

HORTICULTURAL PRODUCERS AND SUPERMARKET DEVELOPMENT IN INDONESIA



REPUBLIC OF INDONESIA



Report No. 38543-ID

HORTICULTURAL PRODUCERS AND SUPERMARKET DEVELOPMENT IN INDONESIA



REPUBLIC OF INDONESIA





THE WORLD BANK OFFICE JAKARTA

Jakarta Stock Exchange Building Tower II/12th Fl.

Jl. Jend. Sudirman Kav. 52-53

Jakarta 12910

Tel: (6221) 5299-3000

Fax: (6221) 5299-3111

Website: <http://www.worldbank.org/id>

THE WORLD BANK

1818 H Street N.W.

Washington, D.C. 20433, U.S.A.

Tel: (202) 458-1876

Fax: (202) 522-1557/1560

Email: feedback@worldbank.org

Website: <http://www.worldbank.org>

East Asia and Pacific Region

Rural Development, Natural Resources and Environment Sector Unit

Sustainable Development Department

Website: <http://www.worldbank.org/eap rural>

Printed in June 2007

This volume is a product of staff of the World Bank. The findings, interpretations, and conclusions expressed herein do not necessarily reflect the views of the Board of Executive Directors of the World Bank or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement of acceptance of such boundaries.



ABBREVIATIONS AND ACRONYMS

AARD	Agency for Agricultural Research and Development
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ARMP	Agricultural Research Management Project
AIAT	Assessment Institutes of Agricultural Technology (BPTP)
BIPP/KIPP	District Center for Information and Extension
BPP	Agricultural Extension Office at Sub-district Level
BPPP	Provincial Center for Information and Extension
DGPMAP	Directorate General for Marketing and Processing of Agricultural Products
FO	Farmer Organization
GOI	Government of Indonesia
HORECA	Hotels, Restaurants, Catering
HRD	Human Resource Development
ICT	Information and Communication Technologies
IFC	International Finance Corporation
IPM	Integrated Pest Management
Kabupaten	District Government
KADIN	Indonesia Chambers of Commerce
M&E	Monitoring and Evaluation
MOA	Ministry of Agriculture
MOF	Ministry of Finance
MOT	Ministry of Trade
NGO	Non-Governmental Organization
PRA	Participatory Rural Appraisal
PPP	Public Private Partnership
RICA	Rural Investment Climate Assessment
RPO	Rural Producer Organization
TA	Technical Assistance
WB	World Bank
WISMP	Water Resources and Irrigation Sector Management Program

Vice President: James W. Adams, EAPVP
Acting Country Director: Joel Hellman, EACIF
Sector Director: Christian Delvoie, EASSD
Sector Manager: Rahul Raturi, EASRE
Task Team Leader: Shobha Shetty, EASRE



Acknowledgments

This report is a product of the World Bank's Rural Development, Natural Resources and Environment Sector Unit of the East Asia and Pacific Region.

The team leader for this report is Shobha Shetty (Sr. Economist, EASRE). Other team members include Richard Chisholm (Sr. Agriculturalist, EASRE), and Frans Doorman (Consultant). The principal authors of the report are Ronnie Natawidjaja (Padjadjaran University, Bandung), Thomas Reardon (Michigan State University), and Shobha Shetty (World Bank) in collaboration with Trisna Insan Noor, Tomy Perdana, Elly Rasmikayati (Padjadjaran University, Bandung), Sjaiful Bachri (Center for Agricultural Social Economics Research and Development, Bogor) and Ricardo Hernandez (Michigan State University).

The report was prepared under the overall guidance of Rahul Raturi, Sector Manager, EASRE. Peer reviewers were Stephen Jaffee (ARD), Peter Timmer (Center for Global Development), and Kees Van der Meer (ARD). Helpful comments were provided by Stephen Mink (Lead Agricultural Economist), William Wallace (Lead Economist), Neil McCulloch (Sr. Poverty Economist), and Enrique Aldaz-Carroll (Economist). Dewi Sutisna (EACIF) provided valuable administrative assistance.

The support of Dr. Ahmad Dimiyati, Director-General Horticulture, Ministry of Agriculture and Mr. Ardiansyah, Director-General Domestic Trade, Ministry of Trade is gratefully acknowledged. Sincere thanks go out to all the key informants including the major retailers, wholesalers, suppliers, farmers and local government officials in the study areas who generously gave of their time, knowledge and advice.

Support from the Regoverning Markets Program (with funding from the United Kingdom's Department for International Development (DFID) and Canada's International Development Research Corporation (IDRC) is gratefully acknowledged. This study was also supported by the World Bank-Dutch Trust Fund (WBDTF) for Institutional Development and Capacity Building Program to Improve Indonesia's Trade Policy.

Photographs courtesy Ronnie Natawidjaja (Padjadjaran University)



TABLE OF CONTENTS

Executive Summary	vi
Chapter 1 : Introduction	1
Chapter 2 : The Rise of Supermarkets in Indonesia	11
Chapter 3 : Supermarket Produce Procurement Systems and their Links to Wholesalers and Farmers in Indonesia	19
Chapter 4 : Patterns, Determinants, and Effects of Farmer Participation in Modern versus Traditional Marketing Channels	27
Chapter 5 : Policy Issues, Challenges, and Implications	43
Annex 1. : Indo-Dutch Cooperation in Horticulture	53
Annex 2. : Preferred Suppliers and Changes in Procurement Systems	59
Annex 3. : Case Studies	65
Annex 4. : West Java Horticulture Production and Market Analysis	75
Annex 5. : The Tomato Value Chain from West Java Farms to Jakarta Retail	87
Tables and Figures	117
References	173





Executive Summary

Introduction

The value of fresh fruits and vegetables (FFV) output doubled in Indonesia over 1994-2004, to become a 10 billion dollar industry. While FFV expenditure was 50 percent of Indonesian rice expenditure in 1994, it had risen to 75 percent of rice outlays by 2004 – and in urban areas, was at 100 percent that is, urban Indonesians, nearly half the population, spend the same on rice and FFV. Nearly all of the FFV market is domestic: while imports of FFV nearly tripled over that decade, but by today are still very minor, accounting for about 3 percent of FFV consumption in Indonesia (the same as the developing country average).

This study focuses on the main vector of globalization change on it, via the rapid rise of supermarkets¹, in particular in the past five years. Supermarkets occupied a tiny niche in the food market through the 1980s. They were still confined to an urban upper income tiny niche by the mid 1990s, but after 1998 (spurred by liberalization of foreign direct investment in retail, a driver for the “takeoff” of supermarkets in many developing countries in the 1990s, complemented by income growth and urbanization and their concomitant changes) has grown very quickly to now occupy roughly 30 percent of overall food retail. Traditional retail loses about 2 percent of its share each year. Informed observers believe within a decade modern retail will dominate the majority of the food market in Indonesia. Key features of these changes are as follows:

(a) As in other countries, supermarkets in Indonesia have not penetrated FFV retail as quickly as they did processed and semi-processed foods, so that industry estimates of the share of FFV retail stand at about 10-15 percent share for supermarkets. This is still minor, but up from nearly zero a decade ago, and likely to continue to grow along with the overall retail transformation. Selling produce only began in earnest in the past five years among modern retailers.

(b) The wholesale sector has been differentiating and segmenting over the past decade, partly independently of the retail transformation, with the rise of large, and more capitalized, wholesalers in rural areas, and the decline of small field brokers.

(c) Recently there have emerged specialized/dedicated wholesalers focused on the supermarket and other modern food industry segments.

Selected Key Findings

First, while FFV sales by supermarkets moved from virtually nothing to 8 percent of supermarket sales and around 10-15 percent of urban FFV retail (as the industry estimate) in a short time, a high share (far higher than the share of imports in overall FFV retail in the country) of those FFV sales are of imported FFV. Approximately 80 percent of the fruit sold by supermarkets, and 20 percent of the vegetables, are imports, an average of about 60 percent. This is noteworthy from several angles. It is at least double to triple the imports share in supermarket FFV sales in comparable developing countries (Mexico, Guatemala, Thailand, and China). It is very rare for

¹ “Supermarkets” throughout the report is used as shorthand for the various segments of modern retail. The segments (hypermarkets and superstores, supermarkets and neighborhood stores, convenience and forecourt stores, and discount and club stores) are distinguished where the need arises.



supermarkets to depend so much on imported vegetables. And this share is even on the rise. Interestingly, the smaller local chains had the highest share of imports in their FFV sales, and the large chains had a lower share of their sales from imports.

The causes of the high level and rapid rise of imports in supermarket FFV sales are attributed to price and quality: fruit and vegetables from China and Thailand in particular are usually cheaper (as products, and in terms of transaction costs) and at the same time higher quality. This is good for urban and even rural consumers of FFV that has become important to the diet - it keeps competition alive, drives food prices down and helps the poor make their diets more nutritious and high in vitamins, more cheaply. But the local farmer is held back from doing his/her best in the market because of the local market conditions. Indonesian farmers trying to sell to supermarkets are severely constrained and handicapped by extremely poor supply chains - moving over poor roads, fraught with rampant corruption, and lacking cold chains and logistics services. Retailers see large potential for local products in supermarkets if only the supply chain problems could be resolved. To enable farmers to earn higher profits by selling into modern domestic, let alone export, channels, **there will need to be a significant improvement of domestic supply chains.**

Second, while marketing FFV by supermarkets in Indonesia is really only in its infancy, the leading chains have moved very early (by international standards) to the use of supply channels alternative to traditional wholesale markets. While leading retail chains still source fruit from large-scale importer-wholesalers and large inter-island traders, they increasingly source local vegetables via:

- (a) new-generation wholesalers who are specialized, capitalized, and dedicated to modern food industry segments like supermarkets, and fast food chains and restaurants and hotels and
- (b) for some products, from grower/packer/shippers using outgrower schemes.

The causes for this precocious move (that usually occurs somewhat later in other countries) to new commercial agents outside the traditional wholesale markets is mainly because retailers find the **condition and efficiency of the main wholesale markets in the cities to be extremely poor.**

Third, while supermarket growth skyrockets, while supply chains and wholesale markets are mired in relative stagnation, the horticultural economies of local areas have shown several surprising developments.

- (i) The comparison with the situation in West Java - a major center of horticulture production in Indonesia - from analysis carried out in the 1990s to the present is striking: before, rural West Java was nearly totally dominated by many small brokers. Today, in its majority it is dominated by large, more capitalized wholesalers, with still an important remnant of small brokers. This is of course a common development in rural areas the world over, but it has happened very fast in West Java with a cropping pattern shift to horticulture.
- (ii) This shift has many farmers **switching out of rice into FFV**, adopting irrigation, cropping multiple seasons, and shifting from low-value commodity vegetables like cabbage to



intermediate-value products like tomatoes and potatoes and even into high-value vegetables – climbing a “value ladder”. An offshoot of that process has been that some lead actors are shifting commodity vegetable production to islands where land and labor are cheaper.

- (iii) An interesting trend that requires further study is a **rapid growth in the land rental market**, with horticulture farmers renting a third of their land mainly from tiny rice farmers and large urban speculators. Medium-sized farmers are emerging to dominate the sector who likely were small rice farmers who started into vegetables a decade ago and then began renting, and then in the “agricultural ladder” seen in other countries, shifted from renting or sharecropping to land purchase.

Fourth, despite the horticulture boom and the dynamic development of the wholesale sector, there is little opportunity for farmers to sell their produce graded by different qualities. That means that **there still is little to no reward to farmers to produce quality. But the wholesalers sell by grades and capture the profit differences**. The market situation is thus similar to horticulture areas in Mexico a decade ago or in the hinterland areas now.

The tomato value chain analysis indicates that between the worst and the best channels, however, the share the farmer captures of the consumer price varies. The highest is that of the “organized-farmers channel to supermarkets” (with the farmer in the farmers’ group capturing 30%). But below that there is no correlation between captured-share of retail price and profitability. The least profitable channel, value chain 5 starting in the hinterland, has farmers earning 24% of the retail price; by contrast, farmers in the value chain 4 (via traditional channels to the supermarket) get a higher price but a low share of the retail price (only 15%). The channels where the farmer sells directly to the specialized wholesaler or to the traditional wholesaler who sells on to the specialized wholesalers allow only slight quality differentiation (within the graded mix, a higher proportion of A grade), and a small price advantage (with a low “share of the pie”, around 15%, as the wholesalers capture the greatest chunk of the added value). Ranked second to the least favorable channel is the dominant channel, faced by most farmers, where the selling price is for an ungraded mix, and the farmers capture 27% of the final consumer price. The above mapping of benefits to the farmer, over channels, makes common sense and is as expected, with the most traditional channels the least favorable (and within them the vestige of the older system by far the least favorable), and the modern channels more favorable, but with a wide gamut from the farmer capturing little of the value added to capturing much through the (so far rare and nascent) group organization to handle post-harvest handling and marketing.

Fifth, depending on the area in West Java, the small horticulture farmers are starting to participate in **sales to the supermarket channels**, mainly via the specialized/dedicated wholesalers but also via some large wholesalers, and a few groups, directly. However, the share of farmers in this new channel is small – varying between 11 and 15 percent over areas.

Sixth, the **farmers participating in the new channel are small farmers – but they are the upper stratum of small farmers in terms of landholdings, and in terms of capital, such as irrigation tanks and education. Their profit rates are also 10-30 percent higher than farmers in the traditional channels**. (These findings are similar to new findings from Central America where small farmers dominate horticulture (outside the export enclaves) and the small farmer upper crust is the actor participating in the outgrower schemes and preferred supplier lists into modern domestic channels, just like in West Java.)



Seventh, public agricultural services do not have the necessary skills and knowledge to effectively help horticultural farmers. Nearly all the farmers receive technical assistance from the agents of input companies. Nearly all credit comes from input credit fronted by local wholesalers or input companies, with basically no access to other credit sources apart from friends and local high-interest-rate individual local lenders.

3. Policy Implications

Sudden change in market channels and sharp competition in retail, combined with a notable lack of support services and institutional and physical infrastructure, have made wholesalers and farmers see the rise of supermarkets as a mixed blessing. There are higher profits to be made, but pressure, confusion, ambiguity, and sometime unrewarded investment to be undergone. On the supply side there is a sense that the demand (retail) side is growing both in its own internal tension and competition while also growing in market power toward its suppliers who want to access the modern channels.

At the same time, the retailers (and wholesalers) see the obvious variety and potential of the production base but are frustrated with the extremely deficient supply chains, infrastructure, and wholesale markets, combined with poor and inconsistent quality and expensive local produce, and a lack of high-quality government technical assistance for horticulture (despite it now rivaling rice in production and consumption nationally), credit, or logistics to support the farmers they want to supply them.

Indonesia has at present no robust institutional systems in place to address in a win-win fashion the possibly mounting conflict and tension between supermarkets and suppliers. Based on the experience of other countries, “a private commercial code of practice” may well be the most practical and useful approach in the short-medium run, in that it harnesses private sector interests and can be implemented in situations where commercial laws and institutions are still in the development stage. The terms of the private code tend to be the main elements of most regulations elsewhere: compliance with contracts by both retailers and suppliers; prompt payment; cooperation in logistics development. **In the medium-longer run, various public regulations and assistance to supply chain actors will be needed to complement this approach.**

The modernization of agricultural marketing in Indonesia has occurred largely as a result of market-driven, private initiatives, rather than as a direct result of government intervention. Results from this study and the recent Rural Investment Climate Assessment indicate that there are distinct roles for the public and private sector in this transformation. In the wake of decentralization, there are clear responsibilities for both the national as well as regional/local governments. Local governments can play a light-handed role in encouraging the development of agricultural clusters and support the formation of viable rural producer organizations which are better able to service the high-volume modern sector demand. Regional governments have a major role to play in the provision of efficient marketing infrastructure,² together with the removal of complex licensing requirements and informal levies. Agricultural extension services have been decentralized to district governments but Indonesia is in a transition phase now with a new Extension Law (Law No. 16/2006) that was recently passed that strengthens the policy and advisory role of the national government. The development of the Implementing Regulations over the coming year should foster greater private sector participation in the provision of advisory

¹ Such as the Sub Terminal Agribisnis that are being developed in various regencies.



services. The current extension agents also need training and new skills adapted to the market – local governments have a key role to play under the guidance of the national government.

Traditional markets – that are under the domain of the district governments - play a buffer role in relation to these modern chains. They take residual produce, including that which fails to meet demanding quality control checks. They sometimes sell to the modern sector in times of scarcity or sudden loss of supplies. Prices in the traditional markets are also used as a reference point for the modern sector. Importantly, traditional markets serve to place a cap on modern sector market power. Thus, although the latter is gradually supplanting the former, in reality the market segments are as much complementary as competitive (RICA, 2006). Traditional retail markets need improvement on hygiene and sanitary standard, infrastructure (pavement, road, building, and stalls), cold chain system, and better waste management system so that they can compete with supermarkets. Overall it will create an efficiency link to the modern procurement system through relation with processors and packers. The latter will then be an added and generalized inducement to supply chain upgrading. It will also allow the rewarding of quality differentiation at the production level, a key point of weakness at present. Key areas for public policy interventions are summarized below.

Agricultural Support Services

The main challenge for policymakers is how to increase the inclusion of small farmers into modern supply channels offered by supermarkets. The increase in horticulture has been occurring despite the lack of government support services notably extension and financial services. Agricultural extension in the study zones are widely seen by farmers, wholesalers, retailers, and other informants as of little or help to the farmers to produce or market in the developing horticulture markets. FFV farmers overwhelmingly report that technical assistance to them comes nearly only from chemical companies' local agents. Furthermore, nearly all their credit comes from input credit fronted by local wholesalers or input companies, with basically no access to other credit sources apart from friends and local high-interest-rate individual local lenders.

The first way is for direct support through investments in public goods and services notably research and extension services. Revamping the quality of the extension services so that it is better prepared and more relevant to the needs of the market is paramount. The results of this study indicate that farmers can be supported with technical and management assistance, post-harvest handling technology assistance, factor input assistance, etc. New approaches to agricultural extension have been piloted and the new Extension Law (Law. No. 16/2006) explicitly recognizes the need for a multi-provider approach. Like public extension systems in many countries, Indonesia faces a major challenge to develop an effective institutional mechanism for disseminating technology relevant for small scale producers especially for high-value crops as evidenced by this study. In responding to the dynamics of the FFV market, farmers need constant and up-to-date technical and marketing assistance. Within agricultural research there has also been an imbalance in that rice dominates the research agenda and horticulture research is not high-priority, is fragmented, and poorly linked to market needs.

Countries like Brazil, Colombia, Chile, South Africa and (perhaps to a lesser extent) India, have shown that formal research and extension can play a role in helping farmers to diversify into high value crops and gain access to modern supply chains. Formal research and extension systems can contribute through specific research projects and farmer training, and the same is likely to be valid for Indonesia. A problem may be that government staff, especially researchers (be they





from research institutes or from universities) may be unwilling to submit to play a role that may be perceived as subordinate – something that may be remedied by good, diplomatic management and the right incentives. The new Extension Law provides a framework to encourage a robust multi-provider extension capacity to the FFV sector but financing remains a thorny issue.

Rural Producers Organizations

The results of the farm survey in W.Java indicate that there is little evidence of strong farmers/producer organizations to facilitate joint marketing, purchase of inputs etc. Development of farmer groups, grower associations, and new-generation cooperatives appear to be strongly needed. However, such organizations will only work if the members have common economic objectives. There have been a lot of government programs to develop farmer groups, associations or cooperatives but only for the purpose of delivering government subsidies or support, and thus have been unsustainable. The groups dissolve when the support or subsidy programs end. The program has to start with the needs or objectives, and not with subsidy or support.

In the case of horticulture farmers in Malang, E.Java (RICA 2006), the small farmers have rarely formed formal farmers' groups, which is likely due to existing informal coordination among neighboring farmers, efficiencies of the collector system where increasing market entry has forced competitive prices and more convenient locations for the collectors' services. The only perceived advantage to farmers' groups in Malang, E. Java is in cases of high-volume demand for a particular crop, when suppliers were able to set up a three-actor supply chain by approaching farmers and directly specifying the planting/harvesting plans (cutting out the local collector function). In these situations farmers groups provided supermarket suppliers critical access to larger plots of land but were also seen as more difficult to work with than individual small farmers.

However, the value chain analysis indicates that there is an incipient channel that utilizes farmer groups to the advantage of the farmers. This channel is found only in the high commercial zone with easy access to infrastructure (Lembang). There is a group of nine farmers that sold their harvest through this channel, with the specific target of selling quality tomatoes to supermarkets and developing a reputation for and competence in post-harvest handling. The share of the farmer (cum farmer group) is on average about 30% of the retail price overall, and on average Rp. 1520 – nearly twice as profitable as the other channels. This group may be the “avant garde” of specialized farmers groups capturing more value added and quality differentiation. This is fairly new so there is not yet evidence of diffusion of this approach but holds promise for improving farmers' bargaining power and incomes.

Rural Infrastructure

One of the factors that reduces the competitiveness of local FFV is high cost of transportation to the production zones. Generally, the wholesaler pays for vegetables on the truck after harvest. That means that farmers have to pay the delivery cost of the vegetables from the field to the truck on the roadside. During the rainy season, unpaved roads are not accessible, thus farmers have to pay labor costs to carry the vegetables from the field to the nearest reinforced road. Good quality telecommunications and a paved-road network are essential, as otherwise local farmers will struggle to compete with imports. This is especially an issue as horticulture crops in Indonesia are often produced in remote, high-altitude areas where these infrastructure facilities are often deficient. This also highlights the distinction between Java-Bali and other regions in Indonesia,



where markets and know-how are generally less well developed. In particular, the development of markets outside Java-Bali is crucially shaped by the quality of the road infrastructure. Thus, supermarkets in South Sulawesi and South Kalimantan are generally sourcing their fruit and vegetables from East Java, even though there are suitable local production sites, because these sites lack transportation connections.

Access to Financial Services

The results of this study also underscore the core constraint to agricultural sector dynamism in Indonesia – that of the lack of outreach of financial services to small farmers and suppliers. This also results in lower productive investments all along the supply chain as evidenced in this study. Increasing access for farmers and wholesalers to financial services is critical. Since the payment of supermarkets is generally delayed for up to 40 days, suppliers, farmer and wholesaler face a problem of having temporary illiquid assets. The government can facilitate agreements with the modern retail association (APRINDO) and the banking system so that they provide a guarantee for the amount of sales the supermarket owes, so that small/ medium farmers or even wholesaler can get access to commercial bank loans. There are some private banks expressing an interest in this kind of agreement.

Market Intelligence.

Providing market intelligence to the supply chain actors and facilitating business linkages among farmers, wholesalers and supermarkets through business meetings, exhibitions, and business visit programs is a key role for the public sector. The meetings can be arranged at local, regional, as well as national level. Ideally extension service facilities like BIPP and BPP (available in every region) can be used on a regular basis.

Public Product Standards.

Standards established by the Bureau of National Standards (BSN) currently for FFV products need to be reviewed and modified if required. The standards also need to be better socialized and adopted along the supply chain. The study indicates there has been an effort to perform grading and handling in the production zone but the market price differentiation is insufficient. The DG-Horticulture's efforts to provide training to farmer groups on Good Agricultural Practices (GAP) is commendable but needs to be expanded to improve awareness of the existing standards for FFV products, to form a common foundation for the parties in the supply chain so that successful farmers and suppliers can upgrade themselves to supply the modern market channels with higher quality and consistency.

Land Rental Markets

Active land rental markets found in the study area significantly contribute to the horticulture boom. However, the study shows that only a small percentage of the land has a title. Thus, public land registration needs to be widely socialized and farmers encouraged to register their land. Land titles will give full right to the landowner and facilitate land rental market with necessary legal support.

The above discussion on the implications for public policy are in line with what Reardon and Hopkins (2006) refer to as a two-prong policy support strategy, focused on structural competitiveness



and customized competitiveness. The policies to develop “structural competitiveness”, which reduce the overall costs of supermarkets procurement and the levelness of the “playing field” for traditional retailers, wholesalers, and suppliers in dealing with a modernized retail sector include enforcing healthy business practices; improving rural infrastructure; improving the quality and relevance of the agricultural extension service etc. In addition, policies that develop “customized competitiveness” support suppliers and farmers with the capacity to supply supermarkets are through the provision of market intelligence, improving enforcement of standards all along the supply chain, improving land titling, and developing innovative financial services that cater to the needs of the major actors in the supply chain.

Introduction

1.1. Introduction

Food is an important part of the economy of Indonesia. In 2004, 55 percent of household expenditures went to food. Changes in the food economy thus have a major impact on the overall development of Indonesia and the well-being of its people. While food has traditionally meant “rice” for most policymakers and researchers in the food economy in Indonesia, there is today a rapidly growing interest in the horticultural products economy. This is partly because, apart from pockets of traditional export cropping, horticulture is the main agricultural diversification option (outside of dairy and aquaculture) for most Indonesian farmers trying to move out of low-value rice cropping. This is also because the horticultural food economy is important to consumers – while the average Indonesian consumer spent 49 rupiah on fresh fruits and vegetables (FFV) in 1999 for each 100 rupiah he/she spent on rice, by 2004 that ratio was 74 to 100 on average; that average disguises the fact that the ratio was 95 on FFV to 100 on rice for the urban Indonesian (versus 59 to 100 for the rural consumer). Thus, for the half of the Indonesian population that lives in cities, FFV now stands equal to rice in importance in the food economy.

An important but incipient change in that food economy is the recent rapid growth in the supermarket sector. Supermarkets occupied a tiny niche in the food market through the 1980s. They were still confined to an urban upper income tiny niche by the mid 1990s, but after 1998 supermarkets have spread very quickly to now occupy about 30 percent of overall food retail. This mirrors a similar rapid diffusion of supermarkets over much of the developing world (Reardon and Timmer, 2007). The counterpart of that is that the share of traditional retail declined 2 percent a year. Informed observers believe within a decade it will dominate the majority of the food market in Indonesia. As in other countries, supermarkets in Indonesia have not penetrated FFV retail as quickly as they did processed and semi-processed foods, so that estimates of the



share of FFV retail stand at about 15-20 percent share for supermarkets. This is still minor, but up from nearly zero a decade ago, and likely to continue to grow along with the overall retail transformation. A number of first and second tier chains of supermarkets virtually started produce sales (from a tiny amount before) as recently as 2000 and are aggressively entering that market.

Some initial studies have been done on the rise of the supermarket sector and its impacts on parts of the horticulture sector (such as case studies of horticulture farming and supply chains to supermarkets in the Bogor and Bandung areas by Natawidjaja et al. (2004) and Reardon (2004) and Chowdhury et al. (2005)), but there is a need to add substantially to the knowledge base, and to update it given the rapid changes in the sector.

1.2. Background on the Development of the Horticultural Sector and Policy Issues and Extant Policies in Indonesia

1.2.1. Production, Export, and Import of Fruit and Vegetables

Fresh fruit and vegetables (FFV) production in Indonesia is still concentrated in the islands of Java and Sumatra, respectively contributing 63 percent and 23 percent of the national production. There is no significant change in these islands' shares over the past decade. FFV production growth is helped by the favorable natural resources in the two islands, including the rich volcanic soils and favorable climate. As discussed further in section 1.2.2., FFV growth is mainly driven by the private actions of farmers combined with the favorable natural resource base, given that government investments and policy support to the sector are minimum, being instead focused on mainly on rice.

Generally, vegetables production in Indonesia in the past ten years has been increasing quite modestly (Table 1.1). The greatest production growth among vegetables is of potatoes, head cabbages, chilli peppers, and shallots.

Vegetable production in Indonesia increased in the past 10 years (1994-2004) – almost doubling in value terms from USD 2.49 billion to 4.995 billion. That doubling over a decade disguises a sharp kink in the curve: the value of production rose only 1.25 from 1994 to 1999, and then jumped 1.6 times from 1999 to 2004, after the crisis. There was no significant composition change over the period (Table 1.4). The top three commodities have been chilies, shallot, and eggplant. Potatoes was ranked third in 1994 (9% share) but dropped to 7% in 2004. By contrast, green onions, leeks, and other alliaceous vegetables increased in position from 5% share to 7%. The shift indicates increasing demand for alliaceous vegetables driven by food diversification of the urban population. Import substitution commodities such as garlic and shallot are continually declining in both value and share in production. Comparing to Table 1.5, the declining trend is seem to be affected by the rising volume of imported garlic and shallot from China.

Similarly, the value of local fruit production also doubled in 10 years, from USD 2,736 million in 1994 to 5,279 million (Table 1.4). Even more markedly than vegetables, there was a kink in the trend: from 1994 to 1999, traversing the trend, fruit production dropped slightly, and then increased 2.5 times from 1999 to 2004 as the economy, and thus demand, recovered. However, its production composition was slightly changed. In 1994, the top four commodities were banana (41%), mango (12%), citrus/oranges (10%), and durian (9%). In 2004, banana was still the highest



share but dropped to 30% with other increases, citrus/oranges to 16%, durian to 15%, and mango to 12%. This represents a possible shift in the agricultural value ladder model where more high-value fruit is grown and low-value fruit in a decline.

Fruits and vegetables import trends gives surprising figures (Table 1.5). Vegetables import doubled in 10 years (1994-2004) from USD 34 million to 78 million, and fruits import tripled from USD 76 million to 215 million. The compositions of main imported vegetables have been unchanged; the top three imported vegetables are garlic (68%), shallots (18%) and onions (6%). On the other hand, the temperate zone fruits such as apples (30%), pears (13%), and grapes (12%) have dominated the imported fruits. Other major imported fruits are tropical fruits which also grown in Indonesia such as durian (5%) and citrus/oranges (23%). However, the *share of total produce imports in total consumption* (production plus imports) is only 3 percent - similar to the worldwide average for developing countries (Reardon and Timmer 2007). The import impact appears to be very slight on local markets.

The overall picture of imported fresh fruits and vegetables at the national level is consistent with the information obtained from the field surveys (Table 1.7). The main imported temperate fruit are grapes, apple, citrus/oranges, and pears mostly imported from China, US, Australia, South Africa, and Pakistan. The supermarket buyers usually make a buying plan for a whole year according to the international fruit calendar as in Table 1.7, especially for seasonal fruits. For example, the best time to buy red globe grapes from the US is between Sept to Oct. Nevertheless, if he wants it in February, he needs to source it from Australia or South Africa. The timing for the supermarket to import a temperate fruit is the availability at the lowest price at international market according to the fruit calendar.

However, among the major fresh imported fruits and vegetables are not only temperate zone commodities, but also some that compete directly with locally grown fruits and vegetables, for examples, durian, citrus/oranges, garlic, and shallot. Since durian in Indonesia is available at different time at different location (Table 1.8), the peak season of durian in Thailand is at almost the same time as the durian season in Lampung. However, what is imported is *Monthong durian*, which is of a better quality. Comparing Table 1.4 and Table 1.5, the increase in imported garlic and shallot has a direct effect on the production of local garlic and shallot that are unfortunately of lower quality than what are imported from China.

There was a huge drop in overall fruits and vegetables export from Indonesia in 10 years (Table 1.6). Total export value of vegetables dropped from USD 44.7 million in 1994 to USD 25.6 million in 2004, almost half of the value in nominal terms. This makes for an *extremely small share of exports in total output – much lower than the developing country average*. Similarly, total export value of fruits also dropped slightly from USD 12.8 million in 1994 to USD 11.8 million in 2004. Major vegetable export commodities are still potatoes (31% but dropped to 14%), cabbages (21% - increase to 28%), and mushroom (32% - dropped to 11%) – however, they have all dropped in value terms. On the other hand, major fruit exports



Photo 1: Imported garlic in supermarket



have only slightly changed from mainly bananas (45%) and mangosteen (19%) in 1994 to more diversification - mangosteen (28%), mango (17%), papaya (11%), and citrus/oranges (9%). Some commodities that are imported also appear in the imported figures, which may be different types or re-exporting to another country.

1.2.2. Strategy and Program of the Horticulture Directorate General, Ministry of Agriculture

The key player in the Government of Indonesia directly related to horticultural production is the Directorate General (DG) of Horticulture. The Directorate General of Agricultural Processing and Marketing plays a key role in the marketing along with the Directorate General of Domestic Trade, Ministry of Trade. The DG Horticulture is keenly aware of the production and marketing general problems and has formulated a strategy and policy for horticultural sector development (2006), focused on output, quality, institutions, and human resource development, and more market access for farmers. However, this strategy which has a very production-oriented bias is now being revised to include a more market-driven approach. Key elements are discussed below.

Measures to Increase Production. Efforts to improve production are focused on the premier commodities that have high market demand and high economic value, through area extensification and productivity improvement. The premier commodities for FFV included in the program are: banana, mango, mangosteen, orange, durian, potatoes, chilli peppers, and shallots. The policy of expansion of production area is carried out through development of a regional complex of production zones. The development of horticulture production zones is done through initiation of commodity zoning, aimed at developing commercial production activities that create scale economies. The main key to the establishment of the zone is with the implementation of advanced technology aimed at increasing productivity, creating safe, high-quality products as well as guaranteeing product continuity.

- **Measures to Increase Product Quality.** Increase in the product quality is aimed to increase competitiveness, added value, and farmers' incomes. The increase in quality is related to food safety because of the increasing consumer awareness. Farmers are encouraged to implement Good Agriculture Practices (GAP)³, including integrated pest management (IPM), the determination of correct harvest time, implementation of HACCP and application of post-harvest handling and grading. Other measures include, control of horticulture pests to meet Sanitary and Phytosanitary Standards (SPS) and product safety requirements, and the development of seed systems to increase the availability of the high-quality seed of superior variety at competitive price and in accordance with market demand.
- **Measures toward Institutional Development.** Institutional development at the farmer level is aimed at forming farmer groups, the rural producer organizations, and co-operatives, so as to be able to play a role as the management of the industry and to empower farmers. unit in horticultural agribusiness, the processing industry and the marketing as well as could determine own problem and its solution. The institution is guided to be able to increase the income and the bargaining position of farmers. Moreover, a strong farmer's group could shorten the chain in marketing. A strong human resources development program is focused on training farmers and extension agents through the provision of manuals, apprenticeships field training, workshops, study tours etc. The DG is also looking to increase market information to farmers through information and communication technologies (ICTs).

³ A manual of GAP has been developed for important horticultural commodities.



Donor programs: There have been two initiatives aimed at the horticultural sector financed under the Dutch government: the Horticultural Research Cooperation between Indonesia and The Netherlands program, HORTIN, and the Horticultural Partnership Support Programme, HPSP. There are also activities under the research collaboration with the Australian Center for International Agricultural Research (ACIAR).

ACIAR has a major investment in management of banana diseases in Java and South and West Sumatra underway since 2006 (about \$2 million over 4-5 years). ACIAR has also done several years work on the almost-intractable problem of citrus greening disease in Java with two years to run as well as completed work on supply chain analysis of banana and mangosteen. More generically, and cutting across fruits and vegetables is a major (\$2m incl large GoI contributions) country-wide activity on fruit fly management that directly underpins export and domestic market competitiveness. In vegetables, the two main initiatives in Java include work on management of disease and quality in chili and a new \$ 1.5 m project on the potato/Brassica system⁴.

The Horticultural Research Cooperation between Indonesia and The Netherlands (HORTIN) program entails Dutch-Indonesian cooperation in strategic and applied research with the following goal: to strengthen Indonesian horticultural research through joint research, capacity and institution building so as to encourage research activities that are interesting for public-private partnerships. The program was carried out from January 1st 2003 to December 31st 2006, under a cooperative agreement between the Indonesia Agency for Agricultural Research and Development (IAARD) and the Ministry of Agriculture, Nature and Food Quality of The Netherlands. A follow-up program under the same name is planned, to be formulated in early 2007. This program will have a stronger target group focus, aiming at addressing the needs and potentials of small and medium-sized horticultural producers, including producer's organizations, by focusing on practical implementation at the level of farmers and agribusiness companies.

The Horticultural Partnership Support Programme, HPSP, is a partnership involving private enterprise, farmer organizations, NGOs and the public sector. It aims to promote small farmer access to horticultural supply chains whilst improving farming practices, notably in terms of sustainability (better soil, water and pest management, reduced deforestation and biodiversity loss) and food safety. Other goals are increasing household incomes and strengthening the position of farmers in the supply chain, a.o. through farmer organization and improved information supply. The project is financed by the Dutch development organizations and the Dutch Embassy. HPSP projects are financed on the basis of applications that have to meet a series of requirements, e.g., involvement of small farmers and preferably, their organizations, involvement of the private sector, and a role for government or non-government research and extension organizations. Reported outcomes are more environment-friendly farming practices, cleaner and safer production of horticultural crops, more direct market access through shorter marketing channels, and strengthened farmer organizations. First project results, reported for the projects that started the earliest, indicate that participating farmers have significantly increased their knowledge of good agricultural practice in horticulture and of adequate post-harvest handling. Also, market access has improved, in some cases through direct linking with retailers, and farmers are better informed of market conditions, notably demand and prices. Of those projects for which data are available indicators are that incomes have more than doubled. Achievements with regard to farmer organization appear to be mixed, in some cases full-fledged

⁴ John Skerritt, Dy. Director-General ACIAR, pers. comm. 2006



organizations (i.e., with statutes, internal regulations, task divisions, etc) have developed, in others the organization is much looser and informal. (See also Annex 1).

1.3. The Present Study: Research Issues and Gap, and Specific Objectives and Methods

1.3.1. Brief Review of the Research Issues, Literature and Gaps in the Literature

The agrifood industry (including retailing, wholesaling, and processing) has transformed extremely quickly and profoundly over the past decade in developing regions. There has been rapid diffusion of supermarkets, fast food chains, modern specialized/dedicated (to modern channels) wholesalers, and large-scale processors (Reardon and Timmer 2007). These trends have been intense in Indonesia as discussed in Chapter 2.

With rising competition, the modern food industry actors have initiated the development of modernized procurement systems (such as centralized, integrated procurement systems, global and regional procurement, the use of implicit contracts and private standards, the use of “new generation” specialized/dedicated wholesalers who manage supply chain governance, and have moved gradually away from traditional market channels’ reliance on spot markets and traditional brokers that dominated traditional product value chains). Extensive recent work has been done in the past five years on documenting both the food industry transformation and the concomitant emergent procurement system change, as well as its domino effects upstream in the agrifood system structure. (A review is given in Reardon and Timmer 2007 and Reardon and Berdegue 2006; for an example see Berdegue et al. 2005 for Central American horticultural supply chains.)

However, a major gap in research concerns whether and how the restructuring of product value chains, driven by food industry transformation, is affecting small farmers’ access to markets, assets, and incomes. There has been some initial work toward filling this major gap, the addressing of which is crucial to design of policy interventions to assist the poor in accessing dynamic markets.

Most attention has been paid to the process already intensively underway in the 1980s and early 1990s, that of agroexport booms since the start of globalization and market liberalization. For example, Carter et al. (1996) show that these booms had limited “inclusion” effects on small asset-poor farmers in Latin America.

Second-most attention has been paid to the effects of the transformation of agro-processing on small farmers, such as the extensive work on this topic in the late 1980s and early 1990s for example in Latin America by CEPAL and others, and by Swinnen and colleagues in Central and Eastern Europe in the dairy industry. This work tends to find a very mixed story, very conditioned on the structure of the farm sector, quality demands by consumers, and degree of restructuring of the processing sector, among other factors. For example, Swinnen and colleagues find small farmer “inclusion” in dairy sector restructuring in Poland, while Farina and colleagues at the University of Sao Paulo find sharp and extensive “exclusion” of small dairy farmers in that process.

By contrast, extremely little work has been done to date on the farm-level and local wholesale-level effects, especially in produce, of restructuring of the wholesale and retail sectors in the



domestic agrifood economies of developing countries in the past decade, despite now strong evidence of the deep restructuring. The scant new evidence emerging for fresh produce is summarized in the following material, drawn from Reardon and Berdegue (2006).

Reardon and Berdegue (2006) summarize the key points of six (tomatoes in Guatemala and Nicaragua, kale in Kenya, lettuce in Guatemala, guavas in Mexico, and produce in China) recent farm household surveys (based on samples of 150 to 600 farmers with an average of 300). The studies compare horticultural product producers participating in modern domestic market channels (in which supermarkets are key downstream actors) versus traditional market channels. While the evidence is still limited and very recent, the papers summarized are a major part of extant research on this issue and most have surprisingly similar findings. The findings are especially interesting because supermarkets are at the mere start of penetrating produce retail, but in dairy, meat, and processed foods have penetrated much further. That means the results presented here are “lower bound.”

All the studies examined cases (products and places) are where farmers had the option to sell either directly to supermarkets or indirectly to them via specialized/dedicated (modern, as distinct from traditional) wholesalers. Supermarkets in developing countries, just like in developed countries historically and now, source from a mix of (1) direct from farmers, (2) from specialized/dedicated wholesalers, and (3) from the wholesale market. The effect of supermarkets on farmers is mainly manifest where (1) and (2) have significantly emerged as sourcing strategies of supermarkets, as the supermarket is able to transmit through these channels their quality and other attribute requirements. In the case of direct sourcing it is obvious. As for the channel via specialized/dedicated wholesalers, they are agents of selection among farmers in order to maximize quality and minimize costs of product sorting and loss from damage from low quality produce and transaction costs from dealing with inconsistent quality and volumes. There is thus the potential for exclusion of farmers who do not “make the grade”. By contrast, if those sourcing strategies are still minor, and supermarkets source the great majority from traditional wholesale markets (as they did in Guatemala in the late 1990s, see Hernandez et al. 2007, or in China now, see Wang et al. 2006), then the effects on farmers are slight and indirect.

Supermarket sourcing evidence points to the important fact that supermarkets source only a minority of their produce directly from farmers, typically from 10 to 30% (for an analysis of retail procurement over products and sources, see Berdegue et al. 2005 for a Central American example). Supermarket chain buying agents prefer first to source from large and medium farmers if they can, but in most countries in all regions there are few horticultural products that medium/large farmers produce for the domestic market. An example is bananas in Central America, tomatoes in Mexico, papaya in Brazil, and potatoes in Indonesia. When supermarkets turn to source from small farmers directly, which is rare, they do so from RPOs. Recent research shows that for RPOs to have staying power in supplying supermarkets, they need hard and soft assets and good management and organization, and few RPOs have that package. But it will take RPOs’ having that package for this sourcing method to grow.

The data (for the products and countries studied) indicate that insofar as the extent and type of “exclusion” as evidenced by the differences in characteristics between supermarket-channel farmers and traditional-market channel farmers is concerned, the key point is that in general, there is substantial evidence of the exclusion of asset-poor small farmers from supermarket channels (direct or via specialized/dedicated wholesalers). Only the top tercile of asset-rich small farmers tend to participate. That excludes the lower two-thirds of the small farmers. The



only type of small farmers that are included are in the same land size range as the other small farmers (the included are merely at the upper end of the distribution of land sizes of small farms in a given country; hence the “included” lettuce growers in Guatemala have 1 ha instead of the 0.5 ha farm that the excluded have).

It is important to note that in all regions, small farmers are not excluded on the basis of size of their landholding or land tenure, except when these factors affect the farmers’ capacity to implement certain technologies that in turn have an impact on quality, productivity, costs, or the ability to plant and/or harvest at the needed times during the year. Rather, the included also have more education, more access to infrastructure (roads, transport), have prior holdings of irrigation, and other physical assets, depending on the product, such as wells, cold chain, greenhouses, and good quality (uncontaminated) irrigation water. If they are selling to a specialized wholesaler, they do not usually have the asset of an RPO. If they sell direct, they have a good one. The mass of excluded, such as most of the traditional tomato farmers in Guatemala and Nicaragua, lack these assets.

Reardon and Berdegue (2006) find only two categories of exceptions. The first is where procurement modernization is as yet insignificant, and there is a cap on farm size and a relative evenness of asset distribution. In their set of six studies reviewed, only the China case fits that. The second is where NGOs have “assisted” (implicitly or explicitly subsidized) the participation of the asset-poor small farmers (in fact by alleviating that asset poverty). Only the Nicaragua tomato case, for the case of the lead chain only, fits that. However, most of the studies show that the supermarket-channel producers hire substantially more labor, most of which are the asset-poor small farmers, and thus the net effect on the asset-poor can be mixed.

Finally, farmers in the supermarket-channel tend to earn substantially more (from 10% to double) in net terms, so the payoff to making the “threshold investments” is substantial. In sum, apart from the small share of farmers who sell to the supermarkets directly, those who access the supermarket channels the main way, through specialized wholesalers, tend to be the asset-elite among small farmers. However, the impact in the early stages of supermarket penetration, on exclusion of asset-poor small farmers should be placed in the context that typically only 10-30% of the farmers are selling via the modern channels. That number will continue to grow (from being nearly zero only a decade ago), and that will create a relentlessly increasing market challenge for the asset-poor.

This new evidence is enough to have already made this issue of high interest to policymakers in the study countries and beyond, as it impinges directly on the debates about how to design asset-building and market access programs and policies for poor farmers.

1.3.2. Research Questions and Hypotheses

Indonesia has a horticulture sector highly dominated by small farmers and has recently experienced rapid food industry restructuring. The questions cover the range of categories of food industry transformation (hence, export market, retail, wholesale, and processing sector transformation) facing small farmers.

The first set of research questions comprises the specific extent and nature of the restructuring of the product value chains, and what are the determinants of that restructuring. To what extent



is the restructuring (such as change in procurement institutions and organization, as discussed above, and the extent of consolidation and multinationalization) driven by export or domestic retail transformation, and how do government policies condition that restructuring?

The second set of research questions comprises the determinants of participation (hence inclusion or exclusion) of small farmers in the restructured market channels. What specific roles do the range of assets play, both as to types, and as to threshold investments needed to meet the requirements of the restructured value chains? How do small farmers' organizations, including their specific design, condition that participation? How do government policy and development programs condition that participation?

The third set of research questions comprises the asset and income effects of market participation, in the modern versus traditional channels. What are the costs and benefits, including risks, of participating in the differential channels?

The determinants hypotheses to test in the project are that assets, organizational design, and policy and institutional design are key determinants of inclusion. The specific hypotheses are a function of the product, country, and setting. The outcomes hypotheses to test are that participation in modern channels provides net benefits and lower risk than in traditional channels.

The final set of questions comprises policy implication questions. What are the program and policy design implications for effective government and donor actions (such as extension, irrigation investments, and so on) and private programs to address challenges facing small farms and firms seeking to be "included" in the restructured markets? What are technical assistance activities that, if replicated in part or in whole, would assist government/donor/private sector in profitably linking small farmers to the restructured markets? The answers to those questions will result in better designed policies, programs and technical assistance projects.

1.3.3. Research Methodology and Activities

The study focuses on the rise of supermarkets, the changes in their procurement systems for FFV, the impacts of that transformation horticulture supply chains at a macro level and for the case of West Java, and the impacts on farmers. The study focuses on tomatoes as a case study at the meso and micro levels.

The methodology consisted of: (1) key informant interviews with supermarkets, wholesalers and selected smallholder farmers or farmer organizations along the product value chain (in this study, it is the case of tomato); (2) field surveys of farmers participating in various market channels (including to: (a) export markets directly or through specialized wholesalers, (b) processors (modern or traditional), (c) directly to supermarkets, (d) specialized/dedicated wholesalers for supermarkets, (e) "transition" category wholesalers (modernizing traditional wholesalers), and (f) traditional wholesalers and brokers); (3) focus groups with farmers associations, and other stakeholders, as well as participatory rural appraisals (PRAs) to understand the policy, organizational, institutional, and socio-cultural context of the study areas and the constraints and opportunities in the markets and at production level perceived by the actors in the chains.

Specifically, to examine the transformation of the retail market, six supermarket chains were interviewed in April 2006, and a number of other key informants (in government and in retailers and suppliers associations). To examine the wholesale market in particular with respect to



its restructuring in view of the rise of supermarkets, managers and wholesalers in the main wholesale markets in Jakarta and Bandung, as well as a further 11 specialized wholesalers selling to supermarkets and farm companies were interviewed.

To examine the impacts of the transformation of the market at a local level, West Java, the leading “vegetable basket” in Indonesia for the domestic market was selected. A number of kabupatens (districts) and within them kecamatans (sub-districts) were selected for interviews with wholesalers and key informants in the local governments using a local area survey. Eight Participatory Rural Appraisals (PRAs) were carried out in those areas to ascertain changes in the horticultural economy in general, and the tomato economy in particular, occasioned by the retail transformation and other important changes.

Finally, to examine the impacts of the market changes on farmers, a field survey of 600 tomato farmers in the West Java area was carried out that examined the determinants of their market channel choices and the impacts of those on technology and farm incomes.

The field work took place from March through November of 2006, from design and start of field surveys to final analysis and write-up. The work took place collaboratively between Padjadjaran University in Bandung and Michigan State University in the U.S., with additional collaboration from the Center for Agricultural Social Economics Research and Development, Bogor.

The introductory chapter is followed by Chapters 2 and 3 that discuss the rise of supermarkets, the evolution of their FFV procurement systems, and the emergence of new actors in the supply chain who coordinate at the field level the supply to supermarkets. Chapter 4 presents the details of the design and the results of the farm-level study including a detailed tomato value chain analysis. Chapter 5 presents policy implications.



The Rise of Supermarkets in Indonesia

2.1. Introduction

This chapter focuses on the recent (mainly over the past decade) transformation of the retail sector in the form of a rapid take-off of supermarkets⁵ in Indonesia with a focus on horticulture products but touching on other products for comparison.

2.2. Food retail change in Indonesia – in global comparative context

In this section the main trends in food retail are outlined in Indonesia, and for each major trend, compared to the global context (drawing on Reardon and Timmer 2007) for that category of trend to see whether and in what ways the experience of Indonesia is a shared one internationally or whether it has elements unique to Indonesia.

Goldman (1974) noted the emergence of domestic supermarket chains in a number of countries due to various demand side factors (rising incomes, urbanization, increasing opportunity cost of women's time in large cities). However, this was a very limited phenomenon – limited mainly to large cities, upper middle or rich consumer segments, and an affair nearly exclusively of domestic-capital chains. This characterization is shared by the supermarket sector in Indonesia up through the 1980s.

In extreme contrast, a “supermarket revolution” in developing countries “took off” in the early/mid 1990s. Supermarkets then rapidly spread from that initial niche base over cities and towns, socioeconomic strata, and product categories. There was an avalanche of foreign direct investment (FDI) and the massive entry of foreign chains was an important, if not the most important, spark in the revolution. The “take-off” was created by a confluence of demand (income growth and



urbanization), policy (retail FDI liberalization and restrictions on traditional retail), and supply side factors (mainly procurement system modernization that played the central role in cost and thus price reduction and allowed the expansion beyond a narrow niche/high income/ market). Again, as noted above, the “drivers” were largely shared in the Indonesian case.

The spread of supermarkets has and is taking place in three established waves, and a fourth emerging wave. It is clear that Indonesia fits into the “second wave” – later than such countries in the region as South Korea and Thailand, but earlier than others like Vietnam and China and India.

