



Australian Government
**Australian Centre for
International Agricultural Research**

Eastern Indonesia-Agribusiness Development Opportunities (EI-ADO)

Mango Value Chain Study Executive Summary



Locations: East Java, West Nusa Tenggara (NTB)

Start & End Date: September 2012

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Executive Summary Mango

Background on AIPD-Rural / EI-ADO

This project is one of five lead commodity value chain studies undertaken as part of the larger \$1 million Australian Government's Department of Foreign Affairs and Trade (DFAT) funded project Eastern Indonesia Agribusiness Development Opportunities (EI-ADO). In this project, Australian Centre for International Agricultural Research (ACIAR) commissioned research to identify lead commodity value chains to be the focus of a new DFAT program Australia Indonesia Partnership for Decentralisation – Rural Economic Program (AIPD-Rural).

The goal of AIPD-Rural is a 30 percent increase in incomes for more than 1,000,000 male and female smallholder farmers by 2022.

The objective is in increased competitiveness of poor male and female farmers, realised through:

- Increased productivity;
- Improved business performance;
- A growing share of an expanding market; and
- The continuous adoption of innovations that contribute to productivity, performance, and market growth.

The expected outcomes are:

- Improved farmer practices;
- Increased access to input and output markets; and
- Improved business enabling environment at the sub national level.

The strategy to be used is to address the systemic growth constraints in rural agricultural sectors that are most relevant to small farmers in the districts in which the Program operates.

The Program is to take a market-led approach of working with on- and off-farm market stakeholders to stimulate both increased access to and the sustained delivery of inputs and services that are likely to increase the incomes of poor farmers.

Study Background

The mango team completed 25 days of field work during the period of 3rd to 28th September 2012, across 11 districts in 5 provinces. Team comprised: Tiago Wandschneider, Ian Baker, Ronny Natawidjaja, Teddy Kristedi, Gamal Pratama, Putu Cakra and Harris.

The field work began by visiting Jakarta, West java and Central java to study the market and demand side of the mango chain and investigate best practices of key mango production areas. The team then continued the field work to East Java and NTB to interview value chain stakeholders and identify key linkages and gaps in the chain.

The team applied the markets for the poor or M4P VC analytical framework, interviewing various levels of market actors as well as other key informants such as relevant government agencies, local non-governmental organizations and market intermediaries. Market information and insights from these actors was solicited to evaluate the relations between buyers and suppliers, end markets and competitiveness, value chain dynamics, market constraints and failures. Extensive secondary

research was also conducted prior and after the field work which helped provide the macro settings of mangoes and its current context and status in Indonesia. Based on the field work and secondary research the team then formulated possible market based solutions to improve value chain effectiveness.

International Context

Three quarters of global mango production comes from Asia, with Latin America and Africa accounting for most of the remainder. With approximately 40 percent of total output, India stands out as the world's leading mango producing country, followed by China, Thailand and Pakistan. However, despite very strong growth in the international mango trade, over 95 percent of global production is still consumed within producing countries. In East and Southeast Asia, five countries account for the bulk of imports: Malaysia, Hong Kong, Singapore, Laos, and Japan.

Indonesia is the sixth largest producer of mangoes in the world, with a 3 to 5 percent share of global production, depending on the year. Indonesia is a marginal exporter of mango. The country exports around 1,000 tonnes of fresh mangoes per annum, or around 0.1 percent of domestic production.

Exporters confirm that Singapore remains the main export destination, followed by the UAE. Occasionally, some mangoes are also exported to Malaysia and Hong Kong. Dependency on air transportation constitutes the single most important barrier to the development of mango exports although the opportunity is there. Indonesia enjoys strong export fundamentals due to timing of production and geographical proximity. The timing of production is good because Indonesia has an abundant and very cheap supply of Harumanis in October and November, a time when other Asian countries have no local production and no access to nearby sources of mangoes. Geographically, Indonesia is uniquely positioned to supply Hong Kong, Southeast Asia, the Indian sub-continent, and the Gulf States during this peak production period.

National Context

During the 2003-11 period, Indonesia's mango production increased by approximately 40 percent, i.e. at an annual average rate of nearly 5 percent. Growth in production resulted from an expansion in cultivated area (31 percent) as well as increases in the productivity of mango trees (6 percent). Production is concentrated along the northern coastal areas of Java, which accounts for two-thirds of national production. East Java, with its drier and therefore more suitable climate for fruit production, has been the centre of mango cultivation, although its traditional dominance is being slowly eroded due to the expansion of planted areas in the western and central parts of Java and other islands.

