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List of Abbreviations

ACIAR	Australian Center for Tropical Agriculture
AIPD-Rural	Australia-Indonesia Partnership for Decentralisation - Rural Economic Program
AVRDC	The World Vegetable Center
BNI	Bank Negara Indonesia
BPSB	Technical Working Unit for Seed Inspection and Certification, Dinas Pertanian
BPTP	Assessment Institute for Agricultural Technology
BRI	Bank Rakyat Indonesia
CV PHS	Pertani Horticultura Sumbawa
DEEDI	Queensland Department of Employment, Economic Development and Innovation
DFAT	Australian Government's Department of Foreign Affairs and Trade
DG-Hort	Directorate General for Horticulture, Ministry of Agriculture
EI-ADO	Analysing Agribusiness Development Opportunities in Eastern Indonesia
EWINDO	East West Seed Indonesia
FATIH	Integrated Facilitation for Investment in Horticulture
IVEGRI	Indonesia Vegetable Research Institute
NTB	West Nusa Tenggara Province
NTT	East Nusa Tenggara Province
CV PHS	Pertani Horticultura Sumbawa

Preface

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).

This report titled *Eastern Indonesia Agribusiness Development Opportunities (EI-ADO)- Analysis of Shallots Value Chains,*[1] was prepared by the Collins Higgins Consulting Group Pty Ltd, as commissioned by ACIAR. The information and recommendations from this study will inform DFAT in the design of the AIPD-Rural Program.

Field work was conducted for 30 days (shallots, tomatoes, chillies) in the months of November and December 2012. Additional follow up field work was performed by Krisnadi Ly and Teddy Kristedi in January and May 2013, and Tiago Wandschneider in May 2013. The report involved the analysis of background data, field trips and interviews with actors involved in all sectors of the value chain.

The author of this study is Tiago Wandschneider, with support from Kuntoro Boga Andri, Stephen Harper, Paul Gnifke, Teddy Kristedi, Krisnadi Ly and Ketut Puspadi. Environment and gender inputs were overseen by Emmanuel Santoyo Rio.

Thanks must go to all the value chain actors - input suppliers, farmers, collectors, processors, and traders - who provided time and valuable information to the team.

The views expressed in this report are those of the consultants and do not necessarily reflect the views of the Collins Higgins Consulting Group, ACIAR or the Governments of Australia or Indonesia.

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Executive Summary

This study was conducted to inform pro-poor interventions in the shallot 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 a characterisation of the shallot sub-sector in Indonesia and an understanding of its potential as a vehicle for poverty reduction are covered. The shallot value chains in two AIPD-Rural target districts are analysed, gender and environmental issues discussed, and possible entry points for pro-poor chain innovation proposed.

Socio-economic importance

In Indonesia, between 90,000 and 110,000 hectares of shallots are harvested every year. Only two other vegetables have a larger cultivated area: chilli and cabbage. Between 100,000 and 200,000 households earn an income from shallot farming.

Illustrative data collected from a small sample of farms shows that shallots provide significant income to growers and on-farm labour. In Bima, a district with a cultivated area of about 7,000 hectares, shallots are the main cash crop: in a normal year, they generate around US$ 40 million as net farm and wage income. A large number of households in Bima also grow shallots on rented land in Sumbawa Besar district.

In Sampang, shallot cultivation is largely confined to Sokobanah sub-district, which has a cultivated area of 2,000 to 3,500 hectares, depending on the year. Shallot farms in Sokobanah are less profitable and employ less labour per unit of land than those in Bima. Still, in Sokobanah, the crop generates between US$ 9 million and US$ 16 million as net farm and wage income per annum.

In 2011, the farms surveyed generated on average 290 person-days of employment per hectare. Hired labour represented about 90% of total farm employment. Women accounted for nearly 40% of total farm employment and half of the labour hired. Women consistently earned lower wages than men.

Production trends

Shallot production peaked in 2010, after several years of continuous growth. That year Indonesia produced nearly 1.05 million tonnes. Production contracted sharply in 2011 following a significant reduction in harvested areas. It recovered in 2012.

Productivity

In recent years, shallot yields have fluctuated around 9.5 tonnes per hectare. Central Java and West Java have the highest farm productivity. Average yields in Nusa Tenggara Barat (NTB) exceeded the national average in 2009 and 2010, but not in 2011. While East Java experienced the most significant increases in productivity, its average annual yield for the 2009-11 period was still 20 percent lower than the national average.

Seasonality

Shallots are mainly grown during the dry season, between April and October. More than half of the crop is harvested between June and September, with a clear peak in August and September. Growing shallots during the rainy season is problematic because of slow plant growth and high incidence of pests and diseases.

Varieties

A large number of varieties are grown across Indonesia. These are chosen by farmers on the basis of local agro-climatic conditions, planting season, availability of planting material, and their own knowledge of the relative strengths and weaknesses of different cultivars. Significant differences in varietal adoption across locations suggest that local agro-climatic conditions and local seed bulb distribution networks have significant influence on varietal choices.

In Indonesia, shallots are vegetatively propagated. Two true seed shallot varieties from East West Indonesia have been recently evaluated. Sanren is the more promising of the two varieties, outperforming Tuk Tuk in terms of planting density requirements, tolerance to rain, disease resistance, earliness, yield, bulb storability, and bulb quality. However, Sanren seed is not yet commercially available.

Despite several potential advantages, including lower planting material costs, reduced transmission of seed-borne diseases, and higher yields, there has been very little adoption of true seed shallot in Indonesia. This is due, in part, to the fact that Tuk Tuk has a very long growing cycle, performs poorly under rainy conditions and does not store well. It appears that this variety is not particularly appreciated by consumers.

Cultivation

Shallots are often grown as a mono-crop, although in some areas inter-cropping is common. In major production districts, farmers may grow up to three consecutive shallot crops, a system that results in a high incidence of seed-borne virus diseases, leading to crop losses across cultivation cycles.

Farmers typically plant around 1 tonne of seed bulbs per hectare. Fertilisers are applied on the basis of local experience and norms, often with poor understanding of impacts on crop yield and quality. Pests and diseases pose significant risks to farmers: *Fusarium sp.* and *Alternaria porri* are the main shallot diseases; *Spodoptera exigua* and *Liriomyza* the major pests. Excessive and inappropriate use of chemicals is widespread. Farmers use no personal protective equipment.

Demand

Shallots are a key condiment in the Indonesian cuisine. Consumers generally prefer bulbs that are not too small and have a strong, pungent taste. Consumers also show a preference for round and bright red bulbs.

The demand for shallots is income-inelastic. Future growth in domestic consumption will have to come from population growth, a decline in the price of shallots, or both. In a context of sluggish and relatively price-inelastic demand, significant increases in production will result in stagnant or declining prices for farmers, unless there is significant growth in exports, a reduction in marketing costs, or both. A reduction in cultivation costs will be critical for maintaining or improving farm profitability in a scenario of declining or stagnant prices.

Exports

Exports remain too small to have any significant impact on domestic market conditions. Shallots are mainly exported in September and October. Thailand and Vietnam are the two main destination markets, followed by Malaysia and Singapore. Probolinggo is the

main supplier of shallots for export. Within NTB, exporters source shallots mainly from Sumbawa Besar.

Imports

Indonesia imports significant quantities of shallots. Some imported bulbs are used as planting material. The contribution of imports is particularly significant during the first five or six months of the year, a period when domestic production cannot meet consumer demand. Thailand, the Philippines, and Vietnam are the main sources of imported shallots. They are generally sold in the market for a lower price than local bulbs.

The Indonesian government has recently introduced a series of legislation aimed at reducing horticultural imports. During the first three months of 2013, the price of shallots skyrocketed following the introduction of a temporary import quota. Most shallot farm households did not benefit because they do not grow shallots during that period. The new legislation will only encourage significant import substitution if managed to ensure exceptionally high prices that can compensate growers for high off-season average production costs. Moreover, any price benefits to Indonesian producers will have to be weighed against higher planting material costs due to an increase in seed bulb prices.

Prices

During the past five years, the real price of shallots in Indonesia followed no clear trend. Significant increases in domestic production have kept prices low, especially during the peak harvesting months. Since late 2010, however, shallot prices have become much more erratic. Weather conditions and short-term volatility in the arrival of overseas consignments are two possible explanations.

Within the year, shallot prices are lowest during the peak harvesting months, i.e. between mid-July and September. Storage by farmers and traders plays an important market stabilisation role during the October-December months. In the first six months of the year, market prices will be heavily influenced by the level and price of imports.

The shallot value chain in Sampang

In Sampang, most shallot farms range from 0.2 to 1 hectare. At least 2,500 households in the district grow shallots as their main crop during the February-April months. Shallots are mainly cultivated in Sokobanah sub-district, in areas without irrigation, which explains why they are is grown much earlier than in other parts of Java.

Manjung is the main variety in Sokobanah. In one village, farmers grow Bima Curut. Both cultivars show good resistance to pests and diseases, a very important trait for local farmers, who are reluctant to invest significant resources in the purchase of agro-chemicals. Farmers in Sokobanah have had limited exposure to other cultivars.

Local farmers producing seed bulbs late in the year and farmers and traders bringing in seed bulbs from Pamekasan and Brebes are the source of planting material. Traders sometimes supply seed bulbs on credit, but prompt payment is more common.

The productivity of shallot farms in Sokobanah is low. Yields typically range from 4 to 8 tonnes per hectare, compared to a national average of 9.5 tonnes. Low productivity reflects the fact that shallots are grown during the rainy season, often in poor soils, with relatively limited use of external inputs.

Farmer-to-farmer exchanges remain the main vehicle for transmission of information about shallot cultivation. Agro-chemicals are mainly bought on a cash-and-carry basis from stores in Sampang town and neighbouring Pamekasan district. Shops in Sokobanah offer a limited product range and are therefore a secondary source of inputs. A few village traders may at times supply fertiliser to farmers on credit. At least one local extension officer supplies agro-chemicals to farmers.

Farmers normally sell to local collectors, although some send shallots directly to Surabaya, often sharing a small truck. Most farmers are aware of spot market prices in their area. Transactions are usually carried out by men. Prompt payment is the norm.

Collectors act on behalf of local assembly traders, from whom they receive funds and a fixed commission. These traders typically handle between 50 and 200 tonnes of shallots per annum. Margins will vary from one year to the next, depending on market prices. Assembly traders have small storage facilities for product assembly. Storing shallots for several weeks or months is not advantageous because Sampang supplies the market during the off-season. Storage for a few days could be justified if prices suddenly dip, but traders cannot hold inventories because of limited storage space.

Most shallots from Sampang are consumed within Java. Surabaya is the main destination. Larger village traders usually sell to a selected number of buyers in two or three locations with whom they have been doing business for many years. Gains from short-term spatial arbitrage are likely to be limited because markets in Java are spatially integrated. Smaller traders usually supply Surabaya. The sharing of truck loads by small traders is not uncommon.

Local traders normally supply mixed grades to urban wholesalers. Selling graded shallots is uncommon because in the off-season many wholesalers and retailers are reluctant to sell grade A, which is too expensive for most consumers. Buyers will pay upon delivery of the bulbs or a few days later. Surabaya wholesalers do not advance funds to Sampang traders. In other locations, some may occasionally provide partial advances. On the whole, however, Sampang traders tend to operate with their own funds. Some also rely on bank loans for working capital.

