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Fresh produce supply chain management: overview of the proceedings and policy recommendations

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Introduction

In seeking to address the growing income disparity between smallholder farmers and the urban community, development agencies worldwide are giving increasing attention to the concepts of supply chain management.

Fundamentally, supply chain management is a process that seeks to integrate supply and demand through coordinating the activities of many independent actors in the procurement, production and distribution of food products. First and foremost, it requires producers, either directly or indirectly, to deliver to consumers the food that fulfils their expectations. But herein lies the first major obstacle: do producers know what consumers want? In most instances, smallholder farmers do not transact directly with the ultimate buyer; rather, they sell their produce to a downstream market intermediary who is just one of many in a long and complex process of exchange. While advances in communication technology now enable most smallholder farmers readily to access price information, of far greater concern is their limited market horizon. Most smallholder farmers are completely unaware of how globalization is impacting upon their livelihood and how, with increasing wealth, consumer preferences are changing.

Perhaps the greatest and most significant impact is that associated with the emergence of the global retailers and fast food franchises who demand consistent quality, reliable delivery and an internationally competitive price. Herein lies the second major obstacle: how can smallholder farmers coordinate their activities to meet the needs of the institutional market? This is a far more complex problem because it requires a more holistic approach. While most development agencies would agree that quality begins on the farm and indeed, most intervention strategies have largely focused on increasing productivity and reducing losses through improved post-harvest handling, without access to good quality seed, technology and credit to purchase the inputs, smallholder farmers are unable to respond. Even then, assuming that significant improvements can be made to enhance product quality on the farm, smallholder farmers are unlikely to benefit until such time as they are able to deliver the product reliably and consistently to the buyers' specifications. By necessity, this either requires farmers to form collaborative marketing groups or for downstream marketing intermediaries to exert

control through contract farming. Either way, it becomes mandatory to standardize production systems and to implement quality standards. Herein arises the third major constraint: how is it possible to introduce and to implement quality assurance systems for smallholder farmers?

In the papers that follow, each of these three themes is explored in more detail.

Market analyses

For over six decades, business management decisions have been driven by the marketing concept. Stated simplistically, the marketing concept suggests that the principal function of the firm is to satisfy its consumers' needs while making a profit. This assumes two things: (1) consumers have a choice (there are alternative offers) and (2) consumers have the propensity to pay (there is no point bringing products to market that consumers cannot afford to buy). Extending the marketing concept a little further, it soon becomes evident that not all consumers are the same: the food a consumer chooses to eat is determined by the interaction of geographic, demographic, socio-economic, psychographic and behavioural variables. Hughes discusses the importance of segmenting the market and of making different offers to different groups of consumers. As personal disposable income increases, consumers' demands increase. Not only do consumers require more convenient food and better quality food, but the whole concept of quality is enlarged to consider such issues as sustainable production, conservation, animal welfare, workers' welfare and food safety. While there is an implicit assumption that food is safe to eat, consumers' perceptions are influenced by the country-of-origin effect. Moreover, largely driven by dissatisfaction with existing product offers and increasing concerns about global warming, there is a steady shift towards local produce which not only looks good but also tastes good. Loeillet discusses the case of the extra sweet MV2 pineapple which is now favoured in Europe. Its success in the market however, was due not only to its superior taste and product attributes, but the implementation of supply chain management principles and strong merchandizing.

The marketing concept traditionally discusses the four Ps: product, price, promotion and place, and the interactions which occur between these variables. In today's market, product form is becoming increasingly important, as consumers look for greater convenience and eat more of their food on the run and away from home. Products such as pineapple, mangoes and orange are seldom available in a form which facilitates immediate consumption. Furthermore, fresh fruit does not always deliver what it promises: apples and bananas might look good, but inside the fruit is bruised or discoloured, too sour, too sweet, too soft, too hard. Product inconsistency and inconvenience is resulting in lost sales, and worldwide, despite the nutritional benefits widely associated with fresh fruit and vegetable consumption, sales are declining.

George, Broadley and Nissen discuss the need for market promotion as an integral component of a strategic approach towards enhancing competitive advantage. Promotion has the potential not only to increase demand in both domestic and export markets, but to differentiate the product in the market and thereby reduce its susceptibility to price competition. Other related strategies include the establishment of global marketing companies and collaborating with competitors to form closed loop

marketing systems that exploit the seasonality of supply. More fundamental however, is the need to identify and to develop those crops in which producers have a competitive advantage.

Nainwal and Singh continue to explore this theme in their examination of the litchi industry in India. Even although India may be the world's second largest producer of litchi and growers have much experience with the crop, yields are low. Poor productivity is a direct result of issues associated with land tenure and the selection of inappropriate planting material. Farmers are unwilling to sacrifice production in the short term in order to replace or to rework trees with superior planting material. Furthermore, the necessary post-harvest infrastructure and transportation are not available to move the fruit from the main producing area to the international airport.