The “first wave” developing countries experienced supermarket-sector “takeoff” in the early to mid 1990s. These include the large countries of South America and East Asia outside China (and Japan), Northern-Central Europe and the Baltics, and South Africa. In these countries, the average share of supermarkets in food retail went from roughly only 10-20% circa 1990 to 50-60% on average by the early 2000s. There is a second set of countries perched at the tail end of the first wave and near the start of the second wave, with their “take-off” in the mid 1990s, such as South Korea and Thailand with roughly 50% shares (of supermarkets in food retail).

The second-wave countries include Mexico and much of Southeast Asia, Central America, and Southern-Central Europe. In these areas, the share went from circa 5-10% in 1990 to 30-50% by the early 2000s, with the take-off occurring in the mid to late 1990s.

The third-wave countries include countries where the supermarket revolution take-off started only in the late 1990s or early 2000s, reaching about 10-20% of national food retail by circa 2003. These areas include parts of Africa, some countries in Central and South America (such as Nicaragua), “transition east Asia” (China and Vietnam) and “transition eastern Europe” (Russia, Ukraine).

Moreover, international patterns (over developing countries) show the following trends within a given country; note that Indonesia’s recent experience in the following domains fits closely the international experience:

- (1) Supermarkets tend to start in large cities, and then spread to intermediate cities and towns, and then to small towns in rural areas.
- (2) Controlling for the pattern of spatial diffusion, there are similar waves of diffusion over socioeconomic groups cum consumer segments.
- (3) Obeying the same business logic as in spatial diffusion, supermarkets focus first on upper income consumer segments (national and expatriate), and then move into the middle class, and finally into the markets of the urban poor.
- (4) As modern retail spreads, there tends to be format diversification to facilitate the spatial and consumer segment differentiation. For example, to penetrate the markets of inner cities and small towns where space is limited and product assortment can be narrower, chains use discount stores, convenience stores, and small supermarkets.

Hence, at earlier stages of supermarket development, the freshness, convenience (near consumer residences), and lower cost of small produce shops and wetmarkets easily dominate produce retail. This changes over time as supermarkets modernize vegetable procurement (see below), imitate wetmarkets in marketing techniques, and make gains in commodity vegetables. While a companion study is examining this question empirically, evidence indicates that the patterns of



shopping-by-location are probably similar to what was found recently in large cities in China by Goldman and Vanhonacker (2006), who show that that modern retailers have a retail market share of 94% in non-food, 79% in packaged/processed goods, 55% in baked goods, 46% in meat, 37% in fruit, 35% in poultry, 33% in fish, but only 22% in vegetables. Another study, in Hong Kong, at a later stage, show supermarkets having a 59% share in fruit retail, but only a 55% share in vegetables (hence a share similar to supermarket penetration of produce retail in Brazil), 52% in meat, 39% in poultry, and 33% in fish (Coca-Cola Retailing Research Council Asia 2005).

2.2.2. The Indonesian Experience

Figure 1 shows the diffusion of supermarkets in Indonesia from 1970 to 2005. There were three distinct periods. The first and second periods were in a general period that can be termed the “pre-takeoff, domestic cycle” period before 1998. From roughly 1970 to 1983, the supermarket sector in Indonesia was a tiny niche serving expatriates and upper-class Indonesians mainly in Jakarta. Supermarket diffusion became rapid from a very tiny base starting in 1983 and then peaking in the early 1990s and then declining by the start of the crisis in 1997. This second period was fueled by overall growth translating into rapid growth in upper-class incomes in Java. This first growth spurt of supermarkets was nearly only of domestic capital retail and was still focused on the upper income segments mainly in Jakarta and a few other large cities on Java where the “New Order” growth was concentrated.

The third period was the veritable “takeoff period” of supermarkets when the sector moved from a tiny niche to a large sector and looks set to grow quickly for some time. Several factors appear to have driven the rapid supermarket growth observed since 1998.

- (1) Various socioeconomic “demand side drivers” were in place: (a) there has been very rapid urbanization: while 42% of population was urban in 2000, the urban share was only 31% in 1990, and 22% in 1980. Extrapolating from the urbanization rate during 1990 to 2000, that would make the urban share in the population about 50% by 2006 (b) real GDP/capita has grown 3% per year on average over 2000-2004 (PlanetRetail 2006).
- (2) The demand-side drivers would appear to be necessary (and were present before the “take-off in 1998” but not sufficient. There was in addition a massive investment-side spur. As part of the economic recovery program negotiated with the IMF, retail foreign direct investment (FDI) was liberalized in 1998. The Indonesian government had closed the retail sector to direct foreign investment since 1969 in the effort to protect local retailers.

However, there is a loophole in the regulation to enter the Indonesian market through franchise and technical arrangement with local companies. The aggressive entry of foreign retailers took place after the economic crisis that hit Indonesia in 1997. The Indonesian government in January 15, 1998 signed a letter of intent with the IMF stating that the Indonesian government should revoke the ban on foreign investors’ entering the wholesale and retail businesses. Later, the opening to foreign investors was legalized by a Presidential Decree No. 99/1998 and a Decision Letter of the State Minister of Investment (Head of Capital Investment Coordinating Board) No. 29/SK/1998. The regulations stipulated that licensing procedures and all other requirements that a foreign retailer has to fulfill are the same as those applicable to local large-scale retailers. Interestingly, unlike in the Philippines where FDI liberalization was bitterly contested and



slowed (until 2000) by traditional retailers associations (see Cabochan 2005), in Indonesia there was relatively little opposition, perhaps because it occurred as part of the policy package applied during the crisis.

This led to a rapid influx of FDI in retail, and competitive investments by domestic retailers just as it had in dozens of other developing countries that liberalized retail FDI in the 1990s as part of various structural adjustment and trade liberalization programs (Reardon and Timmer 2007). The subsequent economic recovery, the low cost of investment (relative to home markets), and the liberalized FDI attracted foreign modern retailers to Indonesia, initiated by the entry of Continent and Carrefour (French retailers) which introduced the “hypermarket” concept. Other foreign retailers entering at that period were Wal-mart (who left with the economic crisis but now is apparently planning return) and Giant (Dairy Farm of Hong Kong). This period may be said to be the initial period of multinationalization. This ratcheted up sharply competition by the end of the 1990s and the early 2000s, which induced some consolidation in the retail market, for example, Continent was acquired by Carrefour, Hero Group acquired Tops (the Dutch Ahold), and Hero Group joined Giant to establish Giant hypermarket. Besides business consolidation, a change in modern retail format orientation also took place; i.e. the Matahari Group that previously grew in a department store business format developed a hypermarket format under the name of Hypermart. Local retailers such as Yogya, which started in Bandung as a department store also, developed a supermarket format under the name of Griya, and later a convenience store format under the name of Yomart.

- (3) Investment in urban real estate also developed rapidly after near collapse in the crisis, and real estate market access is crucial to rapid supermarket diffusion.

The rate of growth of the supermarket sector in the “take-off period” has been rapid. From 1997 to 2003, supermarket sales grew 15% per year on average – versus only 5% per year for traditional retailers (Rangkuti, 2004).

Table 2.1 shows the shares of supermarkets/hypermarkets, and chain convenience stores, hence the modern retail sector, in total food retail in the past five years, based on ACNielsen (2004). Note that ACNielsen does not cover FFV in its database, so these figures cover the processed and semi-processed products and some fast-moving nonfoods. The share of modern retail in the retail market was 21.6% in 2000, and had rocketed to 29.6% by 2004, or an increase of 8% within only 4 years (2000-2004) based on 47 items surveyed in Jakarta. That was a share of an expanding pie, but still, the share of the traditional retailers correspondingly dropped by 2% a year. This rate implies that at the time of this writing, the share of modern retail is about 35% in Indonesia (approximately the same as Thailand in the late 1990s, South Korea in the mid 1990s, or Guatemala a few years ago). While chain convenience stores are numerous, their small size compensates and the overall share of chain convenience stores is only about a quarter of modern sector sales. (This is typical, and even slightly high, compared to other countries.)

Table 2.2 shows the top 8 retail chains in Indonesia. There is no reliable source of information about all the retail chains in Indonesia, so there is currently no accurate way to assess the concentration ratio. In general, retail experts agree that the concentration ratio is still relatively low, with many small chains and independent supermarkets beyond these top eight, and thus the modern retail sector is still significantly fragmented. However, an examination of the top eight is revealing of several key aspects of the frontrunners, points as follows.



- (1) The total retail banner sales of the top 8 are 4.3 billion USD. The ratio of sales of the first to the last ranked is only five times. But if one looks only at the top 7, the ratio of the first to the last is only 2. This indicates roughly that there has not yet been a process of marked consolidation. A key informant (retail expert for USDA/Indonesia) noted that the modern retail market is far from saturated, and that Indonesia is in a period of “proliferation of chains” (not yet at a consolidation stage). The many new small chains of supermarkets are going to the areas not yet dominated by big chains, and that there is “lots of room to expand.”
- (2) There are two types of domestic-capital leaders. The first is the old domestic chains with department store roots, and the second is the convenience-store focused chain. Matahari is leaving that image behind and conforming to the Carrefour and Dairy Farm/Giant models of emphasis on hypermarkets; in fact our interviews revealed that whereas Matahari is shutting down supermarkets and department stores, Matahari hypermarkets are under rapid expansion, with the chain adding one a month, which is a remarkable expansion given the size of these stores (each of which has 7 million USD of sales on average (note that Carrefour’s are about 30 million each), versus an average supermarket with 2 million dollars of sales a year). Hypermarket sales doubled over just the past year for Matahari.
- (3) Moreover, the convenience store chains are opening many stores in the smaller cities and even rural towns, to the point where there are now complaints from the West Java government about ruinous competition from the new convenience store chains, as conduits for goods from imports and large-scale domestic processing firms, with small-scale local firms in rural towns (Dinas Perindustrian dan Perdagangan Agro, Government of West Java Province).
- (4) The average growth of chain sales was 160% over the five years, a rapid growth rate much faster than income/capita growth.
- (5) Smaller, provincial chains were also growing very fast. For example, Yogya (based in West Java) had only 25 stores in 2002, and 47 supermarkets and 1 convenience store in April 2006 – a near doubling of stores. A smaller chain, Borma, also based in Bandung, started in 1980, but only started its rapid growth in 1998 in the “takeoff period”; it had 15 stores in 2000 and now has 20 stores.
- (6) Several of the chains, such as Makro, have important cash&carry operations. These are basically wholesalers selling to small shops and restaurants (the latter category rising very sharply in the past few years) and competing with the wholesale markets. Makro noted that some 20% of their sales are direct to consumers as retail.

There are several factors that indicate that this trend will continue, and that by 2010 nearly half of food retail will be through supermarkets (converging with the situation in Mexico or Thailand today). As supermarkets spread in Indonesia, several patterns in their diffusion emerge.

- (1) Supermarkets are spreading beyond the upper income niche into the middle class (consumer segments A and B, in retail parlance) and starting in the markets of the C and D consumer segments (the lower-middle and working-poor). This is happening faster and earlier in processed products compared to fresh products. This mirrors the international experience.



GAPMMI (Indonesian Food and Beverage Association) noted that some 60% of the Indonesian population is targetable by supermarkets via various formats and mass market pricing. 40 million consumers, or 20% of the population, are consumers “A & B” (upper and middle) who are (up to now) the bulk of the shoppers in modern retail now. Another 40% of the consumers, the lower middle class and working poor, the C’s, will easily be brought into modern retail as the prices are driven down in modern retail with competition and procurement modernization. However, the balance (40%) are rural poor and a small part of urban, that will stay outside of the modern retail for a long time, served by wetmarkets and small shops.

Yogya, a chain of 48 stores based in Bandung, illustrates this point. In addition to their regular lines of processed and nonfood products, before 2000, they sold fruit, but not vegetables (selling vegetables has an implication of starting to compete with the traditional sector on fresh). They noted that the year 2000 was the real “borderline” after which they started to sell meat, dairy, and vegetables instead of just a bit of imported fruit to “A” customers only. They noted that after 2000 there was a clear demand change; shoppers in not just the A segment, but by 2000 on, also B’s and C’s started to use supermarkets and become important clients. They noted that there is different buying behavior of the segments; the A’s and B’s regularly buy their produce (of all types) from the supermarket; the C’s (the lower middle class, upper working class) buy produce mainly when it is on “promotion” and thus discounted prices that compete with the wetmarkets. Yogya reacted by expanding its line of grades/prices; for example, in 2000, they only had grade A tomatoes at a high price; now they sell both grade A and grade B tomatoes at sharply different prices to appeal to the spectrum of A-C shoppers. Borma, a small local chain in Bandung told a similar story.

- (2) Supermarkets are spreading beyond the Jabotabek (Jakarta, Bogor, Tangerang, Bekasi) area into other large cities first on Java and then on other islands, and then into secondary cities on Java and the other islands, and finally recently into small towns (via convenience stores and small supermarkets) on Java. While nearly all the supermarkets were in Jabotabek (the greater Jakarta area) in the mid 1990s, by now only 60% are. This, again, mirrors the international pattern. This pattern occurs even in a given province; for example, Yogya chain focused only on Bandung some 5 years ago but now has stores peppered around the secondary and tertiary cities in West Java.

The result is that most of the larger chains have operations now that extend not just over provinces on Java, but over islands. Examples: (1) Matahari hypermarket division has hypermarkets on 7 islands: Java, Sumatera, Sulawesi, Batan, and recently Kalimantan; (2) Makro started in 1992 with 3 stores (2 in Jakarta, 1 in Surabaya 1); they now have 19 stores, only 7 of which are in Jabotabek.

However, there is one aspect of this change which is, while not unique, certainly pronounced in Indonesia relative to other countries. That is, it is common for different regions of a country to experience supermarket development (and inter-product-category penetration) at sharply different paces. That is because those regions differ sharply in the conditions we termed “drivers” above. Hence there are waves of diffusion inter-regionally in a country just like there are such waves inter-nationally. Because of the extreme transaction costs between islands in Indonesia, and the very sharp differences in degrees of development over them, the “waves” are spaced perhaps further apart in time in Indonesia than in non-archipelagic settings.



- (3) FFV were of minor importance to supermarkets in the 1990s. The great majority of our retail informants note that FFV has gone from a tiny share of supermarket sales in 2000 to a moderately important section today, and is growing. Some observers note that there are signs of the produce section entering the “strategic” status; this is signaled by leading chains moving the produce section from the back of the store to the front. This mirrors similar “inflection points” in other countries.

For example: (a) Matahari supermarkets have about 25% fresh products (meat, fish, FFV), and 65% groceries, and 10% nonfood. Their hypermarkets have 20% fresh, 50% groceries, and 30% nonfood. Of fresh products, FFV are about one-third – that is, 8% in their sales today versus 6% five years ago. (b) The regional chain, Yogya, noted that it only sold fresh food starting in 1990 (a decade after the chain started), and then started selling fruit only in 1995/96, selling only very small amounts of fruit, mainly imported. They noted that they increased radically their sales of FFV from 2000. By 2006, 11% of their total sales (similar for example to supermarkets in Mexico today) are fruit (8%) and vegetables (3%); (c) Makro had a 40% increase in sales of its entire fresh category in 2005 alone, and a 30% increase in FFV specifically. Produce is 25-30% of fresh food; fresh food is 25% of their total sales. Five years ago fresh food was only 10-15% of Makro. 75% of the fresh food goes to hotels, restaurants, catering (Horeca) now. Five years ago they did not sell to Horeca. So it is the food service segment driving their fresh. (d) Borma (small regional chain) sold no FFV in 2000, started their FFV line in 2001, and now FFV sales constitute 8% of their sales.

- (4) The corollary to the above point is that the share of supermarkets in total retail of FFV has grown. However, it is difficult to ascertain with precision how much it has grown and what the share is today. Partly this is because neither ACNielsen nor APRINDO nor any government agency follows the market segmentation of FFV. Partly this is because it is risky to apply some ratio to the supermarket share of food and other fast moving groceries estimated from survey data by ACNielsen – because the share of FFV in supermarket sales differs over chains, as we see above. Estimates are provided by the respondents in this study. Most of the retailers and specialized suppliers agreed that roughly 15% of the FFV retail market is now dominated by supermarkets, and that just 5 years ago that figure was at best 5%. They all agree that it is growing. Some estimated higher shares, such as APRINDO’s estimate of 20%. In general, this estimate mirrors what is happening in most other developing countries: that the share of the FFV market is about one-half of the rate of penetration in the overall food market.
- (5) Based on the interviews, a rough estimation of the order of magnitude of current supermarket sales of FFV in Indonesia indicates that even at this early stage, supermarkets in Indonesia sell an estimate of 500 million dollars (5 trillion rupiah) of FFV per year or 1.5 billion dollars of all fresh foods. From that value, 300 million dollars was imports and 200 million was local produce. That was larger than exports of FFV from Indonesia in 2004.
- (6) The imported share of the FFV sold in supermarkets in Indonesia is surprisingly high. According to the fresh manager of major retailers, about 65% of FFV sales of supermarkets are fruit, and 35% vegetables. Roughly 60-80% of the fruit sold are imported, but only about 15-20% of vegetables are imported, although that can rise to 50% in certain seasons. In general, about 60% of FFV sales are from imports, which is roughly twice as high import shared as in comparable countries (such as Mexico, China, Guatemala).



Interestingly, most of the interviewees noted that rather than falling, the share of imports in total fruit sales is rising. In Giant for example, fruit constitutes 70% of FFV sales; now 80% of their fruit is imported, while 5 years ago that share was only 60%. There is a remarkable constancy of these shares across stores in Jakarta, and the shares tended to be a bit higher in Bandung. There were no major differences between foreign and domestic chains in terms of dependence on imports; the larger chains seemed in fact to rely less on imports than did the small chains. For example, the small chain Borma has 50 SKU's (a very small produce section, compared to some 300 SKUs for a larger chain)), of which 90% are fruit of which 70% are imports; 10% of the FFV section are vegetables (all local except now imports of Chinese carrots).

In general, the reason for the dependence on imports is that the supermarkets feel they can get the same or better quality for lower prices mainly from China and Thailand. The essential point is that these latter countries are simply doing a better and better job at selling their fruit and vegetables to Asian supermarkets. There are also some products from other countries such as oranges from Pakistan, onions from Australia, and so on. While some of the fruit is imported off-season, there are many items that are imported at the same time as these items are available (but at higher cost or lower quality or simply less consistently) locally.

There is also a remarkable consistency across the interviews about what kinds of products are being imported. Regarding vegetables, there are around 10-20 SKUs imported from China, mainly of garlic, broccoli (Chinese and western), carrots, leeks, celery, brussel sprouts, chestnuts, and bean sprouts. Regarding fruit, the retailers noted that there is massive growth in their sales of Chinese oranges (as they are better and more consistent quality and cheaper than local Medan oranges). Supermarkets also sell lots of Chinese pears and apples, Thai durian, and some US grapes.

- (7) The supermarket FFV section has relatively concentrated sales in a small number of items. For example, in Matahari hypermarkets, 80% of the volume is from 70 SKUs, while another 20% of the volume from another 370 SKUs. The top vegetables and fruits sold are generally similar across retailers. For example, Giant's (Bandung) top seven vegetables are: (1) imported carrots (better in terms of consistency and quality than the local carrots); (2) local shallots; (3) local potatoes; (4) local carrots; (5) local tomatoes; (6) imported onions; (7) local garlic. The top 7 fruits: (1) imported lukam from China; (2) imported apples from China; (3) red glow grapes from the US; (4) mandarins from Pakistan; (5) Pears from Shandong China; (6) yali pear (China); (7) skyrocket melon (local or imported). For Yogya, a regional chain based in Bandung (sales of 15 billion rupiahs of FFV per month), the top 5 fruit are: local mango, local citrus, and cavendish banana, and the rest imported; the top vegetables are: imported carrot, local garlic, local potato, local tomato. They, and other retailers, have added organic and low pesticide products lately and that market is growing.
- (8) Most of the retailers interviewed see at present each other as their main competitors, but they are also trying, gradually, to win over the mass market. For example, Carrefour has "wetmarket days" and also have a regular promotion (high discounts on main FFV items) on the weekends. For most of the retailers, the promotion campaigns were led by imported FFV as those are often cheaper.



Supermarket Produce Procurement Systems and their Links to Wholesalers and Farmers in Indonesia

3.1. Introduction

This chapter focuses on the recent (mainly over the past half decade) transformation of: (1) the leading supermarket⁶ chains (Matahari, Carrefour, Giant/Hero), a smaller national chain that is mainly wholesale/cash & carry (Makro), a brief interview with small chains in Jakarta (Sogo, and some prior interviews with Ranch 99), and several smaller regional chains (Yogya and Borma in Bandung, and a prior interview with Sinar from Surabaya); produce procurement systems (and thus interface with the wholesale and farm sectors) and (2) of the wholesale sector, in particular the emergence of specialized/dedicated wholesalers. Again, the focus is on horticulture products but other products are also touched upon for comparison. The companies interviewed and the literature reviewed are detailed in the annexes.

3.2. *Traditional procurement systems shared between the international experience and Traditional Retailers, of “Traditional supermarkets” and of part of modernized supermarkets in Indonesia*

The “traditional” procurement system of supermarkets in the international context of most developing countries was common to most chains until recently (with variation over chains and product categories and countries). That traditional system did not differ much from the procurement system also used by traditional retailers: (1) each store procured its own products or one store was used as an entrepôt for a few neighboring stores; (2) products were procured from the traditional wholesale markets; (3) retailers relied on spot markets rather than on contracts with suppliers; (4) retailers relied on public quality and safety standards where they existed.



The Indonesian experience has some characteristics in common with the above international experience in terms of both the traditional retail procurement system (from the traditional wholesale market) and of the “traditional” supermarket – (distributing store-by-store from the traditional wholesale market, either sending their own trucks to that market or receiving store by store the deliveries of the wholesalers based in that market or coming in from the field).

Given the centrality of the traditional wholesale sector in the above system, this is discussed in more detail in this section. As noted in Chapter 2, given that only 15% or at most 20% of the FFV market is dominated by supermarkets in their incipient penetration of the fresh category, the wholesale market (both as physical entities such as Kramat Jati in Jakarta, or as the aggregate of many brokers and wholesalers working between the field and the market or the consumer) is obviously still by far the most important market entity in FFV.

The general structure of the wholesale sector in Indonesia is similar to other developing country situations: there are networks of small traders and medium/large wholesalers operating in the field buying from farmers; the product then passes through several sets of hands until it reaches the retailer who might be a small shop in a city, a stand in a village, a street vendor with a push cart, or a covered or uncovered marketplace. One of those sets of “hands” may be the actual “wholesale markets” such as Caringin in Bandung or Kramat Jati in Jakarta. There are no current estimates (and estimating this is beyond the scope of this study) of how much of the FFV produced or imported passes via the “wholesale markets” versus “off-market” channels (bought and sold by wholesalers/brokers from source to retailer without the intermediary having a location in a wholesale market).

There is evidence of modernization, mainly in the form of consolidation, of the wholesale sector at the local level, for example in West Java, with the rise of larger wholesalers (not to mention specialized/dedicated wholesalers for the modern segment) and a relative decline in the share of the small brokers in the field. This differentiation within the wholesale sector at the local level is similar also to what is occurring in other developing countries, such as in Mexico (for the guava sector case see Berdegué et al. 2006).

Moreover, in most countries there are large traditional wholesalers who have a foot in-market (a location at the wholesale market) and a foot off-market. Examples of these in Indonesia are the large importer-wholesalers, and the inter-island traders (sometimes an overlapping set). These actors are usually important in very large countries with vast distances between import or production point and final sales point; Indonesia more than qualifies in that regard.

Also, as is common in many developing countries, most of the wholesale markets were built by the government in the past several decades and still managed by the local governments. An example is Kramat Jati in Jakarta (the largest wholesale market in Jabotabek). It was founded in the 1970s, has 14.7 ha and 3653 stalls now (they plan to add 890 next year to reach 4619) - although that does not tell us how many wholesalers operate there as is substantial multiple rentals and sub-rentals. According to the management, there are 2186 fruit and 2433 vegetable stalls, and 1865 owners. The stalls are small, about 11 square meters each. The market deals only in produce. By local law it is the required wholesale market entry point (if a wholesaler or broker wants to sell to a wholesale market) for Jakarta (and then distributes from there to other major and minor wholesale markets). Most of the input is from fields in Java, but some produce from other islands and a large quantity of imports pass through it via large wholesalers engaged in imports and inter-island trade, as noted above. In fact the largest wholesalers there are the fruit



importers, of which there are perhaps six. Judged far too small and antiquated, its renovation nearly started in 2002, but was delayed due to conflicts over fees between the wholesalers and the management, and it is planned for the renovation to be finalized in 2007. 70% of the sales go to Jakarta (much of it via the 151 smaller wholesale markets (Pasars), 20% to Botabek, and 10% outside. A small percentage is exported from the market. While the Kramat Jati market might sound big to the reader, it is small by international standards, relative to the market it serves. (See Box 3.1)



Photo 2: Inside View of New Kramat Jati Central Market (PIK)

Box 3. 1: Wholesale Markets: Jakarta vs Mexico City

The Jakarta area has 7.5 million consumers and the Botabek area another 8.7 million, and then the rest of the area served is roughly 3 million – in all nearly 20 million persons. The Kramat Jati market moves 1200 tons/day of fruit and 1500 tons/day of vegetables. 400 five-ton trucks per day move through, as do 200 pickups of 1.5-2 tons per day, and 8 trailer trucks per week. Compare the volume moved through Kramat Jati with that of the Mexico City Wholesale Market – also serving a population of say 20 million persons. But it is far larger and moves a far larger volume of produce. www.ficda.com notes that it is the largest in the world. It is 2.25 kilometers long at its longest, with two entrances. It covers 304 ha, receives 20,000 visitors a day, and moves 30% of the produce of the country of 100 million persons; 52,000 vehicles enter it per day. It has a combined direct employment of 70,000 persons. There are 1,881 fruit and vegetable stalls, 338 of grocery/dry goods, and 111 of meat and poultry.

Retailers with international experience note that the market and the wholesale markets in general in Indonesia, are well below the capacity and efficiency of wholesale markets they have worked with in comparable countries. This is an issue and constraint for horticulture market development in Indonesia. Specific challenges that the modern retailers see in the wholesale market are presented in section 3.4.

Some large wholesale markets are privately owned, such as Caringin in Bandung. This wholesale market is much more recent than Kramat Jati, as it was built in 1999. It has 4000 vendors, and the management said that it handles 30 billion rupiah/day of produce, and its “market-shed” is to supply 12 kabupaten (with 650 markets) in West Java. It has 792 stalls of vegetables, 79 of fish, 650 of fruit, and 150 of rice, groceries, and meat. It covers 15 ha. According to the management, about 30% of the wholesalers are also farmers. Substantial volumes of imports pass through Caringin, such as grapes, apples, and oranges, as well as onions. Again, given that Caringin serves a city of 4 million, but a large province with millions more around it, and it only has a third of the stalls of Kramat Jati, it is relatively small (compared to the market-shed it serves) by international comparison standards (with other developing countries).



Photo 3: Wholesale market in Caringin, Bandung



Photo 4: Entrance, Caringin Market, Bandung

3.3. International experience as context: Emerging Modernization of Procurement Systems and Implied Challenges for Suppliers

This subsection draws on Reardon and Timmer (2007) and Reardon and Berdegue (2006).

As retail FDI poured into developing countries over the past decade, and domestic chains made competitive investments, and surviving traditional retailers worked to compete on cost and quality, retail competition soared. Competing meant reducing costs in order to penetrate the mass market, and raising quality to hold on to and deepen the market among middle class clientele. A crucial instrument of reducing costs and raising quality is modernization of procurement systems to achieve efficiency gains, economies of scale, and coordination cost reductions.

Supermarket chains in various developing countries have expressed problems with the ability of the traditional procurement system (based mainly on the traditional wholesale system, discussed above) to enable them to meet their quality upgrading and cost reduction objectives. They found that the traditional wholesale system has: (1) low or no standards for quality and/or safety; (2) inconsistent volumes and quality; (3) often, despite cheap labor in the broker sector, high transaction costs (coordination costs) related to use of many small brokers, especially important after the “inflection point” of produce becoming a substantial share of marketings.

To shift away from that traditional system, toward a modernized procurement system (described below), there has to be sufficient incentive for the change (in cost-benefit terms) combined with sufficient capacity (financial, managerial) to make the needed investments and practice changes outlined below. These conditions have implied that the modernization of procurement is characterized by the following heterogeneity.

- (1) It starts with the leading 4-5 chains per country which have the capacity to undertake the investments such as in distribution centers.
- (2) Diffusion rates vary by type of product, roughly mirroring the pattern observed in penetration of markets by product category – first processed, then semi-processed, then fresh.



- (3) There can be substantial variation over sub-categories of products. For example, Berdegue et al. (2005) show that supermarkets in Guatemala moved early (as much as five years ago) to modernize procurement of several large commodities such as tomatoes and some high value niche products like lettuce in the past several years, but have continued to rely on traditional wholesalers for nearly half of their produce, mainly in the medium- and small volume categories. Factors such as perishability, availability of a large suppliers, transaction costs, and seasonality play roles.
- (4) The extent of diffusion differs sharply over countries (correlated inversely with the waves). This is partially related to the degree of competition due to relative saturation, and partly due to conditions in the country on the supply side.

A crucial point is that the extent of diffusion of procurement modernization critically conditions the extent to which the retail transformation in turn affects wholesalers, processors, and farmers. If the modern retailers simply continue to buy from the traditional wholesale sector, and that sector does not change under the influence of changes in the retail market, then the farmer and processor do not perceive a change in their market conditions arising from the supermarket revolution.

3.4. Indonesian Experience: Emerging Modernization of Produce Procurement Systems among leading national and regional chains

The (international) experience of heterogeneity (and incompleteness) of the diffusion of procurement modernization, as well as its causes, apply in the Indonesian case. Procurement modernization differs sharply by type of retailer, product, and even location of the retailer operations. The retailers noted that it has, as in other countries, gone by far the furthest in processed products, and is only very nascent (roughly in the past 3-4 years at most) for FFV, in particular in vegetables, and somewhat in fruit. The changes in procurement systems also differ over the specific products within a category (for example, with widely different systems for tomatoes versus leafy greens) and even their origin (domestic versus imported).

Centralization (shift to use of DCs). Mirroring the international trend there is a tendency to move from store-by-store procurement (buying from local producers) to centralized procurement via the use of distribution centers (DCs). This move has come relatively early for fresh produce possibly because much of the vegetable production and fruit imports and production are in Java or easiest to access in Java and send to stores around Java and by ship to the other islands (or to import directly from the other islands).

Thus the DCs tend to start on Java, but the national chains have plans to build DCs on other islands as a second step. In general, the largest/lead chains, first the foreign chains and then the largest national chain, recently established fresh-produce DCs that have cooling facilities. Most of the capacity is used for imported fruit and some for local fruit and key bulk vegetables which are received in the DC and then distributed after packing or minimal processing out to the stores. In general, suppliers distribute leafy produce directly to the stores (a common practice in all the chains interviewed, and indeed a common practice among Latin American and Eastern European retailers) and some fruit is delivered direct to the stores. The next stratum is the large regional chain that very recently established a small DC for fresh produce. The final stratum is the small chain (in this case, regional) that still uses the traditional (for supermarkets) method of no use of DC for fresh produce, with all sent direct to stores from the suppliers. (See details in Annex 3).



Pursuit of avoiding reliance on traditional wholesale markets. The supermarket chains expressed a generalized desire to get around use of the traditional wholesale markets such as the two noted in section 3.2. There was a fully universal and strong expression among all the retail chains interviewed concerning the following specific points.

- (1) The chains want to minimize their use of the wholesale markets such as those discussed above. The main complaints are that they are dirty, small, congested, and traders and buyers alike are charged “informal fees” by various rent-seeking groups operating that add significantly to total costs.
- (2) The chains seek to reduce as much as possible the set of wholesalers on which they rely. This is because most chains find that there too many “links in the chain”, that there are too many “hands” which are only adding cost but from their perspective, little value. To that cost of intermediation the retailers noted that there are substantial problems of additions, along the highways, of additional, “informal charges”. The retailers also complained of various handling and post-harvest practices of the traders (poor packaging, poor handling, lack of consistency in volumes and quality, and lack of respect for transaction agreements). All the retailers thus noted their fervent desire to cut out as many wholesalers and field brokers from their supply chain as is practicable.
- (c) Where the chains rely on wholesalers, they strive to work with those who add value, such as finding and coordinating skilled farmers, cleaning and transporting the product, and assuring inter-island service. The modern retailers have moved quickly (in relative, international terms) to sourcing from these intermediaries and away from the traditional wholesale channels.

Imported-FFV sourcing occurs mainly via large importer-wholesalers and also through some direct sourcing. In general, the global retailers (Carrefour and Makro) tend to import directly, using their regional sourcing hubs in Asia, but supplement that with the use of local large importer-wholesalers. The other large chains (national or regional) mainly use large importer-wholesalers who are also inter-island traders (and thus “one stop shopping” for certain lines of produce) and supplement that with some direct purchase. The smallest chain tends to rely on importer-wholesalers. One can say that the procurement system is essentially traditional, relying on large importer-wholesaler, with some non-traditional elements such as regional sourcing hubs of the global retailers. All the retailers note the relative ease of importing versus wrestling with the local inadequate supply chains.



Photo 4: Fresh vegetables section in supermarket

There is some (but not complete) complementarity between imports and local FFV. The main imported fruit are oranges, apples, grapes, pears, monthong durian, and kiwi fruit (See also chapter 1). While there are local oranges (from Medan) that compete with imports (as does durian), the prime local fruit are mango, pineapple, mangosteen, snake fruit, bananas, and watermelons. Sometimes there are imports of several of these local fruit beyond oranges and durian, for example in the case of imports of bananas from the Philippines, or mangoes off-season. The main imported vegetables are carrots, garlic, onion, and broccoli. The



main local vegetables are tomatoes, cabbage, radishes, potatoes, ongcay, and peppers. There is mainly competition on onions, carrots and garlic. In addition, there are also local “import substitution” vegetables such as Japanese and other foreign vegetables produced in the region of Cipanas, Cianjur, and Lembang, like okra, zucchini, kyuuri, shisito, horinso, pakcoy and edamame.

Chapter 2 noted that the supermarket chains’ FFV sales have a far higher import share than in comparable chains in comparable countries. The retailers (and other key informants) were unanimous concerning the reasons why the import share is so high:

- (1) they can buy imported FFV at a lower price, but higher and more consistent quality and in proper packaging, than from most local supply chains;
- (2) they consider most of the local FFV supply chains (and thus the produce they get from them) highly underdeveloped and inadequate, lacking consistent quality, packaging, post-harvest handling, cold chain, and with high uncertainty concerning volumes, and limited production of certain key items;
- (3) the local supply chains have extremely high transaction costs, not just because they are “long” (with four or five “hands” through which the produce passes after the farmer), but because they have to pay steep bribes on the highways to get the produce. A common example, and a synoptic quotation concerning it, is that concerning procurement of oranges from Medan. This is a key topic for retailers because oranges are always among their top 5 fruits. They note that “Medan oranges are twice as expensive as those from China. The main problem is that the supply of oranges from Medan is limited. Contributing to the high price are bad roads and many roadside illegal bribes that a business has to pay along the Trans-Sumatra Highway.”

Local Fruit Sourcing. In general, the modern retailers tend to rely on large wholesalers (who supply to all market segments) who have inter-island operations (and thus can assure continuity over seasons and also only a few suppliers known to the chain over several locations). These large wholesalers have stalls in the main wholesale markets, and if they are also importers, have warehouses at the various island ports. One can say that the local fruit wholesale segment appears to be very concentrated; in any case, as in Mexico, the interface of the supermarket sector and the traditional wholesale market is nearly exclusively through very large, nationally-integrated (and often importing as well) and spatially dispersed, wholesalers who act as one-stop-shopping for retailers. A secondary method of sourcing, done mainly by the larger chains (as expected) is direct sourcing from medium-sized suppliers (farm-companies, coops, and some individual larger farms).

The leading retailers want to increase the direct sourcing method, thus, as all retailers say in all countries, to reduce margins paid to wholesalers. The issue is the feasibility of this option: it is hard to compete with the giant wholesalers who move into a production zone and pay farmers in advance or pay a higher price near the point of delivery. This is a similar issue to that faced by retailers in many countries. (See annex for details)

Local Vegetables Sourcing. In general, procurement system modernization has advanced by far the least in the domain of vegetables. Partly this is because it is least feasible and more costly in transport (relative to their prices) to import vegetables (except for the half dozen noted), and partly this is because there are good local sources but with poor supply chains from those sources



to the stores. Thus, the modern retailers have shifted en masse, to a large degree, away from use of the wholesale markets toward use of specialized wholesalers. However, that shift is not yet complete, as they still use the wholesale markets directly or indirectly for a minority, perhaps a large minority, of their products, especially the many small-share vegetables, and also some of their suppliers in turn source from large wholesalers (similar to the large wholesalers of fruit) in the wholesale markets. On balance, the vegetable procurement system is semi-modernized or quasi-modernized, but with a strong will of the leading chains to keep it moving in the direction of further modernization. Again, as with fruit, the smaller chains tend to have gone less far on modernization. Finally, only one chain, Carrefour, is actively involved in local supply chain improvement through upgrading, and that is proceeding on a bumpy, albeit continuous, road. For details, see Annex 2.

3.5. Focus on emerging role of specialized/dedicated wholesaler and medium/large commercial farmers, with illustrations

The response to the modern retail market development which applies centralization of provision and distribution has spurred the emergence of several types of new modern retail market suppliers. This highlights not their innovativeness on some absolute or international scale (in fact they are emerging all over the developing world in the past 4-10 years, see Reardon and Timmer, 2007), but to emphasize that these actors are new in purpose, market segment focus, and mode of operation compared to the traditional wholesalers not to mention the conventional small farmers. These types of suppliers emerged to supply high volumes to supermarkets and other modern segments like food service, with the requisite stability of volumes and consistency of quality. That in turn implies producing or collecting (from wholesalers or from contracted farmers or from both) the product, sorting, minimally processing, packing, and delivering to stores or DCs a variety of products.

The several types of these emergent suppliers are as follows: (1) specialized/dedicated wholesalers without own production (Bimandiri) and with own production and outgrowers (Putri Segar, Saung Mirwan); (2) commercial agricultural companies with own production and outgrowers (Hikmah; Pak Deding; Haji Ruffiat, Amazing Farms; Lyco Farms and Bukit Organic). Details of these emergent suppliers as well as insights from the findings from earlier work under USAID are summarized in Annex 3.



Patterns, Determinants, and Effects of Farmer Participation in Modern versus Traditional Marketing Channels

This chapter focuses on the patterns, determinants, and effects of farmers' participation in the various marketing channels. It discusses the following: (1) the farm survey sample and data; (2) patterns in characteristics and marketing and technology behavior of the sample households; (3) determinants of market channel choice by the farmers; (4) technology correlates of the market channel choices.

The farm survey was carried out in W.Java. West Java was selected for the study because it is an important national vegetable production zone and is an area with rapidly changing produce markets. For example, the retail sector in West Java is second only to the Jakarta area in terms of supermarket development, and DKI Jakarta and West Java together have 60% of the supermarket sector nationally. West Java has been the foremost producer of vegetables in Indonesia traditionally, because of its climatic conditions and rich volcanic soil. It is a leading producer of tomatoes, chilies, potatoes, and cabbage, carrots, and lettuce. West Java produced an average of 35% of the vegetables grown in Indonesia in the past 5 years (2000-2004) and is among the top 5 vegetable production areas in the country. West Java is number 1 in tomato (which is the 6th most important vegetable nationally). Annex 4 presents a broader meso-analysis of the horticultural economy of W. Java.

4.1. The Farm Survey Data, Questionnaire, Sampling Method, and Strata Definitions

4.1.1. The Farm Survey Data

The full matrix of data collected in the farm-level and kecamatan (sub-district) surveys comprise 351 variables - 241 are from the farm survey, and 110 are from the kecamatan survey. The farm



survey variables cover: (1) farm and household characteristics; (2) credit, technical assistance, and participation in associations; (3) farm production and input use; and (4) tomato marketing (channels, terms, subjective evaluation). The recall period is typically current or for the past season, with the exception of assets which pertain to current and five years ago (generally before the modern channel entry for those farmers in those channels).

4.1.2. The Farm Survey Questionnaires

Two farm-level instruments were administered, both covering the same recall period; one was done in February 2006 and the other in July 2006. The latter was a supplement gathering more detail on marketing practices and terms. The survey was administered face-to-face by trained enumerators; they assured the respondents formally of the anonymity of the responses.

4.1.3. The Sampling Method

The selection of the province, districts and sub-districts are described in Annex 4.

The fourth and final stage of sampling involved, at the level of each kecamatan, the selection of farmers. From the list of all farmers (from the land tax registration list), kecamatan agricultural officials, farm leaders, and local traders were asked to identify the tomato farmers. From the set of tomato farmers, the informants were asked to classify the farmers into two strata – farmers supplying supermarkets directly or indirectly via specialized wholesalers or other wholesalers, and tomato farmers only supplying traditional wholesalers and brokers. Table 4.1 shows the resulting figures per kecamatan. From the universes of the channel strata per kecamatan, 600 farmers were selected. To disperse these roughly equally over the kabupaten, 300 were assigned to each of the two kabupaten, and in each kabupaten, 150 to each of the two broad market channels. Then, per market channel, since the distribution per channel over the kecamatan per kabupaten was not available, instead the total tomato production volumes of the kecamatan was used as the weight to sample proportionately a given set of 150. The resultant sample distribution over kabupaten, kecamatan, and market channels is found in Table 4.2.

Finally, to control for the sampling design and thus to present population-representative statistics, a weight was calculated for each of the farmers in a given kecamatan/channel combination. The following formula was used: $FW_{ijk} = Kb_i * Kc_{ij} * P_{ijk}$, where FW_{ijk} = weight for the farm household, Kb_i = weight for Kabupaten -i, Kc_{ij} = Weight for Kecamatan -j at Kabupaten -i and P_{ijk} = Weight for farmer household k at kecamatan j, where $k=1,2$ with 1=traditional and 2=Supermarket. The resulting weights are shown in Table 5.3.

4.1.4. Stratification

Two stratifications were done for use in the descriptives and regressions.

First, the kecamatan were classified into two “commercialization (as opposed to subsistence) levels” (high and low) as described in Annex 3. Second, after the meso level rapid reconnaissance, the farmer marketing channels were categorized⁷ into three channels: (1) “supermarket channel”, which includes farmers selling to supermarkets, either directly, or indirectly via a specialized/

⁷ The farmers were asked for the full list of buyers of their product, and how much they market to each. Farmers market 90% or more to their chosen channel, that is, they are relatively specialized, but sell ‘seconds’ to other channels in the case of being in the supermarket channel or the specialized wholesaler channel as those often ask for sorted product, while the other channels do not.



dedicated (mainly to supermarkets) wholesaler to supermarkets; this is the channel with the closest connection to supermarkets and have full information; most of the farmers in this channel are aware that they are producing for/selling to supermarkets.; (2) “modern wholesaler”, which includes farmers selling to “modern wholesalers” who tend to be larger wholesalers who sell to the traditional wholesale market as well as somewhat to supermarkets and to specialized/dedicated (to supermarkets) wholesalers; the farmers in this channel tend to not be aware that part of their tomatoes go to supermarkets; the wholesaler tends merely to signal certain requirements and scheduling, but do not convey full information concerning the final markets (we found this out through wholesaler interviews and market tracing); (3) “traditional channel”, which includes farmers who sell to local brokers (small traders in the rural areas) and wholesalers who sell only to or in the traditional wholesale market. This is the channel most distant from the supermarket channel.

4.2. Descriptive Analysis

Table 4.4 shows sample characteristics by market channel and kecamatan commercialization level. Several points emerge.

- (1) The average experience growing tomatoes is around a decade for all the strata, with similar coefficients of variation (CVs). The tomato growers were in operation well before the recent market change; specialized wholesalers to supermarkets began their operations only 4-5 years ago in Bandung and 2-3 in Garut. Moreover, specialized wholesalers work with tomato growers of average experience.
- (2) The average education does not vary much across the groups (nearly all completed elementary school education). Only the supermarket-channel growers in the low-commercialization zone have more education (intermediate level).
- (3) The family size (four persons) and structure on average does not vary much over strata, and is typical in rural Java.
- (4) The living conditions of all the strata are well above the average rural household in Indonesia. The great majority in all the strata have concrete houses (which is common now over all Java, but not the typical basic bamboo house of most farmers on other islands), all have electricity and own water source (typical of all of Java).
- (5) Membership in cooperatives is low throughout the non-supermarket channel strata (around 12% in the high-commercial zone and about 6% in the low-commercialization zone), but it is zero among the supermarket-channel households. What is now called a cooperative is either: (1) a village cooperative (which was used as a conduit for input supplies during the Suharto era), most of which have disappeared or become consumption needs such as food purchase cooperatives; (2) a credit cooperative; or (3) a grain cooperative (a food security cooperative). There are in fact extremely few marketing or production cooperatives, at least in West Java where the meso surveys were conducted.
- (6) For all the strata, tomato production is most of the household income. However, there are some interesting differences: in the high commercial zone, the supermarket-channel growers are much more specialized in tomatoes than the farmers in the other channels,



and in the low-commercial zone, the supermarket and modern-wholesale channels farmers are again much more specialized. This specialization is presumably rewarded by the lower risk and higher payoff of the modern channels. But it also appears that the modern channel buyers seek farmers who are more specialized and dedicated.

- (7) The overall picture that emerges is that the modern channel farmers tend to be more independent (from cooperatives), somewhat more educated (though not more experienced), and more specialized in tomatoes. This profile is similar to for example the profile of the modern channel farmer that was found for example in Guatemala (also the tomato case, see Hernandez et al. 2006).

Table 4.5 shows landholding and land use characteristics by market channel and kecamatan commercialization level. Several points emerge.

- (1) The average rice farm in West Java operates about 0.4-0.5 ha. All the horticulture farms in the sample are larger than that, but still small farms. The traditional-channel farms are 0.6-0.7 ha, some 40% larger than rice farms. Moreover, in both the high and low-commercialization zones, the supermarket-channel farms are 40-50% larger than the traditional-channel (as well as the modern-wholesale channel) horticulture farms, and are in the top size-stratum of small farms. The CV is large (0.7-1.0) over all the strata, indicating that some modern channel farmers can be quite small, and some traditional can be larger small farmers, doubtless substituting land size for skills and capital to make up the requirements of the channels.
- (2) All the strata rent-in land but none rent-out; this is because most renting-out is done by absentee owners living in town. The renting-in pattern is striking. In the high commercial areas, the supermarket-channel farmers rent-in nearly a quarter, and the other farmers, a full third, of their operated land. While the supermarket-channel growers rent one-fifth of their operated land in the low-commercial zone, the other farmers only rent-in one-seventh. The land rental market is most active in the more commercial, horticultural zone, as expected. Also expected is that the modern channel farmers avail themselves of what little land rental market there is in the low-commercialized area, while the other farmers do not. What is unexpected is that the traditional horticulture farmers rent the most substantially. It seems thus driven by the profitability of the horticulture market in the more commercial zones in general, and of the emerging supermarket-channel in both areas.
- (3) The land is intensively used in this region, with no fallow or pasture, true of most of Java except some dairy and beef production areas. All the land is under annuals. The sample farmers grow nearly no rice, except the traditional farmers in the low commercial zone (15% of whose land is under rice). In both zones, all the strata divide their annual cropland half to tomatoes, half to other vegetables (mainly cabbages, cauliflower, carrot, lettuce, and potatoes).
- (4) The overall picture that emerges is that the supermarket-channel farmers tend to be 40-50% larger than the farmers in the other channels, and are in the upper size stratum of small farmers. This coincides with findings from other studies, such as recent studies of tomato growers (traditional versus supermarket channels) in Guatemala and Nicaragua (Hernandez et al. 2006 and Balsevich et al. 2006). Just as there, the specialized wholesalers seek these larger small farmers as they have a minimum land area to assure a consistent and sufficient volume and tend also to be the leaders among the small farmers, with more commercial



attitudes. They tend to rent more than other farmers in the low-commercialized zones; however, in the high-commercial zones all the strata depend substantially on rental (that is similar to other commercial tomato zones elsewhere such as the studies cited above).

Table 4.6 shows area under tomatoes, and distribution over households of irrigation and multi-cropping, comparing 2004/05 with 1999/2000. Several points emerge.

- (1) In both areas the majority of the sample's overall farmland is irrigated (mainly meaning having a tank and then using it to hand-water the crops, not the flooding system used on rice). The CVs are relatively low. The share is higher in the high compared to the low commercialization zone (80% compared to 65%), a difference not accounted for by the crop composition. Note that also in 2005, the share of tomato land that is irrigated is in all strata greater than the overall share (about 88% in both zones), meaning that farmers tend to irrigate tomatoes more than their other vegetables. Compare that share to 2000 – when only 53-56% of tomato land in both zones was irrigated.
- (2) There is clear evidence in both zones of the spread of tomato cultivation, with that trend striking among the supermarket-channel and traditional-channel strata in the low-commercialization zone. In the latter, these strata shifted to tomatoes (seen in the share who were not producing them in 1999) and the diffusion of multi-cropping (over several seasons per year). This coincides with the finding above of the diffusion of irrigation in the area.
- (3) The inter-seasonal cropping pattern in a given year did not change much in terms of area planted (for those that planted). Note the share increase in overall plantings for the supermarket farmers but even more for the traditional farmers in both areas.
- (4) The overall picture that emerges is the diffusion of tomatoes, irrigation, and multiple cropping in both areas. Qualitative interviews with farmers indicate that these trends are linked. Farmers without tanks are at a disadvantage of having to use lots of labor to transport water from ponds and valley floors, and they have to grow only in the wet season when there is a tomato glut and prices are low. Irrigation through storage tanks allows tomato production in the dry season when prices are high. While the supermarket-channel farmers in the high commercialization zone are now nearly all using irrigation on tomatoes, the above trends are shared over all strata and corroborate the image of a triple transformation of farming systems, technologies, and horticulture in the area.

Table 4.7 shows tomato production costs per hectare, on average over the seasons. The annex shows inter-seasonal differences. Several surprising points emerge.

- (1) Total costs of supermarket-channel producers are 10% lower than traditional-channel farmers in the high-commercial zone, and 17% lower in the low-commercial zone. This contradicts common wisdom that supermarket-channel farmers are disadvantaged by much higher costs in order to be in that channel. The differences in cost components are analyzed next.
- (2) In the high-commercial zone, comparing the supermarket-channel and traditional farmer, supermarket-channel farmers expend 13% less on fertilizers and seed. This goes along with the information garnered from the qualitative surveys with farmers that the dedicated wholesalers urge farmers to use less fertilizers and replace with IPM methods. The lower



use is thus apparently because they are better informed in terms of efficient use and correct amounts. This is similar to a finding in Mexico, in the guava zone, where, contrary to conventional wisdom, the modern channel farmers were using less external inputs than the traditional farmers because they were better informed and more allocative-efficient (an issue we explore further below). Supermarket-channel farmers, surprisingly, use the same amount of family labor as do traditional farmers, but 20% less hired labor. Again, this goes along with the higher irrigation rate of the supermarket-channel farmers that saves substantial labor. Interestingly, expenditures on plastic cover, stakes, fuel, and rope are about the same over the strata, so those technologies have widely diffused.

