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Chilli Value Chain Study Executive Summary



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Executive Summary

This study was conducted to inform pro-poor interventions in the chilli value chain under a new DFAT program: the Australia-Indonesia Partnership for Decentralisation - Rural Economic Program, or AIPD-Rural. A wide range of issues deemed important for characterisation of the chilli sub-sector in Indonesia are covered. There is a particular focus on understanding the potential of the chilli sub-sector as a vehicle for poverty reduction in the AIPD-Rural target district of Malang in East Java. Within this report the chilli value chain is analysed in detail, gender and environmental issues are discussed, and possible entry points for pro-poor chain innovations are proposed.

Socio-economic importance

As the main vegetable crop in Indonesia, the harvested area of chilli ranges between 230,000 ha to 245,000 ha annually. Given the small average size of chilli farms, it could be conservatively estimated that at least half a million households grow chilli in Indonesia. As in the case of other highly perishable crops, production is concentrated near the main consumption centres (over 50% of domestic production comes from Java).

East Java has about 60,000 ha under cultivation, a far larger area than any other province, but ranks second, after West Java, in terms of output. North Sumatra and Central Java are the third and fourth largest producers. These four provinces alone supply 60% of the chillies consumed in Indonesia.

Production trends

In 2011 Indonesia achieved a record harvest of nearly 1.5 million tonnes, about one-third more than in 2007. Productivity gains were the main source of growth, with average yields increasing by 28% for big chilli and 24% for small chilli, compared to an expansion of harvested areas of just 3% and 6%, respectively.

Seasonality

Chilli is grown all year round with two peak harvesting seasons; late April to late June, and September to early November. Production levels in a given season can vary significantly from one year to another due to the influence of weather conditions, pests and diseases.

Productivity

Differences in chilli productivity across provinces is significant. During the period from 2009-11 farmers in North Sumatra harvested on average 15.8 tonnes of big chilli per hectare (ha) while those in West Java produced 12 tonnes/ha, well above the national average of 7.1 tonnes/ha. The average yield in West Nusa Tenggara Province (NTB) was 7.9 tonnes, considerably higher than in Central Java, East Java or East Nusa Tenggara Province (NTT).

Similarly for small chilli over the same period, farmers in East Java and Central Java harvested on average 3.9 and 4.9 tonnes/ha, respectively, compared to 12.8 tonnes/ha in West Java and 12 tonnes/ha in North Sumatra.

Demand

Given a demand curve that is both income and price inelastic, any significant expansion in domestic production will have major negative impacts on farm-gate prices, even in a context where the

economy is performing well and household incomes are rising. The impact of rising production on domestic prices are exacerbated in a context where imports are very low, with limited scope for import substitution, and exports are unlikely to be developed at scale in the foreseeable future. Consequently, increases in the chilli harvest will have to be absorbed by the domestic market.

Exports and Imports

Fresh chilli exports from Indonesia are too small to have an impact on domestic market conditions. Between 2007 and 2011, exports averaged 1,217 tonnes per annum, i.e. 0.1% of average annual production during that period. Fresh chilli imports have been rising, but the volumes remain too small to influence domestic market conditions.

Prices

Chilli prices are very erratic, with significant daily, weekly and monthly volatility. Short-term price volatility cannot be explained by changes in import and export flows, as these are too small to have a significant impact on prices. Neither can it be attributed to fluctuations in domestic demand, as this is fairly stable throughout the year, with the exception of the holy month of Ramadan, a period characterized by a spike in household consumption. Rather, short-term price volatility is mainly a consequence of fluctuations in the quantities harvested at any given point in time, which can be fairly significant, depending on past planting decisions by farmers, weather conditions, and the incidence of pests and diseases.

Changes in supply will have considerable impact on the market value of the crop because consumer demand is fairly inelastic in relation to prices. The report suggests that short-term storage under low temperatures would reduce market instability, as supplies could be released during periods of high prices or kept in storage when prices are low, but private traders are yet to invest in cold chains for chilli and other vegetables.