In a similar vein, Sudha and Kruijssen investigate the competitiveness of the processed mango industry in South India, citing the lack of appropriate processing facilities as the most significant constraint. In the majority of cases, village level processing plants are too small to have any sustainable market presence and with insufficient capital, they do not have access to the appropriate equipment. Inconsistent demand, the lack of price transparency and information sharing in the market, the lack of trust among the actors, difficult and cumbersome taxation policies are additional constraints.

In a subsequent paper, Nissen *et al.* identify the impediments impacting upon supply chains in Thailand, the Lao People's Democratic Republic and Viet Nam. Due to poor transport and infrastructure, fresh produce supply chains are much longer and include many more participants, significantly constraining the ability of the supply chain to convey accurate information or to return optimum prices to producers. To meet changing customers' demands, farmers need to improve fruit quality. Not only is it essential to match the varieties farmers are growing to the environment and to their customers' requirements, but more appropriate cultivation and marketing practices are necessary to improve and maintain fruit quality. However, as quality improvements often come at significant cost, it will only be sustainable if the market is willing to pay a higher price. Given that prices are ultimately determined by supply and demand, rewarding growers through higher prices can prove problematic.

Kuntarsih *et al.* describe how it is necessary, if growers are to be rewarded for producing superior quality, to develop parallel supply chains. Using bananas as an example, they compare and contrast the traditional marketing system with the improved marketing system. Through improved communication, growers were better able to meet the needs of downstream market intermediaries. Increased returns come about through superior market knowledge, reduced wastage and improved productivity per unit area. Fundamental to their success however, was the establishment of a grower cooperative which sorted, deheaded, washed, dried and packed the bananas. Collectively, growers have started to implement Good Agricultural Practices (GAP) in the field and Standard Operational Procedures (SOP) in the packing shed. The cooperative provides the farmers with a superior bargaining position which enables them to negotiate a better price and the capacity to borrow the funds to pay the farmers with cash on delivery.

In Sri Lanka, Abeysekera and Abeysekera focus on how the alternative supply chain management practices adopted by leading supermarkets have impacted on the performance of existing supply chains. The most significant change has been the emergence of a more dynamic marketing system that is more responsive to consumer needs. At the producer level, supply chain modernization has facilitated the introduction of contract farming and forward purchase mechanisms. However, for efficiency reasons, contract growing appears to favour a smaller number of larger producers who are more capable of supplying the necessary quantities and quality. Potentially this excludes the smaller scale farmers from participating in the supermarket supply chain. At the consumer level, supply chain modernization has resulted in more competitive prices, a wider choice of varieties, improved product quality and presentation.

Punjabi and Sardana report a similar situation in India. Different models for coordinating supply chains are emerging from both the public and the private sector. Irrespective of the driving force, developing supply chains requires a lot of effort to develop linkages with farmers, especially in gaining their trust and motivating them to work. Although developing farmer linkages is easier for those firms that have been involved with farmers over time, usually through input supply or some other means, problems invariably emerge at harvest. “Pole vaulting” is a term frequently used to describe how farmers often sell their produce to a buyer, but not to the buyer who has been assisting the farmer to grow the produce. The motivation for such behaviour is purely economic; the other buyer offers a higher price on the day. Another important issue is the need to dispose of that proportion of the crop that does not meet the buyers’ specifications while still making some profit. Finally, if quality is to be retained, there is the need to invest in post-harvest infrastructure, not only at the farm level, but at the wholesale and the retail level. Invariably, this will be accompanied by a parallel demand for actors in the supply chain to implement a quality assurance system.

Supply chain management

It is widely recognized that if smallholder farmers are to participate in the institutional market there is a need for them to form collaborative marketing groups. Irrespective of whether the catalyst for the formation of the group comes from the farmers themselves (in most instances, one or two farmer-leaders), a non-governmental organization (NGO) or a market intermediary, for the group to succeed, it must offer the farmers something more than what they would ordinarily receive from their existing market intermediaries. For the majority of farmers, their primary motivation is price, but the benefits may also extend to more cost-effective inputs, access to technology, access to capital and a range of other benefits. However, market intermediaries are in business to make money, and thus if farmers are to receive higher prices, they must deliver superior value to their customers. Furthermore, there must be an element of trust, not only within the group, but also between the group and the other actors with whom the group transacts.

In analysing vegetable supply chains in Viet Nam, Cadilhon *et al.* discuss the importance of trust in facilitating the exchange. When exchange parties trust one another, information is more freely exchanged. Greater transparency on prices, activities and market information not only facilitates the joint resolution of conflict, but it leads to greater satisfaction and increased profits for both farmers and market intermediaries.