Shallots from Sampang are retailed through traditional channels. The modern retail segment has a marginal share of the Indonesian retail market, estimated at less than 1.5%. In any case, Sampang shallots do not meet supermarket requirements regarding bulb size, colour, shape, and shelf-life. During the Sampang marketing season, supermarkets in Surabaya mainly sell imported shallots. It is possible that some of the Sampang harvest is absorbed by the processing industry, which buys the lowest-grade bulbs and has the least stringent requirements regarding moisture content.

Sampang shallots have a poor reputation in the market. The Manjung variety has a strong taste, but lacks other attributes favoured by consumers, i.e. medium to large size bulbs, with round shape and bright red colour. Cultivation during the rainy season and premature harvest also affect quality. Finally, the bulbs have a short shelf-life as a result of wet weather conditions at harvest time and poor post-harvest drying. Despite a poor reputation, there are no shortage of buyers for Sampang shallots, which are marketed at a time when there are few alternative sources of supply.

The shallot value chain in Bima

Bima is known as the main shallot production centre outside Java. Around 10,000 households grow the crop in an area of about 7,000 hectares. Shallot farms in the district typically range from 0.1 to 0.5 hectares. On most farms, the crop is grown between April and September, during two consecutive seasons. During that period, many local households are also involved in shallot cultivation in Sumbawa Besar district, either as renters or farm labourers.

Super-Philip is the main variety in those two districts. There appears to be considerable differences in farm yields, even within the same village, in part because of significant variations in seed bulb quality. Farmers reported 8 to 15 tonnes per hectare and 13 to 20 tonnes per hectare as the normal yield range for Bima and Sumbawa Besar, respectively.

Farmers retain some of their harvest for use as planting material and also buy seed bulbs from other farmers, local traders, and some input retails shops. Other inputs are purchased from local stores, which often provide in-kind and cash loans, especially to larger growers. These also access seasonal loans from local traders, the bank, and/or pawn shops. Small growers have much poorer access to credit.

Farmers in Bima rely on other farmers as the main source of information about shallot cultivation. Government extension or chemical companies are not considered major sources of new technical knowledge. Input retailers may at times provide information contained on product labels or received from chemical companies.

Product assembly is coordinated by inter-island traders in Bima and Lombok. Many handle 1,000 tonnes or more of shallots per annum. These traders fund the activity of village collectors working on a small commission. They usually pay farmers upon collection of the crop. The quality of the crop will influence the prices paid.

Most shallots are marketed at harvest time. Some of the September-October harvest may be sold in November or December, but the volumes are small. Farmers and traders face liquidity constraints, have limited storage capacity, and want to avoid excessive exposure to price risks.

Bima and Sumbawa Besar supply Lombok, Bali, Java, Kalimantan, Sulawesi, Flores, Maluku, West Timor, and Papua. Inter-island traders often supply more than one location. Market diversification strengthens their bargaining position vis-à-vis buyers, makes it easier to sell produce of heterogeneous quality, provides opportunities for spatial arbitrage, and reduces exposure to price risks. Volumes and quality are agreed over the phone, but the exact price will be determined once a consignment reaches its destination, as buyers are reluctant to commit to a fixed price in a volatile market.

The bulk of the harvest is sold through traditional channels. Inter-island traders rely on wet market wholesalers with whom they have been doing business for a long time for most sales. Still, inter-island traders rarely receive advances from buyers, relying instead on their own funds, bank loans, and pawn shops for working capital.

Some of the shallots are sold to the processing industry. Processors provide an outlet for low-grade bulbs. These account for about 20-25% of the Bima harvest and are the most difficult to sell. About 15 traders in Bima have contracts with Indo-Food. Most other traders have no interest in supplying the company because of low market prices and delayed payment procedures.

Small volumes are channelled to companies in Brebes and Cirebon involved in the export and import trade. Most of the bulbs for the export market come from Sumbawa Besar, which produces better-quality shallot than Bima. Exporters offer a premium, low-risk outlet for top-quality shallots. Arrangements between suppliers in NTB and companies linked to the export trade are in many ways similar to those in the traditional channel: transactions are coordinated informally, over the phone and by SMS, and buyer finance is either rare or non-existent. The main difference lies in the fact that prices are determined a few days before a consignment is sent rather than at the time of delivery. The relationship between inter-island traders and exporters is often based on a two-way product flow: during the June-August period traders in NTB sell local shallot; between January and June they buy imported bulbs for sale in Lombok, Sumbawa, and other eastern islands.

Problems and constraints

In Sampang, shallot farm households face a wide range of problems and constraints, including: poor access to water; an undeveloped local input retail network; poor knowledge of varieties and areas such as fertilisation, pest management, and disease control; high labour costs; and limited capital. Village traders also have limited working capital. Additionally, they may be missing profitable marketing opportunities because they have no contact with buyers outside Java.

In Bima, shallot farm households have limited availability of agricultural land, use planting material of variable quality, and have to cope with high incidence of pests and diseases. Smaller farmers face particularly acute financial constraints, with some having no option but to borrow from local moneylenders. Interestingly, the traders interviewed did not place much emphasis on their own capital constraints. Some complained about the regularity and delays in ferry services at Lombok and Bali.

Opportunities for pro-poor chain upgrading in Sampang

The research team identified two chain upgrading opportunities in Sampang that could be supported by AIPD-Rural: the adoption of more productive, higher-value varieties and the development of inter-island trade linkages.

Local experience shows that farmers in Sokobanah are receptive to new varieties. AIPD-Rural could consider working with some local traders to test various rain-tolerant cultivars and develop linkages between local traders and outside suppliers of quality planting material. Between 2,000 and 3,000 farm households could benefit from the mainstreaming of more productive varieties. A series of participatory, on-farm trials are proposed to determine whether cultivars such as Bima Curut, Katamocha, Bauji, Batu Iju, Biru Lancor, and Maja Cipanas perform better and are more profitable than Manjung. Selected traders should be responsible for managing the demo-trials with advisory input from the project.

Inter-island trade may offer opportunities for improving farm-gate prices and the profits from shallot trading. Diversion of supplies to other islands could also lead to an increase in prices in Surabaya, which currently absorbs most production from Sampang. At the moment, Sokobanah traders cannot explore inter-island trading opportunities because they lack the links to buyers outside Java. AIPD-Rural is in a position to lower the costs and risks associated with the development of direct supplies to different islands through the implementation of market trials. Mobilisation of village traders for participation in trial shipments is likely to require some form of risk sharing. Possible trial locations include Banjarmarsin in South Kalimantan, Kupang in West Timor, Denpasar in Bali, and Mataram

in Lombok. If inter-island trade from Sampang develops successfully, AIPD-Rural could consider implementing a similar intervention in Pamekasan and Sumenep districts.

Successful development of inter-island trade would create demand for drying and storage capacity. AIPD-Rural could consider subsidising investments in drying yards and storage facilities by traders and exposing them to good drying and storage practices.

Opportunities for pro-poor chain upgrading in Bima

Possible interventions in Sumbawa Island include the promotion of true seed shallot, an upgrading of conventional seed bulb chains, and the development of storage. Improvements in seed chains can impact positively on farm productivity and profitability, while the development of storage activity has potential to improve farm profits through higher prices.

AIPD-Rural will be partnering with East West in Bima and a large shallot farm enterprise in Sumbawa Besar for the promotion of true seed shallots. Selected growers will be supported to establish nursery farms and provide technical advisory services to other farmers. In Bima, the focus will be on the Tuk Tuk variety. Maserati, a Dutch variety, will be promoted in Sumbawa Besar. It is still unclear, however, whether a significant number of farmers will shift from conventional bulbs to true seed shallots. They do not fit well with current crop rotations, so farmers will need to be rewarded with significant increases in yield. Tuk Tuk is also very sensitive to rain, and therefore a risky option, while some questions about its marketability remain. It is therefore recommended that AIPD-Rural considers adding a market research and linkage component to the intervention. Furthermore, regular monitoring of outcomes and impacts will be important, as business models and targeting strategies may need to be refined over time.

Given these caveats, it is recommended that AIPD-Rural considers implementing a parallel strategy aimed at upgrading the structure, conduct, and performance of conventional seed bulb chains. This could include the facilitation of linkages between traders in Bima and outside suppliers of certified or good quality Super-Philip seed bulbs, support to the development of certified producers of Super-Philip seed bulbs within Bima, or both.

At the moment, few farmers store part of their September-October harvest. Many cannot afford the investment and risk, while also facing liquidity constraints. AIPD-Rural could consider developing a co-funding scheme similar to the one proposed for Sampang in order to overcome farmers' reluctance to invest in storage. Inclusion of traders as beneficiaries should be conditional on their willingness to provide storage services to farmers and the development of mechanisms for addressing likely conflicts around weight and quality losses.

Research gaps

Past research on the shallot sub-sector in Indonesia has focused on varietal choices and pest management practices in Brebes and to a lesser extent Cirebon. No major studies on shallot production and marketing have been carried out in other key locations, such as Nganjuk, Probolinggo, Madura Island, Bima, and Sumbawa Besar.

A study such as the present one cannot provide complete answers to many critical questions. Understandably, many of the intervention opportunities identified have a strong action-research or learning component. The feasibility of true seed shallots and an

upgrading of conventional seed bulb chains in Bima or Sumbawa Besar, of new conventional varieties in Sampang, and of trade from this district to markets outside Java can only be properly understood through carefully-designed pilot interventions involving local and other chain actors.

No interventions in the export chain are discussed, despite the strategic importance of export development in a context of stagnant price trends. This is because a proper understanding of the true potential for export growth and the type of interventions likely to address key bottlenecks or constraints is missing.

1 Introduction

1.1 Project Background

This study was conducted in the context of EI-ADO Project – Analysing Agribusiness Development Opportunities in Eastern Indonesia. This is a project funded by the Australian Agency for International Development (DFAT), overseen by the Australian Centre for International Agricultural Research (ACIAR), and implemented by Collins Higgins Consulting Group. Its aim is to identify agricultural commodity value chains and private sector agribusiness development opportunities with greatest potential to increase the incomes of poor men and women, not just farmers, in East Java, West Nusa Tenggara (NTB), and East Nusa Tenggara (NTT).

EI-ADO comprises a number of research activities. A prioritisation of commodity value chains based on a range of socio-economic criteria and the perceived opportunity for pro-poor upgrading and growth was carried out during the first six months of 2012. Five agricultural chains, including vegetables, were selected for research. Three specific vegetable crops were chosen for research: shallot, chilli, and tomato. This report presents the findings from research on the shallot value chain. Findings for the chilli and tomato chains are presented in separate reports. A comparative analysis of key findings and recommendations from all vegetable and other chain studies will be finalised within 2014.

EI-ADO research outputs will inform value chain interventions under a new DFAT program: the Australia-Indonesia Partnership for Decentralisation - Rural Economic Program, or AIPD-Rural. The goal of this programme is to increase the incomes of more than one million poor male and female farmers in 20 districts of four provinces of Eastern Indonesia by 30%. This is to be achieved through better farm practices, better access to input and output markets, and a more enabling agribusiness environment, all of which are critical to improvements in farm profitability and value chain competitiveness. AIPD-Rural is particularly interested in partnering with the private sector for the design and implementation of value chain interventions that can contribute to those outcomes and impacts.