The chilli value chain in Malang

Production

In Malang, chilli represents largest cultivated area amongst all vegetable crops. About 3,340 ha were harvested in 2012, compared to 3,640 ha in 2011. While East Java province specializes in the production of small chilli, red and curly varieties account for over 50% of the chilli cultivated area in Malang. Local vegetable farms typically range from 0.2 to 1 ha, or 1.5 ha in rare cases. Some farmers grow the crop only once a year, some twice.

Compared to other regions in East Java, chilli production in Malang is more advanced, in terms of the tendency of farmers to use better quality seeds. Farmers have high input costs establishing the crop, purchasing fertilizers and pesticides, and hiring labour to work on the farm.

Input distribution

Within the context of the chilli value chain in Malang, this study suggests that there is no problem with regards to input distribution. In the main vegetable growing areas of Malang, farmers may have five or six shops in their own village supplying agricultural inputs. These are generally well stocked, selling different seed varieties and a wide range of agro-chemicals. Prompt payment in cash is the norm, although some input retailers may occasionally provide credit in kind to select farmers they know well and trust. A significant number of chilli farmers in Malang access trader finance.

Many chilli farm households grow their own seedlings in order to reduce costs, for logistical convenience and/or because they are unsure about the quality of the seedlings supplied by local nurseries. However, in villages where chilli is a major crop, 40-70% of growers purchase seedlings from small commercial nurseries. Some farmers access seedlings on credit from village traders, an important client for the larger nursery businesses in sub-districts such as Poncokusumo and Pujon. In most cases, the seed to be grown into seedlings will be provided by the farmer or trader.

Spatial flows and market channels

Most of the chilli harvest in Malang is consumed within the district, in Malang City, and in other parts of East Java, particularly in and around Surabaya. Some supplies are channelled to other important market destinations such as Bali, greater Jakarta, Central Java and Kalimantan. The chilli crop is distributed and retailed through traditional channels. Only a very small share of production is channelled to modern retail outlets.

Intra-district chains

Malang City represents an important market for local chilli growers. Gadang market is the main wholesale distribution centre, supplying large numbers of urban retailers. About half the wholesalers in Gadang specialize in sales to retailers. The other half specializes in long-distance trade, supplying wholesalers in Bali, greater Jakarta and Central Java.

Both collectors and inter-district traders in Poncokusumo and Pujon normally sell between 1 and 3 tonnes of chilli per day and have 40 to 80 regular suppliers.

Intra-provincial chains

Porong market in Sidoarjo, near Surabaya, is a major distribution centre for Malang chilli. Many inter-district traders go to Porong daily and each of them has several regular buyers in Porong. These are "large" market retailers from Sidoarjo, Surabaya, Gresik, Mojokerto, Pasuruan and Madura, or mobile traders who supply market and street vendors in these locations. The fact that inter-district traders have been doing business with buyers in Porong for many years is important for efficient coordination and negotiation of transactions. Prices are determined when the parties meet at the market. Some Gadang wholesalers and some inter-district traders also supply Keputran, the main wholesale market for fresh produce in Surabaya, but this is a secondary channel. Supplies to neighboring Blitar and Lumajang districts are channeled through village assembly markets.

Inter-provincial chains

A few traders in Malang supply wholesalers in and around Jakarta. Despite the distance, Malang is the preferred supply source as it can provide a continuous supply. There are a handful of village traders that supply greater Jakarta directly. One of the largest chilli traders has been doing business with one wholesaler in Tangerang since 1996.

Inter-provincial traders handle larger volumes of fewer vegetables than inter-district traders. They normally supply one or two buyers in one or two markets. Inter-provincial traders face difficulties in dealing with many wholesale customers because each needs a continuous supply of relatively large consignments and because high levels of trust are required for long-distance transactions.

Contract farming and collective action

No formal contract farming arrangements were found in the Malang chilli chain. Contract farming schemes are costly to develop and can only be justified where firms are targeting premium markets

in Indonesia or abroad. Currently, such chains are very under-developed. This is actually the main conclusion of the report about contract farming situation in Malang chilli chains. References regarding the existing contract scheme are somewhat difficult to duplicate since they are dealing with non-chilli vegetables and organic chilli.

