The Fruits and Vegetables Industry in Indonesia: Production and Limited Access to Market

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Smallholder producers of fruits and vegetables in the Nanggung sub-district of West Java, Indonesia practice a multi-cropping system of agriculture on less than two acres of land. Agricultural practices in this area are still crude, with little or no inputs such as fertilization or modern irrigation. When water is available, the furrow irrigation system is used at best. Although banana is one of the income-generating crops, farmers grow it in combination with other fruits such as durian, mangosteen, rambutan, jackfruit, and with vegetables such as chili peppers, tomatoes, sweet corn, and green beans under non-intensive management. Although market-survey reports show that the demand for these fruits and vegetables is greater than the supply, the farmers not only have limited access to markets but produce inferior quality and limited quantity (Fonsah 2003). Due to these limitations, this study is aimed at developing new markets, creating new distribution systems and market channels, and seeks ways to improve those already existing.

Indonesia is located in Southeast Asia. With 240 million inhabitants, it is the fourth most populated country in the world. It is also the largest archipelagic state, comprising 18,000 islands, of which one-third are permanently inhabited. It contains over 1.8 million km^2 of land and 93,000 km^2 of coastal and inter-island marine areas. The study area is Nanggung, West Java. Approximately 60–65 percent of the total inhabitants live on the island of Java. The capital, Jakarta, is also on Java.

The area of Nanggung, a sub-district of Bogor, West Java is 110 km^2. Topographically it is characterized by gentle to steep slopes ranging from 400 to 1800 m above sea level, with annual precipitation of 4500 mm. Soils are primarily andosols and latosols (Djuwansah 1997). The sub-district has a population of over 74,000 and contains 7,002 ha of arable land, of which 47.7 percent is managed by government agencies, state companies, and private corporations (BPS 2003). The remaining 52.3 percent of the land is owned by farmers who grow a variety of fruit, vegetable, and tree crops. Farmers in Nanggung are primarily smallholders at or below the poverty line with access to less than one hectare of land, which can be broken down to 0.3 hectares of irrigated rice land, 0.5 hectares of upland tree garden (*kebun*), and 0.2 hectares for fruits and vegetables.

The farmers practice a mixed-cropping system where fruits, vegetables, and rice are cultivated on the same piece of land. Although these traditional cultivation systems are environmentally sustainable, they are not well managed and thus do not fully meet families' livelihood needs. Because their lands are under-productive, many local communities are forced to utilize neighboring protected areas to meet their livelihoods needs. There is concern that an increase in local forest utilization could become unsustainable, a cause for concern especially as the Gunung Halimun National Park (TNGH) ecosystem is the major watershed for the Jakarta vicinity and an important park reservoir for biodiversity (Roshetko et al. 2004; Fonsah and Chidebelu 1995).

According to Ditjen BP2HP (2004), Indonesia imported 241,000 metric tons (mt) of fruit and 324,000 mt of vegetables in 2001. On the other hand, 21,000 mt of fruit and 113,000 mt of vegetables were exported in the same period. Comparing the import from the export depicts a huge market demand for fruits and vegetables in Indonesia. The distance from Bogor to Jakarta is one to three hours, round-trip. This proximity gives Nanggung a comparative advantage to serve these lucrative markets.

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Material and Method

The research site is the Nanggung sub-district located at longitude 106° 27' 35" to 106° 35' 26" and latitude 06° 33' 25" to 06° 45' 45". Nanggung has an area of approximately 11,000 km^2 and an elevation of 400 to 1800 meters above sea level, and comprises ten villages. Farmers in this sub-district are primarily smallholders with limited access to professional and technical assistance. There is also poor market linkage, particularly to more lucrative urban and regional markets of nearby Bogor and Jakarta (Budidarsono, Wijaya, and Roshetko 2006; Fonsah et al. 2007).

A production survey was conducted using a participatory and rapid approach consisting of short, intensive, and informal field surveys that focused on people's own views of their problems (Chambers, Pacey, and Thrupp 1989). The method involved open-ended exploration using a semi-structured questionnaire. Data were collected from field observations and in-depth interviews with farmers and their leaders. The study was conducted with 105 farm families in three representative villages: Parakan Muncang, Curug Bitung, and Cisarua.

Market surveys were designed and conducted using a rapid-survey format modified from ILO (2000) and Betser and Degrande (2001). The surveys were aimed at identifying the existing market channels, identifying the existing marketing problems faced by farmers and market agents, and recommending strategies to resolve the identified problems based on the survey results. A total of 45 market agents and 75 farmers were interviewed as part of the market surveys.