- (3) In the low-commercial zone, the inter-strata comparative results are similar in direction but magnified. Supermarket-channel farmers use 40% less labor, shared over both family and hired labor. They again expend about 10% less on fertilizers, but 10% more on seed.

Table 4.8 shows the farm budgets. Several surprising points emerge.

- (1) It is more profitable to be in the supermarket-channel. In the high-commercial zone, supermarket-channel farmers have a revenue/cost ratio 12% higher than the other two strata when calculated without imputed family labor costs. Using a weighted-average across strata and locations, this ratio is 33% higher when adding imputed family labor costs to total costs. In the low-commercial zone, the benefit is 35% and 39% respectively (again, using weighted-averages).
- (2) The above advantage of the supermarket-channel producers is due to several things. First, in the high-commercial zone, supermarket-channel farmers receive a 2% price premium; in the other zone, they receive an 18% premium, presumably due to less competition on the supply side. Interestingly, supermarket-channel yields are similar to those of the other strata.

Table 4.9 shows marketing, and Table 4.10 shows prices and price determination. Several points emerge.

- (1) All the strata sell tomatoes frequently (more than once weekly during the last month of the tomato season), as is usual for tomatoes.
- (2) A given supermarket-channel farm sells one half and one third more than traditional farmers in the high and low commercial zones, respectively. The modern-wholesale channel farms are in-between.
- (3) Interestingly, grading is virtually absent at farm level, with the exception of a tiny bit of grading being done in the supermarket channel. That means that all the intermediaries, regardless of channel, buy all the tomatoes, of all grades, from the farmers. The specialized wholesalers and the modern wholesalers in turn grade and sell into different markets, while the traditional wholesalers sell ungraded. This means that the intermediaries, rather than the farmers, capture the profits from achieving quality in tomato production. This as a relatively under-developed market situation. There are some interesting comparisons in other countries; for example, in the guava sector in Mexico (Berdegúe et al. 2006), there are two market zones in Michoacan; in the underdeveloped market zone, farmers still sell ungraded. In the more developed market zone, whereas five years ago farmers were selling



ungraded, as the market demand went up and their leverage increased, the farmers got the traders to buy graded produce so that the farmers could be recompensed for investments in higher quality, and the traders needed that higher quality to compete. West Java is not yet at that point, but in several years it could be. Table 4.10 shows the large variation of prices over quality grades. These data are available only from the farmers in the supermarket-channels in both zones (but only a subset of farmers in that channel) who sold by grade. The average price is in fact 10% below the prices of the first three grades in both cases, showing foregone earnings (and thus also incentives to improve quality) from not grading.

- (4) Table 4.9 shows why farmers do not in general, grade. By far the majority reason is that farmers feel that if they grade they cannot sell all. That coincides with the point above: wholesalers do not want to take the gamut of grades. A minor reason in the high commercial zone, and a more substantially shared reason in the low commercial zone, is the cost in time and perhaps materials for grading. One can think of this as relative to the benefit weighted by the (low) perceived probability that graded product can be sold.
- (5) Table 4.9 shows the selling system. Roughly 30% of the farmers sell under contract in the high-commercial zone and 23% in the low commercial zone. The use of contracts is most prevalent in the modern-wholesale channel, and as or more prevalent in the traditional channel as it is in the supermarket channel. The “contracts” in all cases are informal, implicit, not written, but still qualify as *de facto* contracts in the sense of Hueth et al. (1999). Moreover, the contracts in the traditional and modern-wholesale channels are mainly interlinked markets (Bardhan, 1980) between output and credit markets, with the farmer selling to a particular wholesaler in exchange for input credit. This latter arrangement is traditional and has been practiced for decades. By contrast, although less prevalent, the contracts with supermarket-channel suppliers tend to also specify fertilizer types and seed quality for output quality and consistency objectives of the dedicated wholesaler to maximize quality and consistency for the supermarket client.
- (6) Among all the strata the very-prevalent system is sales on consignment, a way of distributing risk toward the farmer. That corroborates the point about the relatively weak position of the farmer. The modern-wholesaler is the main one to break that pattern in both zones, with 15 and 21 percent of the farmers receiving payment just a few days after sale. That may be a method that modern-wholesalers use to “corner” the supply of top farmers and compete with the dedicated wholesalers. Note that a specialized-dedicated wholesaler sells only (or the great majority) to supermarkets and tends to require sorting at farm level; the modern wholesaler by contrast is essentially a transitional or intermediate level of intermediary, typically much larger than a small broker but tending to buy unsorted product, then sort it him/herself, and sell into all channels.
- (7) The price determination system is generally by negotiation as that is the traditional system. The buyer-determined price is, interestingly, more prevalent in the high-commercial zone (26% of farmers) compared to the low-commercial zone (14%), and within each zone it is most prevalent among modern-wholesalers (perhaps using tied-credit as the bargaining power), and in the high commercial zone, in the supermarket-channel. This is an expected development as the wholesale market continues to segment, developing dedicated wholesaler and modern wholesaler segments with differentiated markets, compared to the traditional wholesale sector that was the “only game in town” a mere decade ago (Natawidjaja, 1993).



- (8) The overall image that emerges from these tables is of a market system that appears to be at the beginnings of modernization, with the bare emergence of grading at farm level and the emergence of attribute-specifying contracts. In general the new modern segments of the wholesale sector are leading that incipient change.

Table 4.11 shows the sources of technical assistance (TA) for farmers. Several points emerge.

- (1) Only 2% of the supermarket-channel farmers receive technical assistance (TA) from either the supermarkets or from the dedicated wholesalers.
- (2) In the high-commercial zone, around 10% of the farmers that are in the modern-wholesale and traditional channels receive TA from associations/cooperatives; in the other zone this is virtually nothing.
- (3) NGOs or projects provide TA only to a small minority of farmers (only in the high-commercial zone and there only about 20% of the non-supermarket-channel farmers).
- (4) Very few farmers use government extension: from 2-5% in the high-commercial zone, and around 10% only of the non-supermarket-channel farmers in the low-commercial zone.
- (5) The most important source of TA is the input company. All the supermarket-channel farmers in both zones depend on this source, as do 60-80% of the other farmers in the high-commercial zone, and a quarter of the farmers in the low-commercial zone. The difference between the strata (with the modern channel farmers depending most on this source) and the zones (with the high commercial zone by far more dependent on this, and as chapter 3 shows, with much more density of these companies in those higher infrastructure, more horticulture oriented areas).
- (6) It is interesting that “other wholesalers” plays a role importantly for the supermarket-channel farmers, but none other.
- (7) In sum, the consistently most important source of TA is the input company. This is similar to various other recent studies of modern horticulture market channels (such as in Mexico, Berdegúe et al. and Guatemala, Hernandez et al.). The absence or near absence of TA from government extension, NGOs, and coops is striking. Finally, it is clear that the dedicated wholesalers either do not have the capacity or the incentive to provide TA to their preferred suppliers.

Table 4.12 shows credit sources. Several points emerge.

- (1) Very few farmers access credit from the commercial bank. None access credit from supermarkets, their dedicated wholesalers, nor government or NGO projects. Only a single pocket of farmers (in the supermarket channel in the low commercial zone) access credit through cooperatives.
- (2) The main suppliers of credit to farmers in the sample are input distributors, and wholesalers and local brokers. This corroborates the earlier point about the wholesalers offering input credit tied to output supply. The input distributors (who give both working capital and some investment capital credit) also attract clientele with credit.



- (3) Note, however, that in no category does the sum (which is a maximum, as some farmers borrow from several sources) of farmers exceed about one-third of the farmers in that channel – except in the most hinterland and traditional group, the traditional channel farmers in the low commercial zone. They depend heavily on loans from intermediaries and input companies for their inputs, presumably because of lack of working capital and other income sources.

Table 4.13 shows farmers' opinions of marketing agents/channels in terms of how well they are perceived to perform on attributes valued by the farmer, such as high prices, quick payment, and so on. Several points emerge.

- (1) Supermarket-channel farmers in both zones tend to find the supermarket-channel is the best paying (level of payment and, to a certain extent, payment compliance hence low risk), with other options distant second and third. Interestingly, in the other attribute categories, these farmers see other wholesalers as performing better. Note that these attitudes toward the supermarket channel are what is observed in Latin America, Central Europe and in Vietnam – that supermarkets and supermarket agents pay well and with low risk compared to traditional wholesalers, but tend to be more demanding, pay with a greater lag, are more difficult to initially access, tend to provide fewer of the traditional tied-services like credit, and involve more formal commercial transaction processes.
- (2) It is interesting that the rankings of the attribute delivery by the different channels, done by the growers selling to the modern wholesale and the traditional channels, are similar to those of the supermarket-channel farmers. The inference is that faced with the same costs and benefits these growers simply opt for the traditional wholesalers, aware of the trade-offs. An interesting difference between the zones is that for the non-supermarket-channel growers the rate of “no response” (perhaps because of lack of familiarity with the supermarket channel which has appeared only in the past two years in the Garut area and only in the past four in Bandung).
- (3) Very few farmers ranked in first or second position the option of the “farmer selling directly in the wholesale market.” This corroborates the view that farmers see the wholesale markets as difficult venues, fraught with transaction costs and risks. This is in sharp contrast with the widespread use, by farmers, of direct sale in wholesale markets for example in the area counterpart to West Java, another vegetable belt, in Shandong (see Huang et al. 2006, and also in Beijing, see Wang et al. 2006).

Tables 4.14 and 4.15 show some subjective rankings re income effects. Table 4.14 shows the rankings by farmers of tomato income in overall household incomes. The results show that for 80-90% of the sample households, tomato income is ranked first or second. Table 4.15 shows that only about 10% of the farmers in the supermarket-channel felt they were made better off by being in that channel, the rest felt there was no change.

4.3. Econometric Analysis

A two-step procedure was used – first, estimating the determinants of market channel participation and then, controlling for the conditional probability of participation in a channel, the technology choices of farmers (production function and input use functions).



4.3.1. The Determinants of channel choice

In the first step, using a multinomial logit, the determinants of the participation of farmers in the three channels (the supermarket-channel, the modern-wholesaler channel, and the traditional channel) was estimated. Two sets of regressions were run, one with just a probit (of traditional versus supermarket channels, collapsing the modern wholesalers together with the traditional field brokers) and one with a multinomial logit, with these three choices. The descriptive results justify this “three step level” market in terms of rewards and requirements, and the statistical results were more robust with the three choices. Moreover, this allows to test the effect of wholesale sector differentiation separate from the impact of the supermarket more directly via specialized/dedicated wholesalers and direct.

The multinomial logit variable (three choices of channels) was regressed on the following:

- (1) producer’s education (in years);
- (2) producer’s age (in years);
- (3) family size (in persons);
- (4) lagged farm size with different with slopes for location, Bandung and Garut
- (5) Distance to paved highway (kms);
- (6) Producer’s experience (years);
- (7) lagged packing houses in the kecamatan (units);
- (8) dummy for commercialization level of the kecamatan;
- (9) lagged association level (associated =1; not associated =0);
- (10) lagged irrigation share (% of farm size under irrigation)

Lagged assets were used in order to avoid causality with the market channel choice. Moreover, the land effect was separated in the two kabupaten because of the different farming systems and land scarcity between the two, with Garut less dense and more extensive. The variables used conform to theory of market choice (Sadoulet and de Janvry 1995) and to recent literature on market channel choice in developing countries (see Reardon and Huang 2005 for a review).

The results (Table 4.17) show several significant and key points.

- (1) Farm size (lagged, to avoid causality issues) has a positive effect on supermarket channel participation in Bandung, where land is scarce, but a negative effect in Garut. Why might smaller farmers be the supermarket channel suppliers in Garut, the more hinterland area? In Bandung, near the city, the more capitalized and larger farmers tend to make frequent shipments to specialized wholesalers and profit from the nearby commercial opportunities. By contrast, Garut is a more hinterland area with larger land sizes; larger farmers tend to sell large volumes to inter-island traders who come to that area for large volumes, leaving the modern retailer channel, a smaller and more specialized channel, to smaller farmers, who nevertheless are in the upper stratum of capitalization.
- (2) Lagged packing houses in the kecamatan have a positive effect on participation in the modern wholesaler channel (who tend to be the owners of those packing houses) but a negative effect on supermarket-channel participation, as farmers have an alternative.
- (3) Being in a high-commercialization zone favors participation in both modern channels.
- (4) Lagged irrigation share has an important positive effect on participation in the



supermarket channel. Such consistency of production is an important attribute that dedicated wholesalers look for in farmers. This asset effect is similar to that found for example among tomato producers in Guatemala (Hernandez et al. 2006).

Table 4.17. Marketing Channel Selection Estimation Results

Variable	Supermarket Producers		Modern Wholesalers	
	Coef.	(SE)	Coef.	(SE)
Producer's education (years)	0.152	0.122	0.024	0.063
Producer's age (years)	0.021	0.028	0.006	0.015
Family size	-0.197	0.203	-0.035	0.116
Lagged land (farm size)	-1.895	0.794 **	-0.048	0.135
Correction for Bandung lagged land	2.112	1.025 **	-0.665	0.452
Distance to paved highway (kms)	0.104	0.175	-0.210	0.354
Producer's experience (years)	-0.046	0.062	-0.070	0.024 **
Lagged packing houses in the area (units)	-0.121	0.025 **	0.008	0.003 **
Dummy for commercialization level of zone	4.069	0.954 **	1.007	0.331 **
Lagged association level (Associated =1 Not Asoc =0)	-0.945	0.816	0.029	0.337
Lagged irrigation share (% of farm size under irrigation)	2.514	1.159 **	0.166	0.620
Number of Observations	596			
Wald Chi(32)	858.96			
Pseudo R²	0.748			

Note that this is a multinomial logit and the base is the traditional channel farmers, so these are deviations from that base. Notes: ** = significant at 5%; * = significant at 10%.

4.3.2. Production Function and Allocative Efficiency Analysis

Table 4.18 shows production function estimates per channel, and Table 4.19, a comparison of marginal value products (MVPs) and factor prices to discern allocative efficiency. Several points emerge.

- (1) The MVP of farmland is well above the rental factor cost for both the modern wholesale channel farmers and the traditional channel farmers. This indicates a severe land constraint. This result is typical in land-constrained areas (see Byringiro and Reardon 1995 for Rwanda or Guatemala, Hernandez et al. 2006 and Mexico, Berdegué et al. 2006).
- (2) The MVP of labor is also well below the factor price for all channels, but as the cost results suggest, the overuse of labor (from an allocative efficiency viewpoint) is most severe among traditional farmers. This result again is typical, as in the papers cited above.
- (3) The results for fertilizer are also similar to the other studies cited, showing an overuse of fertilizer in an allocative efficiency sense. Again, as with labor, the allocative inefficiency is least among the modern channel farmers.



Table 4.18. Production Function Estimation Results

	Supermarket channel		Modern Wholesale channel		Traditional channel	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Tomato Area (Ha)	0.798	0.683	0.860	0.186 **	0.975	0.088 **
Seed	0.207	0.680	0.120	0.189	0.034	0.091
Pesticides	0.002	0.007	0.007	0.002	0.021	0.030
Fertilizers	0.007	0.096	0.019	0.042 **	0.109	0.036 **
Labor	0.267	0.120 **	0.161	0.062 **	0.282	0.035 **
Dummy for dry season (dry =1, other =0)	0.150	0.034 **	0.143	0.015 **	0.176	0.020 **
Dummy for Bandung	-0.024	0.074	-0.075	0.055	-0.075	0.018 **
Irrigation share	-0.052	0.091	-0.034	0.035	0.032	0.024
Mills 1	0.005	0.006	0.001	0.001	-0.001	0.001
Mills 2	0.000	0.004	0.004	0.009	-0.003	0.003
Constant	5.729	3.117	7.472	0.806	4.082	0.828
Number of Observations	84		179		327	
R-squared	0.985		0.983		0.98	
Prob > F	0		0		0	

Notes: ** = significant at 5%; * = significant at 10%; base category is traditional wholesaler

Table 4.19. Marginal Value Products compared to Factor Prices: Allocative Efficiency

	Supermarket Channel		Modern Wholesale Channel		Traditional Wholesale Channel	
	MVP	Factor Cost	MVP	Factor Cost	MVP	Factor Cost
Area			36.4M >	2.2M	41M >	2.2M
Fertilizer			48 <	1,000	219 <	1,000
Labor	476 <	1,000	226 <	1,000	326 <	1,000

4.3.3. Input demand functions

The input demand functions are specified derived from the profit function (which, as Sadoulet and de Janvry 1995 show, does not depend on the assumption of profit maximization) – see results in Annex. The regressors are as follows:

- (1) output price
- (2) own factor price
- (3) vector of the other input prices
- (4) producer's education as human capital
- (5) family size as own-labor shadow price
- (6) farmland (current) (with slopes differentiated by Bandung and Garut)
- (7) distance to paved highway as proxy for transaction costs
- (8) share of tomato land under irrigation (as quasi-fixed capital proxy)
- (9) a vector of Inverse Mill's Ratios to control for endogenous stratification
- (10) dummy for dry season
- (11) dummy for the commercialization level of the kecamatan



Several salient results emerge.

- (1) Labor use is measured in days. Labor demand of farmers in the supermarket channel is more responsive to factor input prices than farmers in the other market channels, apparently indicating the supermarket-channel farmers' greater commercial orientation. For the latter group, the positive signs on the prices of fertilizer and pesticides indicate they are substitutes with labor (using more of the latter to perform weeding, cleaning, and fertilizing). Note that Bandung has a positive effect (for this group and the traditional channel group) on labor use, which makes sense given the higher labor/land ratio in that kabupaten. Moreover, because of farmers in the modern-wholesale and traditional channels have less irrigation, they have greater demand for labor in the dry season to fetch water.
- (2) Pesticide use is measured in cash expenditure for pesticides given that we needed to aggregate, using the pesticide prices, over diverse types of pesticides. Demand for pesticide thus measured responds (tautologically) positively to its own price. For supermarket-channel farmers, it is a substitute for fertilizer, but a complement for the other two groups. The output price and dry season effects are negative, as there are fewer insects at that time.
- (3) As with pesticides, and for the same reason, fertilizer use is measured in cash expenditure. The main results of interest here are the strong complementarity of fertilizer use and irrigation, and the negative effect of transaction costs (proxied by distance to the road) on fertilizer use.

4.4 Value Chain Analysis

586⁸ farmers sell into 5 main market channels that stretch from the production zones to retailers in the Jakarta area. The 5 main channels found are shown in Figure 4.1. The first column shows the channel, the second, the level of commercialization of the zone (as defined in the main report), and the last column, from farmer to the retailer (whether supermarket or traditional) in Jakarta.

Figure 4.1. Farmers and Value Chains of Tomatoes

No.	Comm. Zone	Number of Farmers	Value Chain
1	High	33	Farmer → Specialized Super Wholesaler → Supermarket
	Low	50	
2	High	9	Farmer → Farmer Group → Specialized Super Wholesaler → Supermarket
3	High	147	Farmer → Traditional Wholesaler → Traditional Wholesale Market → Traditional Retail Market
	Low	114	
4	High	122	Farmer → Traditional Wholesaler → Specialized Super Wholesaler → Supermarket
	Low	56	
5	High	3	Farmer → Local Collector → Traditional Wholesaler → Traditional Wholesale Market → Traditional Retail Market
	Low	52	

⁸ From the sample of 600 were dropped 4 farmers as they sold locally as organic producers, and 10 who sell only to small local markets.



Figure 4.1 shows that:

- (a) the most common channel that farmers use is channel 3, the farmer-traditional wholesaler – wholesale market – traditional retail. This traditional channel is used by farmers in the high- and low-commercialization zones alike. By contrast, channel 5 is the other fully traditional channel that starts with local small wholesalers/collectors. It is five times less important now than is channel 3 – yet only 10 years ago, it was dominant, as shown in Natawidjaja (1999). The larger, more capitalized wholesalers have crowded out the small traditional brokers.
- (b) Among the channels to the supermarkets, channel 1 is most important, where specialized wholesalers buy mix-of-grades from the farmers and then sort and grade it themselves and sell on to the supermarkets. The second most important is channel 4, where the specialized wholesalers enlist the traditional wholesalers to do the first stage of sorting and selecting and buy from them. This is used mainly in the higher commercial zone. The third most important (but just nascent) is channel 2, the most beneficial to farmers, where the farmer group grades and sorts and sells on to the specialized wholesaler. This emerging channel will become more important in the future as it diffuses.

The complete value chain calculation of each channel and by actor is available in Table 4.1 and its value chain summary is available in Table 4.2. The paragraphs below summarize the main features of the channels. Detailed description of each value chain as well as the chain actor's roles and functions can be found in Annex 5.

4.4.1 Summary comparison of channels

From the perspective of the farmer, the value chain analysis reveals that the benefits of the channels are ranged from the lowest in the most-traditional channel (dominated by local collectors) in the low-commercial (hinterland) zone, to the highest benefit from the channel where farmers in the high-commercial (good infrastructure zone) group, capture the value added of sorting and packing and local transport, and sell to specialized wholesalers selling to supermarkets. The benefit is measured in price received by the farmer, which triples from the least favorable to the most, due to both capturing value added and differentiating quality. Between the worst and the best channels, however, the share the farmer captures of the consumer price varies. The highest is that of the “organized-farmers channel to supermarkets” (with the farmer in the farmers’ group capturing 30%). But below that there is no correlation between captured-share of retail price and profitability. The least profitable channel, value chain 5 starting in the hinterland, has farmers earning 24% of the retail price; by contrast, farmers in the value chain 4 (via traditional channels to the supermarket) get a higher price but a low share of the retail price (only 15%). The channels where the farmer sells directly to the specialized wholesaler or to the traditional wholesaler who sells on to the specialized wholesalers allow only slight quality differentiation (within the graded mix, a higher proportion of A grade), and a small price advantage (with a low “share of the pie”, around 15%, as the wholesalers capture the greatest chunk of the added value). Ranked second to the least favorable channel is the dominant channel, faced by most farmers, where the selling price is for an ungraded mix, and the farmers capture 27% of the final consumer price. So share analysis does not always reveal benefits to farmers; profitability analysis is also needed, and thus this value chain analysis is complementary to the profits analysis in chapter 5 of the main report. The above mapping of benefits to the farmer, over channels, makes common sense and is as expected, with the most traditional channels the least favorable (and within them the vestige of the older system by far the least favorable), and the modern channels more favorable, but with a wide gamut from the farmer capturing little of the value added to capturing much



through the (so far rare and nascent) group organization to handle post-harvest handling and marketing.

4.5 Summary of Farm-level Analysis

In analyzing the supermarket-channel farmers, it must be kept in mind that they represent very roughly about 15% of farmers, and thus are still a small minority. But the findings with respect to their characteristics, relative to farmers in other channels, are striking and important for the debate concerning the potential medium-term effect of the rise of supermarkets in Indonesia on the tomato sector. Tomatoes are neither a highly specialized niche product such as lettuce or broccoli, where the informants have a strong hypothesis that supermarkets are having a major and immediate impact, nor are tomatoes products that are not quality differentiated or in which there are few needed technological changes to conform to market volume, consistency, or quality requirements (such as in the baser common cabbages). Thus the tomato represents an intermediate step in the “agricultural value ladder” for the study.

First, supermarket-channel farmers are small farmers – but are the upper stratum of small farmers in terms of landholdings, and in terms of capital, such as irrigation tanks and education. A study in Malang⁹ however indicates that going against expectations, small, non-specialized local farms are meeting the demand for horticulture crops in Malang, E.Java via a four-actor supply chain consisting of farmers, collectors, supermarket suppliers and supermarkets. The relatively low volume of demand is one of the key factors making it more efficient for small-scale farmers to participate. Most farmers therefore do not specialize in horticulture crops but rather grow them to supplement their income. The diversified crop strategy characterizing Malang’s small farms mitigates risk. Horticultural crops are not significantly more challenging to grow than conventional crops, though they do require a higher degree of quality control. The size of the market, the need for fresh produce, relatively simple technical standards, as well as rigid land markets (in contrast to W.Java) have so far combined to ensure that small-farmers are still able to participate in horticulture supply chains. But for certain high volume horticultural crops, this is beginning to change with the emergence of direct relationships between suppliers and farmers. Supermarkets in Malang, thus far, have acted as a positive force for small farmers improving their technical skills, enhancing their marketing opportunities and profits by enabling them to sell more and higher value goods.

Second, the tomato farming costs (per ha) of supermarket-channel farms are actually somewhat to substantially below the costs of other farms. Given they receive better prices from supermarkets, their profit rates are from 10 to 30% higher than farmers in other channels.

Third, land-rental markets are extremely active among tomato farmers in the area. Despite that, there is evidence from the allocative efficiency estimates that there are land constraints and overuse of labor and fertilizer, with the allocative inefficiency least among supermarket producers.

Fourth, there is a clear “horticulture boom” occurring in West Java, and tomato production is growing quickly and modern techniques are diffusing throughout the strata, even to farmers in traditional channels.

⁹ Rural Investment Climate Assessment: Case Study 1: The Supply of High Value Crops to Supermarkets in Malang District—Trends and Implications for Small Farmers (INDOPOV Program: The World Bank, Jakarta: 2006)



Fifth, quality differentiation (and the concomitant investments) is not yet systematically rewarded by merchants to farmers in the zone. Mirroring the less developed market areas of other countries, farmers still sell ungraded produce to wholesalers. This is gradually changing as is evidenced by the value chain analysis where the farmer triples his/her earnings by working collectively – all by adding value of sorting, handling, and transport.

Sixth, tomato farmers get nearly all their technical assistance from input distributors, and nearly all their credit from those same actors plus wholesalers. Government and NGO financial services and extension services play a miniscule role in the tomato economy of West Java.



Policy Issues, Challenges, and Implications

5.1. Emerging Issues and Challenges

A key feature of the modern markets is their connections to the global economy. Their product quality and production process standards are converging to international standards. They are more likely to sell imported products, especially now that Indonesia has relatively few import barriers for these products, and they offer the prospect of connecting domestic producers to these international markets, both directly and indirectly.

The demand and local supply of horticulture products have soared in the past decade in Indonesia. A decade ago in West Java there was a limited number of farmers engaged in horticulture. Over the past decade many small farmers switched out of rice into FFV. This mirrors the vast increase on the urban demand side for horticulture products. Moreover, once on the FFV path, they have moved from low-value commodity vegetables to higher value niche vegetables – climbing a “value ladder”. There has also been a concomitant evolution in farm technology, as farmers adopted irrigation systems, plastic covering, greenhouses, and so on, to multiple-crop, to have more consistent quality, and to extend horticulture into new areas. An active land rental market has emerged and is growing, to the point where horticulture farmers now rent a third of their land mainly from tiny rice farmers and large urban speculators.

Several changes and trends in local markets and in farmers’ marketing patterns are notable:

- (1) A decade ago, wholesale in FFV in West Java was dominated by small brokers, and in “long” supply chains selling toward the village and city wholesale markets. Today, there is a substantial number of large, well-capitalized wholesalers, some of which supply both the supermarkets and modern food service as well as the traditional wholesale market, and some, the “specialized/dedicated wholesalers” are emerging to focus most of their effort on the modern channels.



- (2) The qualitative results show that at least to some extent, the emergence of modern and transitional wholesalers out of the former mass of small traditional brokers has been driven and encouraged by the combination of the rise of supermarkets and the latter's move toward modernization of procurement systems. Retailers work to cut costs by shortening supply chains, and to increase quality, by trying to give as direct a quality signal and reward to the producers as is possible. Thus, to address problems in sourcing locally, the larger retail chains have moved to the use of supply channels alternative to traditional wholesale markets. While leading retail chains still source fruit from large-scale wholesalers (often mixing imports and local fruit) and large inter-island traders who have stalls or offices in the wholesale markets, the leading chains increasingly source local vegetables: (a) from new-generation wholesalers who are specialized, capitalized, and dedicated to modern food retail and industry segments and are mainly operating "off-market" (not in the traditional wholesale markets); (b) for some products, from grower/packer/shippers using out-grower schemes; (c) for a small minority of products (like organics), sourcing directly from producers.
- (3) An effect of the rapid increase in horticultural demand, combined with a differentiation and segmentation of the market (for example, into modern retailers versus traditional retailers, and modern food service versus traditional), is the transmission of changes downstream in the agrifood system to segments upstream, in particular, the local wholesale sector in the provinces, and among the farmers.
- (4) The above change in retailers' sourcing system is in turn mirrored by farmers' choices in terms of market channel participation. The results show that small tomato farmers are starting to participate in sales to the supermarket channels, mainly via the specialized/dedicated wholesalers but also via some large modern wholesalers, and in the case of a few groups, directly. So far only about 10-15 percent of the small farmers in West Java sell to supermarkets through these channels, so it is an emergent channel. However, that involvement roughly mirrors the mere 15 percent share of supermarkets in overall FFV retail at a national level. Moreover, the indirect effects via employment and production and consumption linkages mean that the effects are broader on the rural economy than this incipient, small share implies.
- (5) Tomato farmers participating in the new channel are the upper stratum of small farmers (but still in the small farmer category) in terms of landholdings, and in terms of capital, such as irrigation tanks and education.
- (6) The emergent channel is profitable. Farmers participating in the supermarket channel earn profit 10-30 percent higher than farmers in the traditional channel. (It is however hard to untangle the quality premium from the channel premium controlling for quality because only the specialized/dedicated wholesaler (to supermarkets) channel pays farmers different prices according to grade. The latter means that in most of the rapidly emerging horticultural market, farmers are still not rewarded for quality upgrading and differentiation, a major problem in terms of upgrading the overall supply chain.

However, it has to be kept in mind that only the small farmer elite are participating in the (so far small) modern channels, as it is common for the elite group of any producers to be the first to avail themselves of new market opportunities that have steeper requirements than the tried-and-true but less remunerative status quo.



The value chain analysis indicates that collective action is more beneficial to farmers. The farmers in the high-commercial (good infrastructure zone) farmer group, capture the value added of sorting and packing and local transport, and sell to specialized wholesalers selling to supermarkets. The benefit is measured in price received by the farmer, which triples due to both capturing value added and differentiating quality.

However, severe problems exist in the underlying supply chain, which, taken together, are major barriers to farmer involvement in the emerging modern channels and a constraint to agricultural competitiveness more generally. The indicator is the high share of imports in the produce sections of supermarkets in Indonesia. This is just a survival tactic of supermarket chains and far from being restricted to large retailers, actually, is used as much or more by small local chains; the foreign and large domestic chains tend to source locally more than the small local chains, as the study showed. Fresh fruits and vegetables (FFV) sales by supermarkets are increasing very rapidly. The cause of their strong dependence on imports is the lower price and better quality of imports, especially of many fruits, but also of some vegetables. Interviewees from all segments of the supply chain note that the severely underdeveloped local supply chains make many local FFV products more expensive and have low quality and high spoilage. Moreover, the wholesale market system is inefficient, poorly managed, and prone to under-investment in infrastructure, relative to other comparable countries. **These two factors - poor supply chains and poor wholesale markets, are important constraints on farmers accessing modern market channels.**

It is probable, although this hypothesis was not tested, that consumers are drawn to imported produce because it is “trendy”, modern, exotic, global to consume items that were hitherto rare (that is, temperate region fruit in a tropical country). But it is possible (this report does not test consumption side hypotheses, however) that if consumers could buy cheaper and better quality local fruit and vegetables, that the increase in supermarket sales of domestic produce would bring Indonesian retailers to international patterns of reliance on imports – still importing, but not so massively relative to local sourcing. But that local sourcing is held back by the difficulty (due to high transaction costs and risk) of getting local produce relative to the ease of sourcing imported produce through large efficient importing wholesalers with modern logistics interfaces with the retailers, or even through in-house import divisions and global and regional sourcing hubs. As produce demand continues to soar, while local supply constraints continue, supermarkets of course have little choice but to import if they want to stay in business and meet the demands of the consumers.

The main national policy debate on the rapid growth of supermarkets has concentrated on the conflict between modern retail and the traditional retail markets. Many support the control of the growth of the modern market by zoning regulations and limiting permits. What has not been debated in public, despite its importance for both consumers and farmers, is the impact of supermarket growth on farmers, and farmers’ market access to modern market channels via for example supermarket procurement systems. Yet linking farmers to the market has become the priority policy of the government over the past five years. Given that supermarkets are becoming increasingly important in food markets, it is important to address the issue of what policies and programs are needed to develop farmers’ access to supermarket market-channels. That is, as is suggested above, closely connected to how to promote equitable and sustainable development of produce supply chains.

Indonesia has at present no robust institutional systems in place to address in a win-win



fashion the possibly mounting conflict and tension between supermarkets and suppliers. Based on the experience of other countries, “a private commercial code of practice” may well be the most practical and useful approach in the short-medium run, in that it harnesses private sector interests and can be implemented in situations where commercial laws and institutions are still in the development stage. The terms of the private code tend to be the main elements of most regulations elsewhere: compliance with contracts by both retailers and suppliers; prompt payment; cooperation in logistics development. **In the medium-longer run, various public regulations and assistance to supply chain actors will be needed to complement this approach.**

5.2. Policy Implications

Agricultural Support Services

The main challenge for policymakers is how to increase the inclusion of small farmers into modern supply channels offered by supermarkets. The increase in horticulture has been occurring despite the lack of government support services notably extension and financial services. Agricultural extension in the study zones are widely seen by farmers, wholesalers, retailers, and other informants as of little or help to the farmers to produce or market in the developing horticulture markets. FFV farmers overwhelmingly report, in the PRAs and farm surveys, that technical assistance to them comes nearly only from chemical companies’ local agents. Furthermore, nearly all their credit comes from input credit fronted by local wholesalers or input companies, with basically no access to other credit sources apart from friends and local high-interest-rate individual local lenders.

The first way is for direct support through investments in public goods and services notably research and extension services. Revamping the quality of the extension services so that it is better prepared and more relevant to the needs of the market is paramount. The results of this study indicate that farmers can be supported with technical and management assistance, post-harvest handling technology assistance, factor input assistance, etc. The President’s Plan (RPPK) to revitalize agriculture (2005) offers a timely opportunity for refocusing the agenda on agricultural development in a globalizing context. New approaches to agricultural extension have been piloted and the new Extension Law (Law. No. 6/2006) explicitly recognizes the need for a multi-provider approach. Like public extension systems in many countries, Indonesia faces a major challenge to develop an effective institutional mechanism for disseminating technology relevant for small scale producers especially for high-value crops as evidenced by this study. A series of positive debates and experimentation in management have taken place. These have included a shift from top-down to participatory approaches, input and technology dissemination to dissemination of market and upstream information and technology, from centrally managed extension services to decentralized services, and some movement toward privatization of extension. In responding to a more dynamic market, farmers need constant and up-to-date technical and marketing assistance.

Indonesia’s *agricultural research* system consists of national commodity research centers and sub-national adaptation institutes. However, Indonesian agricultural research expenditures have declined dramatically since the early 1990s compared to its neighbors. Real expenditure on public agricultural research in 2001 was no greater than in the 1995; and presently, it ranks near the bottom as compared to other Asian countries in agricultural research spending, relative to



agricultural GDP and total government expenditure on agriculture. Within agricultural research there has also been an imbalance in that rice dominates the research agenda and horticulture research is not high-priority, is fragmented, and poorly linked to market needs.

There appear to be few examples of successful initiatives undertaken with or through formal research and extension systems to help farmers to diversify into high value crops and gain access to modern supply chains. There may be several explanations for this. First is that such efforts require a broad range of high-level expertise not only in technical subject matter, but also in supply chain management and overall managerial and business skills. Government staff, especially extension staff, even lacks the relevant technical knowledge. Researchers may have more expertise, but as a rule in one narrowly defined field. Whilst technical skills in supply chain management are often lacking, business and management skills are even rarer. Examples of successful projects linking small farmers to high value markets therefore entail mostly donor-supported initiatives driven by foreign experts and/or foreign and/or local entrepreneurs who have not only good business and management skills but also, are proficient in accessing donor funding. Successful cases as a rule involve highly dedicated, driven and skilled development workers who manage both to set up a whole supply chain (often including niche markets in their country of origin) and to identify and train talented locals to take over. Nonetheless in many such projects sustainability becomes an issue – depending on whether such talented locals are available, are willing and able to take over, and especially, if benefiting farmer groups are willing to pay them adequately for their efforts. Another issue is that such projects as a rule operate on a fairly small scale, with numbers of beneficiary households in the double or at best triple digits. As the cost of implementing such projects is relatively high so is the cost per beneficiary household.

The above is not to say that formal research and extension could not have a role in helping farmers to diversify into high value crops and gain access to modern supply chains. Especially in countries with highly developed commercial agricultural sectors, e.g. Brazil, Colombia, Chile, South Africa and (perhaps to a lesser extent) India, formal research and extension systems can contribute through specific research projects and farmer training, and the same is likely to be valid for Indonesia. A problem may be that government staff, especially researchers (be they from research institutes or from universities) may be unwilling to submit to play a role that may be perceived as subordinate – something that may be remedied by good, diplomatic management and the right incentives. However, such support will likely be effective only within an overall framework in which private enterprise, possibly together with an NGO with specialized staff, has the lead. The new Extension Law provides a framework to encourage a robust multi-provider extension capacity to the FFV sector but financing remains a thorny issue.

Rural Producers Organizations

The results of the farm survey in W.Java indicate that there is little evidence of strong farmers/producer organizations to facilitate joint marketing, purchase of inputs etc. Development of farmer groups, grower associations, and new-generation cooperatives appear to be strongly needed. However, such organizations will only work if the members have common economic objectives. There have been a lot of government programs to develop farmer groups, associations or cooperatives but only for the purpose of delivering government subsidies or support, and thus have been unsustainable. The groups dissolve when the support or subsidy programs end. The program has to start with the needs or objectives, and not with subsidy or support.



In the case of horticulture farmers in Malang, E. Java, the small farmers have rarely formed formal farmers' groups, which is likely due to existing informal coordination among neighboring farmers, efficiencies of the collector system where increasing market entry has forced competitive prices and more convenient locations for the collectors' services. The only perceived advantage to farmers' groups in Malang, E. Java is in cases of high-volume demand for a particular crop, when suppliers were able to set up a three-actor supply chain by approaching farmers and directly specifying the planting/harvesting plans (cutting out the local collector function). In these situations farmers groups provided supermarket suppliers critical access to larger plots of land but were also seen as more difficult to work with than individual small farmers.

However, the value chain analysis in Chapter 4 indicates that there is an incipient channel that utilizes farmer groups to the advantage of the farmers. This channel is found only in the high commercial zone with easy access to infrastructure (Lembang). There is a group of nine farmers that sold their harvest through this channel, with the specific target of selling quality tomatoes to supermarkets and developing a reputation for and competence in post-harvest handling. The share of the farmer (cum farmer group) is 39% of the final retail price selling the sorted grade. The farmers have to sell the second grade to the wholesale market. That is only about 40% of their production, so on average, farmers in this channel get about 30% of the retail price overall, and on average Rp. 1520 – nearly twice as profitable as the other channels. This group may be the “avant garde” of specialized farmers groups capturing more value added and quality differentiation. This is fairly new so there is not yet evidence of diffusion of this approach but holds promise for improving farmers' bargaining power and incomes.

Facilitating development of farmer groups, grower associations, and new-generation cooperatives needs support at both the local and national government levels. Such organizations should be developed, and will only work if the members have common economic incentives. There have been a lot of government programs to develop farmer groups, associations or cooperatives but only for the purpose of delivering government subsidies or support with the result that they have not been sustainable.

Rural Infrastructure

One of the factors that reduces the competitiveness of local FFV is high cost of transportation to the production zones. Generally, the wholesaler pays for vegetables on the truck after harvest. That means that farmers have to pay the delivery cost of the vegetables from the field to the truck on the roadside. During the rainy season, unpaved roads are not accessible, thus farmers have to pay labor costs to carry the vegetables from the field to the nearest reinforced road. Good quality telecommunications and a paved-road network are essential, as otherwise local farmers will struggle to compete with imports. This is especially an issue as horticulture crops in Indonesia are often produced in remote, high-altitude areas where these infrastructure facilities are often deficient. For example, an 8-ton consignment of oranges from Karo (North Sumatra) to Jakarta had to pay levies totaling Rp190,000 at 45 collection points. These levies were equivalent to Rp24/kg. By way of comparison, the farm price of the oranges was approximately Rp1,850 per kilo, and trucking costs were estimated to be about Rp 692/ kg. Thus these levies appear to be quite trivial, equivalent to less than 5% of total transport costs. However, account needs to be taken of the time lost and inconvenience, in addition to the general unpredictability of these levies.¹⁰ Recent field research in Aceh, for example, suggests they may be a good deal higher.

¹⁰ See Simatupang (2005) and Montgomery et al (2002) for further discussion of these inter-regional trade barriers.



But perhaps this province is a special case in view of its history of conflict.¹¹ (RICA, 2006). This also highlights the distinction between Java-Bali and other regions in Indonesia, where markets and know-how are generally less well developed. In particular, the development of markets outside Java-Bali is crucially shaped by the quality of the road infrastructure. Thus, supermarkets in South Sulawesi and South Kalimantan are generally sourcing their fruit and vegetables from East Java, even though there are suitable local production sites, because these sites lack transportation connections.

Access to Financial Services

The results of this study also underscore the core constraint to agricultural sector dynamism in Indonesia – that of the lack of outreach of financial services to small farmers and suppliers. This also results in lower productive investments all along the supply chain as evidenced in this study. Increasing access for farmers and wholesalers to financial services is critical. Since the payment of supermarkets is generally delayed for up to 40 days, suppliers, farmer and wholesaler face a problem of having temporary illiquid assets. The government can facilitate agreements with the modern retail association (APRINDO) and the banking system so that they provide a guarantee for the amount of sales the supermarket owes, so that small/medium farmers or even wholesaler can get access to commercial bank loans. There are some private banks expressing an interest in this kind of agreement.

Market Intelligence.

Provide market intelligence to the supply chain actors and facilitate business linkages among farmers, wholesalers and supermarkets through business meetings, exhibitions, and business visit programs that facilitate business linkages and alliances. The meetings can be arranged at local, regional, as well as national level. Ideally extension service facilities like BIPP and BPP (available in every region) can be used on a regular basis.

Public Product Standards.

Standards established by the Bureau of National Standards (BSN) currently for FFV products need to be reviewed and modified if required. The standards also need to be better socialized and adopted along the supply chain. The study indicates there has been an effort to perform grading and handling in the production zone but the market price differentiation is insufficient. The training provided to farmer groups on Good Agricultural Practices (GAP) initiated by the DG-Horticulture is a welcome first step but needs to be expanded nationally. This will help improve awareness of the existing standards for FFV products, to form a common foundation for the parties in the supply chain so that successful farmers and suppliers can upgrade themselves to supply the modern market channels with higher quality and consistency.

Land Rental Markets

Active land rental markets found in the study area significantly contribute to the horticulture boom. However, the study shows that only a small percentage of the land has a title. Thus,

¹¹ For example, a development agency carefully monitored a cross-Aceh consignment. It observed 12 check points, and estimated that the levies were equivalent to 11% of the value of the goods. In late 2005, the BRR and the World Bank began monitoring levies imposed on trucks plying the Banda Aceh-Medan route. They found that trucks pay on average about Rp340,000 per trip. Encouragingly, the levies appear to have declined after the military withdrew as part of the peace settlement. Conversely, other illegal payments (eg, by over-weight trucks at weigh stations) have risen. See Olken 2006.



public land registration needs to be widely socialized and farmers encouraged to register their land. Land titles will give full right to the landowner and facilitate land rental market with necessary legal support.

The above discussion on the implications for public policy are in line with what Reardon and Hopkins(2006)refertoasatwo-prongpolicysupportstrategy,focusedonstructuralcompetitiveness and customized competitiveness. The policies to develop “structural competitiveness”, which reduce the overall costs of supermarkets procurement and the levelness of the “playing field” for traditional retailers, wholesalers, and suppliers in dealing with a modernized retail sector include enforcing healthy business practices; improving rural infrastructure; improving the quality and relevance of the agricultural extension service etc. In addition, policies that develop “customized competitiveness” support suppliers and farmers with the capacity to supply supermarkets are through the provision of market intelligence, improving enforcement of standards all along the supply chain, improving land titling, and developing innovative financial services that cater to the needs of the major actors in the supply chain.

Institutional Responsibilities and the Role of the Private Sector

The modernization of agricultural marketing in Indonesia has occurred largely as a result of market-driven, private initiatives, rather than as a direct result of government intervention. Results from this study and the recent Rural Investment Climate Assessment indicate that there are distinct roles for the public and private sector in this transformation. In the wake of decentralization, there are clear responsibilities for both the national as well as regional/local governments. Local governments can play a light-handed role in encouraging the development of agricultural clusters and support the formation of viable rural producer organizations which are better able to service the high-volume modern sector demand. Regional governments have a major role to play in the provision of efficient marketing infrastructure,¹² together with the removal of complex licensing requirements and informal levies. Agricultural extension services have been decentralized to district governments but Indonesia is in a transition phase now with a new Extension Law (Law No. 16/2006) that was recently passed that strengthens the policy and advisory role of the national government. The development of the Implementing Regulations over the coming year should foster greater private sector participation in the provision of advisory services. The current extension agents also need training and new skills adapted to the market – local governments have a key role to play under the guidance of the national government.

Traditional markets – that are under the domain of the district governments - play a buffer role in relation to these modern chains. They take residual produce, including that which fails to meet demanding quality control checks. They sometimes sell to the modern sector in times of scarcity or sudden loss of supplies. Prices in the traditional markets are also used as a reference point for the modern sector. Importantly, traditional markets serve to place a cap on modern sector market power. Thus, although the latter is gradually supplanting the former, in reality the market segments are as much complementary as competitive (RICA, 2006). Traditional retail markets need improvement on hygiene and sanitary standard, infrastructure (pavement, road, building, and stalls), cold chain system, and better waste management system so that they can compete with supermarkets. Overall it will create an efficiency link to the modern procurement system through relation with processors and packers. The latter will then be an added and

¹² Such as the Sub Terminal Agribisnis that are being developed in various regencies.



generalized inducement to supply chain upgrading. It will also allow the rewarding of quality differentiation at the production level, a key point of weakness at present.

There is also the potential for collusive behavior among the modern retail outlets and there is therefore a role for the Business Competition Supervisory Commission (KPPU) to regularly monitor price comparisons. In addition, owing to the political sensitivities associated with the displacement of small-scale traditional traders, the issuance of licenses for the development of supermarkets, now in the hands of district governments, needs to be undertaken in a transparent manner involving public awareness and consultation (RICA, 2006).

A summary of the various institutional responsibilities is presented in Table 5.1.

Table 5.1 Public and private options for strengthening farmer linkages to modern supply chains

Issue	Public sector		Private sector
	Public investments (National/Regional)	Policy environment	
Lack of access to markets	<ul style="list-style-type: none"> Investment in education, rural infrastructure (roads, markets, electricity, irrigation); support formation of farmer organizations; provide market intelligence (National and Regional) 	<ul style="list-style-type: none"> Foster development of input and credit markets (National); remove inter-regional trade taxes and levies (Regional) 	<ul style="list-style-type: none"> Assist farmers in forming farmer organizations
Weak technical capacity	<ul style="list-style-type: none"> Support market oriented extension (National and Regional) 	<ul style="list-style-type: none"> Foster environment for private extension participation through development of implementing regulations under Law 16/2006 (National) 	<ul style="list-style-type: none"> Provide technical assistance and key inputs to farmers
Meeting quality standards	<ul style="list-style-type: none"> Support farmer training on good agricultural practices for quality enhancement and food safety; improve traceability requirements (National and regional) 	<ul style="list-style-type: none"> Establish/improve existing grades and standards in line with market requirements (National) 	<ul style="list-style-type: none"> Supply inputs and train farmers on quality management and food safety
Meeting contract conditions; enhancing competitiveness	<ul style="list-style-type: none"> Train firms in contract design and management; train farmers on their rights and obligations; socialize Law 6/1999 on anti-competitive behavior; transparent licensing (Regional) 	<ul style="list-style-type: none"> Foster institutions for dispute resolution, monitoring collusive practices; strengthen awareness and role of KPPU (Regional) 	<ul style="list-style-type: none"> Foster trust; develop contracts that are self-enforcing
Access to finance	<ul style="list-style-type: none"> Provide business and credit advisory services for farmer/producer organizations; (Regional) facilitate financing arrangements through APRINDO and banks (National) 	<ul style="list-style-type: none"> Create enabling policy environment for microfinance, innovations through retail/farmer associations and banking sector (National) 	<ul style="list-style-type: none"> Provide credit on the basis of supermarket contracts;

Source: Adapted from Draft World Development Report (2007).

Annex 1 **Indo-Dutch Cooperation in Horticulture**

This annex briefly discusses two initiatives aimed at the horticultural sector financed by Dutch aid: the Horticultural Research Cooperation between Indonesia and The Netherlands program, HORTIN, and the Horticultural Partnership Support Programme, HPSP. Additionally, some comments are made on relevant characteristics of the horticulture chain in Indonesia, particularly with regard to the predominant role of traditional traders, and international examples of the successful integration of smallholders into high-value production chains.

HORTIN Program

The Horticultural Research Cooperation between Indonesia and The Netherlands (HORTIN) program entails Dutch-Indonesian cooperation in strategic and applied research with the following goal: to strengthen Indonesian horticultural research through joint research, capacity and institution building so as to encourage research activities that are interesting for public-private partnerships. The program was carried out from January 1st 2003 to December 31st 2006, under a cooperative agreement between the Indonesia Agency for Agricultural Research and Development (IAARD) and the Ministry of Agriculture, Nature and Food Quality of The Netherlands. Cooperating partners on the Indonesian side were the Indonesian Centre for Horticultural Research and Development (ICHORD), with the horticultural institutes IVEGRI (Indonesian Vegetables Research Institute, Lembang), IOCRI (Indonesian Ornamental Crops Research Institute, Segunung), and IFRURI (Indonesian Fruit Research Institute, Solo, West Sumatra). On the Dutch side the cooperating partners were PRI (Plant Research International, Wageningen) and APR (Applied Plant Research, Lelystad), both part of Wageningen University and Research (WUR). A follow-up program under the same name is planned, to be formulated



in early 2007. This program will have a stronger target group focus, aiming at addressing the needs and potentials of small and medium-sized horticultural producers, including producer's organizations, by focusing on practical implementation at the level of farmers and agribusiness companies.