The research is also of interest to ACIAR. There is growing recognition within the organisation of the importance of embedding agronomic research within market and value chain development frameworks and processes. These linkages are regarded more and more as critical for enhancing the relevance and impact of research-for-development efforts. The EI-ADO value chain studies can make a contribution to this process. The studies will generate insights regarding knowledge gaps on farm and post-harvest technologies, as well as an improved understanding of the incentives for technology, product, and process upgrading within specific agricultural value chains. In other words, study findings can be used to inform ACIAR's research agenda in Indonesia and the design of research-for-development strategies and activities that take into consideration market dynamics and opportunities.

1.2 Study Team

The core study team was composed of two value chain specialists and one vegetable expert. Tiago Wandschneider, the International Value Chain Specialist, acted as Team

Leader. Paul Gniffke, a plant breeder who worked with the World Vegetable Center (AVRDC) before retiring, joined the team as International Commodity Specialist. Kuntoro Boga, an economist with the Assessment Institute for Agricultural Technology (BPTP) in East Java, was the National Value Chain Specialist.

The team included three other members. Teddy Kristedi, the ACIAR Project Coordinator for EI-ADO, provided interpretation during the fieldwork, facilitated focus group discussions, and conducted several field and phone interviews. Krisnady Ly, from BTPT in East Java, organised the fieldwork in that province, collected secondary data, carried out focus group discussions and key informant interviews, and collected most of the farm gross margin data. Ketut Puspadi, a colleague from BPTP in NTB, was in charge of organising the fieldwork in that province and accompanying the team during the field discussions and interviews. Stephen Harper, an agricultural researcher with the Queensland Department of Agriculture, Fisheries and Forestry (QDAFF), accompanied the team during one week of fieldwork in May 2013. He helped the team gain a better understanding of cultivation issues and provided comments to an initial draft version of this report.

1.3 Study Objectives

The current study provides a description and analysis of the shallot value chain in two AIPD target districts: Sampang, in East Java, and Bima, in NTB. Some information on the shallot chain in Sumbawa Besar, NTB, is also provided due to the close links between shallot production and marketing in this district and in Bima. The information and analysis presented are used as the basis for a discussion of pro-poor chain upgrading interventions and targeting strategies.

The analytical framework adopted, the research methods employed, the areas visited during the fieldwork, and the structure and content of the report reflect the main study objective: to inform value chain upgrading interventions by AIPD-Rural with potential to improve the incomes of resource-poor households.

1.4 Analytical Framework

The M4P tool book for practitioners of value chain analysis, ‘Making Value Chains Work Better for the Poor’ (M4P, 2008), was used as the main reference for the development of the analytical framework that guided this and other EI-ADO value chain studies. A selective approach to data collection and the choice of tools and methods for data analysis was followed, taking into consideration the resources and time allocated to each study.

The current study covers a wide range of issues deemed important for an understanding of the structure of shallot chains, their conduct and performance, as well as their potential as vehicles for poverty reduction. Emphasis is given to the constraints faced by farmers and other chain actors and the opportunities available to them, in the wider context of the shallot sub-sector and its position in the international trade.

The following are some of the key areas and issues covered:

- Shallot production systems;
- Domestic demand conditions;

- Exports and imports;
- Price trends and seasonality;
- Spatial product flows and market channels;
- Roles and functions performed by different chain actors;
- Vertical linkages, with an emphasis on information, knowledge and financial flows;
- Post-harvest quality management systems;
- Chain governance, i.e. the norms underlying market transactions and the sanctions and rewards (or incentives) for compliance with buyer standards;
- Key constraints faced by farmers, local traders, and other chain actors; and
- Opportunities and incentives for systemic, pro-poor chain upgrading.

In presenting the analytical framework that guided this study, it is important to highlight three cross-cutting themes: poverty, gender, and the environment. AIPD-Rural has been developed to promote pro-poor outcomes and impacts that benefit both men and women, without compromising the natural resource endowments available to future generations. These three themes are also present in ACIAR's research-for-development work. It is only natural, therefore, that this study would seek to provide some understanding of current and potential impacts of value chain development processes on resource-poor households, men and women, and the environment, and some insights into strategies and interventions with potential to enhance the position of those groups and mitigate or address any possible negative environmental impacts.

A presentation of the analytical framework would be incomplete without some considerations about cost and margin analysis. This is a critical ingredient in value chain research, and one that was discussed at some length during the design and planning of the EI-ADO value chain studies. Analysis of costs and margins along whole product chains provides valuable quantitative evidence about key chain dimensions, which can then be used to guide public policy and other interventions. For example, much can be learned about the efficiency of the marketing system, the distribution of value or benefits along the chain, the profitability of different production strategies and market channels, and opportunities for efficiency gains and value creation.

These considerations notwithstanding, there was a consensus amongst all the parties involved in the design and planning of the value chain studies, including representatives of the donor, project management, and project implementation agencies, that not enough time and resources were available for collection of detailed price and cost data along whole agricultural chains. Moreover, the timing of the fieldwork prevented the collection of price data to estimate gross and net marketing margins. Sampang and Bima were visited in December 2012, during the off-season, when shallots are not harvested. Some additional resources were made available for a second visit to Sampang, but this was conducted in May 2013, a few weeks after the local harvesting season. The research team was therefore unable to collect spot price data. Using recall price data was deemed inappropriate because shallot markets are characterised by considerable intra- and inter-daily price fluctuations. Given this context, the study team decided to focus specifically on the collection of gross margin data for some shallot farms in order to gain some idea of on-farm employment impacts and the range of net incomes earned from shallot.

1.5 Study Methodology

A review of existing studies, reports, and government statistics was carried out early on during the research process to take stock of the information available, identify data gaps, and inform the choice of fieldwork locations and the selection of key informants. Secondary data was further reviewed during the report writing stages to support and illustrate the analysis and findings.

Qualitative methods were employed for collection of primary data:

- *Focus group discussions* (FGD) with farmers and *semi-structured interviews* (SSI) with other chain actors and some knowledgeable observers. Checklists were used to guide the discussions with key informants (see Annex 2: Checklists). These methods are particularly suited to rapid appraisals of production and marketing systems, allowing researchers to explore a wide range of issues in some depth and manage the interviews with key informants according to their specific knowledge and willingness to spend time discussing different questions. Large structured surveys are more appropriate for collection of quantitative data, but take time to design and implement and cannot be used for flexible and in-depth probing.
- *Direct observation* methods were employed during visits to trader facilities, markets, and retail outlets. Much was learned from simple observation: for example, about the scale of trading businesses, the type and scale of storage infrastructure, the functions performed by different chain actors, or the quality of shallots sold in traditional markets and modern retail outlets. Direct observation methods also proved important for cross-checking the data collected from key informants. (*Triangulation* methods were further employed to cross-check the quality of the data collected from different key informants and evaluate their views about different issues).

A *structured questionnaire* was developed specifically for collection of gross margin data at the farm level (see Annex 3: Structured format for collection of farm gross margin data). Wholesale price data for several years was obtained from the Management Board of Pare market in Kediri, an important inter-regional agricultural trading centre, and from the Management Board of Pabean market, the main wholesale distribution centre for Sampang shallots.

1.6 Fieldwork

The fieldwork was carried out in December 2012, over a period of about four weeks. During this period, the research team interviewed key informants in the shallot as well as the chilli and tomato chains. In May 2013, the team spent another four and a half days meeting shallot farmers and traders in Sampang and shallot wholesalers and one processing company in Surabaya.

The fieldwork schedule is presented in Annex 1: Field work schedule. Two days were initially spent in Kediri to gain a broad perspective of production and marketing systems for shallot, chilli, and tomato. The team then spent one day in Nganjuk, East Java's main shallot production district; two days in Surabaya, a key wholesale and retail market centre; two days in Sampang; one day in Mataram, the main shallot consumption centre in NTB; half a day in West Lombok, a seed bulb production centre; three days in Bima; and half a

day in East Lombok, where a large inter-island shallot trader was interviewed. In late December and early January, one team member visited Indo-Food (the largest shallot processing enterprise in Indonesia) in Semarang, two enterprises in Brebes that are involved in the shallot export and import trade, and another in Cirebon.

Most of the team gathered again for five days in May 2013 to conduct some additional interviews in Surabaya and Sampang. They were accompanied by Stephen Harper, an Australian researcher and the Project Leader of ACIAR's 'Sustainable productivity improvements in allium and solanaceous vegetable crops in Indonesia and sub-tropical Australia' (HORT/2009/056). Although a second visit to Bima was not possible, the research team did conduct some follow-up, phone discussions with selected traders in that district. In June 2013, one of the team members interviewed the Director of a private shallot farm in Sumbawa Besar district in Denpasar. That same month, another team member interviewed a BTPT researcher in Malang.

In total, the research team facilitated 7 focus group discussions involving farmers and in some cases a few traders, carried out structured and semi-structured interviews with 21 producers, and conducted semi-structured discussions with six input suppliers, 36 shallot traders, staff of three modern retail chains, four traditional market retailers, managers of two processing enterprises, eight district and sub-district extension officers, and two researchers (see Table 1). Due to time constraints, some interviews were conducted over the phone. This included follow-up discussions with selected traders in Bima and Lombok and a short interview with one staff from East West Seed Indonesia (EWINDO). E-mail exchanges were the channel used for discussions with Rofik Basuki, a researcher at the Indonesia Vegetable Research Institute (IVEGRI) in Lembang, West Java, who also provided valuable comments to an initial draft version of this report.

Most key informants were very generous with their time. This allowed the research team to discuss at some length a wide range of issues. However, the team did face some challenges during the interviews with wholesalers and retailers in Surabaya, as they were busy dealing with clients. In many cases, only a short discussion was possible. This explains why so many traders were interviewed in Surabaya.

1.7 Report Structure

The report is structured in six different sections. Following this introduction, Section 2 describes the overall sub-sector context, including an assessment of its socio-economic importance, production and productivity trends, production systems, consumer preferences and demand trends, exports and imports, and price trends and seasonality. Sections 3 and 4 provide information and analysis on the shallot value chains in Sampang and in Bima, respectively. Special emphasis is given to spatial product flows; product, information, knowledge, and financial linkages; quality standards and management systems; key problems and constraints; and opportunities for pro-poor chain upgrading. Key study findings and some important research gaps are highlighted in Section 5. Section 6 lists the references used during the study.

Four annexes are presented after the main report sections. The fieldwork schedule is shown in Annex 1, the checklists used during the key informant discussions in Annex 2, the structured questionnaire used to collected farm gross margin data in Annex 3. Names and locations of all key informants interviewed have been submitted to ACIAR.