Mango is a smallholder crop. The vast majority of mango farmers in Indonesia own less than 100 trees. Harumanis is the main mango variety. Mango cultivation in Indonesia is undergoing a process of commercialization, characterized by an increase in the adoption of external inputs. This process is most advanced in West and Central Java. NTB is at the opposite end of the commercialization spectrum, with mango farmers making very limited use of external inputs.

Mangoes are mainly consumed as fresh fruit or fresh juice. Some dried mango, mango candy, and other mango-based products can also be found in urban shops and supermarkets, but in very small volumes. Most of these products are imported from Thailand, Malaysia, Singapore, and the Philippines. Several brands of processed mango juice are sold in Indonesia. The local product content, however, is minimal. Juice companies import mango concentrate and puree, adding some locally produced pulp just for flavouring.

Indonesian consumers show a marked preference for large and sweet mangoes with nice aroma, firm flesh, and little fibre content. The Harumanis variety combines all these traits, and is the reason why it is so favoured by the majority of Indonesians. Consumers also appreciate mangoes that are harvested ripe (masak pohon) and are not particularly bothered about skin blemishes or marks. Contrary to other countries, Indonesian consumers have no preference for yellow mangoes; however, Gedong Ginku is one of the few local cultivars that have yellow skin with a red blush. Commercial production is currently confined to West Java with most of it being sold through modern retail outlets in greater Jakarta. In Surabaya, consumers are not yet familiar with this variety.

Mango Prices

Analysis shows that mango prices have been increasing over time, which in a context of rising production is a strong indication of growing domestic demand. Intra-annual price variations reflect the seasonal distribution of supply, with prices following a u-shape pattern from August to February. Mango prices are generally high between May and mid-July, when only West and Central Java are supplying the market. After an August peak, prices fall steeply, with a very clear dip in October and November, when the market is literally flooded with mangoes from eastern, central and western Java. In mid- to late November, as the Java harvest is coming to an end, prices start rising. That is when mangoes from neighbouring Bali and NTB are shipped to Jakarta and other parts of Java.

The Fresh Mango Value Chain in Situbondo and North Lombok

Jakarta is a major destination for mangoes from east, central, and west Java. It represents a large consumption market and is a strategic distribution centre for surrounding urban areas and Sumatra. Jakarta is the main destination of Situbondo's mangoes, followed by cities such as Bekasi, Bandung, Bogor, Yogyakarta, Surabaya, and Malang. Mangoes from Situbondo are also sent to Kalimantan via Surabaya. Mangoes consumed in Surabaya or exported to Kalimantan are mainly sourced within East Java. However, the research finds that Surabaya does not appear to be a major market for Situbondo mangoes, despite its relative proximity and large population. The fact that Surabaya has a very poor wholesale market network for fruits (Natawidjaja et al, 2009) is certainly an important constraint to procurement from more distant districts, and may explain why some market retailers and street vendors source their mangoes directly from surrounding production areas rather than from wholesale markets in the city.

Mangoes from NTB are consumed within the province and exported to Java and Bali. Inter-island trade accounts for some 75 percent of provincial production which starts in mid-November, as the harvest in East Java is coming to an end, and continues until January. The remaining 25 percent of production is consumed locally in NTB in which Mataram is the main consumption market in the province.

Variety is an important determinant of spatial product flows. The fact that Harumanis accounts for most production in Situbondo is an advantage, as this variety enjoys strong demand in large cities across Java and Sumatra. In NTB, most of the mango trade with Java is also focused on Harumanis. Other commercial varieties, such as Madu, Manalagis and Golek, are mainly consumed within Lombok, although some are also sent to Bali and Java.

