square test for AEWs perception to the role of training others AEWs

		Education			
Role9 * Education		SHS	Diploma	Bachelor	Total
Neutral	count	3		1	4
	% within Role9	75.0		25.0	100
Satisfied	count	29	10	3	42
	% within Role9	69.0	23.8	7.1	100
Total	count	32	10	4	46
	% within Role9	69.9	21.7	8.7	100

$X^2 = 2.310^a$ (.315)

Table A8.10: Chi-square test for AEWs perception to the role of producing a brochure

		Education			
Role10 * Education		SHS	Diploma	Bachelor	Total
Dissatisfied	count	21	5	4	30
	% within Role10	70.0	16.7	13.3	100
Neutral	count	10	4		14
	% within Role10	71.4	28.6		100
Satisfied	count	1	1		2
	% within Role10	50.0	50.0		100
Total	count	32	10	4	46
	% within Role10	69.6	21.7	8.7	100

$X^2 = 3.642^a$ (.457)

Table A8.11: Chi-square test for AEWs perception to the role of running field schools

		Education			
Role11 * Education		SHS	Diploma	Bachelor	Total
Neutral	count	25	8	3	36
	% within Role11	69.4	22.2	8.3	100
Satisfied	count	7	2	1	10
	% within Role11	70.0	20.0	10.0	100
Total	count	32	10	4	46
	% within Role11	69.6	21.7	8.7	100

$X^2 = .043^a$ (.979)

Table A8.12: Chi-square test for AEWs perception to the role of delivering government project

		Education			
Role12 * Education		SHS	Diploma	Bachelor	Total
Dissatisfied	count	19	4	3	26
	% within Role12	73.1	15.4	11.5	100
Neutral	count	9	3	1	13
	% within Role12	69.2	23.1	7.7	100
Satisfied	count	4	3		7
	% within Role12	57.1	42.9		100
Total	count	32	10	4	46
	% within Role12	69.6	21.7	8.7	100

$X^2 = 2.997^a$ (.558)