Table 1 Key informants interviewed

	Input suppliers	FGD	Prod.	Traders	Retail	Proc.	Research	Govt.	Total
West Java									
Cirebon				1					1
Lembang							1		1
Purwakarta	1								1
Central Java									
Semarang						1			1
Brebes				2					2
East Java									
Kediri				3					3
Nganjuk			3	3				2	8
Malang							1		1
Surabaya				11	7	1			19
Sampang	3	3	11	5				4	26
NTB									
Mataram				1					1
West Lombok		1							1
East Lombok				1					1
Bima, S. Besar	2	3	7	9				2	23
Total	6	7	21	36	7	2	2	8	89

2 The Shallot Sub-Sector in Indonesia

2.1 Socio-Economic Importance

In Indonesia, shallot ranks third amongst all vegetable crops in terms of cultivated area, after chilli and cabbage. Between 90,000 and 110,000 hectares are harvested every year. Given a shallot farming landscape dominated by farms under 0.5 hectares, where shallots are grown in the same farm once or twice throughout the year, and in a few cases over three consecutive seasosn, it is safe to assume that between 150,000 and 250,000 rural households in Indonesia earn an income from shallot farming. In addition, many men and women are hired to work on shallot farms and at different stages along the product chain: in crop assembly activities, loading and unloading operations, and storage, drying, trimming, sorting, grading, packing, cleaning and peeling of shallots.

Table 2 Shallot harvested area per province, 2009-11

	Average harvested area (ha)	Share of harvested area in Indonesia (%)
Central Java	39,842	38.9
East Java	24,602	24
NTB	11,084	10.8
West Java	11,005	10.7
South Sulawesi	3,481	3.4
North Sumatra	2,818	2.8
Other provinces	9,605	9.3
Indonesia	**102,437**	**100**

Source: Authors' calculations based on PUSDATIN data

The socio economic impacts from shallot cultivation and marketing are concentrated in a selected number of districts. Shallot farming is particularly significant in the lowlands of Java and Sumbawa (see Table 2). With more than 20,000 hectares allocated every year to the crop, Brebes stands out as the main shallot production and marketing centre in Indonesia. Tegal is another important shallot growing district in Central Java. Nganjuk and Probolinggo in East Java and Bima and Sumbawa Besar in NTB are other important shallot production districts. Cirebon in West Java occupies an important position in the shallot export and import trade, alongside Brebes.

Table 3 provides indicative estimates of the income impacts from shallot cultivation based on 2012 gross margin data collected from a small sample of 11 farms: two in Nganjuk, four in Sampang, four in Bima, and one in Sumbawa Besar. While the figures should not be interpreted as accurate estimates, they are presented to illustrate the significant contribution of shallot farming to rural household incomes.

Table 3 Estimated annual income impacts from shallot cultivation

	'000 IDR	US$*
Average net farm income per hectare	40,200	~ 4,150
Average wage income per hectare	14,100	~ 1,450
Total net farmer income (100,000 ha)	4,020,000,000	~ 415,000,000
Total wage income (100,000 ha)	1,410,000,000	~ 145,000,000
Total farm income (100,000 ha)	*5,430,000,000*	*~ 560,000,000*

** US$ 1 = IDR 9,600*

Source: Field data, December 2012

According to the data collected, one hectare under shallots generates, on average, US$ 5,600 as net farm and wage income. An extrapolation to the whole country provides an indicative farm income figure of about US$ 560 million. Around 75% of this income flows to shallot farm households, with the remainder representing wages paid to farm labour. These estimates exclude the incomes accruing to traders in production areas, the labour employed by these trading enterprises, and the incomes generated for all those employed in shallot trading and processing activities outside production areas. Further work would be required to collect the data necessary to estimate these income impacts.

In any given area, shallot farm income depends on the area allocated to the crop, the profitability of shallot farms, and the extent to which growers rely on hired labour. In Bima, a district with some 7,000 hectares under shallots, the total income generated by local shallot farms in 2012 is estimated at IDR 390 billion per annum, or about US$ 40 million (see Table 4). As highlighted during discussions with local key informants, shallots represent the single most important source of agricultural income in many villages. The significance of shallots is evident in local architecture, with residential houses typically having an area under the roof purposely built for storing shallot seed bulbs.

Table 4 Estimated annual income from shallot farming in Sampang and Bima

	Sampang	Bima
Shallot cultivated area (ha)	2,000-3,500	7,000
Average net farmer income per ha ('000 IDR)	32,000	43,000
Average wage income per ha ('000 IDR)	11,000	13,000
Total net farmer income (million IDR)	65,000 – 110,000	300,000
Total wage income (million IDR)	22,000 – 38,000	90,000
Total farm income (million IDR)	85,000 – 150,000	390,000

** US$ 1 = IDR 9,600*

Source: Field data, December 2012

This estimate does not include income from rented farms in Sumbawa Besar district. A large number of households in Bima also cultivate shallots in that district, where they can take advantage of the availability of fertile land. Most of the labour employed on

these farms comes from Bima. This district is known as the centre of shallot production in NTB, but over the past five or six years its leading position has been challenged by Sumbawa Besar. However, this development has not been properly accounted for in government statistics, perhaps because the crop is mainly grown by farmers coming from Bima and staying in the district for a period of six months.

In Sampang, shallot cultivation is largely confined to Sokobanah sub-district, which has a total cultivated area of 2,000 to 3,500 hectares, depending on the year. Sokobanah accounts for about 95% of the total shallot cultivated area in Sampang. It is the main cash crop in that sub-district, although cattle rank higher as a source of household income. Tobacco is another important cash crop in Sokobanah. The estimated net income accruing to shallot growers and farm workers in Sampang varies between IDR 85 billion (about US$ 9 million) and 150 million (about US% 16 million). This is considerably lower than the incomes generated in Bima because cultivated areas are much smaller and shallot farms less profitable (see Table 4). Shallot farms in Sampang also employ less labour per unit of land than those in Bima (see Table 5).

Table 5 Employment impacts of shallot cultivation

	Sampang East Java (N=3)	Bima NTB (N=3)	Sumbawa Besar NTB (N=1)	Nganjuk East Java (N=2)	Average (N=9)
Average employment (person-days/ha)	197	294	239	439	289
Wage farm labour / total farm labour (%)	74	84	100	100	89
Wage farm labour costs / total cultivation costs (%)	51	32	24	45	37
Female employment/ total employment (%)	58	42	26	25	38
Hired female workers/ total hired workers (%)	68	46	26	25	50

Source: Field data, December 2012

Shallots are a labour-intensive crop. In the farms surveyed[2], an average of 290 person-days per hectare was allocated to shallot production, although wide variations were recorded across districts: the two farms in Nganjuk, for example, employed much more labour than those in the other three districts (see Table 5). Hired labour represented nearly 90% of total on-farm employment and nearly 40% of total cultivation costs. Again, there were some variations across districts: wage costs accounted for a much higher proportion of total cultivation costs in Sampang and Bima than in Sumbawa Besar and Nganjuk. Many of the workers employed on shallot farms are from households with very limited or no land, i.e. marginal and landless farmers.

[2] *Only nine of the 11 farms surveyed were considered for estimation of employment and wage impacts. Two farms were excluded because the levels of employment reported were exceptionally high in one case (1,179 person days per ha) and exceptionally low in the other (51 person days per ha).*

In the farms surveyed, women accounted on average for nearly 40% of total farm employment and half of the labour hired (see Table 6). Women played a particularly significant role in the Sampang and Bima sample farms. Women are often involved in the planting, weeding, harvesting, and drying of shallots. Men are usually responsible for land preparation, spraying of the crop, and its sale. There are some variations in gender roles across production areas. For example, in Sape Sub-district of Bima, women do not play as strong a role in weeding and harvesting as in the other survey districts.

Table 6 Gender wage gap on shallot farms

	Sampang, East Java (N=4)	Bima, NTB (N=4)	Sumbawa, NTB (N=1)	Nganjuk, East Java (N=2)
Male daily wage rate (IDR)	60,000	50-80,000	50,000	50,000
Female daily wage rate (IDR)	50-54,000	35–60,000	40,000	40,000
Gender wage gap*	0.1 - 0.17	0.25-0.5	0.2	0.2

** Gender wage gap = (male daily wage - female daily wage) / male daily wage*

Source: Field data, December 2012

As for other crops in Indonesia, women consistently earn lower wages than men: in three of the four districts surveyed, women were paid 10 to 20% less than men, while in another the gender wage gap ranged from 25 to 50% (see Table 6). The wage gap was lowest in Sampang, a district where many adult males are away for work in Malaysia. High male migration rates also explain why Sampang had the highest female participation rates amongst all four districts surveyed.

2.2 Production

2.2.1 Production trends

Shallot production peaked in 2010 at nearly 1.05 million tonnes, after several years of continuous expansion (see Table 7). Between 2005 and 2010, the harvested area increased by nearly one-third, from 83,500 to 109,500 hectares, while average yields rose by 9%, from 8.8 to 9.6 tonnes per hectare. This trend came to a halt in 2011, when a significant reduction in harvested area led to a 15% decline in production. While production recovered in 2012, it was still 8% below the 2010 record harvest.

Table 7 Shallot harvested area, production and yield in Indonesia, 2005-11

	2005	2006	2007	2008	2009	2010	2011	2012	Change (%)	
									2005-10	2010-11
Harvested area (ha)	83,503	89,075	93,694	91,339	104,009	109,634	93,667	99,315	31.3	-14.6
Production (tonnes)	732,400	794,714	802,810	853,615	965,164	1,048,934	893,124	960,072	43.2	-14,9
Yield (tonnes/ha)	8.8	8.9	8.6	9.3	9.3	9.6	9.5	9.5	9.1	-1

Source: Center for Data and agricultural information system (Pusdatin), Secretariat General, Ministry of Agriculture, Republic of Indonesia, 2013

2.2.2 Productivity

In recent years, shallot farm yields have fluctuated around 9.5 tonnes per hectare (see Table 8). Central Java and West Java have the highest productivity. Average yields in NTB exceeded the national average in 2009 and 2010, but not in 2011. While East Java experienced the most significant increases in productivity, the average annual yield for the province between 2009 and 2011 was still 20% lower than the national average.