Both domestic and export chains are characterized by fairly unsophisticated quality management systems. Fruit size is the most-valued product quality feature and an important determinant of product flows. Most grade C mangoes (less than 400 gram) can be found in local markets and small urban centres, but in cities consumers prefer and can afford larger fruit. Mangoes exported to other countries are sorted according to much stricter criteria, including size, blemishes, and skin marks,

and may even be washed for sooty mould stains, but current export volumes are insignificant. Likewise, suppliers selling to higher-end retailers follow stricter sorting practices, but this remains a niche market. While the adoption of simple and affordable post-harvest treatments for diseases and fruit flies would have a major impact on the development of export chains, exporters are unfamiliar with the technology. In domestic chains, post-harvest losses are fairly small, despite high levels of fruit fly infestations and high incidence of fruit diseases. Value chains are structured and organized to ensure that mangoes reach consumers soon after harvest, before rotting due to fruit flies and anthracnose or stem-end rots becomes a problem. From this perspective, inter-provincial and inter-island mango chains are quite efficient.

Mango Value Chain Constraints

Critical knowledge gaps along the whole chain and amongst support service providers in the private and government sectors constitute the most serious barrier to pro-poor innovation in the Indonesian mango chain.

Crop manipulation technologies for extending the mango season into earlier, off-season months offers a clear opportunity to raise farm-gate prices, the main issue of concern to farmers, and at the same time improve the productivity of mango farms. Such critical outcomes can be achieved with a level of investment that is certainly within the reach of large numbers of mango farm households. Potential impacts on the incomes from mango farming cannot be overemphasized.

Yet, farmers in East Java and NTB are failing to take advantage of the opportunity. The main reason, the key underlying cause, is a generalized lack of knowledge about manipulation of the mango harvest. Farmers do not know about crop manipulation technologies. But other actors in the chain likely to benefit from increased input demand or longer marketing seasons also lack that knowledge and therefore the ability to support technology adoption processes. That is the case, for example, of field staff from chemical companies, village assembly traders, and market wholesalers. Similar remarks can be applied to key service providers in the government sector, including national mango scientists, research staff, and extension officers. Ultimately, such shortcomings are a consequence of poorly performing formal and informal knowledge transfer systems, or, in other words, limited and inadequate knowledge flows within and into the mango value chain.

Mango exports, or the lack of, provide another clear example of missed value chain development opportunities because of acute knowledge system failures. Exports can drive the development of more productive and more profitable mango chains, and if developed at scale can have a positive impact on mango prices during the critical peak-season months. As discussed, Indonesia enjoys unique competitive advantages in Asian markets on account of its geographical location, the timing of its main mango harvest, and very low mango prices during its main season. Yet, despite these very favourable conditions, the mango export industry remains in its early infancy stages. It can be argued that exporters' inability to make the transition from air to sea freight because of very poor knowledge of post-harvest disease and pest management technologies has been the main barrier to export growth.

While certain knowledge gaps have been singled-out as the key constraint to an upgrading and development of the mango value chain, the research team is well aware that these processes are influenced by many other variable as well. For example, many farmers may not be able to afford off-season cultivation technologies because they lack the necessary resources, access to credit, and ability to take risks. Exporters, in turn, have serious concerns about the quality of mango fruit at the

farm gate and are clearly affected by strict phytosanitary regulations in certain markets. Some of the interventions proposed in the next chapter also deal with these and other issues. But any efforts to overcome financial constraints to adoption of certain technologies or non-tariff barriers on exports will be futile unless critical knowledge gaps are addressed first.

Market based Value Chain Development Opportunities

1. Early-season cultivation.

Having a more pronounced and longer dry season, East Java and North Lombok are more suited to an extended flowering and harvesting period, but farmers in both provinces lack the technical knowledge that would enable them to take advantage of off-season opportunities.

Crop manipulation technologies for extending the mango season into earlier, off-season months offers a clear opportunity to raise farm-gate prices, the main issue of concern to farmers, and at the same time improve the productivity of mango farms. Successful adoption of early-season production technologies (paclobutrazol) provides the most obvious opportunity for increasing the incomes of mango growers, equivalent to 25-50 percent of the total annual harvest. Adoption of growth regulators will also have a positive impact on productivity, as shown by farm research trials in North Lombok. The fact that off-season cultivation technologies have been widely adopted in parts of West and Central Java, with significant financial benefits to farmers, but not in East Java and NTB, reflects huge imperfections in formal and informal knowledge transfer systems.