Results and Discussion

Production and Marketing Survey

The surveys identified the following problems encountered by small holders farmers in Nanggung:

- Growers have adopted non-intensive farm management techniques
- Growers practice multi-cropping techniques to maximize their income and minimize any production risk
- Growers lack harvesting, post-harvest, and handling skills, resulting in inferior product quality
- Growers have limited market knowledge and linkages
- Growers have limited knowledge of quality and quality specifications.

There were four existing markets in the sub-district: the weekly Nanggung market, the twice-weekly Curug Bitung market, and the daily Cibeber and Leuwiliang markets (Wijaya, Budidarsono, and Roshetko 2007).

The results of the surveys showed that there are several fruits and vegetables with high market potential in Nanggung. The fruits with high market potential are banana (*Musa paradisiaca* L.), durian (*Durio zibethinus* Murr.), mangosteen (*Garcinia mangostana* L.), rambutan (*Nephelium lappaceum* L.), petai (*Parkia speciosa* Hassk.), and jackfruit (*Artocarpus heterophyllus* Lam.). Of the twenty-five species of vegetables cultivated by the smallholders, important seasonal vegetables are chili peppers (*Capsicum annuum* L.), tomatoes (*Lycopersicon esculentum* Mill.), sweet corn (*Zea mays* L.), peanuts (*Arachis hipogaea* L.), green beans (*Vigna radiata* L. Wilczek) and chickpeas (*Cicer arietinum* L.) (Table 1). However, the five vegetables species most commonly found in dryland and agroforest plots are banana (*Musa* sp.), long bean (*Vigna sinensis*), cucumber (*Trichosanthes cucumeroides maxim*), kucai (*Allium tuberosum*) and green beans (*Vigna radiata*).

The survey results also revealed that all the respondents produced annual crops. Furthermore, with the exception of sawi (*Brassica juncea* L. chern)—which is produced strictly for domestic consumption—over 89 percent of the 22 annual crops, 76.5 percent of corn, and 29.6 percent of rice are sold at the local and neighboring markets (Wijaya, Budidarsono, and Roshetko 2007).

Recommendations

In the short run, the formation of a farmers market was recommended. The farmers market will be run strictly by the farmers of Nanggung themselves so that the farmers will have total control over the prices received for their fruits and vegetables. The first criterion is for all of the participating farmers to be loyal to the decisions, rules, and regulations of the farmers market. If this is done properly, they will eliminate the collectors or change their pres-

Table 1. Fruit and Vegetable Species with High Potential to Enhance Smallholders' Incomes in Nanggung.

Species – fruits	Farmer preference	Market study (unmet demand)	percentage of trees in inventoried gardens[1]
Banana (*Musa paradisiaca* L)	1	High	45.3
Durian (*Durio zibethinus* Murr)	1	High	1.3
Petai (*Parkia speciosa* Hassk)	1	High	1.8
Jackfruit (*Artocarpus heterophyllus* Lam)	1	High	2.8
Mangosteen (*Garcinia mangostana* L)	2	High	0.6
Rambutan (*Nephelium lappaceum* L)	3	High	2.6
Jengkol (*Archidendron pauciflorum* Benth)	1	Local market	2.6
Mango (*Mangifera indica* L)	3	Local market	3.4
Species – seasonal crops			
Chili peppers (*Capsicum annuum* L)	1	High	Low presence
Tomatoes (*Lycopersicon esculentum* Mill)	1	High	Low presence
Sweet corn (*Zea mays* L)	3	High	Low presence
Peanuts (*Arachis hipogaea* L)	3	High	Present
Green beans (*Vigna radiata* L)	1	High	Present
Chickpeas (*Cicer arietinum* L)	1	High	Present
Scallions (*Allium cepa* L)	1	High	Present

[1] Tree inventory data from Manurung et al. 2005.

ent role by pushing them to the other side of the equation—i.e., the collector will become a buyer/customer of the farmers market. The collector will no longer have any influence over the farmer and will become a price taker rather than a price maker, as at present.