This in turn leads to a long-term commitment from both parties to the transaction. When both parties are committed to the exchange, both parties believe in and accept the stated goals of the relationship. Both firms show a willingness to exert effort on behalf of each other and express a strong desire to maintain the relationship. Commitment facilitates cooperation, which enables the partners to react better to market information, customers, competitors and external environmental forces. The willingness to cooperate and adapt leads to innovation which is the key determinant of a successful long-term relationship.

Keizer explores the nature of the long-term relationships in the sweet potato supply chain in Bataan, the Philippines, to reveal likewise that trust and cooperation facilitate interaction at all levels in the chain. Despite the imbalance of power that exists between producers and market intermediaries, there is a strong interdependency. The producer depends on the trader to market his or her produce while the trader depends on the producer for a regular supply of produce to secure his or her income. Besides this, traders play a vital role in providing the capital and the inputs which producers need to grow the crop. In turn, the producer is obliged to sell his or her produce to the trader after harvest. Not unexpectedly, producers who were tied to a specific trader through credit or input loans had little capacity to negotiate price and often received prices that were somewhat lower than the prevailing market price. Furthermore, traders reportedly paid higher prices to larger producers than smaller producers, presumably because of lower transaction costs. Due to the lack of transparency in market prices, producers often suspected the traders of acting opportunistically, but an examination of the price margins revealed that for most of the time, traders were offering fair and realistic farmgate prices. Trust and respect was also evident in transactions between market intermediaries. In Tagalog, the indigenous language, when one person has traded with another for many years, the bond that develops between the two is described as *suki*. This means that a person will always do a large part of their business with the same trader. Even when prices are higher somewhere else, the person is obliged to do business with this trader, wholesaler or retailer.

Staying in the Philippines, Baniqued describes how the apparent distortion of prices by traders and market intermediaries provided the motivation to develop an alternative route to market. In order to fulfil the growing demand for fresh produce from the fast food industry, growers were encouraged to enter into long-term contracts with a food processor at predetermined prices. However, when prices in the wholesale market exceeded the contract prices, growers reneged on the contract, thereby disrupting the capacity of the processor to meet its supply commitments. Forced to import in order to retain the contract, the processor embarked upon an ambitious plan to train the farmers and to build capacity through: (1) improving the efficiency of their farming practice; (2) developing a sense of business so that farmers could appreciate risk, opportunities and threats; (3) ensuring that the growers' income reflected all the costs of production, social costs and environmental costs; and (4) nurturing social values. Where all parties share similar values, conflict is more easily resolved and individuals learn to value their work and their contribution more highly, thereby improving their capacity to learn.

Driven by a similar desire to improve individual self worth, Serhalawan introduces the Bali Fresh Women Farmers' Partnership. Bali Fresh is a partnership between a group of poor women farmers, a supply company and a marketing company to produce, process,

pack and distribute high-quality fresh vegetables to the institutional market. In a win-win situation, each of the partners needs something: (1) the women need money to invest, technical knowledge and a reliable market for their produce; (2) the supply company needs a market for its seeds, fertilizers, irrigation equipment and greenhouses; and (3) the marketing company needs a reliable supply of quality fresh produce all year round. The key success factors include; (1) sustainability; (2) honesty and integrity; (3) community development; and (4) a revolving fund, whereby credit is extended to group members in the expectation that it will be repaid and subsequently reinvested.

Although it is not discussed as such, the common theme that underpins much of the success for each of the groups discussed thus far is leadership. Leadership should not be confused with power: leaders are able to influence people without needing to resort to power. Leaders establish direction, they align staff, they motivate and they inspire.

Wiboonpongse, Sriboonchitta and Kuntonthong discuss how a farm housewives' group called Chedi Mae Kreow (CMK) was established to make use of poor quality potatoes. CMK turned produce previously sold as animal feed (at bath 1–2 per kilogram) into potato chips and snacks worth baht 2–5 per kilogram. To avoid competition with the multinational food processing companies, CMK supplies mostly to schools and local retail shops. While the key success factors were described as the ability of the group to manage the business and product development, the pivotal role of the group leader (and her husband) was highlighted. Through the group leader's social and business networks, it was possible to access support from government agencies who provided technical advice on processing, product development and marketing, and financial support, mostly in terms of production equipment and a packaging machine.

In Ecuador, Blumthal and Gow describe how a key entrepreneur with a passion for agriculture was able to identify and capture an alternative market for long-stemmed roses in the American market. The role of the entrepreneur was the critical success factor, for he provided the market and saw the opportunity when others could not. Furthermore, he possessed the social capital and willingness to bear the burden of risk associated with the development of the alternative distribution channel.