The HORTIN Annual Report 2006 presents an overview of the contents and results of the ten research projects carried out under HORTIN, nine of which were successfully completed. These nine projects covered the following topics:

- 1) Fruit fly trapping in passion fruit orchards through attractants made from locally grown plants.
- 2) Development of a tailor-made database system for managing genetic resources of tropical ornamentals.
- 3) Development of microspore culture protocols – advanced haploid plant production technologies for hot pepper, cabbages, orchids and anthurium, so as to strengthen breeding programs and hybrid seed production.
- 4) Introduction of mushroom research and promoting mushroom cultivation in Indonesia (notably oyster mushroom, shiitake and paddy straw mushroom), a.o. through collection, conservation and genetic identification of germplasm of edible mushrooms of indigenous and cultivated species. Key activities were the selection of the best strains by comparative tests for strain performance, identification and testing of different substrate materials to prepare spawn, and development of improved methods for preservation.
- 5) Developing improved low-cost greenhouses for commercial flower production at mid- and high elevation through a) the use of sustainable construction materials and cover foils (in co-operation with Dutch greenhouse constructors), b) the design of integrated fertigation systems with special emphasis on simple drip irrigation, water quality, use of high quality fertilisers, and irrigation strategies to optimise water and fertiliser efficiency, and c) application of integrated pest management.
- 6) Developing improved low-cost greenhouses for commercial vegetable production at mid- and high elevation. Project components were a) identification of the potential and problems of existing vegetable production in plastic greenhouses in the highlands of Java, b) development of simple, suitable greenhouse structures, and c) research into simple drip irrigation systems and integrated nutrient management.
- 7) Developing a greenhouse system with natural ventilation (tunnel constructions covered with selective plastic foils) adapted to tropical lowland conditions, combined with research into possibilities for climate control and IPM for pest control through biological control agents and defining action thresholds.
- 8) Development and testing of a certifiable protocol for safe food production and product quality, notably in vegetable production – cabbage, tomatoes and potatoes – on West-Java (see below for a more ample description).
- 9) Survey of seed-borne diseases in shallot, tomato and pepper (on Java), including determination of reliable diagnostic procedures of the most important (seed-borne) diseases.



Description of techniques for preventing and controlling seed-borne diseases during seed production and processing and during production of fresh vegetables, including the use of sanitary measures and seed treatment. Dissemination of the information and techniques achieved from this project to Indonesian seed growers, the Seed Control and Certification Board, the Agriculture Quarantine Agency, and to other end-users.

Results of the above projects have been communicated to stakeholders through publications, workshops, demonstration days, and brochures and leaflets. An important program component was training of Indonesian experts of the counterpart research organizations in the above topics; also, some projects involved demonstration and training of farm advisors and farmers. The numbers advisors and farmers trained or informed are not exactly known but appear to be in the lower three digits; no information is available on further dissemination of the research results.

The above topics were selected by the Dutch and Indonesian researchers working in the project, on the basis of lists drawn up by both sides. There are no indications of involvement of farmers or their organizations in the selection of topics. Such participation of the key stakeholders in agricultural research is common in The Netherlands, but much less so in Indonesia.

The research project mentioned under 8), of development and testing of a certifiable protocol for safe food production and product quality, is probably the most relevant for the Agricultural Export Competitiveness project (AECF). This project entailed initiating the development of product safety and quality management systems in vegetable production chains in Indonesia. The research started with an analysis of the supply chains of the prioritized vegetables through a questionnaire applied to different stakeholders, and the analysis of processes and process step flows in the supply chain. Then hazards for consumers and bottlenecks for product quality were identified, with on the one hand a Hazard Analysis and Critical Control Points Analysis (HACCP), and on the other an analysis of the perception and awareness of stakeholders in the production chain. This was followed by the development of a protocol for Good Agricultural/Hygienic Practice (GAP) in the vegetable supply chain, on the basis of the main bottlenecks identified in the analysis. The protocol was tested in a pilot project with farmers and other stakeholders in the supply chain. Lastly, the possibilities were explored of establishing food safety certification and of setting up an independent assessment agency.

The project concluded that a key problem to be addressed in food safety certification is that of the lack of information regarding pesticide admission and labelling. The project has advised GOI to take action in this respect as soon as possible, as without such information there is no way that food safety in line with international standards can be guaranteed. Recommendations for the private sector were to work on raising awareness on GAP and the importance of improving product quality, presentation and handling. Supermarkets were seen as able to stimulate increased food safety and product quality by offering incentives to certified growers and traders.

The research team found that there is a major need for strengthening and/or refreshing knowledge on IPM, in which farmer networks could play an important role. It was also recommended for Indonesian research to work closely with the private sector, which was found not unwilling to improve food safety but fears complicated systems with high costs.



Horticultural Partnership Support Programme

The Horticultural Partnership Support Programme, HPSP, is a partnership involving private enterprise, farmer organizations, NGOs and the public sector. It aims to promote small farmer access to horticultural supply chains whilst improving farming practices, notably in terms of sustainability (better soil, water and pest management, reduced deforestation and biodiversity loss) and food safety. Other goals are increasing household incomes and strengthening the position of farmers in the supply chain, a.o. through farmer organization and improved information supply. The project is financed by the Dutch development organizations CordAid (an originally catholic Dutch NGO), Agriterro (a NGO created by the federation of Dutch Agricultural Cooperatives), and the Dutch Embassy. HPSP projects are financed on the basis of applications that have to meet a series of requirements, e.g., involvement of small farmers and preferably, their organizations, involvement of the private sector, and a role for government or non-government research and extension organizations.

Two years after the start of the project, at the beginning of 2007, there were 15 projects with the participation of about 1860 farming households constituting 98 farmer groups, 24 enterprises, and 32 knowledge partners such as universities and/or NGO's or groups of consultants. In total 137 professionals were supporting the development of 42 horticultural and business practical learning centres. Reported outcomes are more environment-friendly farming practices, cleaner and safer production of horticultural crops, more direct market access through shorter marketing channels, and strengthened farmer organizations. The project budget is slightly over \$ 1 million, of which 37% is contributed by the applicants and their partners.

First project results, reported for the projects that started the earliest, indicate that participating farmers have significantly increased their knowledge of good agricultural practise in horticulture and of adequate post-harvest handling. Also, market access has improved, in some cases through direct linking with retailers, and farmers are better informed of market conditions, notably demand and prices. Of those projects for which data are available indicators are that incomes have more than doubled – e.g., from \$ 30 to \$ 70 a month. Achievements with regard to farmer organization appear to be mixed, in some cases full-fledged organizations (i.e., with statutes, internal regulations, task divisions, etc) have developed, in others organization is much looser and informal. No information is available on the causes of these different outcomes.

Overall it may be relevant to note that with regard to the Dutch – Indonesian cooperation in establishing public-private partnerships in horticulture, as well as establishing ties between Dutch and Indonesian enterprises operating in horticulture, the same (short list of) names involving a limited number of enterprises and organizations re-appear each time in subsequent programmes. This may point to a situation in which only a limited number of enterprises finds it worthwhile to go through the trouble of forming partnerships and applying for funds. Mostly, such enterprises already had ties with the Netherlands through Dutch enterprises and/or through studies of managers in The Netherlands or other forms of personal contacts, and/or the enterprise has a direct commercial interest in working with small farmers (i.e., sellers of inputs, notably seed). Also, among these entrepreneurs there appeared to be a genuine commitment to helping poor farmer communities. It should be noted that such managers – entrepreneurs are exceptions rather than the rule.



A potential obstacle to improving quality, food safety and supply chains: traders' interest in maintaining the status quo

An important obstacle to improving quality and returns on their produce for farmers is that many traders have a vested interest in maintaining the status quo. Traders pay low prices to farmers for all produce, sell better quality produce for relatively high prices, and also manage to sell lower quality produce at acceptable profit margins. In such a situation there is little incentive for traders to promote product quality, especially if that is to lead to improved prices for farmers. Also, direct contacts between farmers – farmer organizations and buyers such as supermarkets are considered a threat by traders to their presently lucrative business. A well-informed source mentioned that in the past there have been examples of traders blocking initiatives to improve the supply chain by locking out those involved out through practices such as hindering transport and preventing the off-loading of the lorries involved at wet markets. Only politically well-connected individuals and organizations have been able to avoid such pressure from the established traders. The study Quick Scan Country Assessment for Market Access for Tropical Fruits and Vegetables, mentions that the urban markets for fruits and vegetables, also called wet-markets,¹³ are controlled by well-established trader networks that often go back a few generations. These wet markets cannot be accessed by individual traders that are not affiliated to one of the trader networks, and are governed by various patronage systems.¹⁴ As such it is difficult for an outsider to get an insight in price setting systems and trends in demand and supply – and practically impossible to intervene and start operating in these markets. Though some of the large retail chains have their own distribution centres and organise conditioned transportation of the fruits and vegetables, the bulk of the horticultural produce is still sold in the wet markets. Post-harvest losses due to unconditioned transport of bulk produce in open trucks are high, however, with only limited price incentives for higher quality products investments in conditioned transport and storage facilities, crates, boxes, etc is minimal.

An assessment of the present situation, notably in terms of the costs and benefits for established traders of improving product quality and food safety to GAP levels, might be important as the basis for the elaboration of adequate strategies for improving chain performance. Such strategies will have to take account of vested interests, notably those of the trader networks, and probably have to look for ways to co-opt these rather than attempting to bypass them. Such strategies would involve developing supply chains that, whilst complying with standards such as GAP, would offer profit margins for traders that are considerably more attractive than current ones.

¹³ The urban wet-markets are usually known to the public as 3D-markets: 'Dark, Dirty and Dangerous'.

¹⁴ Sources: interviews with staff of the Directorate APPMD, Municipal Council staff and market visits; Interview with Secretary of HORTIN Program

Annex 2 Preferred Suppliers and Changes in Procurement Systems

Bimandiri (based in Lembang, near Bandung) took the first steps to a “preferred suppliers” system in 1998, contracting a farmer group (of 60 farmers) “Horticultura” in Garut (40 km from Lembang); the link was with the head of the group. A subgroup of 30 farmers exited from Horticultura in 2001 and formed “HPSMI.” By 2001 HPSMI decided to make a deal with Syngenta, the seed/chemical supplier from Switzerland operating in Indonesia. HPSMI needed credit and technical assistance from the Syngenta Farmer Support Team (FST) (both of which it felt it could not get from the public system) and so in 2003 it changed its name to ASPIRASI (Asosiasi Petani Mitra Syngenta). It is one of 9 such farmer groups that Syngenta formed as small joint ventures at the farmer level in Java. There was thus in 2003 a “4-way” venture between Carrefour, Bimandiri, Aspirasi, and Syngenta.

In late 2001 Bimandiri went to Yogyakarta (about 8 hours distant) and contacted the farmer group “Mekar Buah” with about 100 farmers. Carrefour wanted a personal-size watermelon, and Mekar Buah was growing the large size. Bimandiri worked with the head of the group to experiment with and then start an outgrower scheme with the best 50 out of the 100 farmers (important point), and brought in Syngenta for technical assistance (for low-pesticide use practices) and input credit, and brought in a local investor to finance the operation – and the farmers got twice the per kg price for this product compared to the traditional product. Carrefour was buying the low-pesticide personal-watermelons (“baby black watermelon – *bimandiri*” is the label on the fruit). The goal had been to also export via the Carrefour system.

While similar attempts continue, these first two experiences were discontinued by the various parties. The essence of the problems encountered were two-fold: (1) in the case of the melons, a marketing issue/problem arose such that it was not possible to implement the quality program with the usually-sought exclusivity of the product; (2) in the case of the ASPIRASI, marketing



coordination became uncertain, with all parties uncertain as to how much they could count on to be marketed, and thus risk undermined the relationship. The general assessment is that the incentive to develop such relationships continues, in order to overcome inadequacies in the enabling environment for farmers and marketers, but that continued work will be needed on the design and organizational side of new arrangements.

Distribution Centers:

Matahari had only a small DC for a number of years (and only for processed products), but its capacity was small. In 2000, only 30% of food products went via the DC to the stores, and 70% were delivered direct from wholesale market or supplier to the stores. Since April 2004, they have (rented) a much larger DC in Cibitung, and are operating with fresh products since July 2005. It is 3700 square meters, has a cold chain, and ambient, chilled, and frozen sections. They plan to have a DC in Surabaya end 2006. They noted (in April 2006) a substantial centralization of procurement over the past five years: now 20% of their produce (mainly for leafy greens) is delivered direct to stores (the traditional system) and 80% passes via the DC and then on to the stores. Suppliers, either domestic wholesalers or suppliers, or importers, arrange transport to the DC. If the chain buys direct from foreign countries, they make arrangements with the exporter and a freight forwarder. Their stores off-Java select what they want to local-source on their particular island, and the central management selects what is imported for that island's stores. They noted the important transport costs in Indonesia: distances of shipment inter-island are large; 4-10 days depending on the area, with very high shrinkage; it takes 5 days by truck from Medan (for example for oranges) to the DC, and from Manado, 10 days.

Carrefour has a large fresh DC; they noted that the majority of it was dedicated to moving imported produce.

Hero has had a DC in Cibitung (since 1980). In the past half decade, it established a 7000 sq meter DC to handle fresh products (with cool and cold storage). Again, leafy greens (usually about 10-15% of vegetables in all the chains) go direct from suppliers to the stores without passing through the DC.

Makro has a moderate sized DC that handles processed and fresh; produce is received early in the morning, stored at ambient temperature, and then moved quickly out to small stores and food service firms in Jakarta.

Yogya (regional chain based in Bandung) built a small DC in 1996 when they only had 15 stores, to handle processed foods and non-foods (but no fresh products). As noted in the international comparison section above, Yogya (and other chains) built the DC to standardize quality and control prices/costs, reduce losses, and increase bargaining power with suppliers. In 2005 they added a small fresh produce section in the DC, mainly for fruit and bulk vegetables.

Borma (a small regional chain based in Bandung), by contrast, has a DC only for non-food, none for fresh products. This goes along with the general point that the procurement modernization proceeds earliest among the larger chains, and for processed products.



Local fruit sourcing:

Matahari mainly uses large local wholesalers with, inter-island operations, such as Trimegah Jaya and Reza Fruit. They also have 12 primary-sector suppliers of local fruit; a number of them produce but also act as wholesalers/collectors. They get melons and groups from local farm groups. They (like other retailers) tried to buy mango direct from the farm groups (to get around wholesalers) but found that it was hard to compete with the large wholesalers (who sometimes pay in advance and “book” the farmers for several years in advance, in places where it is hard to get the needed volumes and quality) in the main production zones. Matahari (like other retailers) permits (or uses it as a marketing device to show the consumers the good reputation and formal status of the companies to inspire trust in the consumers) the use of the company labels, e.g., Dewi Putra, Boga Tani, Prima Cipta, Sun Ripe, Mahkota Buah, and Berdikari labels on the fruit, all major fruit companies in Indonesia. Organics and low-pesticide fruit have company labels and other signaling (certifications) on them, such as the label “Amazing Farms” (see following annex).

Carrefour employs basically the same method as Matahari’s described above. But Carrefour is unique in the extent to which it is striving to develop local fruit (and vegetable) supply chains, partly for its local stores, and partly in hopes of including Indonesia in its Filière Qualité (Quality Supply Chain Program) (in the future, as it is the only country where Carrefour works that is not yet included in this program) for export in the Carrefour international sourcing network. Carrefour has worked for the past half decade to identify opportunities and work with groups to develop supply chains. A key modus operandi is to partner with its specialized/dedicated wholesalers, such as Bimandiri in West Java.(see annex).

Giant/Hero uses, again, a similar method to Matahari’s. They use a small set of large wholesalers based in the main wholesale markets. They noted that two-thirds of the wholesalers for fruit (imported and/or domestic fruit) have stalls in the main wholesale markets. They also have, as with the other retailers, a limited set of direct sourcing arrangements.

Makro also uses a similar system, but is working intensively (like the other major retailers) to develop direct sourcing, such as from orange suppliers in Medan. They are also promoting avocado from East Java, which they told us had been a top selling item in the past three weeks (at the time of our April interview). Makro goes to the avocado supplier directly in Surabaya to develop the new source. However, they noted the huge transport costs and distances (part of the reason that imports are increasing), for example durian’s taking 7 days from farm to their DC, with extremely high losses. This is a key point made over and over in the interviews.

Yogya also has the same system as Matahari’s. A typical example is a “mixed sourcing method” where they source local mangoes and salak from farmers groups, as well as a few large wholesalers with stalls in the Caringin wholesale market. That wholesaler sells the high grade to them, and the other grades to other clients. Some products, like local oranges, they get direct from Medan farmer groups. In the case of pineapples, the hybrid is not with a traditional wholesaler, but rather with a new-type, specialized/dedicated wholesaler, Bimandiri (see annex 3).

Borma again uses the methods above. They noted that 75% of their local fruit (basically non-West Java) come from a handful of large wholesalers in the local wholesale market, and the rest comes from direct sourcing in Subang, Garut, and Lembang.



Local vegetable sourcing

Matahari are not now relying on the traditional wholesale market to source local vegetables, both because they find the wholesale markets inadequate for their needs in general, and because they need their suppliers to sort, clean, minimally process, and pack for them. They tried and then (relatively recently) moved away from the traditional wholesale markets. They noted that their current typical system is to have a preferred-suppliers (wholesalers and/or farm companies and/or farmers' groups) supply them, either directly to the stores (if they are perishables and leafy greens) or to the DC for other vegetables like tomatoes and potatoes. That set of suppliers in turn sources from farmer groups, informing the farmers of what products are needed, at what price, with what timing, and with what quality and volume). That set of suppliers sends about 60% to Jabotabek and the other 40% outside Jabotabek.

Matahari use 75 suppliers for just Jabotabek (to DC and to stores); of that, there are just 6 for the main vegetables (onion, potatoes, tomatoes, shallots), another 25 large suppliers for other products for the DC, and the balance (around 40 smaller suppliers) are for leafy greens direct to the stores. Matahari noted that they have meetings and invite potential suppliers in the production areas, and also find wholesalers and work out direct links with them to become suppliers.

The kinds of companies they use are described in the case studies in the annexes. The latter are usually a combination of specialized/dedicated wholesalers (working mainly with supermarkets and food service companies in the modern sector), own-producers, and contract-farmers (contracting a number of lead farmers). This combination or hybrid actor is a common emerging actor to supply supermarkets in other countries such as Mexico, Costa Rica, and Thailand, as well as Vietnam.

Giant/Hero/Dairy Farm uses a similar system to the one described for Matahari. They select the same kinds of new hybrid companies (that are specialized/wholesalers but may also have production and outgrower schemes), who in turn select farmers groups with the relationship managed by lead-farmers. Their goal is to minimize the number of suppliers to cut transaction costs. They noted that they sometimes help the farmers group with some form of credit at the start of the relationship. Just as with Matahari, Giant has the dual system where bulk vegetables move through the DC and the local leafy greens go from local suppliers to the stores. (This is similar to the system extant among lead chains in Latin America.) The exception is for deals with organic producers like Hygreen where the leafy packaged product goes through the DC. The stores outside Jabotabek source part from the DC and part from local suppliers; for example, the Giant store in Bandung noted that they use 3 local suppliers, one of which has a stall in the local large wholesale market and the other 2 operate in a number of local markets.

However, they noted (as did the other retailers) that even though there are local suppliers with local vegetables such as onions and garlic, the local farmers are simply not competitive with imports; they gave the example of onions and garlic: 19,000 rupiah/kg for local garlic, 15,000 for imported from China; for onions, 6,000 for local, and 4500 for imported – and in both cases the imported is better quality!

Reardon (2004) reports that Giant stores off Java, in this case in Makassar, have somewhat longer supply chains. They buy from a specialized/dedicated (to Hero) wholesaler who in turn bought from a large wholesaler in the local wholesale market who in turn bought from a wholesaler



("collector") in small towns, who in turn bought from a local wholesaler in the vegetable producing zone of Malino two hours up the mountain from the port city of Makassar);

Finally, Hero has had some direct relationships with farmers' groups (such as the Al Ittifaq Muslim Boarding School in Ciwidey, or the Pacet Segar in Cipanas (West Java), but that is a very minor part of their sourcing system. However, they noted that they do not directly assist farmers. They noted that when their farmers apply for a loan from commercial banks they can and do present their business plans which note that they have a relationship with the chain, and that this helps them get a loan (using the de facto contract as a collateral substitute).

However, Dairy Farm noted that there are severe deficiencies in local information access for their farmers. They noted that Agricultural Extension services have not been helpful to their suppliers. This is a point made in all the interviews with all retailers and suppliers in our study. Giant has, however, used local extension service offices (BIPP and BPP) for training of farmers. (Giant does not actually use the personnel of BIPP, but rather just the facility, and provides its own trainers.)

Carrefour relies mainly on specialized/dedicated wholesalers as do the other front runners, avoiding reliance, except as a secondary strategy, on the wholesale markets. Again, as with fruit, Carrefour is the leader in striving to develop supply chains, for the local stores. While they find local Extension Services to not be of use in supporting their farmers, the assistance they provide is mainly limited to making known their requirements. They in general do not provide loans to farmers, but have some micro-credit programs with some groups necessary for upgrading. However, as of August 2006, Carrefour is in stages, reducing the payment delay in order to attract more high quality suppliers and compete with the general wholesalers and provide more incentive for quality upgrading. This has not been observed in other countries.

Makro used to depend (in its first years, over 1992 to 1997) solely on Kramat Jati. However, they transitioned (with still some dependence on the wholesale market) to a system now similar to Giant's and Matahari's, where they have a mix of local suppliers as preferred suppliers (approved by the center), and supply from the DC. Just as with Matahari and Giant (but not Carrefour), Makro does not undertake vendor upgrading, which they deem too risky. They prefer to work via the specialized wholesalers. They require of the latter the programming of supply from the farmers' groups to minimize volume oscillations. Makro has perhaps the greatest motivation among the retailers to source directly, because it is 80% a wholesaler (to small stores and food service) and only 20% a retailer. Its aim is to be a cheap and convenient wholesaler to its clients, so it strives to cut out other wholesaler margins in its supply chain. They started doing direct sourcing for major vegetables starting only 3 years ago, starting small and building each year.

Yogya was sourcing their top 5 vegetables (including for example potato and tomatoes) only from the wholesale market before 2000. Starting in 2001, for those top 5 vegetables only, they began shifting toward sourcing from specialized/dedicated wholesalers off-market in the Bogor (Puncak) and Garut areas. They supplement this with vegetables from Caringin. For the other lesser local vegetables, they continue to source only from the wholesale market. Yogya indicated that they calculated that they save 20% by buying from the specialized/dedicated wholesalers and cut out sourcing from the wholesale market. This was the only retailer that provided a specific figure for cost savings from modernization.



Import procurement systems of supermarket chains:

Matahari used to import direct, but now uses 6 major importer-wholesalers to import its FFV (to take advantage of low costs/economies of scale from the big importers, and reduce transaction costs). Just one of those importer/wholesalers, a very large one, supplies them with 50% of their imports. They have various products coming in over seasons to have seamless supply, for example of oranges (from China, Egypt, Pakistan, California, and Australia). The large wholesaler (Mulia Raya) has a presence in Java and other islands, and thus a large inter-island trade network with DCs of its own in the various islands. The large wholesalers deal in large volumes and thus can supply imports cheaply.

Giant/Hero (Dairy Farm) has a local “sister company” (in the same holding company) that coordinates the imports of fruit via various importer-wholesalers (5-6). Some of these are large wholesalers who both import and have inter-island trade networks, so that for example they can source a steady supply of mangoes all year from other countries and from other islands. Giant also imports some produce directly, such as vegetables from China and lettuce and herbs from Australia. They noted that they import a lot of mangoes off-season, from Thailand, Pakistan, and South Africa. Giant noted a point about citrus that we heard, in strong terms, from every retailer: there is a strong supply of local citrus from Medan/Kalimantan, but the price is very high due to high transaction costs (“informal charges” along the long road from Medan) and many “hands” (intermediation links) and high margins of wholesalers. They can get citrus much cheaper, with more consistent quality from China. The main imported fruit are: (1) mandarin oranges from China from December to April; (2) grapes, all year from South Africa, Chile, Australia, and the US; (3) durian from Thailand; (4) apples from US but increasingly from China (instead).

Carrefour has two ways that it imports fruit. (a) For smaller quantities, it sources from a local importer-wholesaler who sends the produce directly to its hypermarkets. (b) For larger volumes, it sources from Carrefour Global Sourcing in Shanghai with branches in Thailand and China.

Makro arranges imports from the supplying countries via a “feeder” (intermediary) and then uses a freight-forwarder. Makro has 7 stores in Asia, and has an Asian sourcing hub in Bangkok that arranges regional trade links.

Yogya uses a mix of importer-wholesalers and direct imports; The range of countries and products is similar to the other retailers.

Borma as a chain (centrally) makes big orders for some items (like oranges and durian) for all the stores. They import from the large wholesaler Mulia Raya.



Case Studies

Specialized dedicated wholesalers with and without own production and outgrowers (Bimandiri, Putri Segar, Saung Mirwan)

Bimandiri started in 1992 (by a graduate of UNPAD) and functioned 1992-4 as a “traditional wholesaler” to restaurants and hotels. It was just a stall in the local wholesale market in Bandung. In 1994 (during the period when they handled only 0.5 tons/day from 1994 to 1998) they approached local supermarkets (including Matahari and then Wal-mart). During this period they bought from other wholesalers and from lead-farmers (larger small farmers or medium farmers who own-produce as well as collect from 3-10 smaller farmers in the farmers group) who delivered to their small warehouse. Starting in 1998, they became solely dedicated to Carrefour, and up to today mainly supply to Carrefour. They were in fact selected as Carrefour’s best supplier in Indonesia in 2006 (BISNIS, Indonesia-www.bisnis.com, 08-May-2006). They supply tomatoes, potatoes, pineapple, and now mango. In order to assure quality and consistent volumes for their client, from 1998-2004 they used a very “hands on” approach by working closely with farmers groups, such as Aspirasi and Mekar Buah discussed in section 3.4., as well as with a mango farmers group in Pemalang and a variety of other groups. This approach seemed to them to involve more cost than benefit. Bimandiri noted that it had a lot of problems with farmers breaching contracts. This approach seemed to them to involve more cost than benefit and since 2002/3 Hence, since 2002/3 they have maintained preferred-suppliers lists but moved away from close technical assistance and credit, and also sourced some from local large wholesalers to complete orders. In 2005 they invested in a larger distribution center. In 2006, they noted that the recently heated-up competition (and the driving down of prices via using cheap imports as a key strategy since 2003) in the retail sector had translated into tight margins for them, and the emergence of the tension cost of making the various monitoring, storage, selection, and transport investments wanted by the retailers, and indeed a rise in many of their input and materials costs



- versus the diminishing margins that they can earn from these relationships. Key clients like Carrefour have reduced this problem for them somewhat by moving the payment delay from 14 to 7 days, as noted above.

Putri Segar (Lembang and Malang) The company started in 1992 with a focus on supplying food service (mainly restaurants) but then transitioned also in 1992 to supplying Hero in the heady days of high profit margins to supermarkets. By the early 1990s, 90% of their business was with supermarkets, but they diversified into hotels and fishing boats in 1998 and the share to supermarkets declined to 65% and they want to keep it at about half, keeping a diversified market portfolio both of food industry segments and of supermarket chains. Today they supply tomatoes, green beans (in Malang), carrots, broccoli, bokchoy, and snow peas. They sell 30 million rupiahs/day in Lembang, and 10 million/day in the new Surabaya location just to Carrefour (up from 15-17 million/day in 2000). Thus their current total gross is 15 billion rupiahs a year to all clients, or 1.5 million USD a year. Their largest client is Carrefour, but they also sell to ClubStore, Pricesmart, hero, Matahari, and to fishing boats. They noted that the profit rate to Carrefour is dropping over time as margins are compressed, so they are diversifying to buoy back up their overall profit rate. They noted that their profit rate for supermarkets (Carrefour) and food service is now similar (15%) but with supermarkets one has to pay various “fees” such as discounts for product promotions, so less attractive.

It is extremely interesting that Putri Segar was asked by Carrefour, in 2004, to move with the retailer to Surabaya (the capital of East Java, and the second biggest city on Java) when Carrefour opened a store in that city. Putri Segar went before, studied supply conditions and selected suppliers, built a packing house with their own capital. This is similar to what retailers are recently doing with lead specialized wholesalers for example in Mexico (see Reardon et al. 2006). For their east Java operation, in 2004 they sourced half from Lembang and half from Malang (two hours from Surabaya). But now they source 90% from Malang for the Surabaya operation – thus creating a supply base. They transferred technology in the form of new varieties to the local farmers, and supplies them seed from sources in Surabaya and from Lembang. They work, both in Lembang and in Malang (East Java) to supply Carrefour stores nearby in Surabaya City (East Java) through a “lead-farmers system” like an outgrower scheme. Carrefour, through its specialized wholesalers, plans to develop Malang as the center of operations to supply the whole east of Indonesia, and Bandung to supply the whole west of Indonesia.

They have 40 lead farmers in Lembang. Each of these lead farmers has on average 2 ha (hence medium farmers); each lead farmer works with a farmer group with about 20-30 farmers each with 0.3-0.5 ha each under the target products (similar to the average size of the farms we surveyed). (He noted that this is a traditional system used even with traditional wholesalers; the difference in the new market is simply the application of stricter quality standards, tighter coordination.) He noted that they used to buy direct from the farmers, obviating the leaders, and to supply more from their own production. But they found it easier to shift toward the current outgrower system led and coordinated for them by the system of lead farmers. The lead farmer supplies about half his quota from his own production, and half by collecting from the farmers group. Putri Segar tells the lead farmers the schedule, and the lead farmer works with the farmers group to control the rotations and calendars of the producers. The incentive for the farmers is essentially the lower market risk (but the payment period and price to the farmer are similar to that of the traditional market). This is similar to a finding in Guatemala in recent work (Hernandez et al. 2006). Moreover, Putri Segar, echoing the other conversations with retailers, noted that the extension service was of not help to them or to his lead farmers;



they need to supply any technical advice themselves. When asked why he does not just buy from the wholesale market in Bandung, rather than sourcing direct from farmers, he noted that he can save 50% just buying direct, and if he buys in the wholesale market, he still has to sort, clean, process, and pack (thus echoing what we heard from the retailers). Regarding why he does not just sell to the wholesale market, rather than go to the extra effort to sell to the supermarkets, he noted that he can sell grade A for 2000 rupiah/kilo and grade B for 1800 to the wholesale market, but for the two grades, to Carrefour, he gets 3500 and 3100 rupiah/kilo, respectively.

Saung Mirwan In 1984 Saung Mirwan started its hydroponics vegetable venture in Megamendung, Bogor, in the Puncak region (the main vegetable region next to Jakarta). Saung Mirwan became a hydroponics vegetable (paprika), melons, cherry tomatoes, beef tomatoes, and chilies. They began exporting paprika and cherry tomatoes to Singapore, Taiwan, and Hong Kong.. In 2000 Saung Mirwan focused on the production of exclusive vegetable commodities (like Japanese and Chinese vegetables) for the modern retail market. The production area Saung Mirwan possessed experienced development, from 7 ha of hydroponics and 2 ha of non-hydroponics in Megamendung in 1984, to 9 ha of hydroponics in Puncak and no non-hydroponics there by 2000. They added contract farmers in the 1990s. 1998-2000 was the peak of their exporting. But around 2000 they became non-competitive to Singapore because of extremely high air transport costs (1 dollar of air transport for 1 kg of paprika that earned them gross only 3.5 dollars in Singapore, so one-third of their cost was just transport!).

The constraint in the export market for vegetables made them climb the value-ladder in Puncak (shifting to flowers and flower seed to export to Taiwan and Japan) as well as paprika for export, and then shift toward the high-end domestic market but for a series of local niche products (and some commodities) in cheaper labor zones. They thus expanded operations to several other regions to expand their line to commodities, like Ciapanas and Garut in West Java. In line with market demand growth, Saung Mirwan relied not only on produce from their own farm, but also on outgrowers. Three kinds of partnership were implemented, namely: (1) urban based outgrowers to engage in hydroponics in greenhouses; (2) farmer outgrowers, operating farms under 1 ha, and (3) preferred suppliers from which they buy. They moved to Garut because of the growing conditions and the cheaper labor than in the semi-urbanized Bogor rural areas. Saung Mirwan implemented a similar partnership (contract farming) with farmers in the area around Garut. They help the contracted farmers with technical assistance and loans, hence a regular outgrower scheme, but for the local market.

They have two types of clients: 80% of their sales go to supermarkets, and 20% to airlines. They are now moving into food service, in particular to KFC (U.S. chicken meals chain) and McDonalds. (For the latter they are getting certified with HACCP for lettuce, seeking certification from the Bogor Agricultural Institute, a university) and will also get ISO 22000 for exporting romaine to Taiwan. They like McDonalds because they actually pay in advance, a new practice for Saung Mirwan to observe in the market. Saung Mirwan sells a little to the wholesale market (the second grade) and feed their 100 workers with other lower grade produce. 90% of their supermarket sales go to Jakarta, and the rest to Bandung, and they have a wide variety of clients (Carrefour, Giant, Matahari, Gelael, Sogo, Diamond, and Yogya). They export now some snowpeas (as well as sending to supermarkets), and produce lettuce, asparagus, vetch bean, broccoli, romaine lettuce, endive, edamame, bokchoi, and squash for supermarkets and food service. They also have an outgrower scheme and buy and sort from traditional wholesalers for low-end commodities such as roma tomatoes.



Just like Putri Segar, Saung Mirwan has shifted over time from own production to contract farming schemes in Garut. In 2000, 30% was from contract farmers, and they have built that up to 60%, sourcing from wholesalers now for only 10%, and own-production 30%. They have also multiplied by 10 the total land from which they source in West Java over the past five years, and are spreading out to Lembang. Like the others, they find that the Agricultural Extension Service has been of no use to them.

Commercial agricultural companies with own production and outgrowers (Deding; Hikmah; Ruffiat; Koppontren Al Ittifaq; Amazing Farms; Lyco Farms and Bukit Organic).

H. Deding (Garut) While retailers source from specialized wholesalers, they also source direct from medium-large commercial farmers. Pak Deding is an interesting example of this. He is smaller than Haji Eem, who has amassed 30 ha and is the largest tomato producer in the Garut area (dispelling the idea that horticulture is only by small farmers). But he is nevertheless now a considerable commercial farmer with his own small warehouse. He started in 1990 with just 1 ha, and now owns 8 hectares (20 times the average tomato farm in the area). He noted that the normal sequence is first to rent and then buy – the “agricultural ladder” of land acquisition sequence that had been common in the US (see Spillman, 1919).

He started as a farmer and wholesaler. In 1999 Makro approached him to be a dedicated supplier for them, and he started in 2000. He also supplies to Diamond (a small chain with 12 stores). He observed that it is easier (from the point of view of quality selection, for example they accept smaller tomatoes) to supply the small chains than to supply the large chains via the specialized wholesalers, which he used to do just a few years ago. He sells his first grade to supermarkets, and his second grade to the main wholesale markets in Bandung and Jakarta (Cibitung and Cirebon) and Bogor. In the wholesale markets he sells on commission paying 8-10% depending on the price, working with just one wholesaler per market. He is starting also to export via a wholesaler. He sells 4 tons a day to supermarkets, and 6 tons a day to others, hence very roughly calculated, a (gross) 150,000 USD operation. Note that he said that the supermarkets want “one-stop shopping” from the wholesaler, so he needs to bundle in other items such as carrots. We asked him why the supermarkets do not just buy their grade A in the wholesale market. He noted that the grade A in the wholesale market is more like “grade A-”; the supermarkets want bright red, bigger, in a plastic box, and with a very low damage rate. He also needs to deliver (which he does with trucks rented from large nonfood wholesalers). Finally, as did all the suppliers we interviewed, he noted that agricultural extension service had not been useful to him.

PD. Hikmah Potato Company (Pangalengan) is another commercial farm selling to various food industry segments, but a far larger one than the others we interviewed. It is run by persons with MBAs, Masters in Science, and Bachelors degrees. The Adung family has farmed rice for 100 years in the area, supplying to the local rubber, tea, and coffee plantation area. In the 1980s they started growing Chinese vegetables in the highlands, continuing rice in the lowlands. Since 1990 they shifted to a focus on potatoes, selling to the giant processor Indofood. They operated 100 ha of land in 1990, and today operate 200 ha – 30% (60ha) owned, 40% rented, and 30% in usufruct from the government tea plantation. They rent from absentee landowners in the city, plus from many small rice farmers. In addition, they contract with a substantial number of small-farmer outgrowers, as well as contracting local family members to produce tomatoes, carrots, daikon, and leeks. The contract farming is partly on their own land in fallow from potatoes, in order to use the land more intensively (shorter fallows) by rotating in other vegetables. They are doing



this to be more efficient and reduce costs. Another measure for that objective is substituting manure (from the local dairy) for chemical fertilizer (whose cost is rising fast with oil prices rising).

Another key, and very important for the study was the measure to increase the benefit/cost ratio by shifting from commodity potatoes to certified seed (high value) production, and planned increased use of greenhouses. This is part of the “value ladder” climbing occurring in this area. They are now moving their commodity potato production to other islands (Sumatera, Sulawesi) where land is far cheaper; for example, rental is only one-third the cost of rental in Garut. To cut transport costs, they are starting first-stage processing operations on those islands to process into chips. They also sell seed to the farmers on those islands; to do so, they work in a joint venture with IPB (university in Bogor), Dupont, Syngenta, and the Government (the Secretariat of Agriculture). They are doing this in South Sulawesi and West Sumatra (Aceh), Jambi/Buo, and Palembang. They also have a joint venture with the giant Thai CP (starting to export vegetables from Indonesia to Thailand and the Philippines), with technical assistance from CIRAD (the French), focusing on carrots.

Hikmah mainly sells to large processors and to the wholesale market. They noted that to those two segments they can sell large volumes, something the supermarket sector cannot yet handle. They also tried to access the largest supermarket chains but were not received. They found the smaller chains (Yogya, Makro, Superindo, Alfa, and some hotels and restaurants) easier to access. Only 5% of their product now goes to supermarkets, to which they sell the highest grade. They sell the rest to large wholesalers. They want to increase the share they sell to supermarkets as they pay better and allow quality differentiation to be rewarded.

Their vision of the changes occurring in the West Java area coincided, independently with the vision of other key informants like Bimandiri. Hikmah noted that there is a major land redistribution – and consolidation – taking place in West Java with the spillover from urbanization and from the horticulture boom. Small farmers (which they noted are those below 2 ha) and the largest farmers (above 10 ha) are being squeezed out (even the larger ones if they are not highly commercial and efficient). They noted that the small farmers are squeezed out because of their economic crisis and that forcing them to sell or rent out (as was observed extremely strongly in the various interviews at the local level). They noted that many of the larger farms are producing inefficiently, having been founded on speculation, and either the 1998 crisis or the post-crisis surge in competition has knocked them out. Only a few large farms, like Hikma, weathered the “storm.” By contrast, they noted that by far the main winners since 1998 have been the medium farmers, with 2 to 5 ha, who are “taking over” and buying and renting the land. They rent either from the large speculative owners who are urban absentees, or the small poor rice farmers who take urban low-wage jobs and their families rent the untended land. They believe it will look like the highlands of Malaysia in about a decade, with only high-value crops (paprika, cut flowers) and capital-intensive technology used by medium-sized farmers. They said that Puncak, in the past several years, is starting into this phase and merely leading the process that they think will sweep over all of Java. The low-value commodities (as Java climbs the “value-ladder”) shift (as they are starting now) to Sumatra and Kalimantan. They noted that his uncle already went to Malino (Makassar) to be one of pioneer in this process.

Koppontren Al Ittifaq. Not all the non-wholesaler suppliers to supermarkets are commercial farmers like Deding or Hikmah. Several are cooperatives (distinguished from the smaller “farmers groups” that are the 20-30 farmers unit managed by a lead farmer that sells on to specialized



wholesalers or contract schemes). Koopontren Al Ittifaq is an example of an organization that combines education (the Al Ittifaq School), cooperative business, and community development. In 1990 Al Ittifaq School started supplying Hero-Jakarta with vegetables under a contract with KUD Pasir Jambu (a Village Unit Cooperative in the era of Soeharto) in Ciwidey. Al-Ittifaq supplied the produce and the cooperative performed the packaging. At the start, Al-Ittifaq was only able to supply 30 kg of green beans a day and had a major problem because they lacked knowledge of the quality standards acceptable to supermarkets. Then, Hero assigned an employee to provide short-term technical assistance to Al-Ittifaq concerning production, sorting, grading, and packaging. After forming a knowledge base about market requirements, in 1993, Al-Ittifaq went independent from the KUD Pasir Jambu Cooperative and founded its own Cooperative (Kopontren, a set of cooperatives run by an Islamic boarding school). The Al-Ittifaq subsequently supplied Makro Jakarta, Matahari, Superindo, and Diamond Tangerang chains.

They now operate roughly 18 hectares, cultivate 26 varieties of vegetables with a market-oriented planting pattern so as to maintain the continuity of supply. The whole business is carried out by the students, who are grouped according to interest, level of education, and skills. There are now 326 full time students running the business, from cultivation to marketing, under the management of the Al-Ittifaq Cooperatives. Al-Ittifaq also cooperates with 5 outgrower farmers' groups, each allocated 10 to 20 hectares of land. They provide financial assistance, seedlings, and other assistance depending on the needs of each respective farmer's group. The coop sells 2 tons a day mainly of tomatoes and carrots, as well as green beans, shallots, cabbage, potatoes, curly pepper, baby corn, grass roots, Chinese lettuce, tespong celery, mint leaves, lemons, garlic, and onions. They also produce pre-packaged mixed-vegetables ready to cook. Such products are supplied 50% from own cultivation (in cooperation with farmers' groups) and the other 50% purchases from the wholesale markets (Caringin and Andir markets) including small amounts of string beans, bitter melon, and spice roots (around 2%). The supermarkets which are now supplied by Al-Ittifaq Cooperatives are: in Bandung: Yogya, Matahari, and Superindo (Dago, Buahbatu, dan Metro) and in Jabotabek: Makro and Diamond. Other supermarkets have purchased products from Al-Ittifaq including Sogo and Mitra in Jakarta. Hotels (Hyatt) and Japanese restaurants also buy from them.

Lyco Farm. Fatima has a B.S. in Agronomy from IPB and is getting her doctorate from UNPAD while starting and managing a large organic vegetable farm. She is thus another example of the emerging highly-trained business person in the new horticulture market. She started with her own 0.2 ha in 2000, and then rented 3 ha from small rice farmers and an absentee landowner. In 2002 she added 2 ha (renting; she noted it is expensive to buy but cheap to rent). She put in irrigation in the rented land.. She became one of the members of a farmer group selling to specialized wholesalers for supermarkets (mainly Yogya in Bandung) who provided loans, technology assistance, and fronted inputs. By 2003 she moved away from that to produce low-pesticide produce (mainly tomatoes, hence the farm's name) and marketed directly to modern retailers. She obtained certification of low-pesticide by the government (Sucofindo). She has to renew the certification each half year; it is costly, some 600 thousand rupiah (60 USD). Low pesticide to them, they say they want no-pesticide from her by 2010. She also sells to PT Enviro Green in Jakarta, and hotels and restaurant. She gets a very substantial price premium (400%) from the supermarkets for the low pesticide product (relative to the traditional wholesale market where she could not get a differentiated price for it). She also has 7 farmers on contract scheme, 0.75 per farmer. She provides seeds, fertilizer, and irrigation for them to produce also on part of her rented land (a type of share cropping on rented land). She needed a truck for her marketing.



Bukit Organik is similar to Lyco Farm, but focused on organic vegetables. Bukit Organik is a family business with highly trained family members (including an agronomist with a degree from Satyawachana University in Central Java and a certificate from the Organic Training Center in Puncak; there is also a trained marketing specialist). Starting in 2000, Bukit Organik managed 1.4 hectares of family land under organic vegetables; by 2005, they operated 6 ha - owned 4 ha and rented-in 2 ha. They moved from own-production only to a contract farmer scheme in 2003 where Bukit focuses on technical assistance and marketing, and has a farmers group of 5 farmers sharecropping the land Bukit operates. They pay 3-4000 rupiah/kg to the farmers, and then Bukit sells to retailers at 6-7,000. The supermarket then sells to the consumer at 10-12,000 rupiah/kg. Like the other commercial farmers, they have made their operations multi-locational - with operations in Lembang, Ciba, and Arjasari.

They started by selling to a handful of Bandung supermarkets (aimed at A consumers). Now they sell to 10 Bandung supermarkets and 12 stores in Jakarta. Their clients include Yogya Lifestyle Stores, Setrasari, Ranch Market, Healthy Choice, and Alfamart (all focused on consumer A mainly and also B). Very importantly, Bukit entered a joint venture with the retailer Ranch Market in 2005; the chain puts up 70% of the capital and they share a distribution center in Jakarta and Ranch sells the product at their own chain and wholesales it to other chains - and the goal is to export. They do not have international organic certification, just the local one (SUCOFINDO).

Amazing Farms was established in 2000 (after the owner started operations in 1999 in Lembang) by a professional person coming out of the financial industry (he gave off being a financial manager in a major company only in 2003!) Amazing Farms focuses on aeroponic/greenhouse production of low-pesticide vegetables. This is a new technology in Indonesia. Amazing Farms is a multi-location, inter-island operation; it has a main aeroponic greenhouse operation in Puncak (near Jakarta), but also has major operations in Lembang (West Java), Malino (near Makassar), as well as in Bali and Tapos Cimande. The multi-location strategy is to spread risk due to strong winds and rain damage to delicate greenhouses. Between mid 2003 and mid 2006, the company's sales rose 5 times! and they began exporting to Singapore.

The market is narrow and concentrated on supply side (with only one other major competitor, Parung Farms) and on the demand side (with the narrow niche of retailers and food service seeking this product). The target market is supermarkets, hotels, restaurants, and cafes, all focused on segment A consumers in Indonesia, and now to Singapore. Leafy greens are 60% of their production and 70% of those go to supermarkets. They deliver direct to supermarkets in Bandung, Jabotabek, Makassar, Surabaya, and Bali (the latter two are for food service only). They noted that the hotel segment is difficult due to extreme fluctuations in demand. They have a stunning 20% growth a year in their sales to Giant, Carrefour, and Matahari. He noted, however, that it is hard to supply supermarkets. There are numerous discounts, rebates, and other fees applied to suppliers "out of the blue." He also has to pay for 14 sales agents to be in the stores to promote, manage, and monitor sales of the product. Moreover, to stay on the preferred suppliers list of the supermarkets, one must get it perfect every single time, no margin for error. They are particularly concerned with the gigantic cost of transport that they have to face (with slow traffic dogging the steps of their 7 delivery trucks, massive two hour queues into the distribution centers, and lack of logistics companies). With all that, their sales have skyrocketed. They had gross sales of 12 billion r. (1.2 million US dollars) for 2005/6 (one year), versus only 2.4 billion in 2003. These are pioneers: Carrefour did not carry organics just 3 years ago.



While the present study is “self-contained”, many of the conclusions are built from a strong comparative base of knowledge gained from extensive fieldwork in 2004, with the cases compiled in Natawidjaja et al. (2004). Besides interviewing retailers (summarized in Reardon 2004) 18 case studies were undertaken for the USAID Project FPSA that are summarized below:

In general, several aspects stand out from the case studies presented below.

- There is clearly emerging, in the horticultural economy of West Java (as well as central Java, in the Puncak, and now emerging in East Java in the Malang), new elite of wholesalers and commercial farmers. These operations are far from the traditional sector – the managers tend to be educated with specific training in agronomy, organics, and marketing, they sometimes have links to or backgrounds in the urban economy. This group is like a number of such emerging horticulture-entrepreneurial classes in other developing countries in the recent decade.
- At least in the local vegetables sector, the businesses are the emerging main interlocutors directly with supermarkets. This is not yet the case for fruit where large traditional inter-island wholesalers still hold sway, and for the import sector, where large importer-wholesalers, or the retailers’ own regional or global hubs, hold sway.
- The businesses start small and start very recently but then grow extremely fast to the point where they are important businesses – with gross sales of several of them in the 1-2 million dollar range. The very fast growth in their businesses appears to be a confluence of their taking over the market (by buying up and renting land of small farmers and large speculators), by making major investments in greenhouses, irrigation, trucks, and so on, that grows the pie, and finally, the rapid increase in demand from modern retail (coinciding with the emergence of the produce section as important in supermarkets only starting in 2000 or so).
- The businesses are in a very mixed situation with respect to the quality and quantity of the services and factor markets they can depend on. On the one hand, they are unanimous in a strong feeling that the agricultural extension service is of no use to them or the farmers supplying them, that transport conditions and logistics services are poor, that wholesale markets are poor, and that the credit market does little for them or their farmers. By contrast, there is (as seen from the farmers side in Chapter 5) an extremely active land market, with it fairly easy to rent land from poor rice farmers or rich urban speculators, and even to climb the “agricultural ladder” and go from renting to buying. There is thus, a nascent concentration of land in the hands of the medium sized farmers in these horticulture zones.
- Moreover, many of the companies have multiple locations within West Java, across Java, and across islands. This is invited by the retailers themselves. This seems to be a key element driving the integration of the horticulture market in Indonesia – and of course means that competition increases for local farmers and wholesalers facing these emerging powerful players. The flip side of course is that this exposes them to the huge transaction costs of doing business across space in Indonesia.
- The threshold investments for entry into this horticultural business elite appear high, inferring from the capital assets of those studied – warehouses, trucks, irrigation, hydroponics equipment, specialized higher education, greenhouses, even own land acquisition. The daily investments in maintaining demanding relationships with the modern sector clients are also large in terms of time.



- While it appears to be quite profitable for these businesses to sell to supermarkets and other modern segments (fast food chains, food service), it is tough. There are a series of what suppliers see as unforeseen costs laid on them by retailers (discounts, fines, and so on). They have to organize their finances to deal with long payment delays (and the interest costs that implies), lack of investment financing from supermarkets, and the pressing down of margins allowed them by their supermarket clients – who themselves are in an intense competition in the retail sector that is “heating up” fast. An arm in the latter battle is use of cheap imports, which presses domestic players. To this is added a steady rise in fuel and oil and fertilizer and labor costs, and sometimes land limitations where forest use regulations bottle up farming and drive land costs up - so they are in a double-pincers between the demands and falling margins allowed from retailers, and rising costs on the supply and transactions sides.

A final issue is the need to find and train farmers to be able to follow schedules, employ practices that lead to quality and consistency, and most of all, to follow commercial practices that give stability to the operation. Supplier-businesses complain, just as retailers do, of their inability to count on farmers complying with contracts (even implicit contracts). A key reason for this is the lack of appropriate and relevant extension services (shown later in chapters 4 and 5).

West Java Horticulture Production and Market Analysis

This annex reports on the local meso-level study, which is an analysis of the production and marketing situation in the West Java province, in the study zones. The goal is to identify the trends taking place in the wholesale sector and farming sector in the production areas, and discern to what extent these changes are linked to the restructuring national market. The changes examined include changes in crop and variety composition, input and service markets, marketing institutions, contracting, and other market practices.

A2.1. Sampling Methodology

West Java was selected for the study because it is the main vegetable center, is by far the main production zone of vegetables, and is an area with rapidly changing produce markets. For example, the retail sector in West Java is second only to the Jakarta area in terms of supermarket development, and DKI Jakarta and West Java together have 60% of the supermarket sector nationally.