Information and knowledge flows

Farmers, nursery operators, and traders are constantly trialling new varieties, rotation crops, inter-crops, and agro-chemicals. These experiences are shared through family, social, and market networks. Seed and agro-chemical companies have played an important role in local technology adoption processes.

Government extension services are a more impartial source of technical advice. However, they face acute resource and institutional constraints, resulting in only a marginal role in local innovation processes. Extension officers lack key knowledge and skills, as well as the performance-related incentives that are so critical for the delivery of an effective service.

Information about spot market prices has obvious relevance for farmers as without it they cannot assess the fairness of the terms offered by village traders. It is not difficult for farmers to access spot price information, however, both farmers and traders seem to have difficulties making sense of intra-annual price patterns and forming reasonable expectations about price outlook scenarios.

Lack of knowledge of pest and disease management strategies was identified as another important constraint. Understanding of pests and diseases, their causal factors, optimal timing for intervention and the relative cost-effectiveness of different control technologies is often weak. Location-specific research is therefore needed to determine possible improvements over current practices but such services are costly and rare.

Quality Management Systems

Chilli has a shelf-life of just three or four days after harvest. In a context where cold storage is not an option, village traders and wholesalers cannot afford to hold inventories. Once harvested, chilli is channelled to retailers in Malang and other parts of East Java within 24 hours. Farmers, collectors, inter-district traders, wholesalers and retailers do not grade their chilli. Prices along the chain may differ, however, depending on product attributes such as water content and colour. Some wholesalers and retailers will sell broken fruits separately for a discount. Traditional retailers de-stem some of the chilli fruit as a value-addition strategy.

Margins

Price and marketing cost data along the Poncokosumo-Porong chain was collected at a time when chilli prices were particularly high. Chilli growers received approximately 70% of the retail price. Inter-district traders, distributors, and retailers “appropriated” 12% of the crop’s retail value as net margin. Marketing costs accounted for 19% of the retail price. Retailers earned a relatively low margin due to product losses and high transportation costs per kilogram, representing 40% and 20%, respectively, of total marketing costs from the farm through to retailing. Some caution is required when interpreting margin data. Net margins are known to fluctuate considerably between transactions. Village traders and retailers operate in highly atomistic or competitive spot markets where prices are constantly changing in response to changing supply conditions.

Problems and constraints

Despite the fact that traders interviewed for this study had been in business for years, the level of knowledge in basic business skills is mostly very low and the businesses are rarely growing. Particularly in rural areas (intra-district chains), the traders are frequently unable to distinguish between revenue and profit. Unfortunately, this lack of business skills is even more evident at the farmers' level. Farmers do not maintain any records of their activities and therefore are not in a position to accurately determine profitability.

On the production side, intensive use of labour is becoming a problem, not from the perspective of rural labour absorption (employment), but from the efficiency of production costs. Decreasing labour availability and quality in rural areas may lead to a larger proportion of production costs allocated to labour that eventually may cause a significant decline in chilli agribusiness' competitiveness.

Opportunities for pro-poor intervention

This study has identified the following four value chain intervention opportunities:

1. The piloting of small hybrid chilli varieties
2. The development of local markets for Gemini-free seedlings
3. The expansion and improvement of existing contract farming schemes
4. The development of market outlook services

Two of the interventions focus on the commercial development of new technologies with potential to increase farm productivity. One targets lead firms that are working under a vertical coordination model that appears to offer farmers higher returns and lower risks compared to spot market sales. The fourth intervention looks at the delivery of market outlook services as an innovation that could potentially stabilize and improve net farm incomes. Whilst all proposed interventions require further validation, two offer greater opportunities for scalable impacts: the production of Gemini-free seedlings by commercial nurseries and the development of market outlook services by the East Java Chilli Agribusiness Association.

1. The piloting of small hybrid chilli varieties

Farmers' lack of experience growing small hybrid chilli and the opportunity to partner with leading seed companies may justify an intervention by AIPD-Rural. East West Seed, the leading vegetable seed company in Indonesia, has two small hybrid chilli varieties in its product portfolio. BISI, the second largest vegetable seed company in the country, has one.