In a second parallel paper, Blumthal and Gow discuss how the employment of a well known and respected farmer was critical in securing other farmers' willingness to engage in contract farming. With little experience in producing cut flowers, let alone producing for an export market, farmers were initially reluctant to participate.

In a similar manner, Dagupen discusses how under the leadership of the founding president, the Valley Cut Flower Growers' Association has established its own enabling mechanisms like regular meetings for production planning, information and technology sharing, problem solving and coordination to meet the needs of their downstream customers. The association members sell their flowers directly to flower shops in Metro Manila, bypassing the traditional wholesale market.

In the case of Normin Veggies, Concepcion, Digal and Uy describe how leadership is provided by each of the farmers who lead the various clusters. A cluster is an informal group of five to ten small-scale farmers and independent growers who commit to pursue

a common marketing plan for a particular product (or set of products) for an identified market. Designated lead farmers act as quality managers and coaches to assist the smallholder farmers in the production and marketing of quality vegetables. Through the clustering strategy, the core values of interdependence, responsibility, commitment and trust are emphasized among all the producers. It is understood that when a farmer is taken into a cluster, he or she is under a strong obligation to work with the group. Failure to meet this expectation can result in the grower being expelled from the cluster.

However, leaders are also people who have the propensity to lead because others accept that by the position they hold or their role in the supply chain, they have a legitimate right to control.

Poonpiriyasup describes how the CP Group, through its vast retail network, is able to engage smallholder farmers in its “Complete Package” programme. CP provides the market and the technology. Participating farmers benefit from a reduction in cost, less risk, increased productivity and a higher net income, providing that they adhere to the production protocols and meet the prerequisite quality standards. To ensure the product is safe, not only for the consumer, but also for the environment and the farmers themselves, produce must be cultivated following GAP.

In order to supply supermarkets in the United Kingdom, Heather describes how preferred suppliers must comply with an increasing number of technical specifications including GLOBALGAP, SEDEX, LEAF and Fairtrade. To ensure fresh produce is available in-store, 365 days of the year, supply programmes are established twelve months in advance, outlining from where and how the product will be purchased, the product offer quality, the seasonality of supply, packaging requirements and price. Specifying which varieties are acceptable is a large part of the business to minimize wastage and to ensure that consumers are satisfied with the eating quality of the fruit. To control costs and improve the uniformity of the product received from the various suppliers in more than twenty countries, regular workshops are conducted to share thoughts and ideas. An integral part of this activity is the identification and development of new products (varieties) to offer to consumers.

In Perth, Western Australia, Mercer describes how successful wholesaling requires a good balance between small-scale and large-scale suppliers and a diverse mix of customers to provide the best marketing option for each grower’s fruit. As the supply base continues to consolidate, alliances must be built with large national supply organizations while at the same time, relationships must be maintained with small, high-quality producers. Servicing the supermarkets requires a high level of quality assurance, supply planning, logistics and business management whereas servicing the independent stores requires attention to detail and developing good personal relationships. Not unexpectedly, as the trend towards more direct sales gathers momentum, the role of the wholesaler is under threat. The ability to stay in business is very much dependent on securing the best outlet for the growers’ fruit and being able to add value for the buyers through offering a diverse range of produce, prepacking, quality assurance and in-store product support and promotion. Technologies like refractometers and digital cameras enable market agents to address any quality problems immediately with the growers, thereby greatly facilitating trust. As wholesalers have the best knowledge of what is

happening in the market, they are in the best position to advise growers when to bring their fruit to market, when to pack it and how to pack it.

The market is constantly changing as consumers' needs change and new products and new suppliers enter the market. To remain competitive, producers must be able to respond. At the demand level, producers can introduce new varieties which deliver superior quality attributes or adopt new processes which greatly enhance the shelf life of the product and make it more convenient to use. At the supply level, innovations can be introduced to reduce the costs of production or reduce the amount of product wastage. In an increasingly uncertain environment, Yawson and Aguiar discuss the concept of agility as a mechanism for firms continuously to re-examine how they compete. Agility requires organizations to be flexible and cost efficient. How quickly an organization is able to respond to changes in its social or legal environment, its business network, its competitive environment, its customer needs, technology and indeed how quickly it can adjust to internal changes is a measure of its agility.

In the Philippines, Concepcion and Digal describe how a number of alternative supply chains are emerging in response to the emergence of the institutional market. Invariably, these alternative supply chains coexist with the traditional marketing system, providing producers who are either unable or unwilling to change with an outlet for the produce they have cultivated. However, each of the chains differs in the extent to which producers may actively participate. In the market specialist chain, the product specialist chain and the food processor chain, the farmers' relationship with the buyer remains essentially the same as in the traditional marketing system. In the development agency-assisted chain, small farmers are empowered to learn and to make their own production and marketing decisions. In the producer-managed chain, the farmers participate in making decisions on price, volume and quality, for each of the institutional markets they supply.