West Java has been the foremost producer of vegetables in Indonesia traditionally, because of its climatic conditions and rich volcanic soil. It is a leading producer of tomatoes, chilies, potatoes, and cabbage, carrots, and lettuce. As shown in Table A2.1, West Java produced an average of 35% of the vegetables grown in Indonesia in the past 5 years (2000-2004) and is among the top 5 vegetable production areas; the other 4 are much smaller (Middle Java and North Sumatera each have 13%, East Java 12%, and the other provinces are below 3%).

West Java is number 1 in tomato (which is the 6th most important vegetable nationally). West Java produces 49.1% of the tomatoes in Indonesia; North Sumatera is second with just 13.2% and



other provinces contribute only around 1%-5% each (Table A2.3). Tomato is an “intermediate” high value product. Using profit/ha for rice as an index of 100, tomato is 150, cabbage is 110, red chili is 110, and potato is 320 (2004 farm budget data from www.diperta.jabarprov.go.id accessed November 15, 2006); the profit rate from the government data is some 30-40% below calculated from the study, so these figures are the lower bound but tomato profitability can be greater than that lower bound, spiking upward in some seasons and years as the price spikes.

Tomato production nationally expanded at 4% annually over 2000 to 2005. That sounds fast (when one compares it for example to the growth rate of rice output which is only 1% per year). But compare to the real GDP growth of 4.8% a year (www.worldbank.org/external/countries) in 2004 and the population growth of 1.4% a year, so tomato output is growing slower than the lower bound of food demand growth. Interestingly, as shown in Table A2.2, of the top 10 vegetables, only red curly chili, long bean, and green onion grew as fast, or faster, than income plus real GDP growth.

The zone level study focused on several districts (kabupatens) and below them, sub-districts (kecamatans) in West Java. They were selected using the following sampling method. (The farm survey sample was in turn drawn from those areas in a way that is described in Chapter 5.) First, in West Java, districts were selected. There are 25 districts in West Java. The subset of the 12 that produced a (past five-year average) of at least 1000 tons of tomato (according to the Central Bureau of Statistics, the Badan Pusat Statistik, 2000-2004 data) was identified. The “high tomato production” districts were chosen in order to have a high chance of finding farmers in diverse market channels and using diverse technologies and with diverse farm sizes and non-land assets, as well as a diversity of merchant types. Since the districts differ in production volumes, the sample was selected using the sampling method of probability proportional to size (weighted) sampling. At this sampling stage, District Bandung and Garut were selected as the survey areas.

The next stage involved choosing four sub-district from each district. In District of Bandung there are 30 sub-districts, and in District of Garut there are 28 sub-districts producing tomato at a level of more than 1,000 tons annually. Four were randomly chosen from the 30 sub-districts and 4 from the 28 sub-districts. From District of Bandung, the sub-districts selected were Pangalengan, Ciwidey, Pasirjambu, and Lembang; from District Garut, the sub-districts selected were Cikajang, Cigedug, Pasirwangi, and Cisurupan.

From the 8 sub-districts, information for the local-meso study was collected using 3 methods: (1) multi-stakeholder Participatory Rural Appraisal (PRA); (2) focus groups discussion (focused PRA); (3) Sub-district-level Survey.

The objective of the multi-stakeholder PRA was to obtain and confirm information from different stakeholders’ perspectives about the changes takes place locally in the segments of the food industry under study. During the PRA, participants were given a set of questions to respond to and discuss participatively to reach a common perception on the issues. The multiple-stakeholder PRA was organized in 3 locations: Lembang, Pangalengan (covering 3 sub-districts in Bandung District), and Garut (covers 4 sub-districts in Garut District) in April 2006. The participants invited were a cross-section of farm leaders, farmer group members, small-scale food processors, food industry managers, food industry suppliers, farm input providers, wholesalers, local small brokers, supermarket specialized/ dedicated wholesalers, and other related parties involved in the supply chain in the local zone.



The second PRA was a focus-group PRA conducted in July 2006, in the 8 sub-districts where the farm sample was selected. The group discussion objective was to pursue more deeply the issues and information yielded by the multi-stakeholder PRA that had been done at the district level, and discuss policy alternatives. The PRA was conducted separately for two different groups. The first group consisted of 5-8 farmers selected based upon a sociometric mapping (farmer group leaders, advanced farmers and general farmers) while the second group was the group of traders consisting of 4-5 traders based on the supply chain mapping (broker, wholesaler and supermarket's specialized wholesaler).

A Sub-district Survey was also conducted in July 2006, in the 8 sub-districts selected for the micro study. The survey objective was to collect secondary information at the sub-district level related to the population, public facility, commodity, production, and market. The survey included interviews with 2-4 sub-district officials and local agricultural field officers per sub-district in a focus group discussion.

4.2. The Study Sites

The eight sub-districts selected as sampling and PRA areas are key tomato zones in West Java over the past half decade. Lembang was the first area (among those sites) where tomatoes were grown commercially, starting in the early 1990s. Farmers in the Pangalengan area started to cultivate tomatoes as a commercial crop in the late 1990s. Farmers in Garut just started with tomatoes commercially on a large scale in 2000. Today, the Lembang share is only 5% of West Java tomatoes: the farmers there have moved on from tomatoes to higher value vegetables – climbing the “value ladder” (see Table 4.4). By contrast, today the Pangalengan share of tomato production continues high, at 21% of West Java, and Garut is 29% of West Java (hence “the” tomato district in Indonesia). These two latter continue to plant.

The sub-districts under study have good access to roads and markets. There is good public transport 2-4 times a day in and out of the sub-districts. However, most of the farmers do not own a truck, but can easily rent one. Even though sub-districts in Bandung District are relatively closer to the capital cities, they are only 0.5-1 hour closer to cities than those from Garut. The distance to the main road, local markets, and local assembly points from each sub-district indicate that the sub-districts in Garut District are not at a transport cost disadvantage compared to sub-districts in Bandung District (Table 4.5). On the other hand, since districts in Bandung District are generally closer to the large city, and have more urban influence, the population density of Bandung is generally larger than Garut District.

4.3. Level of Commercialization

To engage in a more dynamic and more commercialized market, farmers need to have more supporting environment that facilitate the change and transformation, lessen the risk, and thus help them move away from subsistence farming. The hypothesis is that in the area where the transformation of the market is already taking place, farmers will have a greater chance to shift to the modern market supply chain.

The study area was classified into two zones: high and low commercialization. The commercialization level is measured by two indicators: rural income diversification (into nonfarm activities) and crop diversification (into horticulture products). Then, its area given a score using the indicators and classified into High commercialization (score > 3) and Low commercialization



(score>3). Rural incomes of the more commercialized area will be less dependent on the agricultural sector, moving toward rural industry and service sector. Commercialization of the agriculture system leads to greater market orientation of farm production; so, we will find higher percentage of land cultivated for commercial crop.

According to the commercialization level as shown in Table 4.6, two sub-districts in Bandung District and two sub-districts in Garut District are classified as high commercialization areas: Lembang, Pangalengan, Cisurupan, and Cikajang sub-districts. The remaining sub-districts are classified into low commercialization areas. The numbers below come from sub-district statistical publications, and are clarified and discussed in the sub-district survey conducted in July 2006. Several points emerge.

- (1) The percentage of households that rely on the agriculture sector in low commercial areas is still high (62%), with only 38% of income from non-agriculture, plus less than 1% from agriculture marketing services (Table 4.7). In contrast, of the households in the high commercial area, 73% rely on non-agriculture income, so only 27% of the households still rely on agriculture, and less than 1% rely on agriculture processing and marketing service incomes.
- (2) On average, farmers in the high commercial area allocate only 23% of the total available land for grain, and allocate most of the land for fruit (16%) and vegetables (58%). In contrast, farmer in the low commercial area use the larger part of their land for grain (53%), and allocate only 5% for fruit and 38% for vegetables (Table 4.8).

4.4. Dynamic Changes in the Production Area

4.4.1. Commodity and Variety Changes

There is a dynamic change in the nature of agricultural commodities produced in the research areas in the past two decades. All of the sub-districts that are here categorized as high commercialization areas are considered pioneers in vegetable farming in the area, and thus in Indonesia. Lembang was known since the early 1990s for being a pioneer in commercial tomato production, and has since diversified toward high value niche products like flowers and niche vegetables like horenzo, zucchini, asparagus, radishes, and organic products. This is a typical “value ladder” evolution found in successful horticultural areas around the world, where farmers move from staples to an “easy entry” product like cabbage, then to an intermediate product like tomato, then on to niche products like the ones mentioned above. The farmers use the earnings and experience from the earlier steps to move up the ladder. The sub-district survey and statistical publications revealed the following.

- (1) Only 17% of farmers in Lembang sub-district still cultivate tomatoes today (Table 4.9). In contrast, farmers in Cikajang Sub-district of Garut District which just started to produce tomato 5 years ago, now on average number 60% of them producing tomatoes (20% share of total tomato production in Garut District). Farmers in the highlands of this area also produce other common commercial vegetables such as potatoes, chili, and cabbage. About 34% of farmers in the low commercialization area produce tomatoes, which started mainly in 2000.



- (2) Interestingly, many farmers in the low commercialization sub-districts now cultivate tomatoes in the lowland irrigated rice field during the dry season. Before 2000, these farmers were only cultivating rice and secondary crop in a dry season, and now some of them cultivating tomatoes instead. However, they still maintain cultivating rice at least once. Since the development of tomato production is recent, is not too surprising that marketing services in the area are still weak and commercialization is low.
- (3) It is also noted that the tomato variety grown by farmers has been changing in the past 5 years, driven by what wholesalers want. Growers have been shifting from the old variety (more rounded, thinner skinned Tewe), to new varieties with oval shape, and strong and thick skin, and not easily wilted such as Marta, Samina and Permata.

4.4.2. Technology Change

Tomato production technology in general is known to farmers in the area, but of course skill level varies partly according to experience. The only new technology that has emerged in the area in the past half decade has been the use of plastic soil covering which holds water in the soil, reduce fertilizer run off, and reduces the growth of weeds. This has started only in the past five years, and is now very common among farmers in the area.

The use of irrigation and greenhouses is important for year-round, quality-controlled production. These are major investments, however, and tend to be associated with the more profitable market channels, according to the respondents. The PRA participants further noted the following.

- (1) The water source of most tomato farmers is rain. During the dry season, however, farmers water the tomato plant using water collected in a small reservoir or tank. There are no government records of irrigated land in the dry-high land. The local government only records and reports irrigation used in wetland rice since it is part of the national food policy (Table 4.9). Thus irrigation of tomato is not yet recorded statistically by the government. Technical and semi-technical irrigation is specifically only for wet rice land and only available in a low land area. Village irrigation is generally available for wet rice land in a high land area, where commonly rice is planted for two seasons.
- (2) On the rainfed wet rice land, which is flooded during the rainy season for rice cultivation, the water is still available in the ground for the rest of the dry season. That land then becomes ideal for tomato cultivation. Those practices have attracted many farmers and been diffused very quickly since the tomato price in the dry season is usually higher because of the limited supply from the main production zones. This study captures the phenomenon that is going on progressively across the low commercialization area.
- (3) In the highly commercialized area of Lembang sub-district, there are 17 greenhouses found. None of the farmers in other sub-districts use a greenhouse, including the other 3 sub-districts in high commercialized area. Farmers with greenhouse cultivate specialized niche market and organic products that are marketed to supermarket and specialty stores. None of them grows common tomatoes in a greenhouse.



4.4.3. Tomato Production and Productivity Level

Tomato production from highly commercial areas is increasing; however, production from lower commercialization areas is also continually increasing at an even faster rate even though the total production from high commercial area is still very high.

- (1) The average tomato production in West Java during 2000-2004 was 275,026 tons per year; in 2004, the total production of tomatoes from 4 sub-districts of highly commercial areas was 74,940 tons which represent 27% of the West Java tomato production. In contrast, the total tomato production in 2004 from 4 other sub-districts of low commercial area was 13,923 tons which is only represent 5% of West Java production (Table 4.10).
- (2) Farmers in the study area share almost the same level of productivity; even though there is variation between areas, the difference is not significant. According to the sub-district agricultural offices, based on “guesstimates” rather than representative farmer surveys, the average yield in the high commercialization area is 24 tons of tomato per ha, a little bit higher than the average yield of the low commercialization area which is 23 ton per ha. Note that chapter 5, showing the representative farm survey results, showed much higher yields, around 51 tons per ha; the latter is similar to Central American results for similar kinds of farms also studied in careful farm-level surveys of farms that use similar technology in similar agroclimatic conditions. The 40-50 ton figure is also common in studies elsewhere in Southeast Asia and India.

4.4.4. Land size and land rental

- (1) Again according to the government offices of the sub-district, rather than on farm surveys, the sub-district survey noted that those offices believe the average tomato farm in the high commercial area is 0.5 ha per farmer which is little bit higher than the low commercial area at 0.4 ha (Table 4.10). The land controlled by farmer in high commercial area of Garut is higher, 0.6 ha per farmer. Note that the farm survey (results in Chapter 5) confirms that the tomato area of the tomato farms is about 0.4 ha on average, however, the farms themselves are larger (on average 0.7 ha with other horticulture crops and some rice, and land rental is some 20-30%.
- (2) According to Table 4.11, the share of land that is held by very small farmers is similar across sub-districts, approximately 76%. The next stratum is the small/medium farmer, with landholdings of 0.5 to 3.0 ha, and they have 18%, and the balance of the land (5%) is in the hands of medium/large farmers with more than 3 ha. However, these commercial vegetables areas are known for a very active land rental market, more active than in the rice areas. When farmers need to expand the production in responding to increasing market demand, they can easily find land to be rented. According to Table 4.11, the land that is in the market for rent is about 10% of the available land. Most of the land (70-80%) is operated by the land owner. About 10-20% of the land in vegetable production is share cropped. Note that the farm survey, differs somewhat from these guesstimates from the sub-district statistical offices: 20-30% of the average landholding is rented (not share-cropped).
- (3) Usually, the land that is rented is owned by people who live in the city and taken care of by a distant relative or someone known to the owner previously. So, the share cropped land is available to be operated by others but it is not an open market; it is only passed down



to the people in a close circle to the owner who become the caretakers of the land. Share cropping practices are very common in the rice areas, but not common in the vegetables area.

- (4) The tendency has been for the absentee-owner preferring to rent their land instead of share-cropping. In 1990s, the number of share-croppers was about 30%. Now, even though absentee land ownership is increasing, especially in highly commercial locations, share-cropping has tended to decline.

4.4.5. Labor Force and Wage Rate

The availability of labor is very important to support more intensive and more commercial agricultural activities.

- (1) The number of workers in the high commercialization area is higher (66,007) than that in low commercialization area (33,817); (Table 4.12). However, agricultural labor availability tends to decline due to urbanization and moving to work in other sectors. The available labor in the area is now mostly older - younger laborers prefer to work in construction jobs that pay higher wages.
- (2) The agricultural labor wage rate tends to increase along with inflation and economic development. However, the real wage was actually declining - leading to many rural workers complaining. Increase in commercialization of the area was also suspected would affect the wage rate level. The data show that wage rates in the high commercial area are only about IDR 50 higher than the wage rate in low commercial area; the difference is not significant. Average male wage rate in high commercial area is IDR 13,770 and in low commercial area is IDR 13,710 per day from 07.00 to 12.00 AM. Average female wage rate in high commercial area is IDR 9,016 and in low commercial area is IDR 8,993 per day for the same hour period.

4.4.6. Supporting Institutions

In the agribusiness system, agro inputs stores, financial institutions, and agricultural service offices (*dinases*) are among the important supporting institutions.

- (1) Growers in the study areas have no complaints about the availability of agro inputs in the production center area, the large number of stores and vendors offering competitive prices. Large chemical input and seed companies are competing and giving many promotional offers to expand their market which mostly benefit farmers. Some of those companies such as Syngenta, East West seed, Pioneer, are also giving technical assistance to the farmers, in support for their input purchase.
- (2) In focus group discussions with potato growers, most of them claimed that their major financial capital sources are from their family or relatives. Many of them also said that their capital was from the wholesaler who already became their patron. Very few of them received capital from banking or other formal financial institutions. Only large farmers and wholesalers can borrow from formal lending institution because they have enough assets to be used as collateral.



- (3) According to the sub-district survey, there are enough extension service agents assigned to the sub-districts. In the study area, the extension agent office is not at the sub-district office, but at an experiment station/BIPP, which could cover several sub-districts.¹⁵ Generally, about 5-8 extension agents are assigned to BIPP/Experiment station. The latter covers 3-5 sub-districts. So, the overall average of 3 extension agent per sub-district is fairly good service coverage. However, since most of extension service agents mostly trained during the green revolution era in the 70s, their technical knowledge for high value commodities is insufficient.
- (4) With the program budget from local government and from the effort of seed and pesticides companies, last year, there were an average of 9 technical assistance projects per sub-district related to tomato cultivation and 4 general technical assistance activities. However, the number of technical assistance activities in high commercialization areas was consistently higher than in the low commercialization area, for tomatoes as well for other commodities. Farmers commented that the technical assistance activities from the extension agents was insufficient to support most of the farmers; the program only involves very small percentages of growers in the project-oriented activities.

4.5. Dynamic Changes in the local Horticulture Market

4.5.1. The Emergence of New Channels and Institutions

The marketing channels of fresh vegetables in the production centers in the last two decades have changed very rapidly. Natawidjaja (1999) showed that the fresh vegetables market channels in 1993 merely served local and regional markets, inter-island markets, and exports. As shown in Diagram 1, there are newly emerging channels in the production centers as an impact of market restructuring at the national and global levels. This market channel development increases competition, imposes higher quality requirements, induces higher technology adoption, increases investment and more sustainable production.

- (1) There are 3 new market channels - to the supermarket, food industry, and hospitality industry (hotel and restaurant). Each market channel has developed institutions and intermediary actors. For example, the supermarket requires many produce items with good quality but in smaller quantity. The traditional wholesaler alone cannot fulfill these demand requirements - this then encourages the development of the specialized wholesaler. The same happens in the case of the food industry. Indo Food, for example, demands huge quantities of potatoes for its chips processing, with specifications on type of potato, specific size, and quality. Again, the traditional wholesaler who buys everything and sells everything cannot meet the industry demand requirement and its quantity. Then the industry encourages a development of its own supplier.
- (2) Impressively, some farmers (7%) do manage to respond to an opening opportunity and connect to the new market channel, either through a specialized supplier or directly. The remaining 93% of the farmers are hesitant to change and still market their produce to the traditional actors that have been around for a long time. The majority of farmers still market

¹⁵ It should be clear here that the experiment station is not the standard norm and that the institutional arrangements differ from sub-district to sub-district after regional autonomy system applied. However, with the new Extension Law (No. 16/2006), all sub-districts and sub-sub-districts will now have similar institutional arrangements.



to wholesalers (46%) and local collectors (40%); however, the wholesaler further markets 9% of his volume to specialized wholesalers serving supermarkets and the export market (Table 4.15).

- (3) The development of a new marketing channel is accelerated by the increasing level of commercial activities in the area and supported by the improved commercial infrastructure. In high commercialization areas such as Lembang and Pangalengan, there is a higher inclusion of farmers (Table 4.15). The numbers of specialized wholesalers supplying to supermarkets and suppliers to the food industry are increasing in these areas.

Meanwhile, the long time traditional wholesaler is quickly adapting to the dynamic changes in the market and capturing the opportunity to participate in the restructured market channel. As indicated by Natawidjaja (1999) in 1993, the large wholesaler was the dominant player in the production center areas since he dominated all access to the market, including inter-island trade and also exports. When the market changed, some traditional wholesalers expanded and improved their operation by also supplying a specialized wholesaler to supermarket (9%) and food industry (5%). Now, new players are entering the market with more specific demand characteristics, including new product items (that are traditionally not available in the area) and higher quality standards. One impact has been that the competition in the production centers is intensified. However, since farmers generally lack capital and are always keen to improve cash flow, the wholesaler also plays a role as a capital lender, locking farmers into a weak bargaining position and depriving them of the chance to sell to other alternative markets (generally true in the rural areas). The wholesaler then takes the opportunity to buy the harvest in low price, sort, grade, and sell the highest quality to the specialized supermarket wholesaler and the remaining lower grades to the traditional market.

One of major obstacle to including small farmers in the marketing channel to the supermarket is the long delays in payment, longer than that of the traditional market. The traditional wholesaler usually pays farmers 1-3 days after the product is harvested and sent to the wholesale market. Only at the time of excess demand or low harvest do farmers receive cash payment in half or even full at the time of delivery. In contrast, an average supermarket pays in 2-3 weeks. Hence, the wholesaler or specialized wholesalers have to pay farmers within 3 days using their own operational capital before receiving payment from supermarket, otherwise none of the farmers would be interested. Consequently, the ability of the wholesaler to include small farmers in the supermarket channel dependent upon the amount of capital owned to cover the payment to the farmer in advanced.

Since capital lending from a wholesaler and delayed payment to farmers is a common practice in vegetables production centers, both parties, farmer and wholesalers, like to protect each others' interest by building a social institution around the "contract" to prevent any breaches, particularly since most of the transactions do not have any written contracts. Farmers and wholesalers are in general looking for long- term business relationships so that it will be unlikely to lead to any breach of contract for a short-term gain. Key aspects about the marketing channels include the following:

- (1) Even though the traditional wholesale market is still the main final marketing channel (68%), the new marketing channel to supermarket has already become the main alternative marketing channel (11%) for producers from the production centers in West Java (Table 4.14).



- (2) The channel to supermarket exceeds the percentage marketed to other islands, which is also to the traditional market. Comparing the three areas, the percentage of volume marketed to supermarket is consistent with the level of commercialization described earlier.
- (3) Traditional marketing channel from the vegetables production zone in West Java is mostly marketed to the 4 main wholesale markets - Caringin, Kramatjati, Cibitung, and Tangerang (Diagram 3). As indicated from the national meso study, the wholesale market system in West Java poses a major bottleneck for fresh vegetables marketing in the area.
- (4) As shown in Diagram 3, Caringin has the largest coverage since it was claimed to supply 120 markets in West Java. Kramatjati is administratively an exclusive wholesale market for the Capital Jakarta area with a population of 12 million. In practice, there are a lot of leakages from the other adjacent markets - Bekasi and Tangerang - through the delivery of small pick-ups supplying the retail market in the Greater Jakarta (Jabotabek). However, compared to the size of population supplied, the volume of fresh vegetables traded in Caringin wholesale market is extremely low.

4.5.2. The Number of Market Actors

Consistent with the definition, generally, the high commercialization areas have higher volumes of vegetables to be traded and marketed. Hence, it is normal to find that number of marketing actors in those sub-districts to be higher than in low commercialization sub-districts (Table 4.15). However, the survey also found that marketing actors in high commercialization areas such as Lembang are not only trading locally-produced tomato in the area, but also buy and sell tomato from other production centers, such as Pangalengan, Ciwidey, Cikajang, etc. Therefore, the highly commercial area actually serves as a marketing service provider for the whole region of West Java. The following points are noteworthy:

- (1) The number of wholesalers in the high commercial areas is a lot higher than that of the low commercial areas (Table 4.17). Since the wholesaler is usually a large interregional trader who supplies regional, inter-island and even the export market, their existence in the production center areas is very important. After the emergence of the modern market channels, the wholesaler also supplies the specialized wholesaler to supermarkets and the food industry.
- (2) The presence of many wholesalers could mean more open and competitive market. Table 4.17 shows that in some low commercial sub-districts, the number of wholesalers is only a few or even non-existent (Pasir Jambu). In this case the grower has to sell through the local collector, which creates longer marketing channels and the farmer shares are smaller.
- (3) The local collector is a smaller wholesaler operation, who usually collects from small farmers and supplies to local markets, wholesalers, and specialized wholesalers. The number of local collectors in high and low commercialization areas is almost the same, around 37 traders.
- (4) Compared to Lembang and Pangalengan sub-districts in 1993, the number of local collectors in 2005 is smaller but the number of brokers is higher (See Natawidjaja (1999)). Since the two sub-districts have improved access (better roads and market infrastructure), and are more competitive with the emergence of new market channels, margins have been



squeezed. Small local collectors, with limited amount of capital and market coverage have been pushed out of business and are surviving in the market by serving as brokers.¹⁶

4.5.4. Packing House Development

Tomatoes are usually transported in a wooden box, which is usually prepared on the field or in a packing house. However, larger wholesaler operations are increasingly setting up the boxes in the packinghouse, since it is also a venue for sorting for different market channels. The supermarket supply chain requires tomatoes transported in a plastic container and not in a wooden box. Table 4.17 shows that on average, the number of packing houses available in high commercialization area is 95, far more than the low commercialization areas (only 23 locations). Since packing houses mostly do sorting and grading, the higher number of packing houses mean that a higher volume in the production centers can be graded and standardized to be marketed to higher market standard requirements, such as required by supermarkets, which increases the probability of including small farmers in the supply chain (since most farmers are small farmers).

4.5.5. Problems Constraining Farmers' Supply to Supermarket

The main problems constraining farmers from connecting with supermarket channels (see also summary of PRA in Table 4.14):

- (1) Farmer has **very limited capital**, so finds it difficult to buy good quality inputs to supply good quality products. Delayed payment of supermarket “as long as 40 days” creates difficulties for farmers to plant the next season. Farmer must rely on capital from wholesaler/broker, or input kiosk.
- (2) Most farmers have **small land sizes** and work individually without planning, hence it is difficult to sustain regular production. Additionally, seed quality is available but expensive. So, another main problem for the farmer is unsustainable and low quality production.
- (3) **Information** about supermarket demand (quality, quantity, and price) is not available to most farmers and most farmers felt very **little or no support from the extension services**.
- (4) **Lack of post harvest handling** because when farmer only sells a good grade (Grade A and Super) to a supermarket spec. wholesaler, nobody else in the area buys the remaining grades. Marketing directly then to the wholesale market is difficult for farmers.
- (5) Lack of price information and transparency
- (6) Demand from supermarkets is still small in volume and many times a very short notice. This is voiced by farmers who are not in partnership with specialized wholesalers and only deal with traditional wholesalers
- (7) Lack of partnership and functional farmer organizations/cooperatives/associations
- (8) Delayed payment schedules of supermarket poses a problem and constraint, not only to the farmer but also to wholesalers because they have to float capital from other sources

¹⁶ Broker or commissioner is a local marketing actor who connects farmer to a buyer for a service commission. Therefore, the broker does not decide on the price nor does he pay anything. He merely provides information and connects the two parties interested in making a business transaction.



4.6. Summary

- (1) There is a dynamic commodity shift across West Java. The High Commercial area is moving to more high value and niche market commodities and Low Commercial area is moving from subsistence grain to commercial vegetables.
- (2) Technology change occurs most in High Commercial area with the use of plastic land cover, water tank irrigation, and green house for niche market commodity. However the use of water tank irrigation is beginning to be more widely used, even in the Less Commercial area to support tomato planting in dry season where the market price is usually highest.
- (3) Land rental markets in the horticulture zones are very active. There is an indication of large number of small farmers and an increasing absentee land ownership. However, sharecropping practice has been declining and shifting to more common land renting practices.
- (4) The number of agricultural officials and number of extension agents in each sub-district is adequate. However, the farmer indicated lack of technical assistance from extension and agricultural field officials. Extension agents often do not have enough operational budget to reach farmers. In many instances, they are poorly trained in horticultural/high-value crops extension.
- (5) Aside from the traditional channels, there are 3 new channels emerging, each with its own institutional development. The fast growing alternative channel for vegetable marketing in the production zones is the supermarket channel. It was non existent in 1993, now growing to become the main alternative market channel for the farmer at 11% in 2006.
- (6) Packinghouses have been growing very rapidly, especially in high commercial zones. However, there is little incentive to the farmer to do grading because of lack of price differentiation. Most of the gains are enjoyed by the wholesaler.
- (7) Factors constraining the inclusion of small farmers in supermarket supply chains include: lack of financial institutions that bridge the payment gap from supermarket; small land sizes of individually grower; lack of association or cooperative support; lack of information about products demanded by the supermarket.



Annex 5

The Tomato Value Chain from West Java Farms to Jakarta Retail

This annex presents an analysis of the value chain(s) for tomatoes going from farms in West Java to retailers in Jakarta (a common end point to impose comparability across the chains).

The starting point was the information from the farm survey. 586¹⁷ farmers sell into 5 main market channels that stretch from the production zones to retailers in the Jakarta area. The 5 main channels found are shown in Figure 1. The first column shows the channel, the second, the level of commercialization of the zone (as defined in the main report), and the last column, from farmer to the retailer (whether supermarket or traditional) in Jakarta. The sample is a stratified random sample - half farmers in the modern channels, and half in the traditional channels. The overall true shares in the zone are 85% in the traditional retail channel and only 15% in supermarkets.

Figure 1. Farmers and Value Chains of Tomatoes

No.	Comm. Zone	Number of Farmers	Value Chain
1	High	33	Farmer → Specialized Super Wholesaler → Supermarket
	Low	50	
2	High	9	Farmer → Farmer Group → Specialized Super Wholesaler → Supermarket
3	High	147	Farmer → Traditional Wholesaler → Traditional Wholesale Market → Traditional Retail Market
	Low	114	
4	High	122	Farmer → Traditional Wholesaler → Specialized Super Wholesaler → Supermarket
	Low	56	
5	High	3	Farmer → Local Collector → Traditional Wholesaler → Traditional Wholesale Market → Traditional Retail Market
	Low	52	

¹⁷ From the sample of 600 were dropped 4 farmers as they sold locally as organic producers, and 10 who sell only to small local markets.



Figure 1 shows that:

- (a) the most common channel that farmers use is channel 3, the farmer-traditional wholesaler – wholesale market – traditional retail. This traditional channel is used by farmers in the high- and low-commercialization zones alike. By contrast, channel 5 is the other fully traditional channel that starts with local small wholesalers/collectors. It is five times less important now than is channel 3 – yet only 10 years ago, it was dominant, as shown in Natawidjaja (1999). The larger, more capitalized wholesalers have crowded out the small traditional brokers.
- (b) Among the channels to the supermarkets, channel 1 is most important, where specialized wholesalers buy mix-of-grades from the farmers and then sort and grade it themselves and sell on to the supermarkets. The second most important is channel 4, where the specialized wholesalers enlist the traditional wholesalers to do the first stage of sorting and selecting and buy from them. This is used mainly in the higher commercial zone. The third most important (but just nascent) is channel 2, the most beneficial to farmers, where the farmer group grades and sorts and sells on to the specialized wholesaler. This emerging channel will become more important in the future as it diffuses.

The complete value chain calculation of each channel and by actor is available in Table 1 and its value chain summary is available in Table 2. The paragraphs below contain a brief description of each channel followed by a detailed description of each supply chain actor's roles and functions. The last part is the overall value chain analysis. The sample for the non-farmer actors in the value chain is 3 per segment, chosen as representative according to key informants. The results check against the wholesaler and retailer interviews conducted for the main report. The data for the farmer sample come from the farm survey for the main report, with results reported in chapter 4 therein.

Value Chain 1: Farmer – Specialized Wholesaler - Supermarket

Thirty-three farmers in the high commercial zone and 50 farmers in the low commercial zone sold their harvest through this chain.

In both zones, the farmers sell directly to supermarket-wholesalers (specialized wholesalers dedicated to modern channels). In one sense, they sell “without grading” – in that there is no separation of the tomatoes into individual grades and boxed separately. But in another sense, they do sell the tomatoes graded, and this concept is used throughout as the “default”; that is, they sell a “grade-mix” – the grade of which is indicated by the share of grade A in the box of mixed grade tomatoes. The grade mix has not been sorted or graded: it is just a jumble of the tomatoes harvested. But that jumble has a grade for the mix. We will indicate this as a percentage, say 25%-grade means of the jumbled mix, the farmer and buyer have negotiated an estimate of their being 25 % of grade A. 40%-grade means there is a 40% share of grade A in the jumbled mix, and so on. Of course the price is higher for a box with a higher grade. This is only a very partial incentive to produce quality, because the estimate is rough, and the main payment is made on the basis of share of grade A. Moreover, when the intermediary sells to the retailer, there can be further grading, where the intermediary gets a different price for a box of grade A only, grade B only, and grade C only, so that the intermediary captures the differentiation of quality fully, while the farmer captures it only very partially. For instance, Table 1 shows that specialized wholesalers paid farmers Rp 794 per kg (25% of super quality), but Rp 942 per kg



(50% of super quality). Note that the farmer could in theory earn more by selling just the top grade to the specialized wholesaler, and fully grading his tomatoes himself, but then he would bear the cost of finding a buyer for just the B and C tomatoes, which can be time-consuming and risky.

The supermarket-wholesalers in this chain are actually upgraded traditional wholesalers, who buy mixed-grade harvest and supply both traditional markets and supermarkets. The ones interviewed for the VC analysis used to be traditional wholesalers, but now are focusing on supplying high quality tomatoes to supermarkets. Therefore, the wholesaler procures, sorts (out of the mixed-grade boxes), grades and packs good quality tomatoes – a “very good mix” (Super AB grade - (this is red-greenish, for longer shelf life (super) and largest and second size mixed)), which are about 40% of the volume purchased from the farmers and delivers them to supermarkets for a premium price; the specialized wholesaler sells the rest of the mixed grade “regular mix” to traditional wholesale markets (where only a mixed grade can be sold). Note that the traditional wholesalers only do the latter activity as it does not pay (traditional market will not buy sorted) to sort into A or AB grade except for the supermarket client.

The supermarket paid the wholesalers Rp 3,500 per kg for Super AB grade and Rp 4,000 per kg for Super A grade (only the largest size, and again, green-red). Supermarkets in Jakarta sold tomatoes at Rp 4,900-5,200 per kg.

The farmer in this channel gets 17% of the consumer price selling the mixed-grade.

Value Chain 2: Farmer – Farmer Group - Specialized Wholesaler - Supermarket

This channel is found only in the high commercial zone with easy access to infrastructure (Lembang). There is a group of nine farmers that sold their harvest through this channel, with the specific target of selling quality tomatoes to supermarkets and developing a reputation for and competence in post-harvest handling. This group may be the “avant garde” of specialized farmers groups capturing more value added and quality differentiation. But this is fairly new so there is not yet evidence of diffusion of this approach.

After the harvest, farmers call the procurement staff of the farmer group. They note the quantity and quality of the harvest, and take it over to a packing house of their farmer group (no transaction or payment is made since the farmer group is providing a service rather than buying from farmers). The group has workers trained in sorting and packing.

Since the farmer group is a group of growers specialized in the supermarket market, the group trains and gives technical assistance to the members. Farmers in the group produce a high proportion (compared to regular farmers) of top quality tomatoes by culling tomatoes on the plants to get a higher percentage of higher grades. The group charges a service fee of 10% from the group profit (the gross sales to the wholesaler less the cultivation and handling costs and local transport to the specialized wholesaler in Lembang). To give an idea of the benefit of the group, consider that the total cost of production is 470-650 rupiah per kg. If the farmer sells to the traditional wholesaler ungraded, the price received is between 700-940 per kg. So the farmer’s profit is usually between 230-290 per kg. Now, with the farmers’ group, the total cost to the group of sorting (to the “super AB grade), handling, and transport to the specialized wholesaler is 330 rupiah per kg. The supermarket wholesaler pays 2000 rupiah for that grade. Thus, the gross



profit of the farmer group is 1670/ kg; the group's operation cost is 10% of the profit (167 rupiah per kg). So farmer receives $2000 - 330 - 167 = 1503$ rupiah per kg. The cost of cultivation is between 470-650 rupiah per kg. Assuming the average farmer cost is 560 rupiah per kg, the farmer's profit with the group operation is $1503 - 560 = 943$ rupiah per kg, compared to the farmer's usual operation with profit between 230-290 rupiah per kg. Thus, in the group, the farmer triples his/her earnings – all by adding value of sorting, handling, and transport. Even given a margin of error in measurement, this is a substantial gain over the non-collective approach.

The specialized supermarket wholesaler receives the tomatoes at his packinghouse from the group. He then re-grades and packs according to the requirements of each supermarket chain. Supermarkets in Jakarta buy top quality tomatoes (Super A) for Rp 3,900 per kg at the store. Then the store sells tomatoes at Rp 5,100 per kg.

The share of the farmer (cum farmer group) is 39% of the final retail price selling the sorted grade. Of course, the farmers have to sell the second grade to the wholesale market. That is only about 40% of their production, so very roughly we can say that farmers in this channel get about 30% of the retail price overall, and on average 1520 – nearly twice as profitable as the other channels.

Value Chain 3: Farmer – Traditional Wholesaler – Trad. Wholesale Market – Traditional Retail

There are 147 farmers in the high commercial zone and 114 farmers in low commercial zone sold their harvest through this chain.

As a general custom, the traditional wholesaler buys the harvest from farmers without grading. The wholesaler buys from farmer in the high zone for Rp 806 per kg (grade-mix is of 40% of good quality), and in the low zone for Rp 923 per kg (grade-mix of 60% of good quality)

The wholesaler then sorts, grades, and packs. Grading for the traditional wholesale market is generally an ABC grade (mix). The wholesaler only culls the D grade (the smallest) in the sorting process. With this general mixed grading, almost 100% of the volume bought from farmers can be sold to the traditional wholesale market. The tomatoes are transported (usually in a 10 ton truck, the type one finds in wholesaler markets in many countries) to the traditional wholesale market in a wooden box.

The trader in a traditional wholesale market buys the tomatoes with a mixed ABC grade for Rp 1,650 - 1,700 per kg. Procurement costs in the market are comprised of loading, unloading, and weighting, plus a handling cost for managing the sales and giving service to the retail buyer.

The traditional retailer pays Rp 2,200 per kg for a mixed ABC grade in a box at the wholesale market. He then loads-unloads, stores at his kiosk, and sells the tomato in Jakarta for Rp 3,200-3,100 per kg.

The producer price is similar to the other channels except channel 2, but the share of farmers is 27% in this channel of the traditional market.



Chain 4: Farmer – Traditional Wholesaler - Specialized Wholesaler - Supermarket

There are 122 farmers in the high commercial zone and 56 farmers in the low commercial zone that sell into this channel.

In both zones, the farmers sell to traditional wholesalers without grading (that is, just sell the mixed-grade). The wholesaler's buying price differs depending on the proportion of high quality tomatoes in the harvest. The wholesaler buys from farmers in the high-commercial zone for Rp 794 per kg (25% of good quality), and in the low commercial zone for Rp 804 per kg (45% of good quality).

In this channel, the traditional wholesaler only performs basic sorting, slight grading, and placing the tomatoes into a bucket (not in to a wooden box). The traditional wholesaler sells mixed-grade buckets of tomatoes to a specialized wholesaler for Rp 1,700/ kg. [Note that this is approximately Rp 1000/kg for the value added of some sorting and delivery – less than the Rp 1200/kg that the farmers' group gets for delivery – but the latter sorts further to the specific high grade needed by the specialized wholesaler.] The specialized super wholesaler pays and loads the tomatoes at the traditional wholesaler-packing house.

Then, the specialized wholesaler sorts, grades and packs the good-quality portion of the tomatoes (Super A grade) into a container and delivers it to the supermarket for a premium price. The specialized wholesaler sells the tomato to the supermarket at Rp 4,000/ kg. The specialized wholesaler sells the rest of the tomatoes (below grade A) to the traditional wholesale market.

The supermarket in Jakarta sells the tomato in a store at Rp 5,200 per kg.

The farmer's share of the consumer price is only 15% in this channel.

Chain 5: Farmer – Collector - Traditional Wholesaler – Traditional Wholesale Market – Traditional Retailer

This chain represents a traditional channel commonly found in the vegetable production zones in Indonesia in the 1990s – but that today has waned to the extent of being relatively rare. There are 3 farmers in high commercial zone and 52 farmers in low commercial zone selling their harvest into this channel. This is thus basically a “hinterland” vestige of the prior dominant market system. We posit that it survives because of the high transaction costs for the large traditional wholesalers and specialized wholesalers to collect from small farmers dotted around hard-to-reach hillsides served by very poor roads – so they leave it to small brokers in small pickups to collect from these tiny scattered farms.

The collector buys from farmers on the farm without grading. The price paid in the high zone for Rp 898 per kg (44% of good quality), and from the low zone for Rp 700 per kg (31% of good quality). Note that this latter price, the dominant price, is well below the comparable price paid by wholesalers in the other channels for a similar grade mix. He then performs handling such as re-weighing, sorting and placing the tomatoes in to a bucket. The collector sells tomatoes for Rp 1,200 per kg to a wholesaler usually at his packinghouse.



The wholesaler to traditional wholesale market also performs handling, such as re-sorting, grading and placing in to a wooden box. Again, as in the other traditional channels, the mixed grade can all be sold in the traditional wholesale market.

The traditional wholesale market pays for the mixed grade (ABC) about 1,800 - 1,850 per kg. The wholesale market wholesaler has to pay for procurement costs in the market, such as for loading-unloading, weighing, and handling, and selling to the traditional retailers.

The traditional retailer in Jakarta pays Rp 2,300 per kg for the mixed ABC grade tomatoes in a box at the wholesale market. The retailer then loads-unloads, stores and sells in the market at Rp 3,300-3,400 per kg.

Summary comparison of channels

The main report showed the supermarket channel is more profitable. The present analysis shows by contrast the shares of value going to farmers and wholesalers and retailers. From the perspective of the farmer, the main report revealed that the benefits of the channels are ranged from the lowest in the most-traditional channel (dominated by local collectors) in the low-commercial (hinterland) zone, to the highest benefit from the channel where farmers in the high-commercial (good infrastructure zone) group, capture the value added of sorting and packing and local transport, and sell to specialized wholesalers selling to supermarkets. The benefit is measured in price received by the farmer, which triples from the least favorable to the most, due to both capturing value added and differentiating quality.

Between the worst and the best channels, however, the share the farmer captures of the consumer price varies. The highest is that of the “organized-farmers channel to supermarkets” (with the farmer in the farmers’ group capturing 30%). But below that there is no correlation between captured-share of retail price and profitability. The least profitable channel, value chain 5 starting in the hinterland, has farmers earning 24% of the retail price; by contrast, farmers in the value chain 4 (via traditional channels to the supermarket) get a higher price but a low share of the retail price (only 15%). The channels where the farmer sells directly to the specialized wholesaler or to the traditional wholesaler who sells on to the specialized wholesalers allow only slight quality differentiation (within the graded mix, a higher proportion of A grade), and a small price advantage (with a low “share of the pie”, around 15%, as the wholesalers capture the greatest chunk of the added value). Ranked second to the least favorable channel is the dominant channel, faced by most farmers, where the selling price is for an ungraded mix, and the farmers capture 27% of the final consumer price. So share analysis does not always reveal benefits to farmers; profitability analysis is also needed, and thus this value chain analysis is complementary to the profits analysis in chapter 4 of the main report. The above mapping of benefits to the farmer, over channels, makes common sense and is as expected, with the most traditional channels the least favorable (and within them the vestige of the older system by far the least favorable), and the modern channels more favorable, but with a wide gamut from the farmer capturing little of the value added to capturing much through the (so far rare and nascent) group organization to handle post-harvest handling and marketing.

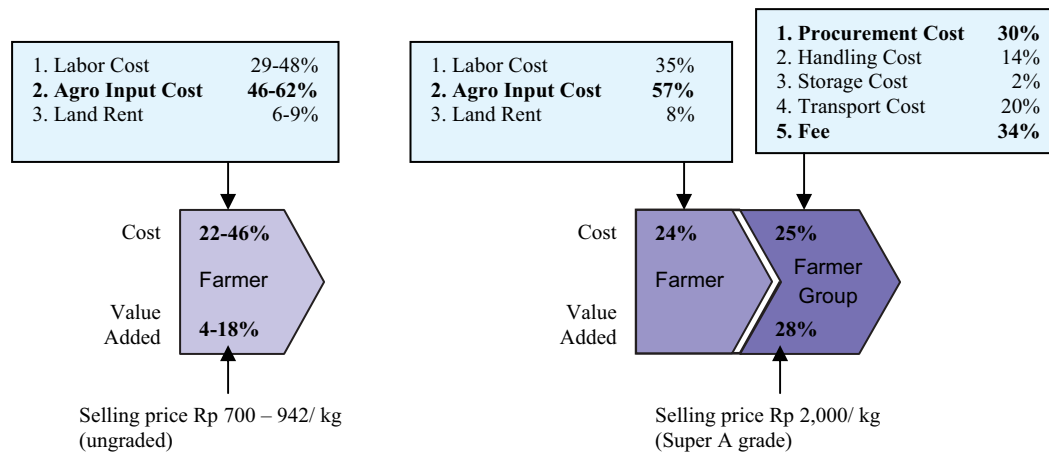


Roles and Function of Each Actor in the Value Chains

1. Farmer and Farmer Group

The farmer performs land preparation, applies fertilizer and pesticides, weeding and harvesting. The total of labor cost is 29-48% of the farmer cost. Farmer also buys seed, fertilizer, pesticides, and other materials. Total cost of all input materials is 46-62% of the farmer cost. The land rent is 6-9% of the farmer cost. The total cost of farmer performing all of cultivation activities is Rp 470,058 – 659,649 per ton (22-44% of the value chain total cost). For those activities performed the farmer receives only 4 -18% of the total value added (Chain 1, 3, 4, and 5). The highest contribution to the value added during cultivations is the agro-input use. However, when farmer have a farmer group who performs post harvest handling for its members, farmer can increase its share in the value added up to 28%, almost double then others (Chain 2).

Diagram 2. Value Added of Farmer

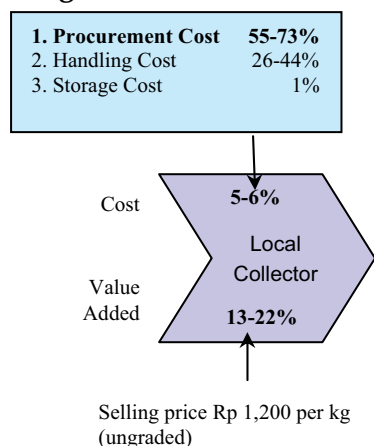


The farmer group performs harvesting from the member's field, transporting to the packinghouse, handling (sorting, cleaning, grading, placing in to a container), storing temporarily, transporting to the specialized supermarket wholesaler, and charges a fee for the group operation (10% from group's profit). Thus, total cost of farmer group contributes additional 28% to the chain cost. However, with additional activities at farmer level, farmer gains higher percentages of value added (28%). The highest contributor to the value added is the procurement activities and the existence of service from the group (fee). This marketing chain found during the survey in a high commercial zone (Lembang) only.

2. Local Collector

The local collector does not contribute much to the value added, but his primary function is to buy tomatoes from many small growers and re-sell them to a wholesaler. Harvest of very small farmers is not too attractive to a large wholesaler. Small farmers like to sell to a collector in his neighborhood whom he trusts for a full payment on the promised time. The collector pays Rp 700 – 898 per kg depending upon tomato quality (percentage of high quality), almost the same range of price as other actor buying from farmer (wholesaler and specialized wholesaler).

Diagram 3. Value Added of Local Collector



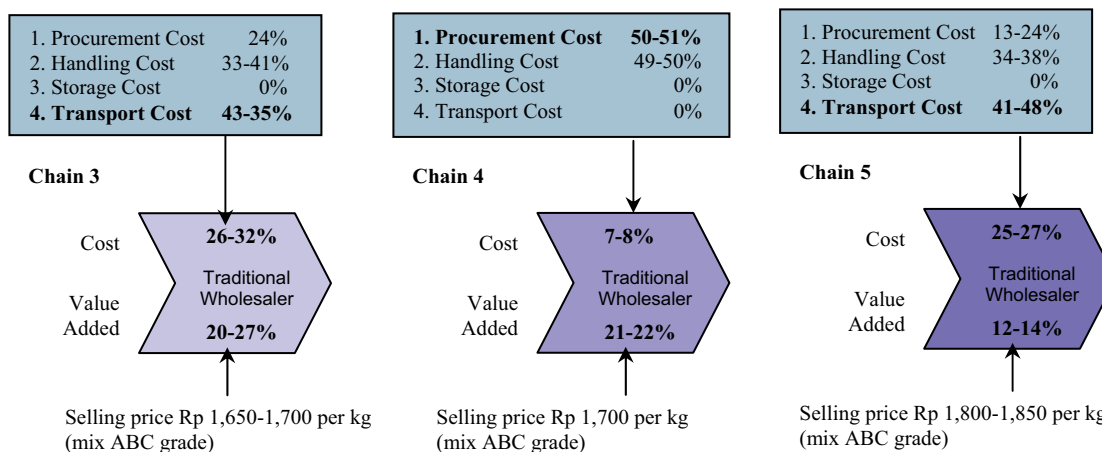
Most of the collector's operational cost is for procuring the harvest from the field (55-73%) and re-weighing (26-44%). The tomato stays at the packinghouse, at most, just over night (1%). Most of the time the collector does not have to expend for transportation since the wholesaler picks up the tomato from his packinghouse. The cost spent by the collector is Rp 73,420 - 75,650 per ton (5-6% of the total chain cost) from which the collector receives 13-22% of the total value added created by the chain (Rp 225,543 - 426,453 per ton). Thus, the highest contributor to the value added received by collector is from procurement (collection) activities.

3. Traditional Wholesaler

Traditional wholesalers buy ungraded tomatoes from farmers at the farm. Then, he performs sorting, grading, and packing. The handling process can be at the farm or at the packinghouse, which make the cost vary. Generally, the wholesaler transports tomato to the traditional wholesale market using a six-ton truck, renting or using own truck. However, in Chain 4, he sells to specialized supermarket wholesaler who picks up the tomato from his packinghouse. In all the chains, the traditional wholesaler sells a mix grade of tomatoes (ABC grade) rather than specific grading.

In each chain where a traditional wholesaler plays a role (Chain 3, 4, and 5), the cost and value added ratio is unique. In Chain 4, a traditional wholesaler supplies a supermarket specialized wholesaler. The wholesaler does not have to spend a transport cost and spend only for procurement and handling (sorting, cleaning, and packing in to a plastic container). Compared to other chains, the traditional wholesaler in this chain spend the least cost (7-8%) but within the same percentage of value added (21-22%) as in Chain 3. The highest contributor to the value added is procurement activities.

Diagram 4. Value Added of Traditional Wholesaler





Traditional wholesalers in Chains 3 and 5 both supply a traditional market and spend operational cost similarly around Rp 545,669 – 590,687 per ton, which is 25-32% of the chain total cost. However, the activities performed by the wholesaler only contributes 12-14% to the value added in the Chain 5 but contributes 20-27% to the value added in Chain 3. Since in Chain 5, the wholesaler buys from local collector (longer chain) without significant contribution to the chain's value added, its value added for each actor in the chain drop considerably. In both chains, the main contributor to the wholesaler's value added is the transporting activities.