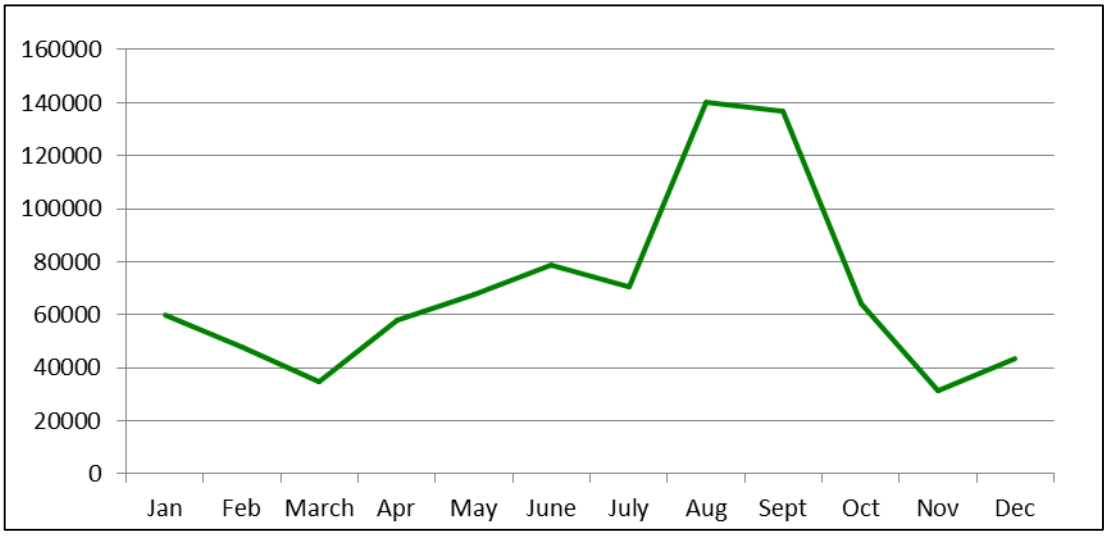
Table 8 Shallot yield in Indonesia, 2009-2011

	2009	2010	2011	Average 2009-11
Central Java	10.6	11.1	10.4	10.7
West Java	11.4	9.6	10.1	10.4
NTB	10.2	10.3	7.8	9.4
East Java	6.9	7.7	9.5	8
Indonesia	**9.3**	**9.6**	**9.5**	**9.5**

Source: Center of Data and agricultural information system (Pusdatin), Secretariat General, Ministry of Agriculture, Republic of Indonesia, 2013

2.2.3 Seasonality

Shallots are normally harvested 55 to 65 days after planting, depending on the variety and market conditions. While planting times vary somewhat, depending on location, in most areas the crop is mainly grown during the dry season, between April and October. More than 50% is harvested between June and September, with a clear peak in August and September (see Figure 1). Growing shallots during the rainy season is problematic because of slow plant growth and high incidence of pests and diseases, resulting in small bulbs at harvest time, low yields, and a high percentage of rots.



Source: Directorate for vegetable crops, in Basuki (2007)

Figure 1 Monthly production of shallots in Indonesia in 2004 (tonnes)

2.2.4 Varieties

Shallots are vegetatively propagated. Farmers grow seed bulbs during the off-season for own use, save some of the main harvest as planting material, and purchase seed bulbs from other farmers and traders. The Directorate General for Horticulture (DG-Hort) estimates that approximately 15% of the seed bulbs sold in Java are certified by the Technical Working Unit for Seed Inspection and Certification (BPSB), a provincial-level agency under Dinas Pertanian (R. Basuki, pers. comm.). Certified bulbs can be sourced from producers assisted by Dinas Pertanian and from BPTP. A blue label is issued for seed bulbs to be used in farmers' fields and a white label for seed bulbs for multiplication. BPSB is responsible for verifying that certified bulbs comply with government standards regarding purity and virus, fungal, and bacterial infections.

A large number of varieties are grown across Indonesia. These are chosen by farmers on the basis of local agro-climatic conditions, planting season, availability of planting material, and their own knowledge of the relative strengths and weaknesses of different cultivars. Yield, resistance to pests and diseases, tolerance to rain, number of days to harvest, bulb storability, and bulb marketability are critical varietal dimensions for farmers (Basuki, 2007).

There are considerable differences in varietal adoption across locations (see Table 9). This suggests that local agro-climatic conditions have a significant impact on varietal performance. Seed bulb distribution networks also seem to influence farmers' choice of varieties. In other words, while farmers tend to choose varieties that are well adapted to local soil, weather conditions and cultivation practices, and that have other desirable traits, they are often locked into particular cultivars that have been grown locally for some time or are brought into the area by local traders.

Bima Curut is the dominant variety in Brebes, both during the dry and the rainy season. This is also the main wet-season variety in Cirebon and the second most important dry-season variety in the district. Farmers in one village of Sampang have been growing it for the past five years. Bima Curut is appreciated for its short growing cycle (55-60 days), resistance to pests and diseases, tolerance to rain, red colour, and good eating quality. Bima Curut is not a registered variety.

Bauji, a variety from Nganjuk, is popular in that district during the rainy season. It is tolerant to *Fusarium*, produces a large number of medium-sized bulbs per cluster, and is harvested 60 to 65 days after planting (Putrasamedja and Suwandi, 1996; Genetic Resources Commission, 2010). An increasing number of farmers in Nganjuk are starting to adopt Manjung, a wet-season cultivar from Madura Island. Tolerance to rain, resistance to pests and diseases, and good storability are some of its strengths. Bauji has higher yield potential and produces redder bulbs than Manjung, but takes longer to grow and has a shorter storage life (Putrasamedja and Suwandi, 1996; Genetic Resources Commission, 2010).

Table 9 Main shallot varieties in key production districts

	Main varieties		Other varieties	
	Dry season	**Rainy season**	**Dry season**	**Rainy season**
Cirebon, West java	Ilokos, Bima Curut	Bima Curut	Timur, Timur Carwan, Tanduyung	Timur, Timur Carwan, Bima Carwan
Brebes, Central Java	Bima Curut	Bima Curut	Bima Brebes, Bima Juna, Kuning, Timur, Ilokos	Bima Brebes, Bima Juna, Bima Suyat, Kuning
Nganjuk, East Java	Thailand	Thailand, Bauji	Bauji, Philippine	Manjung
Probolinggo, East Java	Super-Philip	Biru Lancor	Biru Lancor	
Sampang, East Java	Manjung	Manjung, Bima Curut		
Bima, NTB	Super-Philip (Philippine)	Katamocha		
Sumbawa Besar, NTB	Super-Philip (Philippine)			

Source: R. Basuki, pers. comm.; Baswarsiati, pers. comm.; Genetic Resources Commission (2010); Harper et al, 2010

Super-Philip, a variety released in March 2000 by BTPT East Java, also known as Philippine shallot, is the main cultivar in Probolinggo, Bima, and Sumbawa Besar districts. It is harvested 60 to 65 days after planting and can yield 20 tonnes or more per hectare (Genetic Resources Commission, 2010). The variety produces relatively large, round, and bright red bulbs and fetches high prices in the market. However, it has low resistance to *Fusarium* and *Alternaria*, performing poorly under rainy conditions (Genetic Resources Commission, 2010). It also has poor storability. Certified seed bulbs are difficult to access and command a price premium of IDR 5,000-10,000 per kilogram.

Biru Lancor, a local variety from Probolinggo, is another important cultivar in that district. It is used by farmers during the rainy season and to a lesser extent in the dry season. The bright red-purple bulbs are harvested 55 to 65 days after planting, have a strong aroma, and are easy to peel (Putrasamedja and Suwandi, 1996; Genetic Resources Commission, 2010).

In some major shallot production areas farmers show a strong preference for imported varieties. Seed bulbs are brought in from Thailand and the Philippines every year, but farmers also use some of their own harvest as planting material. 'Thailand' shallot is the dominant cultivar in Nganjuk. Ilokos, a Philippine variety, is very popular in Cirebon and in Larangan sub-district of Brebes (R. Basuki, pers. comm.). Both varieties are very productive during the dry season, while also having relatively short growing cycles and quality traits that are much appreciated by consumers, including medium to large bulb size, round shape, and bright red colour. Thailand bulbs have a longer storage life than most other varieties, with farmers keeping seed bulbs for up to six months (R. Basuki, pers. comm.).

IVEGRI has recently developed Pikatan and Trisula, two short-duration varieties that can be harvested just 55 days after planting and have a potential yield of 23 tonnes per hectare under research station conditions (IAARD, undated). None of these varieties has been tested in farmers' fields (R. Basuki, pers. comm.). IVEGRI is also implementing true seed shallot adaptive trials in Solok and Bukittinggi, West Sumatera, and in Enrekang, South Sulawesi.

Recent research carried out under Hortin, a collaborative programme involving the University of Wageningen in the Netherlands and the Indonesian Vegetable Research Institute (IVEGRI), evaluated the performance of true seed shallot using a range of nursery and farm management options. The research focused on two varieties from EWINDO: Tuk Tuk, an open-pollinated variety, and Sanren, a hybrid. Both were imported from the Philippines, as East West is not yet producing them in Indonesia. Sanren came first in evaluations by researchers and farmers, outperforming Tuk Tuk in terms of planting density requirements, tolerance to rain, disease resistance, earliness, and yield (van den Brink and Basuki, 2010). It is therefore unfortunate that Sanren seed is not yet available for commercial distribution.

Sanren was also found to be superior to Tuk Tuk in terms of bulb storability and bulb quality (R. Basuki, pers. comm.). Sanren bulbs are more aligned with the preferences of Indonesian consumers, both in terms of shape (oval, with splits) and size (2.5-3.5 centimetre diameter). Tuk Tuk bulbs are larger (3.5-4.5 centimetres), have no splits, and are shaped more like an onion.

The research conducted as part of the Hortin programme confirmed that true seed shallot has several potential advantages over propagated seed bulbs. Planting material costs are often lower, although this will depend on seed market conditions, i.e. the price of conventional seed bulbs in the market. Reduced transmission of viruses and other seed-borne diseases is another advantage, and a particularly important one in areas where there is high incidence of *Fusarium*, as true seed shallot interrupts the persistent virus infections that build up in vegetatively propagated material. Finally, during the dry season, true seed shallot has the potential to double current farm yields, although it should be noted that it takes much longer for the crop to mature.

Despite these advantages, adoption rates remain extremely low (Harper et al, 2010; R. Basuki, pers. comm.). Given that true seed shallot has been around for some time and that a company such as East West has a clear interest in capitalising on previous investments in the technology, one must question why it has not been taken up by farmers. Clearly, there are significant barriers to adoption.

Farmers can transplant true seed shallot after this has been grown in a nursery for 40 to 45 days. The crop will then be harvested 75 to 85 days after transplanting, depending on the variety (R. Basuki, pers. comm.). This option has not attracted the interest of farmers due to the investment, technical complexities, and risks associated with nursery operations; poor knowledge of transplanting techniques; and long growing cycles that conflict with existing crop rotations. Another problem is that excessively large single bulbs will be produced under such system. These are not appreciated by consumers. The involvement of commercial nurseries specialising in the production of seedlings and provision of technical advisory services to adopting farmers would reduce some of the barriers to adoption, but no such nurseries have yet been established.

Another option is for nursery farms to grow mini-bulbs (G0) for 80 to 90 days and have these multiplied over a period of 70 to 90 days. The harvest (G1) can then be sold for consumption or planted again and harvested 70 to 90 days later (G2). While G1 will need to be stored for a period of two to three months before propagation, this appears to be an unnecessary step if the tops are cut and the bulbs dipped in water (Frans Serhalawan, pers. comm.). Clusters of smaller bulbs that are more aligned with current market preferences can be produced under this model. Its success will depend largely on the existence of specialised and competent nursery and multiplication farms managing the critical and more challenging initial stages in the process, i.e. the production of mini-bulbs and G1 shallot. Very significant yield gains will have to be achieved under this system if farmers are to shift from conventionally propagated shallots to longer duration true seed shallots.

Some concerns have also been raised about the marketability of Tuk Tuk (Harper et al, 2010). These concerns are based on the fact that its bulbs are much larger than what the market is used to. Farmers in Brebes claimed that Tuk Tuk is sold for a 20% discount (Harper et al, 2010). One exporter in Cirebon who collaborated in the past with EWINDO for the sale of true seed shallot from contract growers confirmed that consumers in Indonesia are unfamiliar with the Tuk Tuk variety. He claimed that there is a small market for this variety in Singapore and Malaysia. The exporter in question stopped marketing Tuk Tuk, allegedly because the farmers he was buying from no longer grow the variety. However, according to F. Serhalawan (pers. comm.) from

Pertani Horticultura Sumbawa (CV PHS), the quality of true seed shallot is not necessarily lower than that of conventional shallots. He reported no difficulties in marketing Maserati, a variety imported from the Netherlands that is grown on his farm in Sumbawa Besar. Bulb size can be managed during the multiplication process through choice of planting densities and the size of bulbs used as planting material.