Although hybrid varieties are unlikely to gain significant market share in the foreseeable future, they may offer opportunities for raising net incomes from chilli farming in the more commercialized production areas of Eastern Indonesia, such as Malang and Kediri, where many vegetable growers already invest significant resources in their farms. AIPD-Rural could therefore consider working with East West and BISI to expose small chilli growers in those districts to hybrid varieties and to assess their impact on farm profitability.

2. The development of local markets for Gemini-free seedlings

The white-fly transmitted Yellow Leaf Curl (Gemini) virus poses an increasing threat to the chilli crop. If the chilli plants become infected at an early seedling stage, they can be rendered almost completely unproductive. Until resistant varieties can be developed and distributed, incorporation of

fine-mesh screening fabric in the shading structures used for seedling production provides the most effective control strategy. Fine-mesh netting delays the onset of the disease, thereby reducing crop losses.

If successful, the intervention would create the necessary demand for Gemini virus-free seedlings and increase sales by specialist nursery operators, the profits earned from seedling production, and wage employment in nursery farms. More importantly, it would raise the productivity and profitability of chilli farms, generating higher incomes for chilli farm households.

3. The expansion and improvement of existing contract farming schemes

Contract farming may have impacts on farmer incomes through changes in yields, production costs, and farm-gate prices. An analysis of the ABC Heinz scheme suggests that this is having a positive impact on farm productivity. Access to input credit and reduced exposure to marketing risk are likely to be associated with increased investment in chilli farms, whereas the delivery of technical advisory services should result in improved crop management practices.

It is also important to note that few farmers in East Java are currently involved in the production of chilli under contract with large lead firms. About 500 growers scattered across five or six districts participate in the ABC Heinz scheme. While there may be scope for expanding these schemes, one should not expect major increases in the number of participating farmers, even in a context whereby the associated costs and risks incurred by contracting firms are reduced through external intervention. It would be unrealistic to expect an increase of more than 200 or 300 contract growers over a two- or three-year period.

Any decision by AIPD-Rural to support an expansion and improvement of current chilli contract farming schemes should be part of a wider intervention targeting a number of agribusiness firms working with contract growers or willing to develop contract farming arrangements for the production of different agricultural commodities.

4. The development of market outlook services

Timely access to relevant market outlook information and analysis can have significant positive impacts on farmer incomes. If farmers can anticipate adverse market scenarios at harvest time, they will reduce planted areas and grow other crops instead. If many farmers adjust cultivated areas accordingly, then there will also be a systemic market stabilization or correction effect: while some growers will no longer enjoy steep price hikes, situations where thousands have to sell their crop for a significant loss or marginal profits will be avoided.

AIPD-Rural could consider working with the East Java Chilli Agribusiness Association to improve the outreach as well as the relevance of its information service. Planting decisions should be based on an understanding of short-term market outlook scenarios: a farmer planting red or curly chilli today needs to have some understanding of price prospects in three to four months' time, i.e. at harvest time.

Further consultations with the leadership of the Association to discuss different design options and the implications for members and other big chilli growers in East Java are needed before a decision by AIPD-Rural to support the development of market intelligence services can be taken. Different service design options will have different impact consequences.

Areas for future research

Nearly all proposed interventions outlined in this report would benefit to some extent from applied research during an implementation phase.

As mentioned previously, there would be benefits in allowing nursery operators and farmers to trial first-hand the protective netting to minimise the incidence of the highly yield limiting Gemini Virus in chilli seedling production.

Comparative research into chilli cultivation systems adopted in higher-productivity provinces compared to the lower chilli producing AIPD-Rural districts within the province of East Java would shed light on specific technical innovations with potential to increase yields and/or lower costs of production.

Smallholder farmers may benefit from more analysis into the upgrading of contract chilli production strategies and improvements in contract design and delivery of input supply, credit, technical assistance and other embedded services by the contracting party.

And finally, the proposed intervention of piloting small hybrid chilli production would benefit from further research into better understanding the dynamic between the higher production levels hybrid chilli varieties offer farmers and the lower preference (lower market price) for hybrid chilli by the consumer.