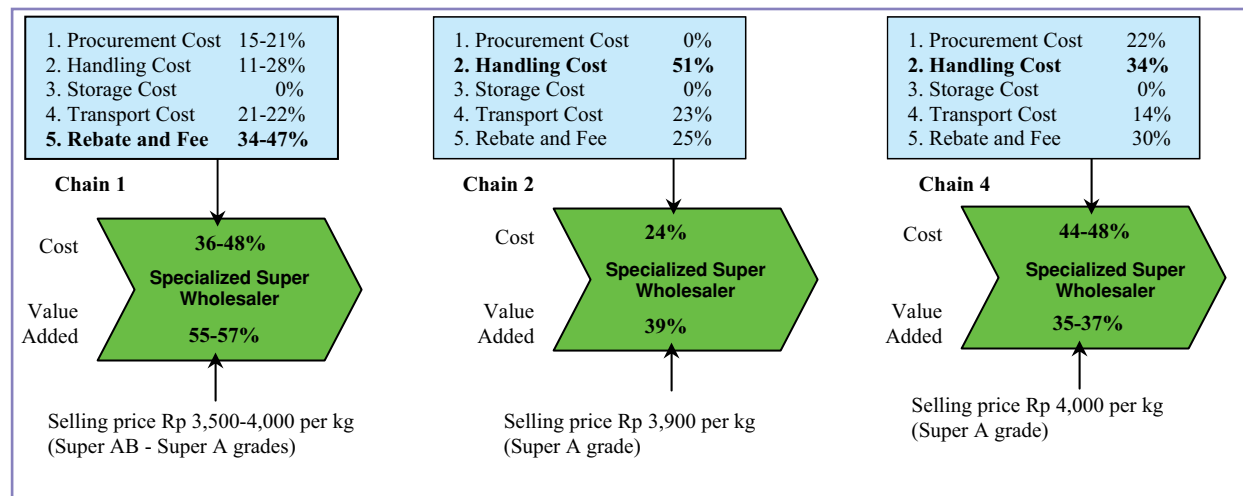
4. Specialized Supermarket Wholesaler

To sustain the supply to supermarket, a specialized super wholesaler has to obtain tomatoes from different sources with different methods of procurement. In the first chain, the wholesaler buys ungraded tomato directly from farmers. Here, the wholesaler needs to transport the tomato to a packinghouse, do sorting, grading, and packaging, then transports to a supermarket store. To guarantee its freshness, a wholesaler does not store the tomato in the packinghouse.

In addition to the operational cost, the wholesaler also has to pay fee and rebate (the tradition that developed by supermarket to its suppliers). Rebate is 3% from a selling price; Marketing fee is 1% of the selling price; and other fee is about 4% of the selling price, which includes new store promotion, weekend promotion, and holiday promotion. Apparently, rebate and fee to the specialized supermarket wholesaler is the highest component of the cost in this chain. The specialized super wholesaler's cost contributes to 36-48% of the chain total cost. Specialized super wholesaler in this chain creates the highest value added (55-57%) compare to the other channel since the wholesaler buy ungraded tomato from farmers and performs handling cost.

In Chain 2 on the other hand, the specialized super wholesaler buys a graded tomato from a farmer group (super AB grade). Since a farmer group transports tomato to the wholesaler's packinghouse, he does not have to incur a transportation cost. Similar to the other chain, the wholesaler performs sorting, grading, and packaging, then transports to a supermarket store. Compare to the other chain, the super wholesaler in this chain spend the smallest proportion of the chain cost (24%) but received almost the same value added as in other chain (averages). Handling cost has the highest contribution to the value added.

Diagram 5. Value Added of Specialized Super Wholesaler



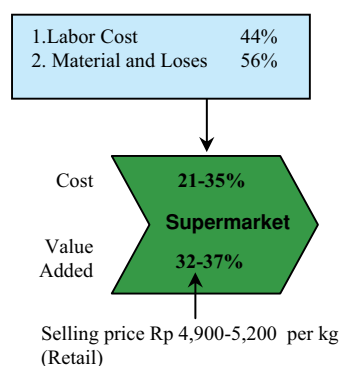


Specialized supermarket wholesalers also depend on sourcing from a traditional wholesaler (Chain 4). The supermarket wholesaler buys tomato with a mix ABC grade directly from a packinghouse of traditional wholesaler. Then, the super wholesaler performs sorting, grading, and packaging, and transports to a supermarket store in Jakarta. Compare to the other chain, the super wholesaler in this chain spend the highest proportion of the chain cost (44-48%) but received almost the same percentage of value added (35-37%). Handling cost has the highest contribution to the value added.

5. Supermarket

For tomato procurement, supermarket is always source to a specialized wholesaler with different length and number of actors in the chain. Supermarket buys tomato at Rp 3,500 – 4,000 per kg depending on the grades. Most of the cost spend by supermarket is for keeping and maintaining on and off display counter. Materials and product loses are the highest cost during on a display (56%). The average total cost of supermarket is 21-35% of the chain cost (Chain 1, 2, and 4) and produces 32-37% of the total value chain found. Supermarket sells on retail for Rp 4,900 – 5,200 per kg.

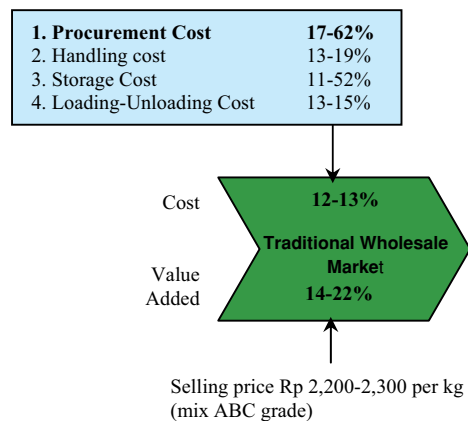
Diagram 6. Value Added of Supermarket



6. Traditional Wholesale Market

Trader at a traditional wholesale market procures tomato from a traditional wholesaler who enters the market at Rp 1,700 – 1,850 per kg (mix ABC grade). Additionally, the wholesale trader has to pay for procurement cost (commission man, weighing), handling (sorting, grading, and serving in the kiosk), storage and loading-unloading cost. The total cost of the wholesale operation is 12-13% of the total chain cost, which contribute to 14-22% of total value added created by the chains. The trader of a wholesale market selling price was between Rp 2,200 -2,300 per kg for a mix ABC grade.

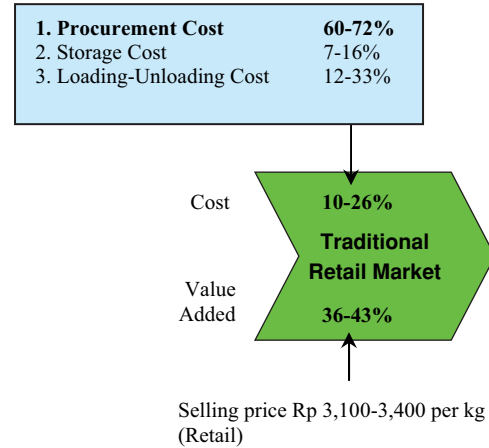
Diagram 7. Value Added of Traditional Wholesale Market





7. Traditional Retail Market

Trader at a traditional retail market buys tomato mostly from a traditional wholesale market. The trader still needs to pay additional cost, mainly for procurement cost (commission man, weighing), storage and loading-unloading cost. The total cost of the market kiosk operation is 10-26% of the total chain cost, which contribute to 36-46% of total value added created by the chains. Selling price at the traditional retail market was between Rp 3,100 – 3,400 per kg.



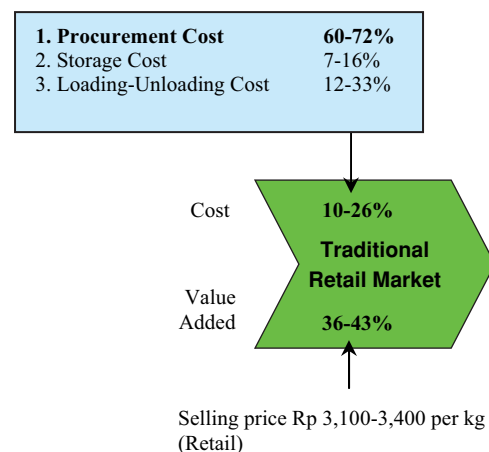
Comparison of Tomato Value Chains

In value term, the supply chain to supermarket created the highest value added (Rp 3.2 – 3.8 million per ton) in which the specialized supermarket wholesaler creates the highest percentage of value added (35-57%). In contrast, the supply chain to traditional market creates lower value added (Rp 1.6 – 1.9 million per ton) where the traditional retail market creates the highest percentage of value added in the chain (36-43%). Over all, the Chain 1, which is one of the channels to supermarket, creates the highest value added (Rp 3.7-3.8 million per ton). The following is an analysis of value chain of each channel.

Chain 1

Farmers sell directly to super wholesaler who is an upgraded traditional wholesaler that buy non-graded harvest and supply both traditional and supermarket. The wholesalers spent Rp 597 - 933 per kg, 15-21% for procurement cost, 11-28% for handling cost: sort, grade and packages good quality portion of tomatoes and transport cost (21-22%) to supermarket.

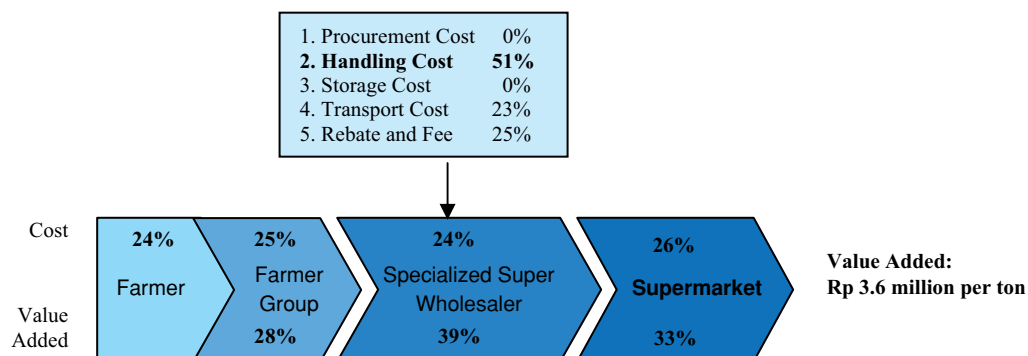
However, the wholesaler to supermarket also has to pay a rebate and fee (34-47%) which becomes the highest portion of the cost. At the supermarkets retail-selling price of Rp 4,900-5,200 per kg, the chain creates Rp 3.7-3.8 million per ton. Specialized supermarket wholesaler received 55-57% of the total value added, the highest value added in the chain.





Chain 2

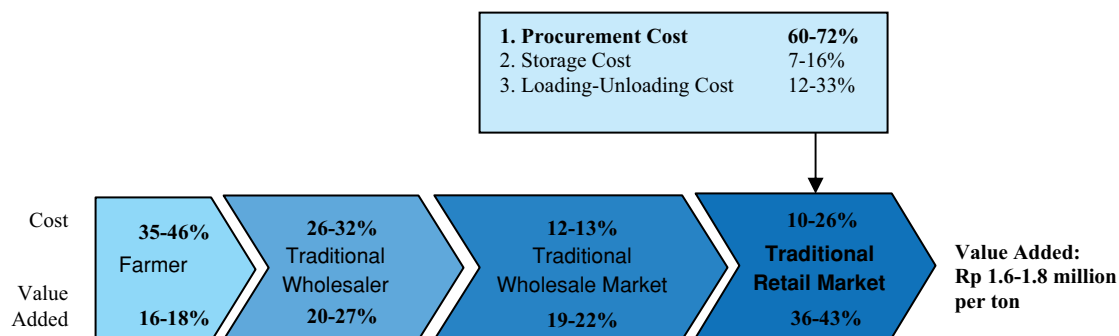
After harvest, procurement staff of the farmer group sorts and grades the harvest. The group charges a service fee of 10%. The group sells and delivers graded tomatoes to the specialized supermarket wholesaler.



The specialized supermarket wholesaler received the tomatoes at his packinghouse. He re-grades and packages (51% of cost), transports (23% of cost) and pays rebate and fee (25% of cost) to supermarket. Overall, the wholesaler has spent cost of Rp 481 per kg. This chain creates Rp 3.6 million per ton value added and supermarket specialized wholesaler received 39% of the total value added, the highest value added in the chain.

Chain 3

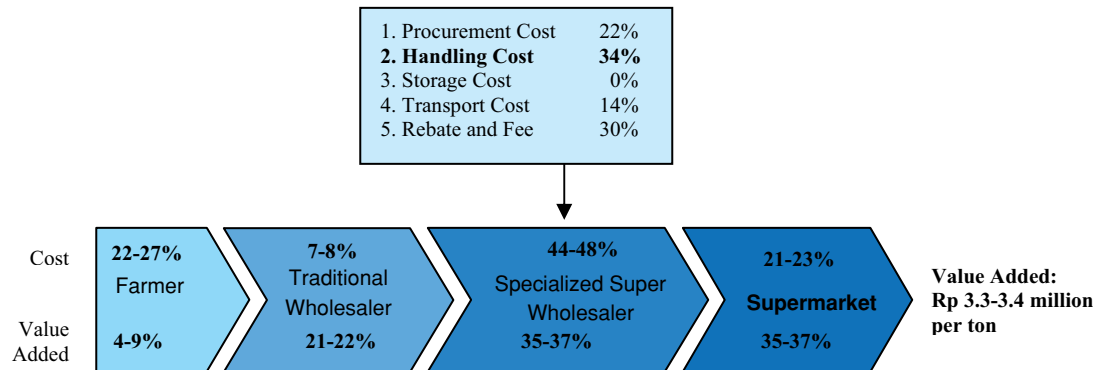
Traditional wholesaler bought harvest from farmers without grading. The wholesaler performs sorting, grading and packaging. The trader from retail market buys a mix ABC grade in a box at the wholesale market. He then load-unload, store and sale in the traditional retail market in Jakarta. Only few post harvest function performs in this chain. The total chain cost is Rp 1,281 – 1,553 per kg. The traditional retailer spent 10-26% of the cost mostly for loading unloading, transport, weighing, and commission. The chain creates value added at Rp 1.6-1.8 million per ton which 36-43% received by the traditional retailer, the highest value added in the chain.





Chain 4

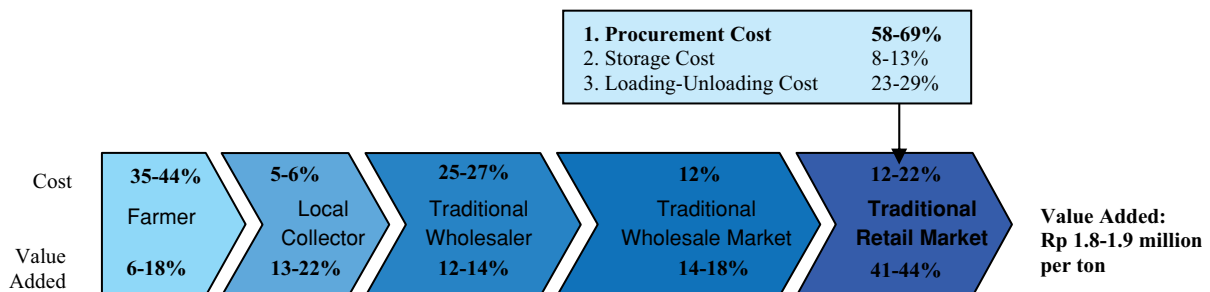
Farmer sells to traditional wholesaler without grading. Traditional wholesaler only performs basic sorting, slightly grading, and placing the tomatoes in to a bucket (not in to a wooden box). The traditional wholesaler sells a mix ABC grade tomato to a specialized super wholesaler. The specialized super wholesaler pays and loads the tomatoes at the traditional wholesaler-packing house.



Other than cost to pick up the tomato (22%), specialized super wholesaler need to spend cost for re-grading and packaging (34% of cost), transports (14% of cost) and pays rebate and fee (30% of cost) to supermarket. Overall, the specialized supermarket wholesaler has to spend cost of Rp 1,073 per kg. The chain creates Rp 3.3-3.5 million per ton value added and supermarket specialized wholesaler received 35-37% of the total value added, the highest value added in the chain.

Chain 5

Small farmer, since only have limited harvest sometime rather sells to a nearby collector. The collector bought from farmers without grading on the farm. The collector sells tomatoes to a wholesaler, usually at his packinghouse. The wholesaler to traditional wholesale market performs basic handling, such as re-sorting, grading and placing in to a wooden box. The trader from retail market buys a mix ABC grade in a box at the wholesale market. He then



load-unload, store and sale in the market. The total chain cost is Rp 1,326 - 1,597 per kg. The traditional retailer spent 12-22% of the cost mostly for loading unloading, transport, weighing, and commission. The chain creates value added of Rp 1.8 -1.9 million per ton which is 41-44% of the total value added received by the traditional retailer, the highest value added in the chain.



Table A.5.1. Tomatoes Value Chain in Indonesia; rupiahs are stated in thousands; rounding to hundreds of rupiahs

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdWWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWWM-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
IA 1	Number of Farmers per channel	Farmer	33	50	9		147	114	122	56	3	52
	FARMERS											
	Labor Cost (family and hired)											
	a. Land preparation	Rp/Ton	21.9	29.8	18.9		19.3	35.5	21.9	54.5	34.4	54.8
	b. Fertilizer application	Rp/Ton	5.4	10.7	5.6		5.4	8.1	5.4	14.4	12.3	15.5
	c. Pesticide application	Rp/Ton	21.4	19.5	30.8		29.1	51.2	21.4	65.5	26.0	43.8
	d. Weeding	Rp/Ton	55.3	52.8	59.7		51.0	60.6	55.3	134.4	71.5	116.7
2	e. Harvesting	Rp/Ton	59.5	58.1	51.0		53.3	42.9	59.5	35.4	55.3	47.1
	Total Labor Cost	Rp/Ton	163.5	170.8	166.0		158.0	198.2	163.6	304.2	199.5	278.0
		%	(34)	(34)	(35)		(29)	(34)	(34)	(46)	(35)	(48)
	Agro Input Cost											
	a. Seed	Rp/Ton	16.0	18.9	16.7		13.8	21.1	16.0	15.4	16.5	15.4
	b. Fertilizer	Rp/Ton	112.2	107.6	117.0		122.5	131.3	112.2	116.3	125.3	110.4
	c. Pesticide	Rp/Ton	100.1	122.3	85.6		146.6	140.6	100.1	131.1	130.3	107.6
3 IB	d. Stick, Plastic and other materials	Rp/Ton	49.4	46.3	46.9		55.4	56.7	49.4	45.4	48.4	35.8
	Total Input Cost	Rp/Ton	277.8	295.1	266.1		338.3	349.8	277.8	308.2	320.4	269.3
		%	(57)	(58)	(57)		(62)	(59)	(57)	(47)	(57)	(46)
	Land Rent	Rp/Ton	46.1	43.9	38.0		49.4	42.6	46.1	47.3	47.0	35.0
	Total Cost	Rp/Ton	487.4	509.9	470.1		545.7	590.7	487.4	659.7	567.0	582.3
	FARMERS GROUP											
	Procurement											
1	a. Labor	Rp/Ton			18.8							
	b. Equipment	Rp/Ton			120.9							
	- Depreciation of scale	Rp/Ton			30							
	- Truck rental	Rp/Ton			100.0							
	- Packaging	Rp/Ton			20.8							
	c. Retribution	Rp/Ton			10.0							
	Total Procurement Cost	Rp/Ton			149.6							

Note: Farm=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWWM=Traditional Wholesaler Market; Spr=Mkt=Supermarket



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low	High	High	High	Low	High	Low	High	Low
II	LOCAL COLLECTOR											
1	Buying Price	Rp/Ton									898,816	700,127
2	Procurement											
	a. Labor	Rp/Ton									25,000	10,000
	- Purchasing	Rp/Ton									15,000	0
	- Load-unload	Rp/Ton									10,000	10,000
	b. Equipment and Materials	Rp/Ton									30,010	30,020
	- Depreciation of scale	Rp/Ton									10	20
	- Truck rental	Rp/Ton									30,000	30,000
	Procurement Cost	Rp/Ton									55,010	40,020
		%									(73)	(55)
3	Handling (Weighting and Sorting)											
	a. Labor	Rp/Ton									15,000	20,000
	b. Equipment and Materials	Rp/Ton									5,000	12,540
	- Depreciation of scale	Rp/Ton									0	20
	- Wiping cloth	Rp/Ton									0	800
	- Packaging	Rp/Ton									5,000	11,720
	Handling Cost	Rp/Ton									20,000	32,540
		%									(26)	(44)
4	Storage											
	a. Equipment and Materials	Rp/Ton									640	860
	- Depreciation of building	Rp/Ton									640	860
	Storage Cost	Rp/Ton									640	860
		%									(1)	(1)
	Total Cost										75,650	73,420
	Selling Price	Rp/Ton									1,200,000	1,200,000
5	Total Profit/Value Added	Rp/Ton									225,534	426,453
		%									(298)	(581)

Note: Farm=Farmer; FanG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SocW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesaler Market; SprMkt=Supermarket



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW - SprMkt		Farm-FarmG - SpcW-SprMkt		Farm-TrdW - TrdWM-TrdRM		Farm-TrdW - SpcW-SprMkt		Farm-Coll-TrdW - TrdWM-TrdRM	
			High	Low	High	High	High	Low	High	Low	High	Low
II	LOCAL COLLECTOR											
	1 Buying Price	Rp/Ton									898,816	700,127
	2 Procurement											
	a. Labor	Rp/Ton									25,000	10,000
	- Purchasing	Rp/Ton									15,000	0
	- Load-unload	Rp/Ton									10,000	10,000
	b. Equipment and Materials	Rp/Ton									30,010	30,020
	- Depreciation of scale	Rp/Ton									10	20
	- Truck rental	Rp/Ton									30,000	30,000
	Procurement Cost	Rp/Ton									55,010	40,020
3	Handling (Weighting and Sorting)	%									(73)	(55)
	a. Labor	Rp/Ton									15,000	20,000
	b. Equipment and Materials	Rp/Ton									5,000	12,540
	- Depreciation of scale	Rp/Ton									0	20
	- Wiping cloth	Rp/Ton									0	800
	- Packaging	Rp/Ton									5,000	11,720
	Handling Cost	Rp/Ton									20,000	32,540
		%									(26)	(44)
	Storage											
	a. Equipment and Materials	Rp/Ton									640	860
4	- Depreciation of building	Rp/Ton									640	860
	Storage Cost	Rp/Ton									640	860
		%									(1)	(1)
	Total Cost										75,650	73,420
	Selling Price	Rp/Ton									1,200,000	1,200,000
	Total Profit/Value Added	Rp/Ton									225,534	426,453
		%									(298)	(581)
5												

Note: Farm=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdRM=Traditional Wholesaler; TrdW=Traditional Wholesaler; TrdM=Traditional Retail Market; SpcMkt=Supermarket



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
III	TRADITIONAL WHOLESALER											
1	Buying Price	Rp/Ton	806,415	923,160					794,333	804,136	1,200,000	1,200,000
2	Procurement											
	a. Labor	Rp/Ton	15,000	50,000					10,000	40,000	15,000	15,000
	- From farm to street		0	10,000					0	40,000	0	0
	- Load-unload		15,000	40,000					10,000	0	15,000	15,000
	b. Equipment and Materials	Rp/Ton	33,349	16					30,010	10	33,343	33,333
	- Depreciation of scale		16	16					10	10	10	0
	- Truck rental		33,333	0					30,000	0	33,333	33,333
	c. Fee	Rp/Ton	50,000	50,000					50,000	50,000	50,000	0
	- Commission agent	Rp/Ton	50,000	100,000					50,000	50,000	50,000	0
	Procurement Cost	Rp/Ton	98,349	100,016					90,010	90,010	98,343	48,333
		%	(24)	(24)					(51)	(50)	(24)	(13)
3	Handling (Sorting, Grading, Packaging)											
	a. Labor	Rp/Ton	35,000	40,000					35,000	40,000	35,000	35,000
	b. Equipment and Materials	Rp/Ton	97,547	129,260					50,030	50,030	102,380	102,004
	- Depreciation of scale	Rp/Ton	20	160					10	10	0	20
	- Wiping cloth	Rp/Ton	1,670	260					20	20	80	1,670
	- Packaging	Rp/Ton	95,857	128,840					50,000	50,000	102,300	100,314
	Handling Cost	Rp/Ton	132,547	169,260					85,030	90,030	137,380	137,004
		%	(33)	(41)					(49)	(50)	(34)	(38)
4	Storage											
	a. Equipment and Materials	Rp/Ton	620	0					250	420	257	820
	- Depreciation of Building		620	0					250	420	257	820
	Storage Cost	Rp/Ton	620	0					250	420	257	820
		%	(0)	(0)					(0)	(0)	(0)	(0)



No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-M-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdRM	
			High	Low	High	High	High	Low	High	Low	High	Low
5	Transport	Rp/Ton										
	a. Labor	Rp/Ton										
	b. Equipment and Materials	Rp/Ton										
	- Truck rental	Rp/Ton										
	Transport Cost	Rp/Ton										
6	Total Cost	Rp/Ton										
	Selling Price	Rp/Ton										
	Total Profit/Value Added	Rp/Ton										
		%										
		%										

Note: Farm=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesaler Market; SprMkt=Supermarket



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
IV	SPECIALIZED SUPER WHOLESALER											
	1 Buying Price	Rp/Ton	794,333	942,386					1,700,000	1,700,000		
	2 Procurement											
	a. Labor	Rp/Ton	40,000	60,000	0				127,094	127,094		
	-Transportation labor	Rp/Ton	25,000	30,000	0				0	0		
	-load-unload	Rp/Ton	15,000	30,000	0				25,000	25,000		
	-Driver and driver assistant	Rp/Ton	0	0	0				91,909	91,909		
	-Procurement permanent staff	Rp/Ton	0	0	0				10,186	10,186		
	b. Equipment and Materials	Rp/Ton	33,369	33,463	0				100,472	100,472		
	-Depreciation of scale	Rp/Ton	36	130	0				60	60		
	-Truck rental	Rp/Ton	33,333	33,333	0				0	0		
	-Depreciation of Truck	Rp/Ton	0	0	0				51,111	51,111		
	-Truck operational cost	Rp/Ton	0	0	0				49,301	49,301		
	c. Fee	Rp/Ton	50,000	50,000	0				0	0		
	-Agent	Rp/Ton	50,000	50,000	0				0	0		
	d. Retribution	Rp/Ton	0	0	0				10,186	10,186		
	Procurement Cost	Rp/Ton	123,369	143,463	0				237,752	237,752		
		%	(21)	(15)	(0)				(22)	(22)		
3	Handling (Sorting, Grading, Packaging)											
	a. Labor	Rp/Ton	66,667	100,000	35,000				35,000	35,000		
	b. Equipment and Materials	Rp/Ton	1,446	163,027	211,907				329,515	329,515		
	-Depreciation of scale	Rp/Ton	36	130	230				300	300		
	-Depreciation of wrapping machine	Rp/Ton	0	130	3,380				290	290		
	-Wiping cloth	Rp/Ton	10	0	8,330				571	571		
	-Packaging	Rp/Ton	1,400	162,667	198,387				325,333	325,333		
	-Electricity	Rp/Ton	0	100	1,580				3,020	3,020		
	Handling Cost	Rp/Ton	68,113	263,027	246,907				364,515	364,515		
		%	(11)	(28)	(51)				(34)	(34)		



No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
4	Storage	Rp/Ton	300	3,890	1,120				2,420	2,420		
	a. Equipment and Materials	Rp/Ton	300	3,890	780				1,500	1,500		
	-Depreciation of storage	Rp/Ton	0	0	340				920	920		
	-Electricity	Rp/Ton	300	3,890	1,120				2,420	2,420		
5	Storage Cost	%	(0)	(0)	(0)				(0)	(0)		
	Transport											
	a. Labor	Rp/Ton	60,650	102,632	60,650				91,910	91,910		
	- Load-unload	Rp/Ton	30,000	50,000	30,000				0	0		
	-Driver and driver assistant	Rp/Ton	30,650	52,632	30,650				91,910	91,910		
	b. Equipment and Materials	Rp/Ton	65,000	100,000	44,307				46,019	46,019		
	-Truck rent	Rp/Ton	65,000	100,000	0				0	0		
	-Depreciation of Truck	Rp/Ton	0	0	23,148				6,296	6,296		
	-Truck Operational cost	Rp/Ton	0	0	21,159				39,723	39,723		
	c. Retribution	Rp/Ton	0	0	5,800				10,940	10,940		
	Transport Cost	Rp/Ton	125,650	202,632	110,757				148,869	148,869		
		%	(21)	(22)	(23)				(14)	(14)		
6	Rebate and Fee											
	a. Rebate (3% of selling price)	Rp/Ton	105,000	120,000	122,500				120,000	120,000		
	b. Marketing Fee (1% of selling price)	Rp/Ton	35,000	40,000	0				40,000	40,000		
	c. Other Cost (4% of selling price)	Rp/Ton	140,000	160,000	0				160,000	160,000		
	Total Rebate and Fee	Rp/Ton	280,000	320,000	122,500				320,000	320,000		
		%	(47)	(34)	(25)				(30)	(30)		
7	Total Cost	Rp/Ton	597,432	933,012	481,284				1,073,556	1,073,556		
			3,500,00	4,000,00					4,000,00	4,000,00		
	Selling Price	Rp/Ton	0	0	3,900,000				4,000,000	4,000,000		
	Total Profit/Value Added	Rp/Ton	2,108,235	2,124,602	1,418,716				1,226,444	1,226,444		



No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt	Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low		High	Low	High	Low	High	Low
7	Selling Price	Rp/Ton	0	0	3,900,000			4,000,000	0		
	Total Profit/Value Added	Rp/Ton	2,108,23	2,124,60	1,418,716			1,226,444	1,226,44		
		%	5	2	(295)			(114)	4		
			(353)	(228)					(114)		

Note: Fam=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesaler Market; SprMkt=Supermarket



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-G-SpcW-SprMkt		Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
V	SUPERMARKET											
1	Buying Price	Rp/Ton	3,500,000	4,000,000					4,000,000	4,000,000		
2	Handling cost	Rp/Ton										
	a. Labor	Rp/Ton	119,000	104,000					104,000	104,000		
	b. Material and Losses	Rp/Ton	476,000	416,000					416,000	416,000		
	Total Cost	Rp/Ton	595,000	520,000					520,000	520,000		
	Selling Price	Rp/Ton	4,900,000	5,200,000					5,200,000	5,200,000		
2	Total Profit/Value Added	Rp/Ton	1,400,000	1,200,000					1,200,000	1,200,000		
		%	(235)	(231)					(231)	(231)		

Note: Farm=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesaler; TrdRM=Traditional Retail Market; SprMkt=Supermarket



Table A5.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-FarmG-SpcW-SprMkt		Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low	High	High	High	Low	High	Low	High	Low
VI	TRADITIONAL WHOLESALE MARKET											
1	Buying Price	Rp/Ton					1,650,000	1,700,000			1,850,000	1,800,000
2	Procurement											
	a. Labor	Rp/Ton					20,000	25,714			20,000	25,714
	-load-unload	Rp/Ton					20,000	25,714			20,000	25,714
	b. Equipment and Materials	Rp/Ton					203	0			203	240
	-Depreciation of Scale	Rp/Ton					150	0			150	0
	-Depreciation of other equipment	Rp/Ton					53	0			53	240
	c. Fee	Rp/Ton					100,000	0			100,000	0
	-Commission agent	Rp/Ton					100,000	0			100,000	0
	Procurement Cost	Rp/Ton					120,203	25,714			120,203	25,954
		%					(62)	(17)			(62)	(17)
3	Handling (Sorting and Grading)											
	a. Labor	Rp/Ton					25,000	28,571			25,000	28,571
	b. Equipment and Materials	Rp/Ton					47	0			47	0
	Handling Cost	Rp/Ton					25,047	28,571			25,047	28,571
		%					(13)	(19)			(13)	(18)
4	Storage											
	a. Equipment and Materials	Rp/Ton					21,278	79,167			21,278	79,167
	-Storage Rent	Rp/Ton					20,000	79,167			20,000	79,167
	-Electricity cost	Rp/Ton					1,278	0			1,278	0
	b. Retribution	Rp/Ton					0	1,429			0	1,429
	Storage Cost	Rp/Ton					21,278	80,595			21,278	80,595
		%					(11)	(52)			(11)	(52)
5	Loading-Unloading											
	a. Labor	Rp/Ton					28,571	19,286			28,571	19,286
	b. Retribution	Rp/Ton					0	0			0	34
	Loading-Unloading Cost	Rp/Ton					28,571	19,286			28,571	19,320
		%					(15)	(13)			(15)	(13)
	Total Cost	Rp/Ton					195,099	154,167			195,099	154,441



Table A.5.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-G-SpcW-SprMkt	Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low		High	Low	High	Low	High	Low
6	Selling Price Total Profit/Value Added	Rp/Ton Rp/Ton %				2,200,000 354,901 (182)	2,200,000 345,833 (224)			2,300,000 254,901 (131)	2,300,000 345,559 (224)



Table A.5.1.1. Tomatoes Value Chain in Indonesia (continued)

No.	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-G-SpcW-SprMkt	Farm-TrdW-TrdWM-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdWM-TrdRM	
			High	Low		High	Low	High	Low	High	Low
VII	TRADITIONAL RETAIL MARKET										
1	Buying Price	Rp/Ton				2,200,000	2,200,000			2,300,000	2,300,000
2	Procurement										
	a. Labor	Rp/Ton				38,095	28,571			38,095	28,571
	b. Equipment and Materials	Rp/Ton				190,626	60,000			190,626	60,000
	-Depreciation of Scale	Rp/Ton				150	0			150	0
	-Truck Rental	Rp/Ton				190,476	60,000			190,476	60,000
	c. Retribution	Rp/Ton				15,714	1,200			15,714	1,200
	Procurement Cost	Rp/Ton				244,436	89,771			244,436	89,771
		%				(60)	(72)			(69)	(58)
3	Storage										
	a. Equipment and Materials	Rp/Ton				29,276	20,000			29,276	20,000
	-Storage Rent	Rp/Ton				25,397	20,000			25,397	20,000
	-Depreciation of Equipment	Rp/Ton				2,609	0			2,609	0
	-Electricity cost	Rp/Ton				1,270	0			1,270	0
	Storage Cost	Rp/Ton				29,276	20,000			29,276	20,000
		%				(7)	(16)			(8)	(13)
4	Loading-Unloading										
	a. Labor	Rp/Ton				126,190	15,000			76,190	45,000
	-Non-permanent labor	Rp/Ton				50,000	0			0	0
	-Permanent labor	Rp/Ton				76,190	15,000			76,190	45,000
	b. Equipment and Materials	Rp/Ton				6,349	40			6,349	40
	Loading-Unloading Cost	Rp/Ton				132,540	15,040			82,540	45,040
	Total Cost	Rp/Ton				406,251	124,811			356,251	154,811



5	Selling Price	Rp/Ton				3,200,000	3,100,000				3,400,000	3,300,000
	Total Profit/Value Added	Rp/Ton				593,749 (146)	775,189 (621)				743,749 (209)	845,189 (546)
	Farmer share	%				25%	30%				26%	21%
	Total Value Added					1,646,465	1,818,515				2,104,153	2,473,787

Note: Fam=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesdemarket; TrdRM=Traditional Retail Market; SprMkt=Supermarket



Table A.5.2. Summary of Tomatoes Value Chain in Indonesia

No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-Gr-FarmG-SpcW-SprMkt		Farm-TrdW-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdRM	
			High	Low	High	Low	High	Low	High	Low	High	Low
I	Number of Farmer per channel	Farmer	33	50	9	114	147	114	122	56	3	52
	<u>A. FARMERS</u>											
	Total Cost of Farmer	Rp/Ton	487,441	509,870	470,058	590,687	545,669	590,687	487,441	659,649	566,907	582,256
		%	(29)	(26)	(24)	(46)	(35)	(46)	(22)	(27)	(35)	(44)
	B. FARMERS GROUP				496,838							
	Total Cost of Farmer Group	Rp/Ton			(25)							
	Value Added	Rp/Ton	306,892	432,516	1,033,104	332,473	260,746	332,473	306,892	144,487	331,909	117,871
		%	[8]	[12]	[28]	[18]	[16]	[18]	[9]	[4]	[18]	[6]
	Selling Price	Rp/Ton	794,333	942,386	2,000,000	923,160	806,415	923,160	794,333	804,136	898,816	700,127
II	LOCAL COLLECTOR											
	Total Cost	Rp/Ton									75,650	73,420
	Value Added	Rp/Ton									(5)	(6)
	Selling Price	Rp/Ton									225,534	426,453
III	TRADITIONAL WHOLESALER										[13]	[22]
	Total Cost	Rp/Ton									1,200,000	1,200,000
	Value Added	Rp/Ton									403,123	361,158
	Selling Price	Rp/Ton									(25)	(27)
											246,877	238,842
		%									[14]	[12]
		Rp/Ton									1,850,000	1,800,000
		%										



IV	SPECIALIZED SUPER WHOLESALER								
	Total Cost	Rp/Ton	597,432 (36)	933,012 (48)	481,284 (24)	1,073,556 (48)	1,073,556 (44)		
	Value Added	Rp/Ton	2,108,235 [55]	2,124,602 [57]	1,418,716 [39]	1,226,444 [35]	1,226,444 [37]		
	Selling Price	Rp/Ton	3,500,000	4,000,000	3,900,000	4,000,000	4,000,000		

Note: Fam=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdWM=Traditional Wholesaler Market; SpcMkr=Supermarket



Table A.5.2. Summary of Tomatoes Value Chain in Indonesia (Continued)

No	Chain Actor and Activities	Unit	Farm-SpcW-SprMkt		Farm-G-SpcW-SprMkt	Farm-TrdW-TrdRM		Farm-TrdW-SpcW-SprMkt		Farm-Coll-TrdW-TrdRM	
		Comm Zone	High	Low		High	Low	High	Low	High	Low
	Number of Farmers per channel	Farmer	33	50	9	147	114	122	56	3	52
V	<u>SUPERMARKET</u>										
	Total Cost	Rp/Ton	595,000 (35)	520,000 (26)	519,000 (26)			520,000 (23)	520,000 (21)		
	Value Added	Rp/Ton	1,400,000 [37]	1,200,000 [32]	1,200,000 [33]			1,200,000 [35]	1,200,000 [37]		
	Selling Price	Rp/Ton	4,900,000	5,200,000	5,100,000			5,200,000	5,200,000		
VI	<u>TRADITIONAL WHOLESALE MARKET</u>										
	Total Cost	Rp/Ton				195,099 (13)	154,167 (12)			195,099 (12)	154,441 (12)
	Value Added	Rp/Ton				354,901 [22]	345,833 [19]			254,901 [14]	345,559 [18]
	Selling Price	Rp/Ton				2,200,000	2,200,000			2,300,000	2,300,000
VII	<u>TRADITIONAL RETAIL MARKET</u>										
	Total Cost	Rp/Ton				406,251 (26)	124,811 (10)			356,251 (22)	154,811 (12)
	Value Added	Rp/Ton				593,749 [36]	775,189 [43]			743,749 [41]	845,189 [43]
	Selling Price	Rp/Ton				3,200,000	3,100,000			3,400,000	3,300,000
	TOTAL COST	Rp/Ton	1,679,873	1,962,881	1,967,180	1,553,535	1,281,485	2,256,287	2,433,665	1,597,031	1,326,086
	TOTAL VALUE ADDED	Rp/Ton	3,815,127	3,757,119	3,651,820	1,646,465	1,818,515	3,463,713	3,286,335	1,802,969	1,973,914

Note: Farm=Farmer; FamG=Farmer Group; Coll=Collector; TrdW=Traditional Wholesaler; SpcW=Specialized Supermarket Wholesaler; TrdRM=Traditional Retail Market; SprMkt=Supermarket





TABLES AND FIGURES

Chapter 1

Table 1.1. Fruit and Vegetables Production, Indonesia 1994-2004

No	Commodity	Production (Ton)			Percentage Increase (%)		
		1994	1999	2004	94-99	99-04	Annual
Vegetables							
1	Potatoes	877,146	924,058	1,072,040	5	16	2,2
2	Head Cabbages	1,213,924	1,447,910	1,432,814	19	-1	1,8
3	Leafy Cabbage	370,852	469,996	534,964	27	14	4,4
4	Carrot	233,470	286,536	423,722	23	48	8,1
5	Tomatoes	476,124	562,406	626,872	18	11	3,2
6	Green Onion	250,068	323,855	475,571	30	47	9,0
7	Chilly Pepper	724,445	1,007,726	714,705	39	-29	-0,1
8	Shallot	636,864	938,293	757,399	47	-19	1,9
9	Garlic	134,940	62,222	28,851	-54	-54	-7,9
10	Cucumber	456,025	431,950	477,716	-5	11	0,5
11	Long bean	453,351	386,188	454,999	-15	18	0,0
Fruits							
1	Durian	268,562	194,359	675,902	-28	248	15,2
2	Oranges	393,427	449,552	2,071,084	14	361	42,6
3	Mango	668,048	827,066	1,437,665	24	74	11,5
4	Papaya	406,587	449,919	732,611	11	63	8,0
5	Banana	3,086,557	3,376,661	4,874,439	9	44	5,8
6	Pineapple	376,278	316,749	709,918	-16	124	8,9
7	Mangos teen	-	19,174	62,117		224	44,8
8	Avocado	93,267	126,104	221,774	35	76	13,8

Source: Dirjen Hortikultura, 2006b



Table 1.2. Fruit and Vegetables, Export 1999-2004

No.	Commodity	Volume (Ton)		Percentage Increase (%)	
		1994	2004	1994-2004	Annual
	Vegetables				
1	Cabbages ³⁾	71,736.7	32,210.6	-55	-6
2	Carrots & Turnips ³⁾	2,223.1	313.4	-86	-9
3	Cauliflowers and Broccoli ³⁾	186.4	1,340.6	619	62
4	Cucumbers ³⁾	19.5	10.2	-48	-5
5	Chicory	1.0	32.3	3,034	303
6	Garlic ³⁾	6.7	30.3	350	35
7	Gherkins ³⁾	0.5	261.6	55,805	5,580
8	Leeks & Other Alliaceous Veggies.	1,781.1	77.9	-96	-10
9	Potatoes	89,123.6	16,553.8	-81	-8
10	Shallots ³⁾	6,843.3	4,637.3	-32	-3
11	Tomatoes ³⁾	3,744.5	751.6	-80	-8
	Fruits				
1	Apples ¹⁾	4.8	241.5	4,912	491
2	Avocado ⁴⁾	1.1	5.4	387	39
3	Bananas ¹⁾	33,148.5	1,197.5	-96	-10
4	Durian ¹⁾	210.0	1.5	-99	-10
5	Grapes	36.0	189.2	426	43
6	Lemon ¹⁾	62.6	139.5	123	12
7	Mandarin ¹⁾	9.7	487.7	4,949	495
8	Mango ³⁾	885.1	1,879.7	112	11
9	Mangosteen ³⁾	2,687.4	3,045.4	13	1
10	Orange	89.3	641.2	618	62
11	Papaya ³⁾	0.1	524.7	529,886	52,989
12	Pears and Quinces ¹⁾	16.4	378.3	2,207	221
13	Pineapples ⁴⁾	21.9	2,431.3	10,998	1,100

Note 1)= Fresh, 2)=Dried, 3)=Fresh or chilled, 4)=Fresh or dried, 5) including seeds

Source: Biro Pusat Statistik, 1994a, 2004a



Table 1.3. Fruit and Vegetables Import 1994-2004

No.	Commodity	Volume (Ton)			Percentage Increase (%)		
		1994	1999	2004	94-99	99-04	Annual
	Vegetables						
1	Cabbages ³⁾	308.9	346.4	191.4	12	-45	-4
2	Carrots & Turnips ³⁾	103.5	167.9	5,239.1	62	3,021	496
3	Cauliflowers and Broccoli ³⁾	160.3	202.3	303.4	26	50	9
4	Cucumbers ³⁾	757.4	103.7	0.7	-86	-99	-10
5	Chicory	92.1	33.5	11.0	-64	-67	-9
6	Garlic ³⁾	29,625.6	178,046.0	243,720.7	501	37	72
7	Gherkins ³⁾	26.9	0.4	4.3	-98	968	-8
	Leeks & Other Alliaceous						
8	Veg.	90.6	7.3	172.2	-92	2,262	9
9	Potatoes ^{3) 5)}	5,837.1	12,908.4	8,906.2	121	-31	5
10	Shallots ³⁾	15,213.3	35,775.3	48,927.1	135	37	22
11	Tomatoes ³⁾	219.0	245.8	120.2	12	-51	-5
	Fruits						
1	Apples ¹⁾	31,428.3	33,429.1	114,030.5	6	241	26
2	Avocado ⁴⁾	15.5	8.3	29.9	-46	260	9
3	Bananas	58.8	384.6	408.8	555	6	60
4	Durian ¹⁾	431.9	19.4	11,086.8	-96	57,010	247
5	Grapes	5,804.8	3,565.9	30,152.5	-39	746	42
6	Lemon ¹⁾	127.3	161.9	286.3	27	77	12
7	Mandarin ¹⁾	8,850.9	27,089.7	43,416.6	206	60	39
8	Mango ³⁾	7.9	33.5	688.7	323	1,954	859
9	Mangosteen ³⁾	0.0	0.1	0.3	11,300	159	2,940
10	Orange	18,462.7	7,398.4	50,937.5	-60	588	18
11	Papaya ³⁾		2.5	1,789.9		71,467	14,293
12	Pears and Quinces ¹⁾	7,743.2	12,307.3	74,276.5	59	504	86
13	Pineapples ⁴⁾	1.6	0.4	0.0	-75	-99	-10

Note 1)= Fresh, 2)=Dried, 3)=Fresh or chilled, 4)=Fresh or dried, 5) including seeds

Source: Biro Pusat Statistik, 1994b, 1999b, 2004b



Table 1.4 Value of Fruits and Vegetables Production 1994-2004

No	Commodity	1994		1999		2004	
		(000 US\$)	(%)	(000 US\$)	(%)	(000 US\$)	(%)
	VEGETABLES						
1	Potatoes	231,917	9	259,180	8	361,117	7
2	Head Cabbages	113,113	5	213,523	7	238,592	5
3	Cabbage Lettuce	34,556	1	69,310	2	89,082	2
4	Carrot	38,280	2	32,301	1	66,321	1
5	Tomatoes	73,209	3	72,449	2	168,353	3
6	Onion	135,457	5	152,442	5	378,493	8
7	Chilies	707,696	28	929,385	30	1,339,221	27
8	Shallot	344,976	14	441,664	14	602,791	12
9	Garlic	73,094	3	29,289	1	22,962	0
10	Cauliflowers and Broccoli	0	0	0	0	94,914	2
11	Leeks & other alliaceous vgs.	135,457	5	152,442	5	378,493	8
12	Peas	32,561	1	42,340	1	56,863	1
13	Eggplant	260,731	10	450,485	14	711,589	14
14	Mushrooms	0	0	0	0	11,350	0
15	Other fresh Vegetables	309,412	12	288,138	9	475,359	10
	Total	2,490,460	100	3,132,947	100	4,995,499	100
	FRUITS						
1	Durian	241,706	12	134,069	6	776,611	15
2	Citrus/Oranges	283,114	14	185,926	9	856,207	16
3	Mango	334,999	16	166,397	8	658,436	12
4	Papaya	48,298	2	56,892	3	148,837	3
5	Banana	1,123,383	54	886,137	42	1,570,788	30
6	Pineapple	32,337	2	19,429	1	62,828	1
7	Mangos teen		0	10,698	1	34,393	1
8	Avocado	20,475	1	45,945	2	98,612	2
9	Other fresh fruits	651,617	24	602,575	29	1,071,924	20
	Total	2,735,930	100	2,108,068	100	5,278,637	100

Source:

- Volume is production of each commodity multiply by it's price
- Fruits and vegetables production is based on "Production, Harvest Area, and Productivity of Fruits, Vegetables, Ornamental Plants, and Bio-pharmacy plants" published by Directorate General of Horticulture, Ministry of Agriculture (2005) and Agricultural Statistics Database, MOA (<http://database.deptan.go.id/bdspweb/f4-free-frame.asp>) downloaded on March 29, 2007
- Prices are base on FAOSTAT (<http://faostat.fao.org/site/570/>) for 1994, 1999, and 2004 downloaded on March 29, 2007 and particularly for peas, cauliflowers broccoli, and mushrooms were calculated (import volume divided by quantity) from Indonesia Foreign Trade Statistics Import Volume II, 1994, 1999, and 2004, Central Bureau of Statistics, Jakarta-Indonesia



Annex to Table 1.4

	1994	1999	2004	Growth (%)	
				1994-1999	1999-2004
Vegetables					
Value of Harvest (000 USD)	2,490,460	3,132,947	4,995,499	26	80
Harvest (000 Ha)	933	837	988	-10	7
Value per Ha (USD/Ha)	2,671	3,744	5,054	40	64
Constant Value per Ha (USD/Ha)*	2,671	2,719	2,373	2	-11
Fruit					
Value of Harvest (000 USD)	2,735,930	2,108,068	5,278,637	-23	121
Harvest (000 Ha)	500	375	702	-25	54
Value per Ha (USD/Ha)	5,476	5,619	7,516	3	36
Constant Value per Ha (USD/Ha)*	5,476	4,081	3,529	-25	-48

Note: * 1993=100

Source: DG of Horticulture, MOA



Table 1.5. Value of Fresh Fruits and Vegetables Import 1994-2004

No	Commodity	1994		1999		2004	
		('000 US\$)	%	('000 US\$)	%	('000 US\$)	%
	VEGETABLES						
1	Potatoes	1,037	3	2,899	5	1,672	2
2	Head Cabbage	180	1	142	0	165	0
3	Cabbage Lettuce	271	1	124	0	132	0
4	Carrots & Turnips	858	3	1,749	3	1,707	2
5	Tomatoes	210	1	175	0	98	0
6	Onion	2,572	7	2,909	5	5,058	6
7	Chilies	-	0	202	0	54	0
8	Shallots	5,964	17	9,068	15	14,240	18
9	Garlic	22,673	66	40,795	69	53,303	68
10	Cauliflowers and Broccoli	148	0	251	0	288	0
11	Leeks & other alliaceous vgs.	94	0	179	0	294	0
12	Peas	108	0	536	1	678	1
13	Eggplant	-	0	2	0	7	0
14	Mushrooms	194	1	231	0	209	0
15	Other Fresh Vegetable	-	0	-	0	-	0
	Total	34,308	100	59,260	100	77,905	100
	FRUITS						
1	Durian	9,447	12	4,036	5	11,731	5
2	Citrus/Oranges	15,474	20	16,906	20	50,495	23
3	Mango	166	0	496	1	446	0
4	Papaya	-	0	625	1	521	0
5	Bananas	255	0	205	0	179	0
6	Pineapples	1	0	1	0	1	0
7	Mangos teens	-	0	-	0	0	0
8	Watermelon	134	0	170	0	342	0
9	Avocado	21	0	11	0	26	0
10	Apples	26,946	35	19,462	22	63,353	29
11	Grapes	7,233	10	27,726	32	25,642	12
12	Pears	6,205	8	7,520	9	28,420	13
13	Dates	2,079	3	2,437	3	4,208	2
14	Peaches	74	0	56	0	102	0
15	Kiwi fruits	-	0	246	0	784	0
16	Strawberries	87	0	231	0	272	0
17	Grapefruit	7,233	10	169	0	242	0
18	Other fresh fruits	627	1	6297	7	28281	13
	Total	75,982	100	86,596	100	215,044	100

Source: Central Bureau of Statistics (1999, 2000a, 2004a).