Hughes and Cadilhon provide a detailed analysis of KG Fruits Ltd, a cooperative of 80 berry farmers in the United Kingdom who collectively hold a 45 percent share of the British market and supply all the major retailers. From their humble beginning over three decades ago, much of their success is attributed to the recognition by the seven founding members that they were the most able to produce the fruit, but a third party marketing company could market their fruit more efficiently. Moreover, in order to lower the costs of production and marketing, the growers collectively pooled their input requirements. Very early in the evolution of the business, the lack of trust was identified as the biggest risk constraining the overall business. To overcome some of the growers' concerns, the cooperative does not pool fruit: each member's fruit is sold to a specific buyer and the grower receives the price that the sales team were able to extract from that buyer. Growers pack their own fruit and are charged a commission on fruit sold by KG Fruits, the level of commission reflecting the size of sale (i.e. lower commission rates for larger orders). Size is also important to ensure that the cooperative has some countervailing power and to generate sufficient funds to invest in the future competitiveness of the cooperative. The cooperative is governed by a Board of Directors which oversees the commercial business of the cooperative and meets monthly. Membership is not open and new growers must apply and be approved by the Board. As the cooperative has expanded, the one-member-one-vote rule has been

amended to allow larger-scale growers to have a proportionately greater say and ownership in the company. However, the maximum ownership that any one grower may hold has been capped at ten percent. Rather than pass all the profits back to the growers, a proportion of the profits is retained for reinvestment. Should a grower elect to leave the cooperative, the contributions that he or she has made to this account can be withdrawn, thus also providing some capital growth based on patronage. More recently, the cooperative has developed close relationships with two strategic partners, providing the cooperative with an increased presence in the market when their own fruit is not available and exclusive access to some of the world's best planting material.

Quality management

Invariably, when market researchers ask consumers to describe the criteria they most often use in their decision to purchase fresh fruit and vegetables, the two most frequently cited responses are good quality and low prices. While it is also abundantly clear that consumers purposefully make some value judgement, trading one off against the other, the concept of quality often remains elusive. Furthermore, quality means different things to different people. Batt conceptualizes quality at five levels. At its most basic level, quality captures the consumers' requirement for food that is nutritious, safe to eat and true to description. Intrinsic quality considers the physical attributes of the product. Extrinsic quality considers the value that the brand, the package, the place of purchase and the price add to the product. As attributes such as taste, texture and flavour can only be ascertained after purchase, such are described as the experiential quality attributes. The credence attributes are those that consider how the food was produced. With rising income, consumers' concern for the environment, sustainable production, workers' welfare and animal welfare become more influential in their decision to purchase.

In the United Kingdom, Baines and Davies discuss how consumer preferences, concerns, fears, politics and beliefs are presenting new food marketing opportunities based on the nature of food production systems. Ethical consumerism may be only a relatively small sector of mainstream retailing, but in Europe, it is becoming an increasingly important driver of consumer choice. As most of these credence attributes relate to the production and processing environment, they are difficult to verify at the point of sale. Consequently, these credence attributes are embedded in trust, confidence and ethical traceability both in the product and the supply system. Trust is reinforced through the development of standards that objectively address the issues of ethical supply: organics, animal and worker welfare, wildlife and biodiversity, geographic indicators and religious beliefs. From this set of standards, an audit protocol must be developed and a mechanism for inspection and certification developed. Such audit protocols must have the capacity to withdraw certification from individuals who breach these standards and only certified food producers should be permitted to use the brands or trademarks which identify the product in the market.

If the chain between producers and consumers is short and local, then trust can be built up through personal relationships. However, the majority of food producers do not sell directly to the consumer, but distribute their product through some market intermediary. In business-to-business markets, the concept of quality is very different: product is

purchased with the intention of either incorporating it in the manufacture of some other product or with the expressed intention of reselling it. As a result, not only must the product conform to some predetermined standard (technical quality), but it must be available when the buyer wants it and in the quantity that the buyer requires (functional quality). Should the product fail to conform on either quality dimension, there will be significant implications for both upstream suppliers and downstream customers.

Botden and Terhürne describe the “Executive Flower Management” programme as a means of continuously monitoring the gap between actual performance and desired performance on key product and process performance indicators in flower supply chains. These key performance indicators are based on plant physiological and managerial standards. Early observation of unacceptable differences between actual and target performance can result in prompt and efficient managerial action which enables producers to serve final customers better.