2.2.5 Cultivation practices

In Indonesia, shallots are normally grown during the dry season. In key production districts, such as Brebes, farmers may produce up to three consecutive shallot crops on the same farm. This system results in a high incidence of seed-borne virus diseases, particularly *Fusarium sp*, leading to crop losses across cultivation cycles (Harper et al, 2010). Shallots are often grown as a mono-crop, but in some areas, such as Brebes and Cirebon, inter-cropping is also common (Harper et al, 2010).

Farmers typically plant between 0.8 and 1.2 tonnes of seed bulbs per hectare. It is currently unclear what developmental stage of shallot growth is most responsive to treatments that stimulate (or suppress) the production of offset growing points. Smaller bulb size is considered to produce a higher number of offset bulbs. However, farmers often prefer using medium to large bulbs as planting material, reporting that these provide a faster and more vigorous start to the new crop and result in higher yields. The cost of planting material can range from 8-10% (small cloves) to 20% (large bulbs) of the value of the crop produced.

Soil preparation commences with the establishment of raised beds alternating with 50 to 80cm deep furrows. Cattle are traditionally used during the land preparation stage, although in many areas Dinas Pertanian is distributing tractors to farmer groups in order to reduce land preparation costs. This is the case in some of the areas visited in Sampang and Nganjuk. Rows are typically placed across the bed so that weed control and irrigation can be easily managed from the furrows. Rows are placed 15 to 20cm apart, and bulbs are set at approximately 15cm intervals. Wider spacing results in increased production of offsets, and consequently may be adopted by farmers targeting the production of seed bulbs.

Some farmers add organic matter to the soil at the time of planting by applying cow manure. Macro fertilisers are widely used. Side-dressings are applied at about 20 days and again at 40 to 50 days after setting the shallot bulbs. In some farms up to three or four side-dressings are applied within one season. These practices are not informed by a clear understanding of the effect of nitrogen levels on bulb size, offset production, storage quality, and other crop traits. Very low nitrogen use efficiency rates of 12% have been reported (Harper et al, 2010). Many growers also apply foliar spray applications of minor- and micro-nutrient solutions, such as “Green Tonic”, “Gandosil”, and “Microsil”. Farmers have no access to soil analysis services, applying fertilisers on the basis of local experience and norms.

Pests and diseases pose significant risks to farmers. *Fusarium sp.* and *Alternaria porri* (purple blotch) are the main shallot diseases; *Spodoptera exigua* and *Liriomyza* (leaf miner) are the major pests (Harper et al, 2010). Spraying of fungicides and insecticides constitutes the primary control strategy. Excessive and inappropriate use of chemicals is widespread. Research in Brebes and Cirebon districts to assess control practices for

Spodotera exigua caterpillar on shallots has shown that farmers have limited knowledge regarding selection of effective insecticides, regularly spraying their crops at concentrations 150 to 200% higher than the recommended rates, at intervals of just one or two days (Basuki, 2011). The research also found that *Spodotera exigua* was resistant to many of the chemicals used and that the mixing of antagonistic insecticides within the same application was common practice. Harper et al (2010) also identified overuse and poor application of chemicals as a major problem, with farmers in districts such as Brebes and Nganjuk often spraying their shallot crop at intervals of just two or three days and applying cocktails of up to six pesticides and two fungicides. Farmers use no protective clothing and masks, risking exposure to the chemicals. Intensive chemical use was also reported during interviews with key informants in Bima. In Sampang farmers apply pesticides only three to five times during the season, but inappropriate use of chemicals is still an issue of concern. For example, many shallot growers use Furadan, a systemic insecticide placed in the sowing furrow at the time of planting. While Furadan provides effective control of soil-borne insect pests and results in better stand establishment and improved crop vigour, its use in food crops has been banned in the US, Canada, and Europe. Other insecticides, such as Dyfonate, are being used in violation of label guidelines.

2.3 Demand

Deep-fried shallots are a key condiment in the Indonesian cuisine. Pickled shallots are also added to many traditional dishes. Indonesian consumers generally prefer bulbs that are not too small, as these are easier to peel and slice. Varieties with a strong, pungent taste are particularly appreciated. As mentioned, consumers also have a preference for bright red shallots with a round shape.

According to 2010 national household consumption and expenditure survey data, presented in Marks (2012), Indonesian households spend, on average, IDR 8,445 per month on shallot. This is equivalent to 0.7% of their average expenditure, much more than for any other single vegetable, with the exception of chili. Interestingly, while rural households generally spend less than urban households on vegetables, as expected given the income divide between rural and urban areas, they do spend more on shallots. This suggests that, in Indonesia, the income-elasticity of demand for shallots is low or even negative. In economic terms, shallots may well be an inferior good. At best, increases in per capita income result in modest growth in consumer demand. In such a context, an expansion of the domestic market will have to come from population growth, a decline in the real price of shallots, or both.

If an increase in household income cannot drive growth in domestic demand, any significant expansion in production will result in stagnant or declining prices for farmers, especially in a context where the price elasticity of demand is low. Price inelasticity reflects the importance of shallots as a food ingredient, the lack of close substitutes, and its low share of household expenditure.

These demand patterns have important implications in terms of development priorities in the shallot sub-sector. Firstly, exports and a reduction in marketing costs should be a major focus of public interventions, as they would counter-balance any negative impacts of rising domestic production on farm-gate prices. Secondly, in a scenario of

stagnant or declining prices, a reduction in average cultivation costs is critical for maintaining or improving farm profitability, and should therefore be prioritised.

2.4 International Trade

2.4.1 Exports

Indonesia has a small export trade in shallots (see Table 10). Between 2008 and 2012, the country exported on average 11,000 tonnes per annum. Exports were fairly stable throughout this period, with the exception of 2010, when Indonesia exported just 3,200 tonnes. Exports peaked in 2011 at 13,800 tonnes, but that year they still represented just 1.5% of national production. Exports remain too small to have any significant impact on domestic market conditions and farm-gate prices.

Table 10 Exports of shallots in Indonesia, 2007-2011

	2008	2009	2010	2011	2012	Average 2008-12
Exports (tonnes)	12,314	12,759	3,234	13,792	12,647	10,949
Production (tonnes)	853,615	965,164	1,048,934	893,124	960,072	944,182
Exp./Prod. (%)	1.4	1.3	0.3	1.5	1.3	1.2

Source: Center for Data and agricultural information system (Pusdatin), Secretariat General, Ministry of Agriculture, Republic of Indonesia, 2013 and authors' calculations

Shallots are mainly exported in September and October (Marks, 2012). In certain years, some export consignments may also be shipped in August and November. The timing of exports is linked to domestic supply and external demand factors. Shallots for export are generally procured during and soon after the peak harvesting season, when farm-gate prices are lowest and bulb quality highest. The export season also coincides with periods of low production in key export markets.

Thailand and Vietnam are the two main destination markets, followed by Malaysia and Singapore. Trade statistics also show some exports to Taiwan and the Philippines (Dewayanti et al, 2010). Shallots are sent to Thailand and Vietnam in September and the first week of October, just before the main harvesting season in those two countries.[3] The export trade to Malaysia and Singapore continues until late October and may even extend into November.

According to the exporters interviewed, Thailand and Vietnam are the largest and fastest growing markets, whereas Malaysia and Singapore have the strictest quality requirements, particularly with regards to bulb size. Super-Philip and Ilokos are the two preferred varieties in Malaysia and Singapore. Some key informants mentioned that Vietnamese importers have a preference for Manjung, the main variety in Sampang.

Probolinggo is the main supplier of shallots for export. The traders interviewed consistently named this district as the source of best-quality shallots in Indonesia.

[3] *The other main harvesting season in Thailand and Vietnam falls in March and April.*

Within NTB, exporters source shallots mainly from Sumbawa Besar, a district with very suitable agro-climatic conditions and where farmers also grow the Super-Philip variety. Bima supplies negligible quantities for the export trade.

2.4.2 Imports

Indonesia imports significant quantities of shallots. During the past five years, imports averaged 110,000 tonnes per annum, although there were significant inter-annual fluctuations (see Table 11). Imports contracted significantly in 2009 and more than doubled in 2011, a very poor production year in Indonesia, reaching a record high of 160,000 tonnes. That year, shallot imports exceeded US$ 75 million, ranking seventh in value amongst all horticultural imports, after cloves, garlic, apples, oranges, grapes, lychees, and pears (Kurnia, 2012). While most imported bulbs are consumed as food, some are used as planting material.

Table 11 Imports of shallots in Indonesia, 2007-2011

	2008	2009	2010	2011	2012	Average 2007-11
Imports (tonnes)	128,015	67,330	73,270	160,270	119,505	109,678
Prod + Imp. – Exp.	969,316	1,019,735	1,118,970	1,039,602	1,066,930	1,042,911
I / (P + I – E) (%)	13.2	6.6	6.5	15.4	11.2	10.6

Source: Center forData and agricultural information system (Pusdatin), Secretariat General, Ministry of Agriculture, Republic of Indonesia, 2013 and authors' calculations

Clearly, imported shallots are an important component of domestic supply (see Table 11). Between 2008 and 2012, they accounted for 7 to 15% of domestic production plus net exports.[4] The contribution of imports is particularly significant during the first five or six months of the year, a period when Indonesia does not produce enough shallots to meet its domestic consumption needs (see Table 12). In late May 2013, during a visit to Surabaya, the study team could confirm that imported shallots accounted for the bulk of supplies in wholesale markets.

Imports of seed bulbs follow a different seasonal pattern than bulbs for consumption. According to official data, seed bulbs are normally imported into Indonesia during the April to August months, peaking between May and July (Marks, 2012). This data is not entirely consistent with the information provided by importers in Brebes and Cirebon, who mentioned April to June as the peak import months.

[4] *Production plus net export is an approximate measure of domestic supply. Initial and final stocks, post-harvest losses, and the quantity diverted to seed would have to be accounted for in order to estimate actual supply. About 10 percent of the harvest is used as planting material.*

Table 12 Monthly imports of shallots in Indonesia, 2007-2011

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2007	7,323	10,332	21,474	18,835	25,771	8,981	2,814	1,303	1,861	428	2,390	6,137	107,649
2008	11,798	24,176	47,351	25,025	4,175	5,300	4,507	549	3,070	649	322	909	128,015
2009	1,959	9,174	26,597	9,024	3,947	1,674	1,819	2,945	1,636	3,171	288	1,519	67,330
2010	2,747	9,081	19,212	11,219	5,899	2,877	3,187	2,266	1,536	4,167	3,500	4,883	73,270
2011	17,055	25,130	42,155	20,241	17,864	15,848	7,400	2,152	1,926	2,322	2,057	2,231	160,270
2012	5,477	28,288	25,198	37,643	12,506	5,521	2,372	622	1,878	1,175	385	1,124	122,191
Average	8,176	15,579	31,358	16,869	11,351	6,936	3,945	1,843	2,006	2,147	1,711	2,832	107,307

Source: Marks (2012) and Center for Data and agricultural information system (Pusdatin), Secretariat General, Ministry of Agriculture, Republic of Indonesia, 2013

Thailand, the Philippines, and Vietnam are the main sources of imported shallots, followed by India and Myanmar. The Philippines and Thailand supply better-quality shallots than Vietnam or India. High moisture still appears to be a general problem with imported bulbs, as observed during the May 2013 visits to Pabean and Keputran wholesale markets in Surabaya, and one that is likely to be a function of storage at cold temperature and high humidity during transportation in reefer containers. Condensation from high humidity causes skin sloughing/loss, exposing the underlying pink/white bulb tissue.