Table 1.6. Value of Fresh Fruits and Vegetables Export 1994-2004

No	Commodity	1994		2004	
		('000 US\$)	%	('000 US\$)	%
	VEGETABLES				
1	Potatoes	13,888	31	3,556	14
2	Head Cabbage	9,639	22	7,267	28
3	Cabbage Lettuce	151	0	215	1
4	Carrots & Turnips	389	1	106	0
5	Tomatoes	1,586	4	318	1
6	Onions	31	0	63	0
7	Chilies	152	0	453	2
8	Shallots	1,775	4	1,889	7
9	Garlic	3	0	12	0
10	Cauliflowers and Broccoli	64	0	476	2
11	Leeks & other alliaceous vgs.	455	1	9	0
12	Peas	124	0	250	1
13	Eggplant	-	0	1,828	7
14	Mushrooms	14,314	32	2,793	11
15	Other fresh vegetables	2,150	5	6,364	25
	Total	44,719	100	25,601	100
	FRUITS				
1	Durian	126	1	67	1
2	Citrus/Oranges	313	2	1,122	9
3	Mango	936	7	2,013	17
4	Papaya	225	2	1,301	11
5	Bananas	5,821	45	723	6
6	Pineapples	964	7	529	4
7	Mangoes teens	2,484	19	3,292	28
8	Watermelon	113	1	294	2
9	Avocado	1	0	1	0
10	Apples	109	1	275	2
11	Grapes	238	2	104	1
12	Pears	81	1	449	4
13	Dates	84	1	25	0
14	Peaches	-	0	14	0
15	Kiwi fruits	-	0	2	0
16	Strawberries	81	1	95	1
17	Grapefruit	1	0	-	0
18	Other fresh fruits	1,295	10	1,518	13
	Total	12,872	100	11,825	100

Source: Central Bureau of Statistics (1999b, 2004b).



Table 1.7. Import Calendar of Top-selling Imported Fruit Sold in Supermarket

No.	Commodity	Country of Origin	Import Calendar											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Durian	Thailand					XXX	XXX	XXX	XXX				
2	Longan	Thailand						XXX	XXX	XXX				
3	Grapes													
	Red Globe grapes	US									XXX	XXX	XXX	XXX
		Australia		XXX	XXX	XXX								
		South Africa	XXX	XXX	XXX	XXX								XXX
		China							XXX	XXX	XXX	XXX		
4	Apple													
	a. Red Delicious apple	US	XXX	XXX	XXX	XXX					XXX	XXX	XXX	XXX
		China								XXX	XXX	XXX		
	b. Fuji apple	China	XXX	XXX	XXX	XXX	XXX					XXX	XXX	XXX
5	Citrus/Orange													
	a. Lokam mandarin	China	XXX	XXX	XXX							XXX	XXX	XXX
	b. Shatang mandarin	China	XXX										XXX	XXX
	c. Kino mandarin	Pakistan	XXX	XXX	XXX									XXX
6	Pears													
	a. Yali pears	China	XXX	XXX	XXX	XXX	XXX			XXX	XXX	XXX	XXX	XXX
	b. Shandong pears	China	XXX	XXX	XXX	XXX					XXX	XXX	XXX	XXX

Source:

- Private interview with a supermarket buyer (confidential)
- Just Grapes (www.justgrapes.com.au)
- Pakistan Horticulture Development and Export Board (www.phdeb.org.pk)
- Siam Merit Plus Co., Ltd. (www.siammeritplus.com)
- SAFE-South African Fruit Exporter (www.safe.co.za)
- Wing Mau Fruit Company (www.wingmau-fruit.com)



Table 1.8. Local Fruits and Vegetables Seasons in Indonesia

No.	Commodity	Time Availability/Harvest Time											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
	VEGETABLES												
1	Potatoes	XXX	XXX	XXX	XXX	X	X	X	X	X	X	X	X
2	Head Cabbages	X	X	X	X	X	X	X	X	X	X	X	X
3	Leafy Cabbage	XXX	XXX	X	X	X	X	X	X	X	X	XXX	XXX
4	Carrots	XXX	XXX	XXX	XXX	X	X	X	X	X	X	X	X
5	Tomatoes	X	X	XXX	XXX	XXX	XXX	XXX	X	X	X	X	X
6	Onions	X	X	X	X	X	X	X	X	X	X	X	X
7	Chilies	X	X	X	X	X	X	X	X	X	X	X	X
8	Shallot	XXX	XXX	XXX	XXX	X	X	X	X	X	X	X	X
9	Garlic	X	X	X	X	X	X	X	X	X	X	X	X
10	Cucumber	X	X	X	X	X	X	X	X	X	X	X	X
11	Long beans	X	X	X	X	X	X	X	X	X	X	X	X
	FRUITS												
1	Durian	XXX	XXX				XXX	XXX	XXX		XXX	XXX	XXX
2	Citrus/Oranges	X	X	X	X	X	X	X	XXX	XXX	XXX	X	X
3	Mango	XXX				X	X	X	X	X	XXX	XXX	XXX
4	Papaya	X	X	X	X	X	X	X	X	X	X	X	X
5	Bananas	X	X	X	X	X	X	X	X	X	X	X	X
6	Pineapple	X	X	X	X	X	X	X	X	X	XXX	XXX	XXX
7	Mangos teen	XXX	XXX	XXX	XXX	XXX						X	X
8	Avocado	X	XXX	XXX	XXX	X	X	X	X	X	X	X	X

Note: XXX = peak of the harvest, X=available but limited
Source: Private communication, various sources



Chapter 2

Figure 2.1. Development of Supermarkets in Indonesia

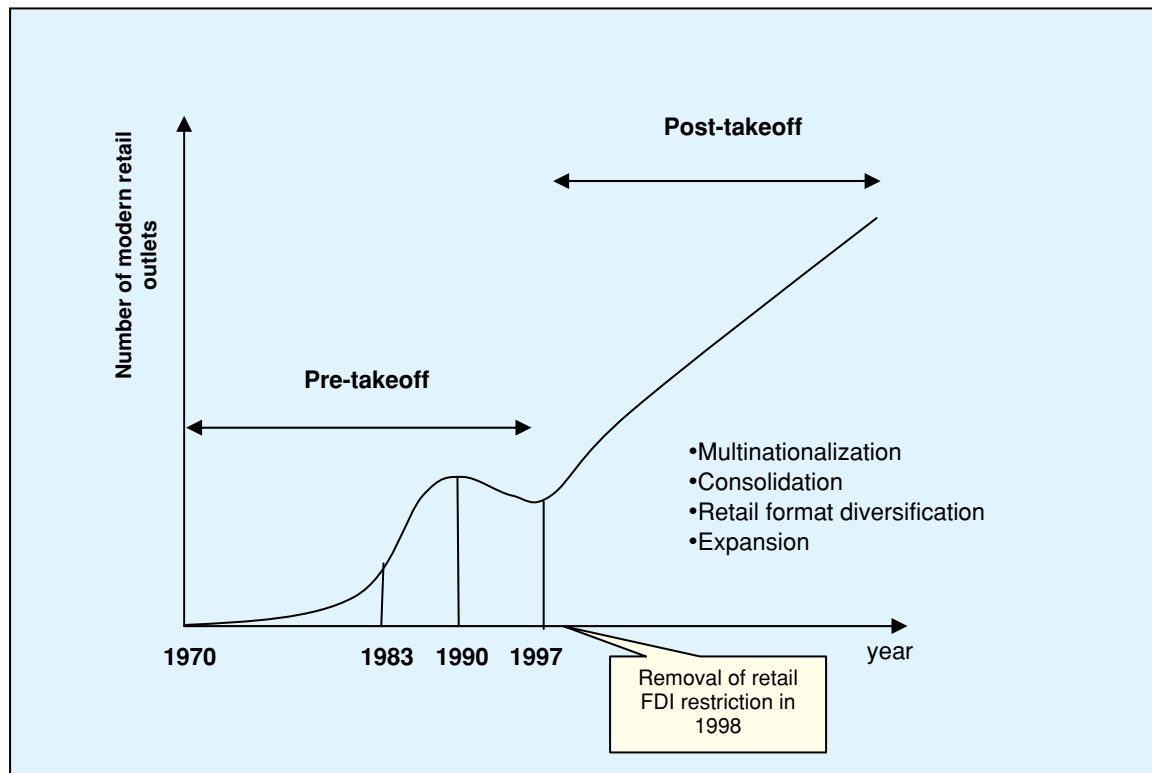




Table 2.1. Number of retail outlets and sales 1999-2003, Indonesia

Type of outlet	Description	1999	2000	2001	2002	2003
Hypermarket	Outlet	6	7	8	11	13
	Retail Sales (Rp billion)	1,446	1,649	1,995	2,720	3,590
Supermarket	Outlet	1,173	1,210	1,255	1,312	1,377
	Retail Sales (Rp billion)	8,517	9,215	9,981	10,756	11,625
Convenience stores	Outlet	1,025	1,121	1,225	1,325	1,615
	Retail Sales (Rp billion)	2,021	2,315	2,615	2,946	3,328
Independent grocers	Outlet	70,300	74,952	80,031	85,421	91,305
	Retail Sales (Rp billion)	24,751	28,219	32,033	36,246	41,201
Co-operatives	Outlet	74,751	79,512	84,510	89,748	95,264
	Retail Sales (Rp billion)	6,899	8,075	9,161	10,802	12,003
Warehouse clubs	Outlet	22	23	28	29	29
	Retail Sales (Rp billion)	3,669	3,831	4,002	4,185	4,385
Wet market		10,430	10,452	10,475	10,502	10,532

Rangkuti, 2004.



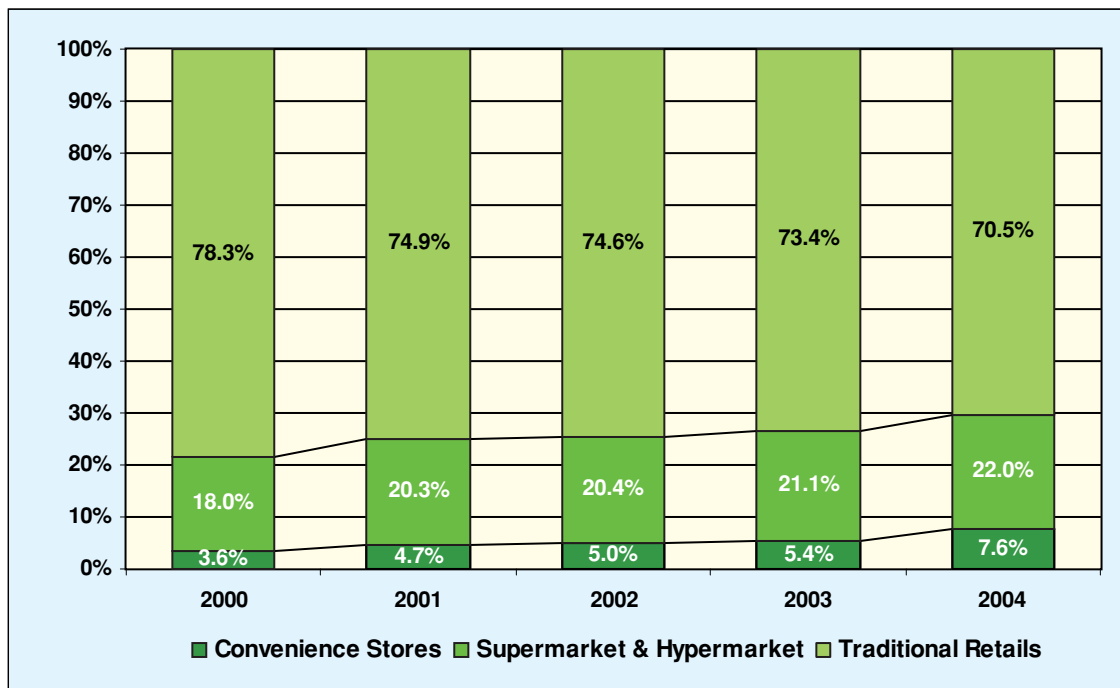
Table 2.2: Top 8 Retail Chains in Indonesia

Chain	2005 Retail Banner Sales, mil. USD	2005/2001 Retail Banner Sales; 2001 = 100	Format shares of total sales	Groceries share of total sales (%)	Capital Nationality	Market Reach
1. Matahari	764	94	60% dept. store, 21% hypers, 12% supers	28	national	Asian regional (now in China)
2. Alfa Retailindo	697	165	49% conv store; 22% cash/carry; 29% supers	90	national	national
3. Carrefour	644	255	100% hypers	70	French	global
4. SHV Makro	566	135	100% cash/carry (authors: but 20% retail)	80	Dutch	global
5. Ramayana	537	128	77% dept.store, 23% supers	24	national	national
6. Dairy Farm/Giant/Hero	455	165	47% hypers, 42% supers	74	Hong Kong	Asian-regional
7. Indomaret	420	197	100% conv stores	95	national	National
8. Delhaize/Lion Super Indo	144	160	100% supers	90	Belgian	global

Source: www.planetretail.net, accessed November 19, 2006, with some authors' calculations and notes



Figure 2.2. Market Share of Modern and Traditional Retailers



Source: ACNielsen, 2004



Chapter 4

Table 4.1: Universe of tomato farmers from which the sample was selected

Kabupaten	Kecamatan	Market Channel		Total
		Supermarket	Non-Supermarket	
Garut	Cikajang	3,046	12,183	15,229
	% within kecamatan	20.0	80.0	100.0
	% within Market Channel	34.9	23.2	24.8
	% of Total	5.0	19.9	24.8
	Cisurupan	3,200	13,642	16,842
	% within Kecamatan	19.0	81.0	100.0
	% within Market Channel	36.7	25.9	27.5
	% of Total	5.2	22.3	27.5
	Cigedug	410	3,690	4,100
	% within Kecamatan	10.0	90.0	100.0
	% within Market Channel	4.7	7.0	6.7
	% of Total	0.7	6.0	6.7
	Pasirwangi	546	6,283	6,830
	% within Kecamatan	8.0	92.0	100.0
	% within Market Channel	6.3	12.0	11.1
	% of Total	0.9	10.3	11.1
Bandung	Pangalengan	646	7,432	8,078
	% within Kecamatan	8.0	92.0	100.0
	% within Market Channel	7.4	14.1	13.2
	% of Total	1.1	12.1	13.2
	Ciwidey	151	3,623	3,774
	% within Kecamatan	4.0	96.0	100.0
	% within Market Channel	1.7	6.9	6.2
	% of Total	0.2	5.9	6.2
	Pasirjambu	220	3,447	3,667
	% within Kecamatan	6.0	94.0	100.0
	% within Market Channel	2.5	6.6	6.0
	% of Total	0.4	5.6	6.0
	Lembang	499	2,274	2,774
	% within Kecamatan	18.0	82.0	100.0
	% within Market Channel	5.7	4.3	4.5
	% of Total	0.8	3.7	4.5
Total		8,719	52,574	61,293
% within Kecamatan		14.2	85.8	100.0
% within Market Channel		100.0	100.0	100.0
% of Total		14.2	85.8	100.0

Source: The column "total" is drawn from Kecamatan Dalam Angka, 2005 (the kecamatan level statistics or land registration). The other numbers are from the authors' survey.



Table 4.2. The Sample Distribution over locations and market channel strata

Kabupaten	Kecamatan	Sample Size	
		Non-Supermarket channel Farmer	Supermarket channel Farmer
Bandung	Pangalengan	39	41
	Ciwidey	44	50
	Pasirjambu	38	19
	Lembang	29	40
	Sub-total	150	150
Garut	Cikajang	45	22
	Cigedug	35	41
	Pasirwangi	24	35
	Cisurupan	46	52
	Sub-total	150	150
	Total	300	300



Table 4.3. Weight of Kabupaten, Kecamatan, and Household (per weighting formula presented in text)

Class	Kabupaten	Kb _i	Kecamatan	P _{ijk}	FW _{ijk}
Supermarket channel	1. Bandung	1.287	1. Pangalengan	0.1543	0.19861
			2. Lembang	0.1222	0.15727
			3. Pasirjambu	0.1133	0.14590
			4. Ciwidey	0.0296	0.03805
	2. Garut	0.713	5. Cikajang	1.3552	0.96600
			6. Cisurupan	0.6024	0.42940
			7. Pasirwangi	0.1528	0.10893
			8. Cigedug	0.0979	0.06978
Non-Supermarket channel	1. Bandung	1.287	1. Pangalengan	1.8654	2.40110
			2. Lembang	0.7677	0.98818
			3. Pasirjambu	0.8879	1.14286
			4. Ciwidey	0.8061	1.03767
	2. Garut	0.713	5. Cikajang	2.6502	1.88907
			6. Cisurupan	2.9031	2.06936
			7. Pasirwangi	2.5628	1.82678
			8. Cigedug	1.0320	0.73564



Table 4.4. Household sample characteristics, by market channel (supermarket, modern wholesale, and traditional) and kecamatan commercialization level, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif. Test
	Super	Mod. Whl.	Trad.	Over-all	Super	Mod Whl.	Trad.	Over all	
No. of households (n)	43	122	152	317	47	57	175	279	
Age of head of HH (yrs)	41.7	41.7	43.2	42.4	42.7	48.1	42.1	43.4	Egi
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.2)	
Tomato farming experience (yrs)	8.6	9.4	10.5	9.8	11.1	8.9	11.3	10.8	Bcgij
	(0.5)	(0.8)	(0.6)	(0.7)	(0.5)	(0.6)	(0.7)	(0.6)	
Head of HH educ. (yrs)	7.2	7.2	6.7	7.0	8.6	6.5	6.8	7.1	Cegh
	(0.3)	(0.4)	(0.3)	(0.3)	(0.4)	(0.2)	(0.3)	(0.3)	
No. of HH members (persons)	4.3	4.1	4.3	4.2	4.2	4.0	3.7	3.8	Fhij
	(0.3)	(0.4)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	
Dependency ratio	2.7	2.2	2.4	2.4	2.0	2.4	2.0	2.1	Acfij
	(0.6)	(0.6)	(0.5)	(0.6)	(0.6)	(0.5)	(0.4)	(0.5)	
Housing:									
a. concrete (%)	93.0	86.1	92.1	89.9	85.1	61.4	82.9	78.9	B
b. electricity (%)	100.0	100.0	100.0	100.0	100.0	100.0	98.3	98.9	
c. Own water source (%)	100.0	97.5	96.7	97.5	100.0	100.0	96.6	97.8	
Member of cooperative (%)	.0%	13.9	12.5	11.4	.0	1.8	9.1	6.1	AB
Tomato as main HH total income (%)	93.0	50.0	71.1	65.9	85.1	91.2	69.7	76.7	AB

Notes: "Overall" is calculated here, and in all the tables, as the population-weighted (see Table 3) average.

"(...)" is the coefficient of variation; the averages are zeroed-out vector calculation; A. is the chi square test for the high-commercialization zone, B. for the Low zone.

The significance test indicators are as follows: (a) supermarket high-zone vs modern-wholesale high zone; (b) supermarket high-zone versus traditional-channel high-zone;

c) supermarket-channel high-zone vs. supermarket channel low-zone; (d) modern-wholesale high zone vs traditional-channel high-zone;

(e) modern-wholesale high-zone vs modern-wholesale low-zone; (f) traditional-channel high-zone vs. traditional-channel low-zone;

(g) supermarket-channel low-zone vs. modern-wholesale low-zone; (h) supermarket-channel low-zone vs traditional-channel low-zone;

(i) modern-wholesale low-zone vs traditional-channel low-zone; (j) high versus low zone.



Table 4.5. Household sample land use, 2004/5

	High Commercial Zone			Low Commercial Zone			Signif.	
	Super.	Mod. whl.	Trad.	Over-all	Super. r.	Mod. whl.		Trad.
No. of households (n)	43	122	152	317	47	57	175	279
Controlled land:								
	0.9	0.7	0.6	0.7	1.0	0.7	0.7	0.7
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.7)	(0.9)	(0.9)
a. Operated land (ha)	0.9	0.7	0.6	0.7	1.0	0.7	0.7	0.7
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.7)	(0.9)	(0.9)
b. rented out (ha)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. sharecropped out (ha)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operated land by status:								
	0.9	0.7	0.6	0.7	1.0	0.7	0.7	0.7
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.7)	(0.9)	(0.9)
a. owned operated (ha)	0.7	0.4	0.5	0.5	0.8	0.6	0.6	0.6
	(0.9)	(1.0)	(1.3)	(1.1)	(0.9)	(0.8)	(1.0)	(0.9)
b. rented in (ha)	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1
	(1.6)	(1.3)	(1.6)	(1.5)	(1.4)	(2.6)	(2.1)	(2.0)
c. sharedcropped in (ha)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operated land by cultivation:								
	0.8	0.7	0.6	0.7	1.0	0.7	0.7	0.8
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.8)	(0.8)	(0.8)
a. cultivated (ha)	0.8	0.7	0.6	0.7	1.0	0.7	0.7	0.8
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.8)	(0.8)	(0.8)
A1. Annual (ha)	0.8	0.7	0.6	0.7	1.0	0.7	0.7	0.8
	(0.8)	(0.8)	(1.0)	(0.9)	(0.9)	(0.8)	(0.8)	(0.8)
- Tomato (ha)	0.4	0.4	0.3	0.3	0.5	0.3	0.3	0.3
	(1.2)	(1.1)	(0.8)	(1.0)	(1.4)	(0.5)	(0.9)	(1.1)
- Other veg. (ha)	0.4	0.4	0.3	0.3	0.5	0.3	0.3	0.4
	(1.2)	(1.3)	(1.6)	(1.4)	(1.1)	(1.3)	(1.3)	(1.2)
- grains (ha)	0.0	0.0	0.002	0.001	0.03	0.03	0.1	0.1
			(8.9)	(12.8)	(6.9)	(5.4)	(2.1)	(2.8)



A2 Perennial (ha)	0.0	0.0	0.0002	0.0001	0.0	0.0	0.03	0.02	fhij
			(12.3)	(17.8)			(5.0)	(6.3)	
b. un-cultivated (ha)	0.0	0.0002	0.0003	0.0002	0.0	0.0	0.0	0.0	j
		(11.0)	(8.5)	(10.2)					
B1. Livestock (ha)	0.0	0.0002	0.0003	0.0002	0.0	0.0	0.0	0.0	j
		(11.0)	(8.5)	(10.2)					
B2. Fallow (ha)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Same notes as Table 4.



Table 4.6. Area under tomatoes and distribution of irrigation and multi-cropping, 2004/05 and 1999/2000

	High Commercial Zone				Low Commercial Zone				Signif.
	Super	Mod. whl.	Trad.	Over all	Super	Mod. whl.	Trad.	Over all	
Share of total annual crop land irrigated in 2005 (%)	76.5	76.4	83.3	79.7	68.8	61.0	65.3	65.0	defj
	(0.4)	(0.4)	(0.3)	(0.4)	(0.5)	(0.5)	(0.5)	(0.5)	
Share of tomato land that is irrigated (%) in 2005	93,1	89,7	85,2	88,0	85,9	87,6	88,0	87,6	B
	(0,2)	(0,3)	(0,4)	(0,4)	(0,4)	(0,4)	(0,4)	(0,4)	
Share of tomato land that is irrigated (%) in 2000	55,8	49,2	55,9	53,3	66,0	46,3	56,2	55,8	G
	(0,9)	(1,0)	(0,9)	(0,9)	(0,7)	(1,1)	(0,9)	(0,9)	
No. of seasons growing tomato Sept. 04-Aug 05									AB
a. Once (% of farmers)	25.6	41.8	27.6	32.8	19.1	35.1	41.4	36.3	
b. Twice (% of farmers)	34.9	36.9	40.1	38.2	44.7	24.6	27.6	29.9	
c. 3 times (% of farmers)	39.5	21.3	32.2	29.0	36.2	40.4	31.0	33.8	
No of seasons growing tomato sept 99-Aug 00									AB
a. Did not grow (% of farmers)	14.0	32.0	23.0	25.2	8.5	14.0	26.9	21.1	
b. Once (% of farmers)	7.0	22.1	15.8	17.0	87.2	12.3	36.0	39.8	
c. Twice (% of farmers)	41.9	22.1	30.3	28.7	2.1	33.3	14.3	16.1	
d. 3 times (% of farmers)	37.2	23.8	30.9	29.0	2.1	40.4	22.9	22.9	
Tomato cultivation Sept 04 - Aug 05									
a. Wet season1 (ha)	0.3	0.2	0.3	0.3	0.4	0.2	0.2	0.2	dfh
	(1.0)	(1.2)	(1.1)	(1.1)	(1.0)	(1.7)	(1.6)	(1.5)	
b. Wet season2 (ha)	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	
	(1.2)	(1.7)	(1.4)	(1.5)	(1.0)	(1.4)	(1.9)	(1.7)	
c. Dry season (ha)	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2	
	(1.3)	(1.6)	(1.4)	(1.5)	(1.0)	(1.7)	(2.6)	(2.0)	
Tomato cultivation Sept 99 - Aug 00									
a. Wet season 1 (ha)	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.2	J
	(1.3)	(1.5)	(1.7)	(1.6)	(1.1)	(2.1)	(2.1)	(1.9)	
b. Wet season2 (ha)	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	Fj
	(1.2)	(1.6)	(1.7)	(1.6)	(1.5)	(2.4)	(2.0)	(2.0)	
c. Dry season (ha)	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	cg
	(1.6)	(1.5)	(1.4)	(1.5)	(1.1)	(1.5)	(2.3)	(2.0)	

Same notes as Table 4.



Table 4.7. Tomato production cost per ha, Sept 04 – Aug 05

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
AVERAGE									
Sample households (n)	43	122	152	317	47	57	175	279	
1. Agro-input costs (Rp. Mil)	12.7	13.6	13.6	13.5	12.6	12.9	13.0	12.9	ADEHJ
	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.1)	(0.2)	(0.2)	
- Seed	0.8	0.9	0.9	0.9	1.0	0.8	0.9	0.9	ABCEFGK
	(0.1)	(0.1)	(0.2)	(0.2)	(0.1)	(0.1)	(0.2)	(0.1)	
- Fertilizers	5.5	6.2	6.3	6.2	5.4	6.0	6.1	6.0	ABFGHJ
	(0.1)	(0.2)	(0.1)	(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	
- Pesticides	6.4	6.4	6.4	6.4	6.2	6.1	6.1	6.1	CDEK
	(0.3)	(0.4)	(0.3)	(0.3)	(0.4)	(0.3)	(0.3)	(0.3)	
2. Labor costs (Rp. Mil)	8.1	10.6	10.0	10.0	8.7	13.7	14.0	13.1	ABCFGHJ
	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)	(0.3)	(0.3)	(0.3)	
- Family	1.5	1.8	1.6	1.7	1.5	3.0	2.8	2.6	ABFGHJK
	(0.2)	(1.0)	(0.9)	(0.9)	(0.5)	(1.0)	(1.0)	(1.0)	
- Hired	6.6	8.8	8.4	8.3	7.2	10.7	11.3	10.5	ABCGHJ
	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)	(0.4)	(0.3)	(0.4)	
3. Land rent paid-out (Rp. Mill)	2.4	2.2	2.4	2.3	2.2	2.5	1.9	2.1	BCDEFHJK
	(0.3)	(0.3)	(0.2)	(0.2)	(0.1)	(0.2)	(0.3)	(0.3)	
4. Plastic cover, stakes, rope, fuel (Rp mil)	2.4	2.4	2.3	2.3	2.3	2.1	2.2	2.2	BCDEG
	(0.1)	(0.3)	(0.3)	(0.3)	(0.1)	(0.3)	(0.3)	(0.3)	
5. Total Cost	25.6	28.8	28.3	28.1	25.8	31.2	31.2	30.3	ABDEFGHJ
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.2)	

Table 4.7, Annex, by season

	High Commercial Zone				Low Commercial Zone				Signif
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
WET SEASON									
Sample households (n)	11	50	59	120	23	22	75	120	
1. Agro-input costs (Rp. Mil)	14.4	15.5	15.4	15.4	14.7	14.4	14.9	14.8	uv
	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	
- Seed	0.7	1.0	0.9	0.9	1.0	0.8	0.9	0.9	abcefv
	(0.1)	(0.1)	(0.2)	(0.2)	(0.1)	(0.0)	(0.2)	(0.2)	
- Fertilizers	5.4	6.2	6.3	6.2	5.6	5.6	6.0	5.8	abgh
	(0.1)	(0.2)	(0.1)	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	
- Pesticides	8.3	8.3	8.2	8.3	8.1	8.0	8.0	8.0	uv
	(0.2)	(0.3)	(0.2)	(0.2)	(0.3)	(0.2)	(0.2)	(0.2)	
2. Total Labor costs (Rp. Mil)	8.5	10.6	10.3	10.3	8.6	14.9	13.6	12.9	abfghi
	(0.1)	(0.2)	(0.3)	(0.2)	(0.1)	(0.3)	(0.3)	(0.3)	
- Family	1.6	2.0	2.1	2.0	1.6	3.4	3.0	2.8	afghijv
	(0.1)	(1.0)	(1.0)	(1.0)	(0.4)	(0.8)	(0.9)	(0.9)	
- Hired	6.9	8.6	8.2	8.2	7.0	11.5	10.5	10.0	abgh
	(0.1)	(0.3)	(0.3)	(0.3)	(0.1)	(0.4)	(0.3)	(0.4)	
3. Land rent paid-out (Rp. Mill)	2.5	2.3	2.4	2.3	2.3	2.6	1.9	2.1	defhj
	(0.2)	(0.3)	(0.2)	(0.2)	(0.1)	(0.2)	(0.3)	(0.3)	
4. Plastic cover, stakes, fuel, rope (Rp mil)	2.5	2.4	2.2	2.3	2.3	2.1	2.2	2.2	bc
	(0.1)	(0.3)	(0.3)	(0.3)	(0.0)	(0.3)	(0.3)	(0.3)	
5. Total Cost	27.8	30.8	30.3	30.3	27.8	34.0	32.7	32.0	abdefghiuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	
DRY SEASON									
Sample households (n)	32	72	93	197	24	35	100	159	
1. Agro-input costs (Rp. Mil)	12.1	12.3	12.5	12.3	10.6	12.0	11.6	11.5	mnoqrstuv
	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	
- Seed	0.8	0.9	0.8	0.9	0.9	0.8	0.9	0.9	klmopqrv
	(0.1)	(0.2)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	
- Fertilizers	5.5	6.3	6.4	6.2	5.2	6.3	6.2	6.0	klnpqrs
	(0.1)	(0.2)	(0.1)	(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	
- Pesticides	5.8	5.2	5.3	5.3	4.5	4.9	4.7	4.7	lmnopqstuv
	(0.3)	(0.3)	(0.3)	(0.3)	(0.1)	(0.2)	(0.2)	(0.2)	
2. Total Labor costs (Rp. Mil)	8.0	10.6	9.8	9.8	8.7	12.9	14.4	13.2	klmqrs
	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)	(0.2)	(0.3)	(0.3)	
- Family	1.5	1.7	1.3	1.5	1.4	2.7	2.6	2.4	pqr
	(0.2)	(0.9)	(0.5)	(0.7)	(0.5)	(1.0)	(1.0)	(1.0)	
- Hired	6.5	9.0	8.5	8.3	7.3	10.2	11.8	10.8	klmnqr
	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	
3. Land rent paid-out (Rp. Mill)	2.4	2.2	2.4	2.3	2.1	2.5	1.9	2.1	lmnopt
	(0.3)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.3)	(0.3)	
4. Plastic cover and stakes (Rp mil)	2.4	2.4	2.3	2.4	2.4	2.1	2.2	2.2	lnoqs
	(0.1)	(0.3)	(0.3)	(0.3)	(0.1)	(0.3)	(0.3)	(0.3)	
5. Total Cost	24.8	27.4	27.0	26.8	23.8	29.4	30.0	28.9	klmoqrstuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	



Table 4.8. Tomato farm budget, September 04- August 05

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
AVERAGE									
Sample households (n)	43	122	152	317	47	57	175	279	
1. Revenue (Rp mil/ha)	44.3	42.1	42.1	42.4	45.8	39.3	39.9	40.7	ABEFGHK
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	
Production (ton/ha)	54.3	52.1	52.7	52.7	50.6	52.7	51.8	51.8	DE
	(0.1)	(0.1)	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	
Price (Rp/kg)	838	830	823	828	936	758	793	810	AEFK
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	
2. Costs (Rp. Mil/ha)	25.6	28.8	28.3	28.1	25.8	31.2	31.2	30.3	ABDEFGHJ
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.2)	
3. Profit w/ fam.labr as costs (Rp mil)	18.7	13.2	13.8	14.2	20.1	8.1	8.7	10.5	ABEFGHJK
	(0.4)	(0.5)	(0.6)	(0.6)	(0.5)	(1.2)	(1.1)	(1.0)	
R/C ratio	1.7	1.5	1.5	1.5	1.8	1.3	1.3	1.4	ABCEFGHJK
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	
4. Profit w/o fam.labr as costs (Rp mil)	20.2	15.0	15.4	15.9	21.5	11.1	11.5	13.1	ABEFGHK
	(0.4)	(0.5)	(0.5)	(0.5)	(0.4)	(0.9)	(0.9)	(0.8)	
R/C ratio	1.8	1.6	1.6	1.6	1.9	1.4	1.4	1.5	ABCEFGHK
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	



Table 4.8-Annex, by season

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
WET SEASON									
Sample households (n)	11	50	59	120	23	22	75	120	
1. Revenue (Rp mil/ha)	52.9	47.6	48.5	48.5	52.7	47.5	45.9	47.5	aghuv
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	
Production (ton/ha)	46.2	46.2	46.0	46.1	44.7	48.9	45.8	46.2	adejuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	
Price (Rp/kg)	1160	1041	1068	1065	1185	980	1010	1038	aeghuv
	(0.3)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	
2. Costs (Rp. Mil/ha)	27.8	30.8	30.3	30.3	27.8	34.0	32.7	32.0	abdefghuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	
3. Profit w/ fam.labr as costs (Rp mil)	25.0	16.8	18.2	18.2	24.9	13.5	13.2	15.5	abghuv
	(0.4)	(0.4)	(0.6)	(0.5)	(0.4)	(0.8)	(0.9)	(0.8)	
R/C ratio	1.9	1.5	1.6	1.6	1.9	1.4	1.4	1.5	abdefghuv
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	
4. Profit w/o fam.labr as costs (Rp mil)	26.6	18.8	20.3	20.3	26.5	16.9	16.2	18.3	abghuv
	(0.4)	(0.4)	(0.5)	(0.5)	(0.4)	(0.7)	(0.7)	(0.7)	
R/C ratio	2.0	1.7	1.7	1.7	2.0	1.6	1.6	1.7	abghuv
	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	
DRY SEASON									
Sample households (n)	32	72	93	197	24	35	100	159	
1. Revenue (Rp mil/ha)	41.3	38.2	38.0	38.6	39.2	34.1	35.4	35.7	klopqrtuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	
Production (ton/ha)	57.1	56.1	56.9	56.7	56.4	55.1	56.2	56.0	mpstuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.0)	(0.1)	(0.1)	
Price (Rp/kg)	728	683	668	683	698	619	630	638	kloprstuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	
2. Costs (Rp. Mil/ha)	24.8	27.4	27.0	26.8	23.8	29.4	30.0	28.9	klmoqrstuv
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	
3. Profit w/ fam.labr as costs (Rp mil)	16.5	10.8	11.0	11.8	15.4	4.7	5.4	6.7	klmopqrtuv
	(0.3)	(0.5)	(0.5)	(0.5)	(0.2)	(1.5)	(1.2)	(1.1)	
R/C ratio	1.7	1.4	1.4	1.5	1.6	1.2	1.2	1.3	klmopqrtuv
	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	
4. Profit w/o fam.labr as costs (Rp mil)	18.0	12.4	12.3	13.3	16.8	7.4	7.9	9.2	klmopqrtuv
	(0.3)	(0.4)	(0.5)	(0.4)	(0.2)	(1.0)	(0.8)	(0.8)	
5. R/C ratio	1.8	1.5	1.5	1.5	1.8	1.3	1.3	1.4	klmopqrtuv
	(0.1)	(0.2)	(0.2)	(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	



Notes for significant test for Tables 7 and 8:

a= wet season, high zone, Supermarket , vs wet season, high zone, Modern Wholsle ,	q= dry season, low zone, Supermarket , VS dry season, low zone, Trad Wholsle ,
b= wet season, high zone, Supermarket , VS wet season, high zone, Trad Wholsle ,	r= dry season, low zone, Modern Wholsle , VS dry season, low zone, Trad Wholsle ,
c= wet season, high zone, Supermarket , VS wet season, low zone, Supermarket ,	s= Overall wet season, high zone, VS wet season, low zone,
d= wet season, high zone, Modern Wholsle , VS wet season, high zone, Trad Wholsle ,	t= Overall wet season, high zone, VS dry season, high zone,
e= wet season, high zone, Modern Wholsle , VS wet season, low zone, Modern Wholsle ,	u= Overall wet season, low zone, VS dry season, low zone,
f= wet season, high zone, Trad Wholsle , VS wet season, low zone, Trad Wholsle ,	v= Overall dry season, high zone, VS dry season, low zone,
g= wet season, low zone, Supermarket , VS wet season, low zone, Modern Wholsle ,	A= Average high zone, Supermarket , VS high zone, Modern Wholsle ,
h= wet season, low zone, Supermarket , VS wet season, low zone, Trad Wholsle ,	B= Average high zone, Supermarket , VS high zone, Trad Wholsle ,
i= wet season, low zone, Modern Wholsle , VS wet season, low zone, Trad Wholsle ,	C= Average high zone, Supermarket , VS low zone, Supermarket ,
j= dry season, high zone, Supermarket , VS dry season, high zone, Modern Wholsle ,	D= Average high zone, Modern Wholsle , VS high zone, Trad Wholsle ,
k= dry season, high zone, Supermarket , VS dry season, high zone, Trad Wholsle ,	E= Average high zone, Modern Wholsle , VS low zone, Modern Wholsle ,
l= dry season, high zone, Supermarket , VS dry season, low zone, Supermarket ,	F= Average high zone, Trad Wholsle , VS low zone, Trad Wholsle ,
m= dry season, high zone, Modern Wholsle , VS dry season, high zone, Trad Wholsle ,	G= Average low zone, Supermarket , VS low zone, Modern Wholsle ,
n= dry season, high zone, Modern Wholsle , VS dry season, low zone, Modern Wholsle ,	H= Average low zone, Supermarket , VS low zone, Trad Wholsle ,
o= dry season, high zone, Trad Wholsle , VS dry season, low zone, Trad Wholsle ,	I= Average low zone, Modern Wholsle , VS low zone, Trad Wholsle ,
p= dry season, low zone, Supermarket , VS dry season, low zone, Modern Wholsle	J= Overall Average high zone, VS low zone,



Table 4.9. Marketing analysis, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
Sample households (n)	43	122	152	317	47	57	175	279	
1. Times sold during season	10.5	7.7	8.4	8.4	8.3	7.6	7.9	7.9	Abcdj
CV	(0.2)	(0.4)	(0.4)	(0.4)	(0.3)	(0.3)	(0.3)	(0.3)	
2. Total volume sold over season (ton)	23.2	18.1	15.3	17.4	22.8	18.4	14.4	16.6	Bhi
CV	(1.2)	(1.1)	(0.8)	(1.0)	(1.5)	(0.5)	(1.0)	(1.1)	
a. Graded	0.3	0.0	0.0	0.04	1.4	0.0	0.0	0.2	Gh
CV	(6.6)			(17.8)	(3.7)			(9.3)	
b. Ungraded	22.9	18.1	15.3	17.4	21.4	18.4	14.4	16.4	Bi
CV	(1.2)	(1.1)	(0.8)	(1.0)	(1.5)	(0.5)	(1.0)	(1.1)	
3. Reasons for selling ungraded (%)									AB
a. If graded, not all can be sold	100.0	62.2	86.0	78.8	61.7	62.5	67.8	65.7	
b. No grading cost	.0	17.6	1.3	7.4	2.1	30.4	29.9	25.3	
c. Not used to grading	.0	7.6	2.7	4.2	36.2	7.1	2.3	9.0	
d. Others	.0	12.6	10.0	9.6					
4. Selling system (%)									AB
a. Partnership or contract	27.9	38.5	25.7	30.9	10.6	38.6	21.7	23.3	
b. Regularly w/o contract	25.6	28.7	21.1	24.6	36.2	36.8	17.7	24.7	
c. Intermittently, without contract	46.5	32.8	53.3	44.5	53.2	24.6	60.6	52.0	
5. Payment system (%)									AB
a. In advance									
b. At harvest time					.0	7.0	.6	1.8	
c. Few days after harvest	.0	14.8	2.6	6.9	.0	21.1	9.1	10.0	
d. Consignment	90.7	85.2	97.4	91.8	95.7	71.9	90.3	87.5%	
e. Others	9.3	.0	.0	1.3	4.3	.0	.0	.7	

Same notes as Table 4



Table 4.10 Prices and Price Determination

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad	Over All	
Sample households (n)	43	122	152	317	47	57	175	279	
1. Prices (Rp/kg)									
a. Super quality	963			963	1240			1240	Cj
					(0.3)			(0.3)	
b. Grade A	849			849	1094			1094	Cj
					(0.3)			(0.3)	
c. Grade B	849			849	1094			1094	Cj
					(0.3)			(0.3)	
d. Grade C	542			542	697			697	Cj
					(0.3)			(0.3)	
e. Grade D									
f. Ungraded	812	802	770	788	904	758	796	805	Gh
	(0.4)	(0.3)	(0.4)	(0.4)	(0.3)	(0.4)	(0.4)	(0.4)	
2. Price setting (%)									AB
a. Use current market price	9.3	.0	.0	1.3	.0	24.6	31.4	24.7	
b. Negotiation	55.8	68.0	77.6	71.0	89.4	47.4	57.7	60.9	
c. Determined by farmer	.0	.0	3.3	1.6					
d. Determined by buyer/	32.6	32.0	19.1	25.9	10.6	28.1	10.9	14.3	
e. Others									

Same notes as Table 4.



Table 4.11. Technical Assistance for Tomato Farmers, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
Source of technical assistance (% of farmers getting TA from that source)									
a. Supermarket (%)									
b. Supermarket-dedicated wholesaler (%)	2.3			0.8	2.1			0.7	B
c. Association / cooperative (%)	.0	12.3	9.9	9.5	.0	.0	1.1	.7	
d. NGO or project (%)	.0	23.8	17.1	17.4	.0	.0	.6	.4	A
e. Government (%)	2.3	4.1	4.6	4.1	.0	14.0	6.3	6.8	B
f. Input supplier (%)	100.0	62.3	79.6	75.7	100.0	24.6	28.6	39.8	AB
g. Agro industry (%)									
h. other wholesalers	81.4	.8	.0	11.4	29.8	3.5	1.7	6.8	AB
i. Neighbors	83.3	10.7	2.0	16.1	29.8	12.3	34.3	29.0	AB

Same notes as in Table 4.



Table 4.12. Credit, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Overall	Super.	Mod. Whl.	Trad.	Overall	
Sample households (n)	43	122	152	317	47	57	175	279	De
1. Commercial Bank									
Working capital loan (Rp/mil)		2.0	2.5	2.1	1.0	1.0		1.0	
% of farmers	0.0	3.3	0.7	1.6	2.1	1.8	0.0	0.7	
2. Supermarket									
Working capital (Rp/mil)									
% of farmers									
3. Supermarket dedicated wholesaler									
Working capital (Rp/mil)									
% of farmers									
4. Association/cooperative					2.3		1.5	2.3	
Working capital (Rp/mil)	0.0	0.0	0.0	0.0	29.8	0.0	0.6	5.4	
% of farmers									
5. NGO/project									
Working capital (Rp/mil)									
% of farmers									
6. Government									
Working capital (Rp/mil)									D
% of farmers									
7. Input supplier	9.5	1.6	0.5	2.5		1.3	0.8	0.9	Ij
Working capital (Rp/mil)	4.7	5.7	2.6	4.1		8.8	18.9	13.6	
% of farmers	20.0			20.0		2.0	1.1	1.1	
Investment capital (Rp/mil)	2.3			0.3		1.8	18.9	12.2	
% of farmers									
8. Wholesalers	0.9	2.6	0.9	1.4		0.7	1.4	1.4	I
Working capital (Rp/mil)	23.3	10.7	15	14.5		7.0	35.4	23.7	
% of farmers	0.5		0.4	0.4		0.2	0.6	0.6	
Investment capital (Rp/mil)	2.3		2.6	1.6		1.8	13.1	8.6	Adef
% of farmers									
9. Traditional small brokers	0.5	1.0	0.7	0.7		0.4		0.4	
Working capital (Rp/mil)	7.0	1.6	8.6	5.7		3.5		0.7	
% of farmers			1.2	1.2					
Investment capital (Rp/mil)			1.3	0.6					
% of farmers									
10. Others									

Notes same as in Table 4.