However, performance will not improve if information is not adequately communicated and there is little if any reward in the form of higher prices for producers to deliver a superior quality product. Murray-Prior and Batt demonstrate how the failure of the current coffee marketing system to give the right price signals to growers in terms of different prices for different qualities of parchment is one of the major obstacles towards improving the quality of the coffee produced in Papua New Guinea. Traditionally, smallholder coffee farmers have transacted individually with roadside traders who offer one price to farmers based on the moisture content of the parchment and the proportion of physical defects and waste material. However, as many of the faults in coffee cannot be detected at the parchment stage, those farmers who adhere to prescribed processes for the production of parchment are unlikely to receive any price premium. Traders can only reward those growers who produce superior tasting coffee when they deal directly with the traders and they provide a sufficient quantity of parchment that makes it worthwhile to cup-taste the consignment prior to acceptance. Furthermore, cultural differences between smallholder farmers, the plantation operators and exporters contributes to the perception that lower prices are due to excessive profits in the processing–export sector rather than to any inherent problems with coffee quality.

Given that prices in the market are determined primarily by supply and demand, prices do not always reflect or reward growers for producing superior quality. More often than not, when fruit is in season, it is in peak condition and thus it offers consumers the best eating experience. However, as it is also the most plentiful, prices are correspondingly lower. Conversely, at either end of the season, while the quality is compromised, prices are at their peak. Sudden disruptions in supply, most often occasioned by climatic events (whether predicted such as typhoons or unexpected like heavy rain or hail storms), can also result in extraordinarily high prices being paid for very mediocre quality. Without a good understanding of the market dynamics, such variations make it very difficult to promote the benefits of improving quality to smallholder farmers.

While it is widely accepted that quality begins on the farm, Brown *et al.* demonstrate how the majority of mangoes harvested in the Philippines fail to meet the quality requirements of the domestic and export market. Typically, harvested fruit is of poor physical appearance with scab, insect damage, wind scars and latex burn emerging as

the major problems. While growers are very aware of the need to harvest the fruit when the turgor pressure is low, they are often constrained by the need to deliver fruit to the buying station. Fruit quality further deteriorates from the farm to major distribution centres due to overstacking, rough loading and unloading, and poor handling during final sorting at the warehouse. Anthracnose and stem end rot are important post-harvest diseases of mango, especially for fruit harvested during the rainy months of July to November. The fruit deteriorates very rapidly along the supply chain, especially when it begins to ripen. Effective preharvest pest management, careful post-harvest handling, the application of hot water treatment for disease control and improving logistics are among the potential measures to improve the quality of mangoes in the Philippines.

Looking now to the demand side, in penetrating the emerging institutional markets, one of the most significant constraints facing smallholder producers is the mandatory requirement for certified quality assurance systems. In order to protect themselves from the threat of legal litigation, most food manufacturers and retailers now require their suppliers to take all reasonable steps to ensure that the food they sell is safe: safe for the consumer, safe for the environment and safe for the workers. Pattanatorn and Sutton outline the quality requirements farmers must meet to supply supermarkets in Thailand. All suppliers are audited and approved against national and European Union standards, irrespective of the source. Furthermore, random spot checks are undertaken around two times per year to ensure the supplier conforms to the established standards. Traceability is imperative.

Oates discusses in some detail the problems associated with traceability in a transitional economy. At a very basic level, traceability enables the buyer to identify where the product has come from, when it was harvested and where it is going. However, an increasing number of buyers and an increasing number of markets require more detailed information on issues such as Fairtrade, organic and other credence attributes. In the transitional economies where farms are generally small and farmers are often linked to the market through collector agents and other intermediaries, traceability continues to be problematic. In most instances, while it is possible to trace back to the collector level, it is seldom possible to trace back to the individual farm and even more difficult to trace back to the input level. The quality of information, record keeping and the authentication of records are other areas that need to be addressed. Records are invariably kept on pieces of paper and in most cases, there is no formal record keeping system. As the consignment moves through the system, these little pieces of paper get lost and mixing of the produce from various growers invariably occurs to optimize transport costs and minimize handling. Furthermore, it is important to understand that traceability on its own does not assure the safety of a product. If traceability is to contribute towards producing a safer product, a robust quality management system must already be in place. As price incentives continue to be the principal factor encouraging the adoption of quality management systems, such systems can only be supported when all members of the supply chain are committed.