Market and Distribution Channels

The creation of a centralized farmers market is a step toward maximizing the farmers' profit margins. All or most of the consumers and market agents in the area will be forced to get their supplies directly from the farmers market. This market could be organized once a week, once a month, or as the forces of demand and supply dictate, since it will be one of the primary sources of fruits and vegetable from that region. This could become a huge marketing outlet in the long run depending on how well it is managed and publicized. This will create a synergistic and beneficial impact to both the farmers and the buyers (Figure 1). The farmers will be getting the price they want for their produce, and the buyers (collectors, individuals, retailers, wholesalers, hotels and restaurants, supermarkets, etc.) will be getting better quality produce due to less handling. The buyers will take care of their own transportation. The economic impact of this farmers market could grow rapidly in a very short time. The spillover or multiplier effect will increase other parts of the community economy as well.

As shown in Figure 1, production and marketing technical assistance can be provided to the individual, farmer groups, or farmers' cooperative by the government, private entity, non-profit organizations, extension services or universities. With such assistance, the quality of the produce that goes to the fresh fruit and vegetable farmer's market will be superior (Fonsah 2003). Buyers are interested in quantity, quality, reliability and sustainability (Fonsah 2004; Wolfe and Fonsah 2002). If these requirements are met, either the domestic or foreign market could be targeted. Furthermore, part of the fresh produce can be used for processing.

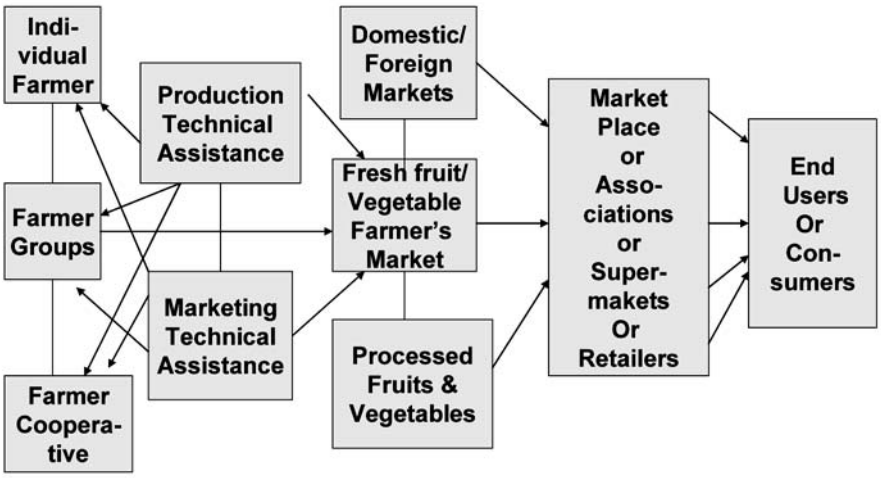

Figure 1. Long-Term Recommendations for Market Channels Needed to Improve Fruit and Vegetbale Quality and Increase Smallholder Income.

Conclusion

Smallholder producers of fruits and vegetables in the Nanggung, West Java, Indonesia practice a multi- or mixed-cropping system whereby a farmer jointly cultivates fruits, vegetables, and rice on the same piece of land, which is usually less than two acres in size. Although these traditional cultivation systems are environmentally sustainable, they are not well managed and thus do not fully meet families' livelihood needs. Production and marketing surveys were conducted in this study, and the following problems were identified:

- Growers have adopted non-intensive farm management techniques
- Growers practice multi-cropping techniques to maximize their income and minimize any production risk
- Growers lack harvesting, post-harvest, and handling skills, resulting in inferior product quality
- Growers have limited market knowledge and linkages
- Growers have limited knowledge of quality and quality specifications.

This study further reveals a huge demand for fruits and vegetables in Indonesia, and since domestic supply is insufficient in terms of quantity, quality, reliability, and sustainability, importation of these commodities will continue to rise.

The creation of a farmers market where the growers will have total control over pricing decisions for their fruits and vegetables is recommended. However, there will be need to provide production and marketing technical assistance to individuals, farmer groups, or farmers' cooperative by either the government, private entity, non-profit organizations, extension services, or universities. If this assistance is provided, the quality and quantity of the produce that goes to the fresh fruit and vegetable farmers market will be superior, thus justifying the higher prices. The farmer-extension approach is recommended because of its informal, practical, impact-oriented focus on priorities identified by target communities. If our recommendation is implemented successfully, smallholder farmers in Nanggung will eventually become the backbone of the Indonesian fruit and vegetable industry. Marketers and/or buyers are interested in quantity, quality, reliability and sustainability, qualities necessary for profit maximization.

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