Table 4.13 Farmers' opinions of marketing channels (which have a farmer-desired attribute), 2004/2005; columns are surveyed farmers by stratum; first-level row is the variable judged and the second-level rows are the buyer types/modes

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod.Whl	Trad.	Over all	Super.	Modern Wholsle	Trad Wholsle	Overall	
Number of sample (n)	43	122	152	317	47	57	175	279	
1. Best Price (% of farmers selecting buyer)									B
Supermarket/ dedicated wholesaler	74.4	73.0	63.2	68.5	100.0	40.4	67.4	67.4	
Wholesalers	20.9	23.8	30.3	26.5	.0	5.3	16.6	11.5	
Direct to wholesale market	4.7	.8	1.3	1.6	.0	.0	1.7	1.1	
No answer	.0	2.5	5.3	3.5	.0	54.4	14.3	20.1	
2. Sustainable access (%)									AB
Supermarket	18.6	32.8	19.7	24.6	2.1	3.5	12.6	9.0	
Wholesaler	65.1	48.4	67.1	59.6	.0	40.4	40.0	33.3	
Direct to WM	4.7	1.6	2.6	2.5	.0	.0	6.9	4.3	
No answer	11.6	17.2	10.5	13.2	97.9	56.1	40.6	53.4	
3. High volume of sale (%)									B
Supermarket	16.3	9.8	3.9	7.9	.0	.0	5.7	3.6	
Wholesaler	69.8	82.8	89.5	84.2	97.9	45.6	72.6	71.3	
Direct to WM	7.0	3.3	3.9	4.1	2.1	.0	7.4	5.0	
d. No answer	7.0	4.1	2.6	3.8	.0	54.4	14.3	20.1	
4. Least rejected product (%)									B
Supermarket	7.0	8.2	9.9	8.8	.0	.0	2.3	1.4	
Wholesaler	74.4	83.6	82.9	82.0	97.9	45.6	76.6	73.8	
Direct to WM	4.7	3.3	3.9	3.8	2.1	.0	7.4	5.0	
No answer	14.0	4.9	3.3	5.4	.0	54.4	13.7	19.7	
5. Easy quality fulfillment (%)									AB
Supermarket	39.5	10.7	15.1	16.7	.0	.0	1.7	1.1	
Wholesaler	53.5	77.0	75.7	73.2	97.9	45.6	78.3	74.9	
Direct to WM	2.3	5.7	7.2	6.0	2.1	.0	3.4	2.5	
No answer	4.7	6.6	2.0	4.1	.0	54.4	16.6	21.5	
6. TA (%)									B
Supermarket	9.3			4.7					
Wholesaler	41.9	44.3	53.9	48.6	.0	35.1	59.4	44.4	
Direct to WM	.0	2.5	.7	1.3	.0	.0	.6	.4	
No answer	48.8	45.9	44.1	45.4	6.4	61.4	29.1	31.9	
7. Credit (%)									AB
Supermarket	4.7%			5.4%					
Wholesaler	55.8%	39.3%	61.2%	52.1%	40.4%	22.8%	38.3%	35.5%	



	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod.Whl	Trad.	Over all	Super.	Modern Wholsle	Trad Wholsle	Overall	
Direct to WM	.0%	2.5%	3.9%	2.8%					
No answer	39.5%	50.8%	30.9%	39.7%	59.6%	77.2%	61.7%	64.5%	
8. Ease of selling process (%)									B
Supermarket	2.3%	0.00%	0.00%	0.3%	2.1%	0.0%	0.0%	0.3%	
Wholesaler	97.7%	83.6%	84.9%	86.1%	97.9%	45.6%	82.3%	77.4%	
Direct to WM	.0%	2.5%	7.2%	4.4%	.0%	.0%	1.7%	1.1%	
No answer	.0%	13.9%	7.9%	9.2%		54.4%	16.0%	21.2%	
9. Business commitment (%)									AB
Supermarket	25.6%	25.4%	13.8%	19.9%	61.7%	8.8%	9.7%	18.3%	
Wholesaler	60.5%	27.0%	55.3%	45.1%	2.1%	35.1%	46.3%	36.6%	
Direct to WM	2.3%	7.4%	5.9%	6.0%	.0%	.0%	9.1%	5.7%	
No answer	11.6%	40.2%	25.0%	29.0%	36.2%	56.1%	34.9%	39.4%	
10. Payment compliance (%)									AB
Supermarket	32.6%	17.2%	19.7%	20.5%	53.2%	1.8%	12.6%	17.2%	
Wholesaler	55.8%	42.6%	55.3%	50.5%	.0%	42.1%	42.3%	35.1%	
Direct to WM	.0%	5.7%	7.2%	5.7%	2.1%	.0%	8.6%	5.7%	
No answer	11.6%	34.4%	17.8%	23.3%	44.7%	56.1%	36.6%	41.9%	
11. payment delay lowest (%)									B
Supermarket	7.0%	5.7%	2.6%	4.4%					
Wholesaler	86.0%	68.9%	81.6%	77.3%	97.9%	45.6%	65.1%	66.7%	
Direct to WM	2.3%	7.4%	6.6%	6.3%	2.1%	.0%	13.7%	9.0%	
No answer	4.7%	18.0%	9.2%	12.0%	.0%	54.4%	20.0%	23.7%	

Notes same as Table 4



Table 4.14 Ranking by farmers of tomato in their household incomes, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
% sample that consider tomato as:									
a. first-ranked income source (%)	48.8	51.6	67.8	59.0	61.7	52.6	54.3	55.2	AB
b. second-ranked (%)	41.9	28.7	23.0	27.8	34.0	21.1	28.0	27.6	B
c. third-ranked (%)	4.7	15.6	7.2	10.1	4.3	19.3	14.3	13.6	AB
d. No answer (%)									
Total (%)	100	100	100	100	100	100	100	100	

Table 4.15 Evaluation by farmers of their economic condition after selling to supermarkets, 2004/2005

	High Commercial Zone				Low Commercial Zone				Signif.
	Super.	Mod. Whl.	Trad.	Over all	Super.	Mod. Whl.	Trad.	Over all	
condition after selling to supermarket									AB
a. Better (%)	7.0%			7.0%	12.8%			2.2%	
b. Worse (%)	0.0%			0.0%	0.0%			0.0%	
c. The same (%)	69.8%			69.8%	46.8%			7.9%	
d. No answer (%)	23.3%	100%	100%	23.3%	40.4%	100.0%	100.0%	90.0%	
Total (%)	100	100	100	100	100	100	100	100	



Table 4.16. Level of explanatory variables used in the regressions

		1			2			3			Total	
	Units	Mean	Std. Dev.	CV	Mean	Std. Dev.	CV	Mean	Std. Dev.	CV	Mean	CV
HHH educ	Years	7.9	2.8	0.35	6.9	2.2	0.32	6.8	2.0	0.29	7.0	0.32
HHH age	Years	42.2	8.4	0.20	43.8	11.2	0.26	42.6	10.1	0.24	42.9	0.24
Fam size	persons	4.3	1.4	0.32	4.1	1.4	0.34	4.0	1.3	0.32	4.0	0.33
Land in '00	Ha	0.6	0.6	1.10	0.4	0.5	1.25	0.5	0.9	1.77	0.5	1.58
Road dist	Km	19.1	67.7	3.54	0.4	0.5	1.11	0.6	0.6	1.01	3.3	27.0
Experience	Years	9.9	5.6	0.56	9.2	7.0	0.76	10.9	6.7	0.62	10.3	0.65
phouse00	Units	28.8	24.2	0.84	78.0	59.1	0.76	41.2	42.9	1.04	50.4	0.99
Aso00	dummy	0.5	0.5	0.94	0.3	0.5	1.57	0.3	0.4	1.70	0.3	1.50
Irri share '00	percentage	0.3	0.4	1.67	0.1	0.2	3.78	0.1	0.3	3.12	0.1	2.83
Irri share '05	percentage	0.9	0.2	0.25	0.9	0.2	0.26	0.9	0.2	0.27	0.9	0.26
Outprice	Rps	873.6	66.2	0.08	792.6	65.3	0.08	819.4	75.5	0.09	819.5	0.09
Price pest	1000 rps	3531.7	469.2	0.13	3194.8	323.7	0.10	3105.1	498.5	0.16	3196.5	0.15
Output	1000 rps	23.0	30.6	1.33	18.2	16.9	0.93	14.8	13.0	0.88	17.1	1.06
Seed expen	1000 rps	876.6	133.6	0.15	890.9	128.2	0.14	878.6	140.3	0.16	882.0	0.15
Fert expen	1000 rps	6424.2	1051.8	0.16	5979.9	1150.2	0.19	6033.5	1016.2	0.17	6076.4	0.18
Pest expen	1000 rps	6329.7	2123.0	0.34	6326.3	2229.4	0.35	6249.3	1996.9	0.32	6284.6	0.33
Land05	hectares	0.7	0.7	1.05	0.5	0.5	1.12	0.6	1.0	1.56	0.6	1.42
Corner zone	dummy	0.5	0.5	1.05	0.7	0.5	0.69	0.5	0.5	1.07	0.5	0.94
Dd	dummy	0.6	0.5	0.78	0.6	0.5	0.82	0.6	0.5	0.83	0.6	0.82
Db	dummy	0.6	0.5	0.78	0.5	0.5	1.00	0.5	0.5	1.09	0.5	1.01
Labor use	Units	552.5	719.8	1.30	429.5	425.1	0.99	352.3	334.5	0.95	405.7	1.10
Labor wage	1000 rps	9.1	2.0	0.22	8.8	2.7	0.30	8.6	2.1	0.25	8.7	0.26
Price seed	Rps	32.8	4.0	0.12	32.1	4.2	0.13	30.8	3.8	0.12	31.5	0.13
Price fert	1000 rps	96.7	5.3	0.05	120.2	22.8	0.19	109.0	18.7	0.17	110.5	0.18
Lntom land		-1.2	0.8	-0.69	-1.3	0.7	-0.51	-1.5	0.7	-0.46	-1.4	-0.51
Ln labor		16.1	0.2	0.01	16.1	0.3	0.02	16.1	0.2	0.01	16.1	0.02
Ln fert		15.7	0.2	0.01	15.6	0.2	0.01	15.6	0.2	0.01	15.6	0.01
Ln prod		9.7	0.8	0.08	9.6	0.7	0.07	9.4	0.7	0.07	9.5	0.08
Ln pest		14.2	2.9	0.20	14.2	2.1	0.15	14.1	0.7	0.05	14.1	0.12

Table 4.20 Labor Demand Estimation Results

Labor demand	Supermarket Channel			Modern Wholesale		Traditional Wholesale	
	Coef.	(SE)		Coef.	(SE)	Coef.	(SE)
Output Price (rp/kg)	-15.891	5.648	**	-1.905	4.457	0.438	0.269
Price of Fertilizers (rp/kg)	0.174	0.057	**	0.010	0.012	0.000	0.001
Labor wage (rp/day)	-0.200	0.073	**	0.024	0.019	-0.009	0.011
Price of pesticides (rp/kg)	3.40E-04	8.75E-05	**	3.76E-04	4.92E-04	-7.69E-05	3.38E-05
Producer's education (years)	6.381	23.623		7.586	11.948	5.599	7.967
Producer's age(years)	12.092	3.871		3.318	2.586	1.363	1.635
Family Size	78.092	28.562		36.623	17.684	2.021	12.196
Current land (hectares)	71.659	85.779		111.822	66.007	14.536	17.297
Correction for Bandung current land (Bandung=1, Other=0)	23.077	270.303	**	-12.155	114.323	88.411	37.763
Distance to paved highway (kms)	63.471	14.534		63.237	50.622	43.723	31.286
Current irrigation share (% of tomato land under irrigation)	-1669.3	168.9		-960.5	127.5	-587.4	64.9
millsp1	24.978	14.608		-1.038	2.880	2.614	1.534
millsp2	108.045	20.931		67.405	25.724	73.669	15.108
Dummy for dry season (dry =1, other =0)	155.079	79.587	**	60.765	55.509	8.114	32.093
Dummy for commercialization level (high level =1, low level =0)	-					-	
Constant	204.754	230.300		173.793	519.229	130.420	55.290
Number of Observations	84			179		327	
R-squared	0.758			0.371		0.319	
Prob > F	0.000			0.000		0.000	

Notes: ** = significant at 5%; * = significant at 10%; base category is traditional wholesaler



Table 4.21. Pesticides Demand Estimation Results

Pesticides demand	Supermarket Channel			Modern Wholesaler			Traditional Wholesaler		
	Coef.	(SE)		Coef.	(SE)		Coef.	(SE)	
Output Price (ths. rp/kg)	-69.498	11.671	**	33.647	16.007	**	-4.281	1.145	**
Price of Fertilizers (rp/kg)	696.424	118.248	**	-105.991	44.174	**	-21.774	5.151	**
Labor wage (ths. rp/day)	-0.702	0.151	**	-0.311	0.069	**	-0.185	0.045	**
Price of pesticides (rp/kg)	2.099	0.181	**	-1.008	1.765		0.896	0.144	**
Producer's education (years)	17.866	48.816		-7.802	42.913		6.091	33.923	
Producer's age(years)	-5.562	7.999		-6.603	9.288		-7.512	6.962	
Family Size	40.136	59.023		19.055	63.512		-76.988	51.931	
Current land (hectares)	-130.958	177.260		-288.004	237.068		-165.837	73.650	**
Correction for Bandung current land (Bandung=1, Other=0)	-								
	1406.053	558.575	**	385.212	410.599		-17.415	160.793	
Distance to paved highway (kms)	14.686	30.034		-298.812	181.811	*	110.869	133.214	
current irrigation share (% of tomato land under irrigation)	308.8	349.1		-15.7	458.1		280.6	276.3	
millsp1	-25.463	30.188		-20.704	10.344	**	-24.278	6.532	**
millsp2	11.255	43.253		-318.510	92.390	**	-142.228	64.329	**
Dummy for dry season (dry =1, other =0)	-			-			-		
	2017.154	164.466	**	2796.273	199.363	**	3142.117	136.651	**
Dummy for commercialization level (high level =1, low level =0)	58.410	475.909		-					
				3015.978	1864.849		920.908	235.421	**
Constant							11100.0	1677.5	**
Number of Observations	84			179			327		
R-squared	0.877			0.697			0.692		
Prob > F	0.000			0.000			0.000		

Notes: ** = significant at 5%; * = significant at 10%; base category is traditional wholesaler



Table 4.22. Fertilizer Demand Estimation Results

Fertilizer demand	Supermarket Channel		High-end Wholesalers		Traditional Wholesalers	
	Coef.	(SE)	Coef.	(SE)	Coef.	(SE)
Output Price (ths. rp/kg)	-32.475	11.793 **	49.165	12.245 **	-1.336	0.949
Price of Fertilizers (rp/kg)	334.909	119.484 **	-136.598	33.792 **	-2.900	4.271
Labor wage (ths. rp/day)	-0.131	0.152 **	-0.015	0.053	-0.016	0.037
Price of pesticides (rp/kg)	0.180	0.183	-3.491	1.350 **	0.174	0.119
Producer's education (years)	39.754	49.326	-3.482	32.828	3.996	28.124
Producer's age(years)	6.549	8.083	-6.606	7.105	-0.967	5.772
Family Size	139.633	59.640 **	-25.421	48.586	-30.546	43.054
Current land (hectares)	342.925	179.113 *	166.314	181.354	31.925	61.060
Correction for Bandung current land (Bandung=1, Other=0)	350.554	564.415	51.499	314.104	315.562	133.307 **
Distance to paved highway (kms)	-114.405	30.348 **	220.938	139.084	151.858	110.443
current irrigation share (% of tomato land under irrigation)	361.0	352.8	732.3	350.4 **	165.7	229.1
millsp1	50.817	30.503 *	-1.031	7.913	19.232	5.416 **
millsp2	-195.455	43.705 **	202.412	70.677 **	192.689	53.332 **
Dummy for dry season (dry =1, other =0)	-227.924	166.185	6.312	152.511	-248.539	113.292 **
Dummy for commercialization level (high level =1, low level =0)	-685.601	480.885	-6632.919	1426.589 **	-673.443	195.179 **
Constant					9071.9	1390.8 **
Number of Observations	84		179		327	
R-squared	0.545		0.352		0.138	
Prob > F	0.000		0.000		0.000	

Notes: ** = significant at 5%; * = significant at 10%; base category is traditional wholesaler



Table 4.23. Input and Output prices by kecamatan

	No	Price of Fertilizer (ths. Rp/unit)			Price of Wage (ths. Rp/unit)			Price of Pesticides (ths. Rp/unit)			Price of Tomato (ths. Rp/Kg)		
		Mean	Std. Dev.	CV	Mean	Std. Dev.	CV	Mean	Std. Dev.	CV	Mean	Std. Dev.	CV
Sub District													
Cikajang	61	95.43	12.42	0.13	7.09	0.81	0.11	2739.17	859.55	0.31	0.88	0.32	0.36
Cisurupan	95	90.09	1.98	0.02	7.86	1	0.13	3868.45	895.22	0.23	0.81	0.25	0.3
Cigedug	85	129.07	26.05	0.2	7.33	1.54	0.21	2908.62	1126.54	0.39	0.73	0.19	0.26
Pasirwangi	59	128.28	25.58	0.2	7.35	0.14	0.02	3169.11	1292.14	0.41	0.72	0.22	0.31
Pangalengan	92	143.4	12.51	0.09	7.71	0.97	0.13	3045.24	1204.83	0.4	0.87	0.24	0.27
Ciwidey	94	101.64	19.26	0.19	9.03	1.27	0.14	3770.11	1381.53	0.37	0.93	0.3	0.32
Pasir Jambu	41	97.32	19.21	0.2	9.29	1.14	0.12	2284.72	776.94	0.34	0.83	0.29	0.35
Lembang	69	90	0.31	0	14.72	2.01	0.14	3015.42	723.58	0.24	0.74	0.14	0.19
Total	596	110.52	26.33	0.24	8.71	2.59	0.3	3196.46	1177.22	0.37	0.82	0.26	0.31

Table 4.24. Vegetables Production in Indonesia by Province, 2000 – 2004 (Ton)

No.	Province	Year				Average	Share
		2000	2001	2002	2003	2004	
1	West Java	2,925,736	2,609,922	2,484,256	2,782,359	2,929,585	35%
2	Middle Java	1,013,896	830,131	906,317	1,147,627	1,316,286	13%
3	North Sumatra	1,123,251	787,755	843,108	1,220,331	999,838	13%
4	East Java	845,489	955,871	860,661	1,029,065	1,129,913	12%
5	South Sulawesi	330,926	153,478	345,011	256,154	245,414	3%
	Others	1,320,888	1,582,467	1,716,492	2,141,434	2,429,649	24%
	Indonesia	7,560,186	6,919,624	7,155,845	8,576,970	9,050,685	100%

Source: Biro Pusat Statistik, 2005



Table 4.25. Top Ten Vegetables Commodity in Indonesia 2000 – 2005 (Ton)

No.	Commodity	Year						Average	Growth
		2000	2001	2002	2003	2004	2005		
1	Head cabbage	-	1,205,404	1,232,843	1,348,433	1,432,814	1,292,984	1,302,496	3%
2	Potatoes	977,349	831,140	893,824	1,009,979	1,072,040	1,009,619	965,659	3%
3	Red curly chili	727,747	580,464	635,089	1,066,722	1,100,514	1,058,023	861,427	12%
4	Shallot	772,818	861,150	766,572	762,795	757,399	732,609	775,557	-2%
5	Large chilly	-	-	-	774,408	714,705	661,730	716,948	-2%
6	Tomatoes	593,392	483,991	573,517	657,459	626,872	647,020	597,042	4%
7	Leafy cabbage	454,815	434,043	461,069	459,253	534,964	548,453	482,100	5%
8	Cucumber	423,282	431,921	406,141	514,210	477,716	552,891	467,694	5%
9	Long bean	313,526	317,408	310,297	432,365	454,999	466,387	382,497	10%
10	Green onion	311,319	283,285	315,232	345,720	475,571	501,437	372,094	12%

Note: - = data not available; Source: Biro Pusat Statistik, 2005



Table 4.26. Tomatoes Production in Indonesia, 2000-2004, by 5 major Provinces and total (Ton)

No.	Province	2000	2001	2002	2003	2004	Average	Share
1	West Java	291,036	264,894	313,926	261,493	282,837	282,837	49%
2	North Sumatera	125,305	26,670	27,284	126,352	76,403	76,403	13%
3	East Java	30,121	30,410	47,152	54,092	40,444	40,444	7%
4	Bali	14,481	25,781	27,424	43,789	27,869	27,869	5%
5	South Sulawesi	28,948	21,991	27,174	16,211	23,581	23,581	4%
	Others	105,491	116,246	132,559	157,525	125,958	127,556	22%
	Indonesia	595,382	485,992	575,519	659,462	577,092	578,689	100%

Source: CBS, 2005; Statistical Year Book 2004

**Table 4.27. Tomato Production of Counties and District Research Areas in 2004**

Production Level	Production (Ton)	% County	% Province	% National
Indonesia	577,092			100
West Java Province	240,605		100	41.7
Bandung County	91,878	100	38.2	15.9
1. Pangalengan	50,359	54.8	20.9	8.7
2. Lembang	4,623	5.0	1.9	0.8
3. Pasirjambu	3,833	4.2	1.6	0.7
4. Ciwidey	2,962	3.2	1.2	0.5
Garut County	69,791	100	29.0	12.1
1 Cikajang	13,925	20.0	5.8	2.4
2. Cisurupan	6,033	43.3	2.5	1.0
3. Pasirwangi	4,759	6.8	2.0	0.8
4. Cigedug	2,369	3.4	1.0	0.4



Table 4.28. Level of Accessibility, Population, and Number of Household of the Study Areas

No.	Study Area	Distance of district to						Population Size (Person)	Number of Household (HH)
		National capital city (km)	Province capital city (km)	Toll road (km)	Nearest main asphalt road (km)	Nearest local market (km)	Nearest collecting point (km)		
Bandung County									
1.	Lembang	180	18	14	0	7	2	152,120	47,506
2.	Pangalengan	205	43	40	0	1	1	128,208	20,775
3.	Ciwidey	197	35	35	-	3	-	70,505	16,012
4.	Pasir Jambu	190	28	23	5	5		73,655	20,369
Garut County									
1.	Cikajang	233	70	51	-	1		68,506	16,167
2.	Cisurupan	227	65	45	1	1		85,440	20,268
3.	Pasir Wangi	234	72	52	-	1		56,422	12,770
4.	Cigedug	225	62	42	2	2	1	33,871	7,874
Average									
	Bandung County	193	31	28	1	4	1	106,122	26,166
	Garut County	230	67	48	1	1	1	61,060	14,270
	Over All	211	49	38	1	3	1	83,591	20,218

Source: District Survey and District Statistical Book, 2004



Table 4.29 Level of Commercialization of the Study Area

No.	Criteria and Measure	Bandung County				Garut County			
		Pangalengan	Lembang	Pasir Jambu	Ciwidey	Cikajang	Cisurupan	Pasir Wangi	Cigedug
I	Rural Income Diversification								
	a. Agriculture (HH)	5,765	6,164	7,967	16,602	7,520	8,154	6,808	4,198
	b. Agricultural Trading (HH)	40	74	9	9	22	13	14	15
	c. Agricultural processing (HH)	2	2	1	0	1	1	1	-
	d. Non-Agriculture (HH)	14,969	41,266	8,482	3,758	8,176	12,101	5,948	3,661
II	Commodity Diversification								
	a. Total area of Food Crops (Ha)	3,191	188	11,049	1,617	3,424	2,897	1,464	1,330
	b. Total area of Fruit trees (Ha)	448	3807	763	31	155	2326	738	45
	c. Total area of Vegetables (Ha)	14,258	4,357	6,604	783	4,392	2,020	1,371	2,247
	Score of Commercialization	4	4	2	2	3	3	2	2
	Level of Commercialization*	High	High	Low	Low	High	High	Low	Low

Note: * Low=1 - 2; High=3 - 4

Source: District Survey and District Statistical Book, 2004



Table 4.30. Rural Income Sources

No.	Production Area	Farmers (HH)	Agric. Labor (HH)	Agriculture Marketing (HH)	Agricultural Processor (HH)	Non-Agriculture (HH)
High Commercialization						
1.	Cikajang	5,715	1,805	22	1	8,176
2.	Lembang	5,089	1,074	74	2	41,266
3.	Cisurupan	6,147	2,006	13	1	12,101
4.	Pangalengan	2,909	2,856	40	2	14,969
Low Commercialization						
1.	Cigedug	2,118	2,080	15	-	3,661
2.	Pasir Wangi	3,435	3,373	14	1	5,948
3.	Ciwidey	1,733	14,869	9	-	3,758
4.	Pasir Jambu	6,029	1,938	9	1	8,482
Average						
High Commercialization						
		4,965 (19.0%)	1,935 (7.4%)	37 (0.1%)	2 (0.0%)	19,128 (73.4%)
Low Commercialization						
		3,329 (23.2%)	5,565 (38.7%)	12 (0.1%)	0 (0.0%)	5,462 (38.0%)
Over All						
		4,147 (20.5%)	3,750 (18.5%)	24 (0.1%)	1 (0.0%)	12,295 (60.8%)

Source: District Survey and District Statistical Book, 2004



Table 4.31. Cultivated Agricultural Land by Commodity Group

No.	Production Area	Total cultivated Agricultural land (Ha)	Total area of Food Crops (Ha)	Total area of Fruit Trees (Ha)	Total area of Vegetables (Ha)
High Commercialization					
1.	Cikajang	9,371	3,424	155	4,392
2.	Lembang	8,352	188	3,807	4,357
3.	Cisurupan	7,243	2,897	2,326	2,020
4.	Pangalengan	17,897	3,191	448	14,258
Low Commercialization					
1.	Cigedug	2,874	1,330	45	2,247
2.	Pasir Wangi	3,573	1,464	738	1,371
3.	Ciwidey	18,416	1,617	31	783
4.	Pasir Jambu	4,286	11,049	763	6,604
Average					
	High Commercialization	10,716	2,425	1,684	6,257
		(100%)	(23%)	(16%)	(58%)
	Low Commercialization	7,287	3,865	394	2,751
		(100%)	(53%)	(5%)	(38%)
	Over All	9,002	3,145	1,039	4,504
		(100%)	(35%)	(12%)	(50%)

Source: District Survey



Table 4.32. Irrigation System Facilities

Production Area	Cultivated land (Ha)	Irrigated land						Tomato Farmers using a greenhouse (# Farmer)
		Technical Irrigation (Ha)	Semi-Technical irrigation (Ha)	Village Irrigation (Ha)	Rain fed (Ha)	Total (Ha)	Percentage (%)	
High Commercialization								
1. Cikajang	9,371	-	-	173	45	218	2	-
2. Lembang	8,352	-	-	-	5,153	5,153	62	17
3. Cisurupan	7,243	-	515	1,185	55	1,755	24	-
4. Pangalengan	17,897	-	50	468	-	518	3	-
Low Commercialization								
1. Cigedug	2,874	182	-	-	38	220	8	-
2. Pasirwangi	3,573	-	116	956	-	1,072	30	-
3. Pasir Jambu	18,416	-	-	-	-	-	0	-
4. Ciwidey	4,286	-	-	1,200	365	1,565	37	-
Average								
High Commercialization	10,716	-	141	456	1,313	1,911	18	4
Low Commercialization	7,287	46	29	539	101	714	10	-
Over All	9,002	23	85	498	707	1,313	15	2

Source: District Survey



Table 4.33. Tomato Production

No.	Production Area	Area planting of tomato (Ha)	Tomato Production (Ton)	Percentage of Tomato Grower (%)	Average land size per grower (Ha)	Average yield of tomato (Ton/Ha)
High Commercialization						
1.	Cikajang	518	13,925	60	0.6	23.6
2.	Lembang	222	4,623	17	0.3	23.7
3.	Cisurupan	212	6,033	65	0.6	24.6
4.	Pangalengan	2,109	50,359	45	0.4	24.0
Low Commercialization						
1.	Cigedug	315	2,369	45	0.3	21.5
2.	Pasir Wangi	210	4,759	45	0.5	22.1
3.	Ciwidey	99	2,962	15	0.2	23.9
4.	Pasir Jambu	131	3,833	30	0.5	24.1
Average						
	High Commercialization	765	18,735	47	0.5	24.0
	Low Commercialization	189	3,481	34	0.4	22.9
	Over All	477	11,108	40	0.4	23.4

Source: District Survey



Table 4.34. Farm Land holding and Status

Land Holding and Status	Lembang	Pangalengan	Garut
Farm land distribution according to size	< 0.5 Ha (78%)	< 0.5 Ha (75%)	< 0.5 Ha (78%)
	0.5 – 3.0 Ha (19%)	0.5 – 3.0 Ha (20%)	0.5 – 3.0 Ha (17%)
	> 3.0 Ha (3%)	> 3.0 Ha (5%)	> 3.0 Ha (5%)
Farm land distribution according to status	Farm owner (70%)	Farm owner (80%)	Farm owner (80%)
	Renter (10%)	Renter (10%)	Renter (10%)
	Share cropper (20%)	Share cropper (10%)	Share cropper (10%)

Source: District Agricultural Officials



Table 4.35. Labor Force and Wages in 2005

Production Area	Labor Force (Person)	Agric. Labor (Person)	Wage of Male Agric. Labor (IDR/Day)	Wage of Female Agric. Labor (IDR/Day)
High Commercialization				
1. Cikajang	39,066	1,938	12,500	8,000
2. Lembang	97,475	1,074	15,000	10,000
3. Cisarupan	48,338	1,074	12,500	8,000
4. Pangalengan	79,147	2,856	15,000	10,000
Low Commercialization				
1. Cigedug	18,979	2,080	12,500	8,000
2. Pasir Wangi	32,248	3,373	12,500	8,000
3. Ciwidey	34,760	1,805	15,000	10,000
4. Pasir Jambu	49,280	14,869	15,000	10,000
Average				
High Commercialization	66,007	1,736	13,750	9,000
Low Commercialization	33,817	5,532	13,750	9,000
Over All	49,912	3,634	13,750	9,000

Source: District Survey



Table 4.36. Technical Assistance Activities

Production Area	Agricultural Officials (# Person)	Agricultural Field Agents (# Person)	Tech. Assistant activities per Year	
			Tomato-related technical assistance (# activities)	Agricultural marketing-related assistance (# activities)
High Commercialization				
Cikajang	2	3	15	6
Lembang	4	5	7	7
Cisurupan	3	3	15	4
Pangalengan	1	3	3	4
Low Commercialization				
Cigedug	2	3	10	3
Pasirwangi	1	4	10	3
Pasir Jambu	1	2	3	3
Ciwidey	2	4	5	4
Average				
High Commercialization	3	4	10	5
Low Commercialization	2	3	7	3
Over All	2	3	9	4

Source: District Survey



Table 4.37. Linking to Supermarket Supply Chains - Problems Faced by Farmers

Problem	Lembang	Pangalengan	Garut
Farmer has very limited capital	<ul style="list-style-type: none"> Limited capital, insufficient to buy good quality inputs Production costs become more and more expensive 	<ul style="list-style-type: none"> Dependence on capital and input loan from wholesaler/ broker or input supplier – restricts who the farmer can sell to 	<ul style="list-style-type: none"> Long delayed payment from supermarket or supermarket specialized wholesaler makes difficult for the next farming season (need a quick cash after harvest)
Limited land resources	<ul style="list-style-type: none"> Small land holding and its continue to declines Soil quality degradation 	<ul style="list-style-type: none"> Most farmer (75%) is small farmer (< 0.5 ha) 	<ul style="list-style-type: none"> Small farm, work individually
Seed quality	<ul style="list-style-type: none"> Good seed quality is expensive, depending on import 	<ul style="list-style-type: none"> Seed is available but too expensive 	
Lack of information on market demand; small volumes demanded by supermarkets	<ul style="list-style-type: none"> Procedure and info to supply supermarket is not transparent Quantity demanded is still a small percentage (10%) 	<ul style="list-style-type: none"> Information on supermarket demand is not clear Quantity demanded is small and sometimes at short notice 	<p>Quantity demanded is small</p>
Low quality product, and only seasonal production	<ul style="list-style-type: none"> Low production quality (only 15%-30% of Grade A) Seasonal production only, resulting in no assurance of product continuity Lack of production coordination 	<ul style="list-style-type: none"> Farmers do not have crop planning, mostly speculative (planting the crop mostly depending upon non market factors) Quantity produce is still limited by season and planting culture (habit) 	<ul style="list-style-type: none"> Product quality is not uniform Farmer still farming according to seasonality, not market demand
Lack of trust and commitment	<ul style="list-style-type: none"> Commitment on contract is not consistent and level of trust is low 	<ul style="list-style-type: none"> Commitment of farmers on partnership contracts has not been consistent Partnership has to be for long-term and can be adjusted according to market development 	<p>Low commitment of farmers and traders</p>



Lack of partnerships with supermarkets; non-functional farmers' organizations	<ul style="list-style-type: none"> Farmer groups are not facilitating output marketing of members No partnership between the majority of farmers and supermarket/ spec. Wholesaler and food industry Procedures to market to spec. Wholesaler and supermarket is very complicated 	<ul style="list-style-type: none"> Farmers lack price information, quality, quantity, and procedures to market to supermarket Access to supermarkets is difficult, and no partnership with farmers in the area Time of delivery is sometimes too short Supermarket does not have a collection center in the production area No technical assistance 	<ul style="list-style-type: none"> There is no mediator between farmer and supermarket There are only few partnerships developed, so only few farmers are involved Lack of technical assistance from extension services
Technical assistance			

Source: Multistakeholder PR4 in April 2006

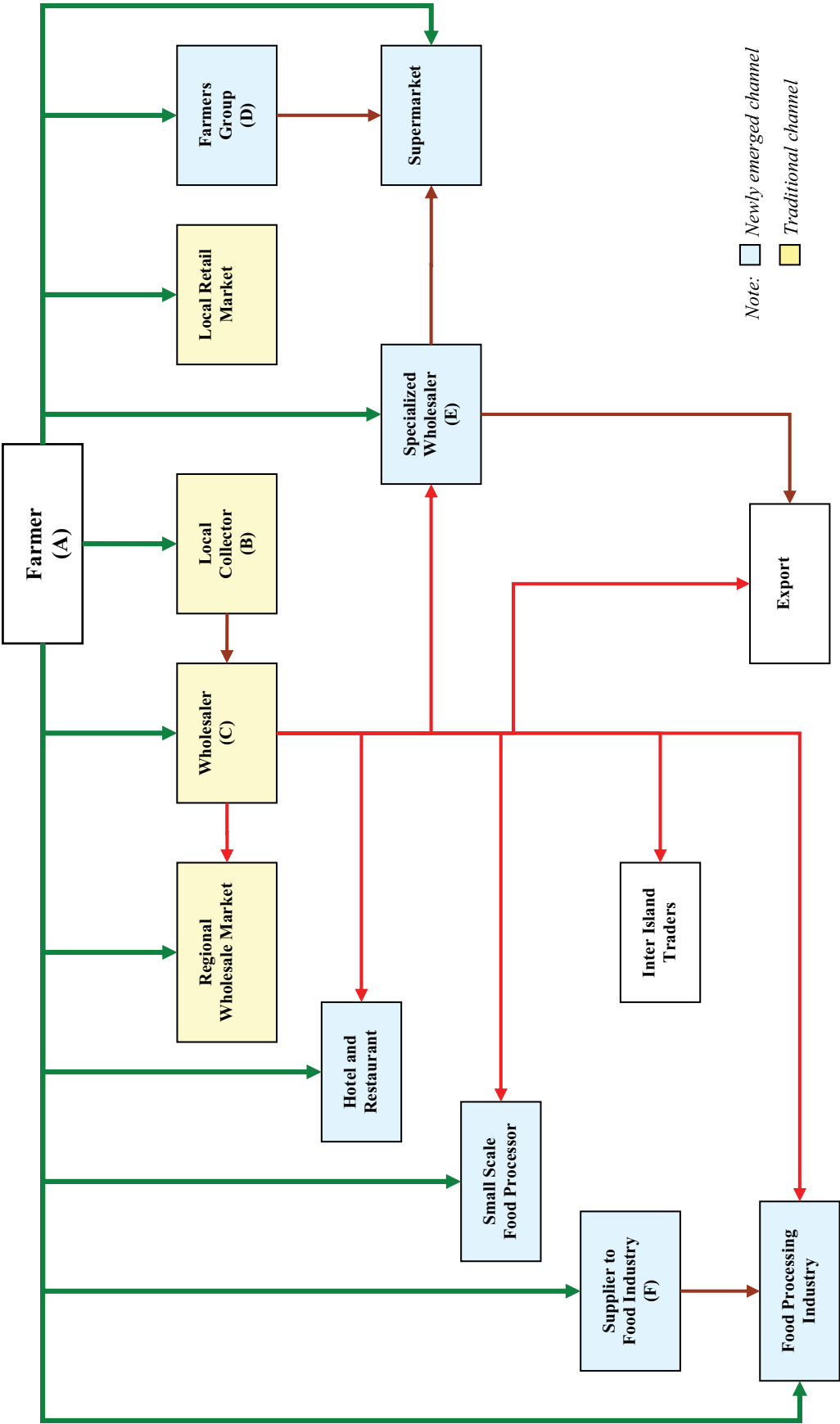


Figure 4.1.
Alternative Marketing Channel of Fresh Vegetables at the Production Center of West Java
(Source: Multistakeholder PRA)



Table 4.38. First Buyer and Volume Share of Fresh Vegetables Marketing from Production Centers in West Java

Seller	1st Buyer	Share from Volume Traded (%)			Average (%)
		Lembang	Pangalengan	Garut	
(A) Farmer	Wholesaler	52	75	10	46
	Local Collector	40	10	70	40
	Traditional Wholesale Market	0	1	14	5
	Local Retail Market	0	5	0	2
	Farmers Group	2	0	0	1
	Specialized Wholesaler	2	2	2	2
	Supermarket (direct)	2	2	0	1
	Small Scale Food Industry	1	1	2	1
	Supplier to Food Industry	0	1	2	1
	Food Processing Industry	1	1	0	1
	Hotel and Restaurant	0	2	0	1
	Total	100	100	100	100
(B) Local Collector	Wholesaler	100	100	100	100
	Total	100	100	100	100
(C) Wholesaler	Traditional Wholesale Market	72	76	74	74
	Specialized Wholesaler	11	9	6	9
	Inter Island Trader	11	5	10	9
	Small Scale Food Industry	0	0	2	1
	Food Processing Industry	5	5	4	5
	Hotel and Restaurant	1	2	4	2
	Export	0	2	0*	1
	Total	100	100	100	100
(D) Farmers Group	Supermarket	100	0	0	33
	Total	100	0	0	33
(E) Specialized Wholesaler	Supermarket	83	100	100	94
	Export	17	0	0	6
	Total	100	100	100	100
(F) Supplier to Food Industry	Food Processing Industry	0	100	100	100
	Total	0	100	100	100

Note: * Only occasional

Source: Multistakeholder PRA and Focus group discussion



Table 4.39. Volume Share of Fresh Vegetables Marketing from Production Centers by Final Market in West Java

No.	Final Market	Percentage Share by Final Market			Average %
		Lembang	Pangalengan	Garut	
1	Local Retail Market	0	5	0	2
2	Traditional Wholesale Market	66	66	73	68
3	Inter Island Market	10	4	8	7
4	Supermarket	14	12	7	11
5	Hotel and Restaurant	1	4	3	3
6	Small Scale Industry	1	1	4	2
7	Food Processing Industry	6	6	5	6
8	Export	2	2	0	1
	Total	100	100	100	100

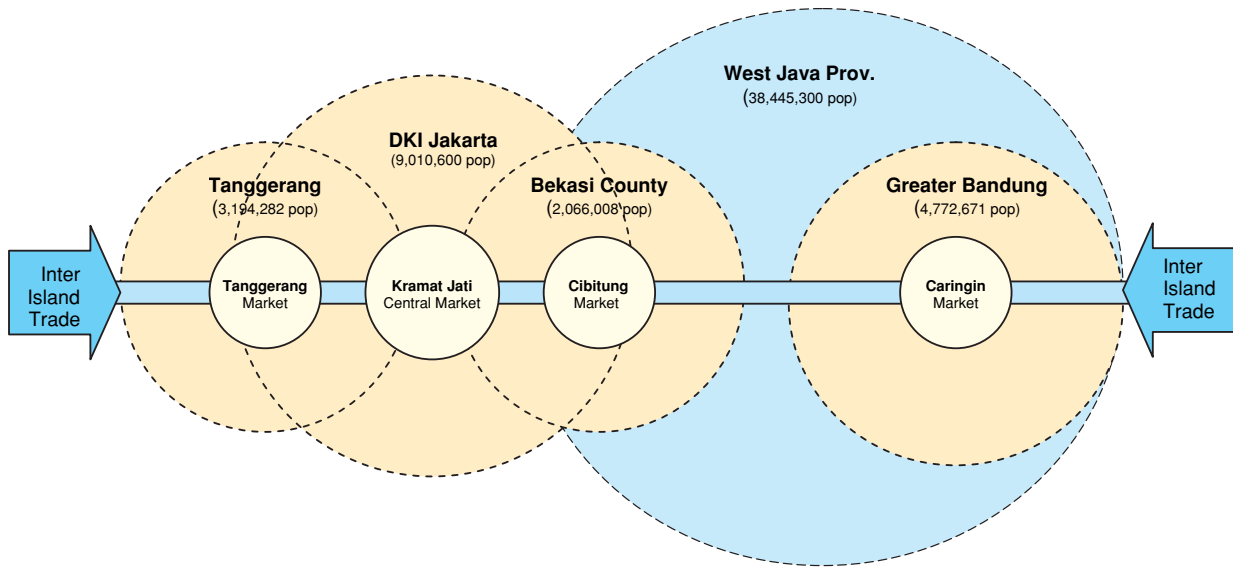


Figure 4.2.
Traditional Wholesale Markets System in West Java, Banten, and DKI Jakarta





REFERENCES

Chapter 1 References

- Balsevich, F., J. Berdegúe, and T. Reardon. 2006. Supermarkets, New-Generation Wholesalers, Tomato Farmers, and NGOs in Nicaragua. Staff Paper 2006-03, Dept. of Agricultural Economics, Michigan State University.
- Berdegúe, J.A. F. Balsevich, L. Flores, T. Reardon. 2005. "Central American supermarkets' private standards of quality and safety in procurement of fresh fruits and vegetables," *Food Policy*, Vol 30 Issue 3, June: 254-269.
- Berdegúe, J.A., T. Reardon, F. Balsevich, A. Martínez, R. Medina, M. Aguirre, and F. Echánove. 2006. Supermarkets and Michoacán Guava Farmers in Mexico. Staff Paper 2006-16, April, East Lansing: Michigan State University Department of Agricultural Economics.
- Biro Pusat Statistik (1994) Indonesia Foreign Trade Statistics. Imports Volume II, 1994. Page 1090-1095.
- Biro Pusat Statistik, 1994a. Statistik Perdagangan Luar Negeri Indonesia, Ekspor, Volume 1 (Indonesian Foreign Trade Statistic: Export). BPS Jakarta
- Biro Pusat Statistik, 1994b. Statistik Perdagangan Luar Negeri Indonesia, Impor, Volume 2 (Indonesian Foreign Trade Statistic: Import). BPS Jakarta pp. 27-35
- Biro Pusat Statistik, 1999a. Statistik Perdagangan Luar Negeri Indonesia, Impor, Volume 1 (Indonesian Foreign Trade Statistic: Import). BPS Jakarta. Pp. 1172-1177
- Biro Pusat Statistik, 1999b. Statistik Perdagangan Luar Negeri Indonesia, Impor, Volume 2 (Indonesian Foreign Trade Statistic: Import). BPS Jakarta. Pp. 1172-1177
- Biro Pusat Statistik, 2004a. Statistik Perdagangan Luar Negeri Indonesia, Ekspor, Volume 1 (Indonesian Foreign Trade Statistic: Export). BPS Jakarta, pp. 44-54
- Biro Pusat Statistik, 2004b. Statistik Perdagangan Luar Negeri Indonesia, Ekspor, Volume 2 (Indonesian Foreign Trade Statistic: Export). BPS Jakarta, pp. 30-44
- Chowdhury, S., A. Gulati, and E. Gumbira-Said. 2005. *High-Value Products, Supermarkets, and Vertical Arrangements in Indonesia*. MTID Discussion Paper no 83. Washington: IFPRI.
- Direktorat Jenderal Hortikultura, 2006a. Pedoman Umum Pelaksanaan Pengembangan Agribisnis Hortikultura (General Guide for Development Implementation of Horticulture Agribusiness). Departemen Pertanian RI, Jakarta.
- Directorate General of Horticulture, Ministry of Agriculture (2005). Fruits and vegetables production is based on "Production, Harvest Area, and Productivity of Fruits, Vegetables, Ornamental Plants, and Bio-pharmacy plants"



Direktorat Jenderal Hortikultura, 2006b. Statistik Hortikultura Tahun 2005 (Horticulture Statistic 2005). Departemen Pertanian RI, Jakarta.

FAOSTAT (<http://faostat.fao.org/site/570/>) for 1994, 1999, and 2004 downloaded on March 29, 2007

Flores, L. and T. Reardon. 2006. Supermarkets, new-generation wholesalers, farmers organizations, contract farming, and lettuce in Guatemala: participation by and effects on small farmers. Staff Paper 2006-07, Dept. of Agricultural Economics, Michigan State University.

Hernández, R., T. Reardon, and J.A. Berdegúe. 2007. "Supermarkets, Wholesalers, and Tomato Growers in Guatemala," *Agricultural Economics*, forthcoming 36(3), May.

Horticultural Partnership Support Program, Annual Report 2006. HPSP Secretariat, Indonesian – Netherlands Association.

HORTIN Annual Report 2006. W.J. van der Burg & A.P. Everaarts, Editors (hard copy and CD with reports of individual projects).

Market Access for Tropical Fruits and Vegetables, Quick Scan Country Assessment - background study for the Partnership Agreement Indonesia, Malaysia and the Netherlands. International Agricultural Centre, Wageningen, The Netherlands, January 2004

MOA, Agricultural Statistics Database, (<http://database.deptan.go.id/bdspweb/f4-free-frame.asp>) downloaded on March 29, 2007

Natawidjaja, R.S., B. Bayu Krisnamurthi, T. Perdana, L. Fauzia, T. I. Noor, T. Reardon, C.P. Timmer, J. Gingerich. 2004. *Supermarkets and Agricultural Development in Indonesia: Edited Compilation of Reports in 2004 for USAID Project RAISE/FPSA*. UNPAD, IBP, DAI, and MSU.

Neven, D., M. Odera, T. Reardon. 2006. *Horticulture Farmers and Domestic Supermarkets in Kenya*. Staff Paper 2006-06, Dept. of Agricultural Economics, Michigan State University.

Reardon, T. 2004. *Supermarkets and Agricultural Development in Indonesia: Initial Impressions*, Report for RAISE/FPSA, to USAID, March.

Reardon, T. and C.P. Timmer. 2007. "Transformation of Markets for Agricultural Output in Developing Countries Since 1950: How Has Thinking Changed?", chapter 13 in R.E. Evenson, P. Pingali, and T.P. Schultz (editors). 2006. *Volume 3 Handbook of Agricultural Economics: Agricultural Development: Farmers, Farm Production and Farm Markets*. Amsterdam: Elsevier Press.

Reardon, T. and J.A. Berdegúe. 2006. The Retail-led Transformation of Agrifood Systems and its Implications for Development Policies. Background Report for the World Development Report 2008 of the World Bank.

Reardon, T., C.B. Barrett, J.A. Berdegue, and J. Swinnen. "Transformation of agrifood systems and small farmers in developing countries," *World Development*, special issue, forthcoming, introductory article.



Wang, H., X. Dong, S. Rozelle, J. Huang, T. Reardon. 2006. Producing and Procuring Horticultural Crops with Chinese Characteristics: A Case Study in the Greater Beijing Area. Staff Paper 2006-05, Dept. of Agricultural Economics, Michigan State University.

Chapter 2 References

ACNielsen Indonesia, 2004. Annual Supermarket Training 2004 – Semarang. ACNielsen Retailer Services. Graha Santika Hotel, October 13th, 2004.

Cabochan, C.V. 2005. “Philippines: Modern Retail Trade and Policy Implications”. Paper presented at the Pacific Economic Cooperation Council’s (PECC) Pacific food System Outlook Annual Meeting, held 11-13 May 2005 in Kunming, China.

Coca-Cola Retailing Research Council Asia. *The Fresh Imperative: Creating Excellence in Asian Fresh Food Retailing*. Study by Accenture, commissioned by Coca-Cola Retailing Research Council, 2005.

Galbraith, J.K. and R.H. Holton. 1965. *Marketing Efficiency in Puerto Rico*. Cambridge, MA: Harvard University Press.

Goldman, A. 1974. “Outreach of Consumers and the Modernization of Urban Food Retailing in Developing Countries,” *Journal of Marketing*, 38 (4), October: 8-16.

Goldman, A. and W. Vanhonacker. 2006. The Food Retail System in China: Strategic Dilemmas and Lessons for Retail Internationalization/Modernization,” paper presented at the “Globalizing Retail” Conference, July 17-18, University of Surrey.

Goldman, A., R. Krider, and S. Ramaswami. 1999. “The persistent competitive advantage of traditional food retailers in Asia: Wet markets’ continued dominance in Hong Kong,” *Journal of Macromarketing*, 19(2): 126-139.

Holton, R.H. (1953). Marketing Structure and Economic Development. *Quarterly Journal of Economics* 67, August, 344-61.

www.PlanetRetail.net. 2006. Indonesia section, Accessed November 2006.

Rangkuti, F.Y. 2004. *Indonesia Retail Food Sector Report 2004*. GAIN Report No: ID4032. USDA Foreign Agricultural Service. Jakarta.

Reardon, T. and J.A. Berdegue. 2006. The Retail-led Transformation of Agrifood Systems and its Implications for Development Policies. Document contributed as input to the preparation of the World Development Report 2008 of the World Bank.

Reardon, T. and C.P. Timmer. 2007. “Transformation of Markets for Agricultural Output in Developing Countries Since 1950: How Has Thinking Changed?”, chapter 13 in R.E. Evenson, P. Pingali, and T.P. Schultz (editors). 2006. *Volume 3 Handbook of Agricultural Economics: Agricultural Development: Farmers, Farm Production and Farm Markets*. Amsterdam: Elsevier Press.



Chapter 3 References

- Berdegúe, J.A., T. Reardon, F. Balsevich, A. Martínez, R. Medina, M. Aguirre, and F. Echánove. 2006. *Supermarkets and Michoacán Guava Farmers in Mexico*. Staff Paper 2006-16, April, East Lansing: Michigan State University Department of Agricultural Economics.
- Berdegúe, J.A. F. Balsevich, L. Flores, T. Reardon. 2005. "Central American supermarkets' private standards of quality and safety in procurement of fresh fruits and vegetables," *Food Policy*, Vol 30 Issue 3, June: 254-269.
- Chowdhury, S., A. Gulati, and E. Gumbira-Said. 2005. *High-Value Products, Supermarkets, and Vertical Arrangements in Indonesia*. MTID Discussion Paper no 83. Washington: IFPRI.
- Hernandez, R., T. Reardon, and J. Berdegúe. 2006. *Tomato Farmer Participation in Supermarket Market Channels in Guatemala: Determinants and Technology and Income Effects*. Staff Paper 2006-04, Dept. of Agricultural Economics, Michigan State University.
- Hueth, B.M., Ligon, E., Wolf, S. and W. Wu. 1999. "Incentive Instruments in Agricultural Contracts: Input Control, Monitoring, Quality Measurement, and Price Risk," *Review of Agricultural Economics*, 21 (2): 374-389.
- Natawidjaja, R.S., E. Rasmikayati, and T. Reardon. 2006. *Study of Supermarket Development, Wholesale Market Restructuring, and Horticultural Producers in Indonesia: Interim Report on Interviews with Supply Chain Actors*, April, Intermediate Results Report, UNPAD and MSU, July, to World Bank.
- Natawidjaja, R.S., B. Bayu Krisnamurthi, T. Perdana, L. Fauzia, T. I. Noor, T. Reardon, C.P. Timmer, J. Gingerich. 2004. *Supermarkets and Agricultural Development in Indonesia: Edited Compilation of Reports in 2004 for USAID Project RAISE/FPSA*. UNPAD, IBP, DAI, and MSU.
- Natawidjaja, Ronnie S., 1999. "Search and Price Information in Agricultural Market: A Case Study of Two Upland-Vegetable-Producer Markets in Bandung County, West Java Province, Indonesia. Ph.D Dissertation Research, University of Hawaii. Published electronically by UMI.
- Pingali, P.L. and M.W. Rosegrant, 1995. "Agricultural Commercialization and Diversification: Processes and Policies". *Food Policy* 20 (June 1995): 171-85.
- Reardon, T. 2004. *Supermarkets and Agricultural Development in Indonesia: Initial Impressions*, Report for RAISE/FPSA, to USAID, March.
- Reardon, T. and J.A. Berdegúe. 2006. *The Retail-led Transformation of Agrifood Systems and its Implications for Development Policies*. Document contributed as input to the preparation of the World Development Report 2008 of the World Bank.
- Reardon, T. and R. Hopkins. 2006. "The Supermarket Revolution in Developing Countries: Policies to Address Emerging Tensions among Supermarkets, Suppliers, and Traditional Retailers," *European Journal of Development Research*, 18(4).



Reardon, T. and C.P. Timmer. 2007. "Transformation of Markets for Agricultural Output in Developing Countries Since 1950: How Has Thinking Changed?", chapter 13 in R.E. Evenson, P. Pingali, and T.P. Schultz (editors). 2006. *Volume 3 Handbook of Agricultural Economics: Agricultural Development: Farmers, Farm Production and Farm Markets*. Amsterdam: Elsevier Press.

Spillman, W.J. 1919. "The Agricultural Ladder," *American Economic Review, Supplement*. 9, March: 170-179.

Timmer, C.P., 1997. "Farmers and Markets: The Political Economy of New Paradigms" *American Journal of Agricultural Economics* 79 (1997): 621-27.

Chapter 4 References

Balsevich, F., J. Berdegue, and T. Reardon. 2006. Supermarkets, New-Generation Wholesalers, Tomato Farmers, and NGOs in Nicaragua. *Staff Paper 2006-03*, Dept. of Agricultural Economics, Michigan State University.

Berdegue, J.A., T. Reardon, F. Balsevich, A. Martínez, R. Medina, M. Aguirre, and F. Echánove. 2006. *Supermarkets and Michoacán Guava Farmers in Mexico*. Staff Paper 2006-16, April, East Lansing: Michigan State University Department of Agricultural Economics.

Hernández, R., T. Reardon, and J.A. Berdegue. Forthcoming. "Supermarkets, Wholesalers, and Tomato Growers in Guatemala," *Agricultural Economics*, accepted October 2006.

Hueth, B., Ligon, E., Wolf, S. and S. Wu. 1999. 'Incentive Instruments in Fruits and Vegetables Contracts: Input Control, Monitoring, Measurements, and Price Risk', *Review of Agricultural Economics*, 21(2):374-389.

Sadoulet, E. and A. de Janvry. 1995. Sadoulet, E. and A. De Janvry (1995), *Quantitative Development Policy Analysis*, The John Hopkins University Press, Baltimore and London.

Wang, H., X. Dong, S. Rozelle, J. Huang, T. Reardon. 2006. Producing and Procuring Horticultural Crops with Chinese Characteristics: A Case Study in the Greater Beijing Area. Staff Paper 2006-05, Dept. of Agricultural Economics, Michigan State University.

Chapter 5 References

Montgomery, Roger. 2002. "Deregulation of Indonesia's Interregional Agricultural Trade," *Bulletin of Indonesian Economic Studies*, 38 (1), pp. 93-117.

Olken, Ben. 2006. "Trucking and Illegal Payments in Aceh." Briefing note for BRR and World Bank.

RICA 2006. *The Rural Investment Climate Assessment*, Consultative Draft, The World Bank, June 2006



Reardon, T. and L. Flores. 2006. " 'Customized Competitiveness' Strategies for Horticultural Exporters: Central America Focus with Lessons from and for other Regions," *Food Policy*, 31(6).

Reardon, T. and R. Hopkins. 2006. " 'The Supermarket Revolution in Developing Countries Policies To Address Emerging Tension Among Supermarkets, Suppliers, and Traditional Retailers,'" *European Journal of Development Research*, 18 (4).

Simatupang, Pantjar and Hal Hill. 2005. "Agricultural Marketing and Competition." Background paper for Indonesia Rural Investment Climate Assessment. Jakarta.