Shepherd and Gálvez discuss the numerous constraints to the production of safe food in the transitional economies. In the wholesale market where traders buy from unknown producers, it is exceedingly difficult to trace the product back to its source. While some grading is carried out, usually on the basis of size, there is little quality differentiation as

traders are rarely able to buy anything other than “fair average quality” and thus most are unable to provide the necessary price incentives for farmers to improve quality. Most traditional marketing systems are not equipped to handle products of different qualities en route to the consumer and even if it were possible for traders to buy different qualities from farmers, there is often little quality differentiation by the time consumers make their purchase. At the farm level, farmers face problems with polluted water and other contamination. They have inadequate information about the dangers of bacterial infection and pesticide misuse and as most farmers are illiterate, they are forced to rely on the local pesticide retailer as their main source of information. Pesticide use is often encouraged by horticultural produce buyers because this leads to “attractive” fruit with no blemishes, but recommended practices are rarely followed. Produce is often harvested too soon after the last chemical application. In several countries, traders are constrained by the poor infrastructure of the markets in which they operate. Poor structural facilities are often compounded by inadequate management that results in haphazard operations and unsanitary facilities. Waste disposal arrangements are often poor and many post-harvest activities frequently take place on the bare earth.

While Ketelaar praises governments in Asia for having initiated programmes that promote good agricultural practices, in most parts of Asia, farmers continue to rely heavily on pesticides to produce their crops. While new options for pest control including biopesticides, the better use of parasitoids and natural enemies, and improved seed technology become more widely available, the utilization of these integrated crop management programmes is often constrained by the GAP programmes which are very biased towards pesticide application. In a similar vein, Vellema and Jansen describe how the standardization of crop production systems through the adoption of GAP may stifle innovation in the long term.

While the adoption of quality management systems in the food industry is primarily encouraged to assure food safety, quality management systems can also contribute to the profitability of the firm by reducing wastage, the costs of reworking or regrading produce that fails to meet specifications and reducing the costs of transacting with dissatisfied customers. However, the adoption of quality management systems may also provide the firm with an opportunity to differentiate its product in the market through pursuing organic or Fairtrade accreditation, or promoting the product under a protected geographic indication (GI).

The value being placed on environmentally and socially beneficial production systems generally supports the entry of smallholder farmers into the global market. However, much depends on the capacities and responsiveness of the farmer groups. Using a case study from Indonesia, Suarja discusses the various constraints that impacted upon the capacity of cashew growers in Flores to attain organic certification. While the farming systems practised by the farmers typically did not use chemical fertilizers or pesticides, the farmer groups had to be mobilized and trained. The formation of farmer groups was critical for the delivery of the associated training programmes, to spread the costs of inspection and certification and to improve the farmers’ bargaining position. Moreover, certificates were held by the groups, not by individual farmers. Each farmer group had their own administrative structures and rules, and each group was further divided into three or four subgroups based on geographic location or administrative boundaries.

From each of these subgroups, one or two members were chosen to be local inspectors. While each of the groups achieved the standards and were accredited as organic, without the prerequisite training on sorting, grading and processing, product quality declined. Without being able to meet the quality standards, farmers did not receive the anticipated price from the sale of organic cashew nuts. Furthermore, constant fluctuations in the price of nuts and a dramatic reduction in yield after a long dry season accentuated by pests and diseases caused farmers to become disillusioned.

In contrast, Uathaveekal describes how organic-certified quality was achieved through the implementation of contract farming rather than relying on loosely structured cooperative farmer groups. Given the small size of farms and the need to create buffer zones around each farm, individual farmers would not have sufficient land left to farm without entering into a collective contract farming agreement. Before commencing production, the proposed site was repeatedly checked to assess its soil conditions, the availability of water and to ascertain its past cropping history. Only then were the groups mobilized and training provided. Before providing any agronomic training, the groups were first taught how to manage themselves. The groups selected their own leaders and their own management committee. Managing the group dynamics was important, because it was the group that was certified, not the individual. Hence if anyone in the group failed, the whole group failed. To maintain quality, a number of agronomists were employed to provide continuous training and on-the-spot problem solving. Furthermore, in order to ensure that everything was done right according to the production protocols, regular internal audits were undertaken on a daily basis.

According to Vieira, Aguiar and Maia, Fairtrade is an example of a set of private voluntary standards that establishes a strong link between smallholder producers and consumers. Fairtrade certification not only helps producers from the transitional economies access international markets, but it enables them to gain better margins and to facilitate community development. Fairtrade attempts to overcome some of the market imbalances for smallholder farmers by creating specialist marketing channels and networks that operate in parallel to the existing trading system. Those engaged in Fairtrade have to follow the basic principles: (1) direct purchasing from farmers; (2) transparent and long-term trading relationships; (3) agreed minimum prices, and (4) a focus on development and technical assistance through the payment of an agreed social premium. Firms engaged in Fairtrade are perceived to be more socially responsible and concerned about the environment, animal welfare and human health. Nevertheless, if Fairtrade is to be sustainable, the producers must offer a consistent quality product to the market and endeavour to optimize production. Not only is it very expensive to seek formal accreditation under Fairtrade, but some argue that it perpetuates the rich country–poor country syndrome. As the Fairtrade system relies upon the goodwill of a small group of consumers, there may be no domestic or alternative market within the developing countries. Accreditation may even favour the diseconomies of scale, encouraging smallholder producers to remain small.