Data presented in Marks (2012) shows that Indonesian shallots are generally sold for a higher price than imported bulbs. During the interviews with wholesale traders in Surabaya, the research team heard conflicting views about the relative price of local and imported shallots. Some indicated that Indonesian shallots are more expensive because consumers prefer their stronger aroma and pungency, as well as longer shelf-life. A few traders claimed that imported shallots fetch higher prices. Variety and grade may explain these divergent views: traders may have been thinking of different origins, varieties, and grades when asked to compare the price of locally produced and imported bulbs.

Price data collected in May 2013 from wholesalers in Surabaya shows that shallots from Probolinggo fetch higher prices than imported bulbs (see Table 13). Supplies from Probolinggo were part of a first, very early harvest from that district. Judging by their small size, it is likely that they were harvested prematurely in response to high prices at the time. Still, the bulbs had a good colour and were free of diseases and skin blemishes. One kilogram was being wholesaled for IDR 23,000-27,000, compared to IDR 18,000-23,000 for competing imports. It should be noted that Probolinggo is regarded as the supplier of the best-quality shallots in Indonesia, receiving higher prices than competing bulbs from other areas (see Table 14).

Table 13 Wholesale selling price of shallots, Pabean market, Surabaya, 21 May 2013

Origin	Price IDR/kg	Observations
Probolinggo	23,000 – 27,000	small, bright red, dry
Philippines	23,000	large, bright red, wet
Thailand	20,000 – 23,000	large, bright red, wet
Vietnam	18,000 – 20,000	large, light red, wet
India	18,000	very large, light red, some rots

Source: Trader interviews, May 2013

Table 14 Wholesale selling prices, Pabean market, Surabaya, early December 2012

	Price (IDR/kg)		
	Grade A	**Grade B**	**Grade C**
Trader 1			
Super-Philip, Probolinggo	17,000	16,000	13,000
Bauji, Brebes	11,000	10,000	8,000
Trader 2, variety unknown, unclean, Brebes	9,500	8,000	7,500

Source: Trader interviews, December 2012

2.4.3 Import regulations

Most imported shallots are exempt from import taxes. Shallot imports from Thailand, the Philippines, Vietnam and Myanmar are subject to a zero-percent tariff, as these countries form part of the ASEAN Free Trade Area (Marks, 2012). A 20% tariff applies to shallots for consumption from India. Shallots for propagation, which are imported in bundles, with their top stem and roots on, are subject to a zero-percent tariff, irrespective of the country of origin.

The differential treatment for seed bulbs appears to reflect a deliberate intention on the part of policy-makers to keep the cost of planting material purchased by farmers low. In practice, however, the government has been imposing quotas on the importation of untrimmed shallots, with inputs from the National Shallot Association, based in Cirebon. This seems to contradict the initial intentions of lawmakers. The fact that import quotas have been allocated in an un-transparent way is another issue of concern. One key informant expressed some frustration that, in 2012, no company in Central Java had been allocated some of the import quota for untrimmed shallot. Marks (2012) mentions that all planting material imports must go through companies based in Cirebon, West Java.

Government concerns over increasing horticultural imports have recently led to the introduction of protectionist measures (Marks, 2012). Legislation imposing stricter licensing rules and limiting the number of authorised ports of entry for horticultural imports (Law 13) were promulgated in 2010 and came into effect in September 2012.

According to Regulation 60/12 of the Ministry of Agriculture, issued on 24 September 2012, importers of fresh and processed horticultural products are required to obtain a recommendation for importation from the ministry before applying for an import permit letter from the Ministry of Trade (Ministry of Agriculture, 2012). The letter of recommendation states the volume the importer is authorised to bring into the country; is issued for one single horticultural item; is valid for one country of origin, one supplier in that country, and one port of entry in Indonesia; and specifies the destination markets within the country. Letters of recommendation are issued on the basis of a number of criteria, including the level of competition between imports and local production. Only importers registered with the Ministry of Trade can apply for a letter of recommendation from the Ministry of Agriculture. The Ministry of Trade will in principle follow the recommendation from the Ministry of Agriculture and issue an import permit. This permit will be valid for a period of four months.

Stricter criteria for becoming a registered importer of horticultural products were introduced on 21 September 2012 (Regulation 60/12, Ministry of Trade, 2012). Enterprises must have had sales contracts with three or more distribution firms for a period of at least one year in order to qualify. The new legislation initially required importers to own cold storage facilities and cold storage trucks, but this requirement was subsequently relaxed to ownership of appropriate storage facilities and appropriate means of transportation. Retailers are banned from importing fresh or processed horticultural products directly. Importers, in turn, cannot sell to retailers or consumers. As a consequence, modern retail chains will now have to procure imported fruits and vegetables from a distribution company.

Since September 2012, imported horticultural products, both fresh and processed, can only come into Indonesia through Belawan seaport, outside Medan, Tanjung Perak seaport in Surabaya, Makassar sea port, and Sorkarno-Hatta airport in Jakarta. Both

Denpasar Airport in Bali and Batam seaport were closed for imports. Tanjung Priok seaport in Jakarta was also closed for all horticultural imports, although the government subsequently opened an exception for produce from the United States, Canada, Australia, and New Zealand. The closure of Tanjung Priok has the most significant impact, as this was the main entry point for fruits and vegetables destined to greater Jakarta, Bandung, western and central Java, and southern Sumatra. It is estimated that some 5,000 containers with imported horticultural products were coming through Jakarta before the new legislation came into effect. About 1,000 were from countries that can send produce through this port (Marks, 2012). The rest will now have to be diverted to Surabaya.

East Java has also introduced its own import legislation (Marks, 2012). In early 2012, the Governor of the province issued a regulation limiting the periods during which horticultural products may be imported into the province to one month before and two months after the main harvest. Moreover, any horticultural import shipments to be unloaded in East Java need permission from the governor, to be granted on the basis of recommendations from the local offices of the Ministry of Agriculture, the Ministry of Trade, and the Ministry of Industry. The new regulation further stipulates that imported horticultural products circulating in fruit stores, malls, or modern markets within the province cannot exceed that of domestically produced horticultural products.

Legislation specifically aimed at controlling imports of shallots was introduced in Brebes district in March 2012 (Marks 2012). Traders now need permission from the district government before bringing in any imported shallots for consumption or propagation. Such permission is to be granted on the basis of recommendations from the local offices of the Ministry of Agriculture, the Ministry of Trade, and the Ministry of Industry. The impact of this new legislation extends well beyond Brebes because of its strategic position as a production and distribution centre. Brebes has the largest shallot area in Java, is an important supplier of planting material to other areas, and has a large concentration of traders who procure shallots from different parts of the country and supply markets across Java, Sumatra, Sulawesi, Kalimantan, and other islands.

Government intervention in shallot markets is reflected in the activity of the National Shallot Association and its provincial branches, which were formed to represent growers and traders. As highlighted by the Vice-Chairman of the East Java Shallot Association, the current primary role of the national association and its provincial branches is to provide production forecast information and assessments shallot supplies for propagation to the Ministry of Agriculture. This information is then used to inform government decisions about import quotas.

The Government of Indonesia has already started using the powers enshrined in the new import regulations. For the first six months of 2013, the Ministry of Agriculture issued no recommendation for the importation of 15 fruit and vegetable products, a decision that amounts to a temporary import ban (Australian Department of Agriculture, Fisheries and Forestry, 2013). In addition, an import quota has been imposed for 11 horticultural products, including shallots and onions. For shallots, the import quota for January to June was set at 60,000 tonnes, much lower than the quantity imported during the same period in 2007, 2008, and 2011 (see Table 12).

It is unclear whether Indonesia will be able to maintain its new import regulations. In January 2013, the United States filed a complaint with the World Trade Organisation (WTO), claiming that the new regulations violate commitments under WTO rules (USTR, 2013). Other countries may also file similar complaints or raise their concerns in bilateral

discussions with the Indonesian government. The new regulations are likely to face internal opposition as well. According to reports from the local media, the price of fruits and vegetables soared in the first months of 2013 as a result of the import ban and quotas (the Christian Science Monitor, 2013; Food Mate, 2013; Investvine, 2013).

Many of the problems and costs associated with the new protectionist measures are discussed in Marks (2012). In the specific case of shallots, the most obvious impact will be an increase in consumer prices due to higher barriers to entry into the shallot import trade, controls on the quantity of shallot entering the country, an increase in distribution costs, and regulations that limit the ability of importers to perform short-term spatial arbitrage and market stabilisation functions. During the first three months of 2013, the price of shallots in Surabaya was five to seven times higher than during the same period of 2012. Indra Mukti Segara, a fried shallot processing company in East Java, had to temporarily stop production in February and March as a result.

The benefits to shallot farm households, on the other hand, may not be that significant. Most shallot imports occur during the first five or six months of the year. Most Indonesian farmers are unaffected by these imports as they do not grow shallots during the rainy season. While imports during the second half of the year compete with local production, the volumes are too small to have any visible impacts on farm-gate prices. The new policies may encourage significant import substitution, but only if managed to ensure exceptionally high market prices that can compensate growers for higher off-season production costs. This may be politically unfeasible due to the punitive impacts on consumers, including the rural and urban poor.

It should be noted, moreover, that any benefits accruing to off-season producers will have to be weighed against the costs imposed on large numbers of shallot growers through higher planting material costs. These will rise due to an increase in the price of imported and locally produced seed bulbs. The two are substitutes: rising prices for imported material will lead to an increase in the price of local seed bulbs as well.

2.5 Prices

2.5.1 Price trends and volatility

Between 2008 and 2012, the real domestic price of shallots[5] followed no clear trend (see Figure 2).[6] Significant increases in domestic production, in a context where consumer demand is not very responsive to increases in household income, have kept prices low, especially during the peak harvesting months.