A shift towards off-season cultivation systems would have significant indirect impacts, especially over the medium term and beyond. First, adoption of crop manipulation technologies and subsequent farm intensification processes would generate new employment, as additional labour would be required to carry out various farm operations. Much of these activities would be performed by small and marginal farmers and landless rural workers hired as wage labourers. Second, an increase in the profitability of mango farms would raise local tree rental values, benefiting households that leave the management of their trees to others in exchange for an agreed payment. Finally, the development of off-season cultivation at scale would result in a significant shift of supplies from the October-November months to the July-September period, thereby reducing intra-annual variations and increasing prices during the critical peak harvesting season. This would benefit mango growers across the board, both adopters and non-adopters, as well as households renting-out mango trees.

Potential private partners for this intervention are chemical companies, village assembly traders, and market wholesalers. Specifically for chemical companies, Syngenta, Bayer and BASF, the companies selling Cultar Amistartop, Cabrio and Nativo, respectively, are most potential partners. These companies have large field staff networks working on crops such as rice and vegetables, which could be easily mobilized.

Facilitation activities to enable early-season cultivation are: (1) Demo trials. (2) Exchange visits, (3) Development of relevant information products and (4) Facilitation of market linkages.

2. Enabling Export Development

Although Indonesia enjoys unique competitive advantages in Asian markets on account of its geographical location, the timing of its main mango harvest, and very low mango prices during its main season, the mango export industry remains in its early infancy stages. Mango exports, or the lack of, are results of acute knowledge system failures. The main barrier to export growth is

exporters' inability to make the transition from air to sea freight which is limited by their poor knowledge of post-harvest disease and pest management technologies.

Exports can drive the development of more productive and more profitable mango chains, and if developed at scale can have a positive impact on mango prices during the critical peak-season months because by channelling supplies to other countries, exporters are in effect reducing the amount of fruit available in the domestic market.

To enable the emergence of a sizeable mango export industry in Indonesia, a series of intervention need to be done, such as the transfer of appropriate post-harvest technologies, the coordination of trial shipments by exporters, the sharing of initial risks associated with a transition to sea freight, the provision of strategic export market information, the facilitation of business linkages with importers in current and potential markets and also linking exporters to traders in assisted districts.

3. Processing

As with exports, a reduction in the supply of fresh mango would trigger an increase in market prices during the critical peak harvest months (October-November). Impacts on the price of lower-quality fruit would be particularly significant. Current support by government to small processing groups or enterprises reflects this thinking, as well as a desire to support value addition activities that can generate new employment opportunities, especially for women. However, Research indicate that mango-based products enjoy relatively limited demand in domestic and export markets. Moreover, Indonesian processors face strong competition from imports and in potential export markets.

Small processing groups may generate interesting income opportunities for members, but this segment will never achieve a scale that would influence market prices. Likewise, small and large formal enterprises may create some employment opportunities, but the sector is unlikely to develop to an extent where systemic price effects can be envisaged due to at least two reasons. First, processors can only afford to buy fresh mango during the short peak marketing season, when the fruit is widely available in local markets and therefore cheap. This inhibits investment in larger processing facilities and imposing a cash flow burden on businesses. . Second, small informal enterprises are rarely able to break into the modern retail segment, which is critical for success in urban markets. Consequently, the research does not recommend targeting processing enterprises as a major focus of AIPD interventions in the mango sub-sector.

Other issues

While certain knowledge gaps have been singled-out as the key constraint to an upgrading and development of the mango value chain, the research also indicate that these processes are influenced by many other variable as well. For example, many farmers may not be able to afford off-season cultivation technologies because they lack the necessary resources, access to credit, and ability to take risks. Exporters, in turn, have serious concerns about the quality of mango fruit at the farm gate and are clearly affected by strict phytosanitary regulations in certain markets. Some of the interventions proposed in the next chapter also deal with these and other issues. But any efforts to overcome financial constraints to adoption of certain technologies or non-tariff barriers on exports will be futile unless critical knowledge gaps are addressed first.

Future research questions

The study team also identified a range of additional research questions that will need to be answered as program design moves forward. The support to a transition towards off-season mango cultivations systems in East Java and NTB and the development of sea-freighted exports of mangoes have strong learning and adaptation elements, as well as a private sector and value chain

development dimension that fits with ACIAR and Australian Government's Department of Foreign Affairs and Trade (DFAT) mandates. Research areas include:

1. A more participatory approach to intensive and larger size of farm and export trials,
2. The cost-effectiveness of crop manipulation strategies in different agro-climatic contexts
3. The technical and financial feasibility of different post-harvest treatments
4. Opportunities in different export markets, and
5. The economics of sea freight.