While Fairtrade operates primarily to support the smallholder producers, it does not preclude or prevent smallholders from selling to the multinational food manufacturers and retailers. Indeed, the decision to engage the multinationals has resulted in a massive growth in market share. According to Rosenkranz, sales of Fairtrade products now

exceed US\$1 billion per annum and are growing at the rate of 37 percent per annum. Not only is the market expanding but so also is the range of produce. Fairtrade does not transact with individual producers, but rather with collaborative producer groups. These groups must be democratically organized, there must be producer participation and they must be transparent. Under Fairtrade, the farmer should always get a higher price or at least a sufficient return to recover the costs of production. Furthermore, there is a premium, but this premium is not for the individual farmer: it is for community development activities. The producer group must have the potential to export, either by themselves or through a trader. Ideally, the group should be directly involved in the commercialization of their product through either quality control or product consolidation. While Fairtrade products are not organic, there are environmental standards that must be met. As the use of many pesticides are forbidden, producer groups must have an internal control system to show what pesticides have been applied, how they were applied and what impact, if any, this had on the environment. Fairtrade products must not have been produced using child labour or forced labour: labour rights and conditions must meet prescribed standards.

Ekkayokkaya provides an overview of the process associated with the registration of a protected geographic indication. A geographic indication (GI) is a mark or a sign which indicates a link between a location, region or area and the perceived quality of a product. When producers use the name of this region with their product, it sends a signal to the consumer that the product originates from this geographic origin and has some specific quality characteristics. Geographic indications are a unique form of intellectual property because they belong to a community rather than to an individual. Therefore, they cannot be sold to someone else. Not unexpectedly, in order to get a GI registered, producers must be able to demonstrate that the product has a specific link to the region in terms of quality, character or reputation. Furthermore, if the GI is to be protected, the community must establish some minimum quality standards to ensure the consumers get what they expect.

Finally, two papers show how investment into agroprocessing facilities can contribute to achieving higher-quality produce. Estigoy shows how cold storage and refrigerated transport allows extended shelf life of fresh vegetables in the tropical climate of the Philippines. Likewise, the detailed study by Giametta, Morabito and Giametta demonstrates the capacity of optical graders to distinguish different fruit calibres so as to extract as much price differential from the supply of different grades of fruits.

Policy implications

In the light of the results reported above, the following policy recommendations to governments can be suggested:

- Governments should provide infrastructure facilities and public utilities to enhance the efficiency of producers and market stakeholders;
- Access to financial facilities at the village level should be improved to encourage greater participation of rural households in high-value agricultural production;

- Improving extension services is also essential to provide information to growers so that they are fully aware of market opportunities as well as the most efficient techniques of production, crop establishment and management, transportation and storage;
- Governments must provide an enabling environment and support for small farmers to group together in order to avail some of the economies of scale that larger farmers have when dealing with buying agents;
- It is essential for governments to provide a conducive environment for private sector investment. Amending current laws regulating the marketing of agricultural products can go a long way towards encouraging private sector investment into food marketing. Several national governments have achieved a great deal of success on this front, but more effort is required;
- Governments need to work with the private sector to develop standards for food safety and higher quality. Setting mandatory safety standards for fresh fruit and vegetable will enable organized retailing and other agribusinesses to set up their own robust quality assurance schemes for fresh produce, which are stricter than the government standards. It is very important for the private sector to meet such quality requirements to be competitive;
- Investments into post-harvest management and agroprocessing at farmers' level should be encouraged. Historically, post-harvest management has not been given much attention in government extension programmes. In a changing market, post-harvest management needs to be an important part of government extension programmes if farmers are to be able to participate in modern value chains and meet the quality requirements of supermarkets and other industrial buyers. Similarly, governments should create an appropriate enabling environment to encourage agribusinesses to invest in improving their supply chains: for example, lower import taxes for reefer trucks and other logistical equipment will encourage more investment in this area;
- Developing linkages between small farmers and their customers is essential. The government sector, donor groups and NGOs can facilitate the development of linkages between small farmers and supermarkets through supporting marketing extension services. It is important to initiate projects with public-private partnership, encouraging the involvement of small farmers in modern value chains by providing training in post-harvest management and links to input supply and credit providers. The supermarkets are at the stage where they are setting up farmer linkages. Initiating such projects will ensure the participation of small farmers in modern value chains.



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