[5] *The monthly Consumer Price Index for Indonesia was used to convert market prices into real prices.*

[6] *Wholesale selling prices in Pare market, Kediri district, are used in this report. Pare is an important assembly and wholesaling centre.*

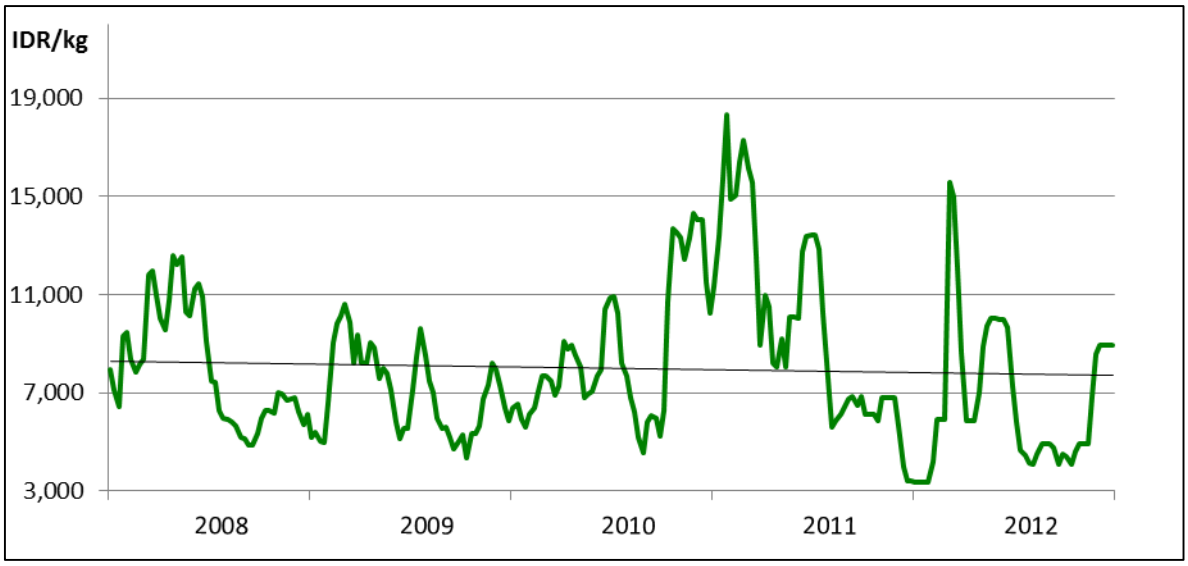


Figure 2 Average real wholesale selling price of shallot, Pare market, Kediri, 2008-12

Shallot prices have become much more volatile since late 2010. The factors fuelling this sudden change in price patterns are unclear. Prices soared in the first three months of 2011, despite very high levels of imports (see Table 12). Later that year and in early 2012, a period of exceptionally low prices was followed by a short-lived price hike. Short-term volatility in market supplies due to erratic weather patterns and unstable import flows are possible explanations.

2.5.2 Price seasonality

The price of shallots normally reaches its lowest levels during the peak harvesting months, i.e. between mid-July and September. Prices will then start rising, peaking sometime in the first or second quarter of the next calendar year. Storage by farmers and traders is the main market stabilisation factor during the October-December period. During the first six months of the year, market prices will be heavily influenced by the level and price of imports. Traders rarely store shallots for more than two or three months to avoid significant physical and quality losses.

Figure 3 presents weekly wholesale selling prices in Surabaya in 2011 and 2012. Prices varied between IDR 7,500 and IDR 22,000 per kilogram in 2011 and between IDR 5,000 and IDR 14,000 in 2012. In 2011, prices were highest during January, February, March and June, and lowest between late-July and mid-October. Interestingly, prices increased only slightly from late October to late December and remained fairly stable until the end of February 2012. They dropped significantly in March but recovered during the next two months, peaking at IDR 14,000 in late June, just before the main harvest. As expected, the 2012 harvesting season was characterised by low prices. During the last two months of the year, as the supply of shallots contracted, prices increased: from IDR 6,500 in late October to IDR 10,000-11,000 in late December. They then overshot during the first three months of 2013 as a result of the new import quota and government delays in issuing import licenses.

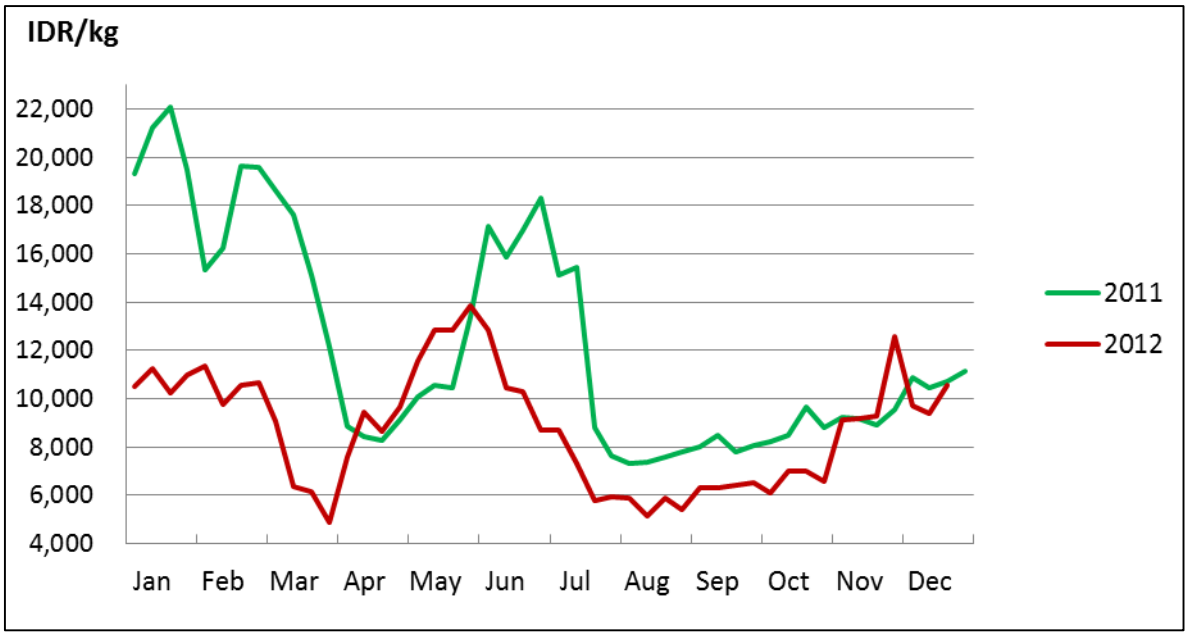


Figure 3 Price seasonality in Pabean wholesale market, Surabaya, 2011 and 2012

3 The Shallot Value Chain in Sampang, East Java

3.1 Production Context

In Sampang, shallot cultivation is concentrated in Sokobanah, a relatively remote sub-district that accounts for virtually all the planted area in the district. Shallots are a major crop in four villages of Sokobanah: Tamberu Laok, Tamberu Selatan, Sokobanah Tengah, and Sokobanah Laok. In the other eight villages of Sokobanah, shallots are a secondary crop. In Sokobanah Tengah, shallot farms range from 0.2 to 2 hectares, with an average farm size of about 1 hectare. In Tamberu Laok, shallot farms typically vary between 0.3 and 1 hectare, averaging about 0.5 hectares.

According to district-level data, the shallot production area in Sokobanah contracted from 3,500 hectares in 2010 to 2,600 hectares in 2011 and 1,300 hectares in 2012. However, the farmers and traders interviewed made no mention of such a decline in cultivated areas. On the contrary, some claimed that shallots are becoming a more important crop. It is expected that planted areas will expand considerably in 2014, especially if the import regulations introduced in late 2012 remain in place. In 2013, shallot growers in Sokobanah enjoyed exceptionally high prices as a result of an import quota and acute inefficiencies in the allocation of import permits. Most of the shallot crop was harvested in late March, five to 10 days earlier than usual, as farmers sought to take advantage of unusually high prices. One kilogram of shallots were sold at the farm gate for IDR 30,000-35,000, compared to IDR 7,000-8,000 the previous year.

The majority of shallot farmers in Sokobanah only grow the crop during the rainy season. Seed bulbs are propagated in February, after a maize or soybean crop, and harvested in late March and early April, much earlier than in production areas outside Madura. After shallots, many farmers plant tobacco. Shallots are mainly cultivated in areas without irrigation and where most shallow wells run dry as the dry season progresses. Despite some recent innovations in the production sphere, particularly the use of tractors provided by Dinas Pertanian for land preparation and the adoption of new pesticides and fertilisers, Sokobanah growers use relatively few external inputs.

The research team would need to spend more time in Sokobanah in order to estimate the number of shallot farm households in the sub-district. It is safe to assume, however, that at least 2,500 households grow shallots as their main crop during the February-April months. Many other local households grow in smaller areas or in some years, depending on expectations about prices and access to planting material.

In Tamberu Laok village, farmers have been growing the local Manjung variety for many years. Last year some tried a variety from Brebes, but prefer Manjung due to its greater resistance to pests and diseases. Manjung is browner, thicker skinned, more oval, and has a more pungent taste than the Brebes variety. The farmers interviewed did not know the name of this variety, referring to it as Java shallot. In Sokobanah Laok, where the commercial development of shallots is a much more recent phenomenon, Manjung was adopted for the first time in 2011, when some farmers propagated seed bulbs brought from neighbouring Pamekasan district. In just two years Manjung became the dominant variety in the village, out-performing the variety previously planted, which they referred to as the ‘local’ shallot and which had probably degenerated over the years. Manjung was

quickly adopted because of its superior yield performance, lower fertiliser, pesticide and labour requirements, and good storability. In Sokobanah Tengah, farmers shifted from Bauji to Bima Curut five years ago, when traders in Brebes started supplying the variety. The farmers interviewed claimed that Bima Curut has a higher yield than Bauji, is more resistant to pests and diseases, and is easier to sell on account of its brighter red colour, larger bulb size, rounder shape, and superior eating quality.

While farmers claim that their current varieties are well suited to the local environment, the fact is that they have had limited exposure to other cultivars. The research team was surprised to find that farmers in Sokobanah Laok had never heard of Bima Curut, the main variety grown in neighbouring Sokobanah Tengah village, just five kilometres down the road. The farmers interviewed in Tamberu Laok were equally unaware that Bima Curut is widely grown in Sokobanah Tengah.

The productivity of shallot farms in Sokobanah is low in comparison to other parts of Java and NTB. Yields typically range from 4 to 8 tonnes per hectare, compared to a national average of 9.5 tonnes. In Sokobanah Tengah, key informants reported yields of 6 to 7 tonnes per hectare. In Tamberu Laok and Sokobanah Laok, farmers cited an average yield of about 7 tonnes and 5 tonnes per hectare, respectively.

Low yields reflect the fact that shallots are grown during the rainy season, under a low-input, rain-fed production system. Wet conditions inhibit the development of the shallot crop and create an environment that is conducive to the emergence of pests and diseases. Farmers typically spray their shallot crop three to five times during the season, whereas in Brebes, Nganjuk and Bima chemicals may be applied 20 times or more during one season. The harvesting of immature bulbs is another contributing factor.

Interestingly, farm labour in Sokobanah is more expensive than in many other, more developed parts of Java. One male farm worker in Sokobanah typically earns IDR 60,000 per day plus food. The gender division of labour is less clearly defined than in other areas. It appears that large-scale out-migration, particularly to Malaysia, has had a major impact in the structure and functioning of the local labour market in Sokobanah.

3.2 Product Flows

Most of the shallot harvest in Sokobanah is channelled to a few selected markets in eastern and central Java. Surabaya, Indonesia's second largest city, just two or three hours away by road, stands out as the main destination market. Other destinations include major distribution centres, such as Probolinggo in East Java and Brebes in Central Java, and relatively large consumption markets, such as Semarang and Solo in Central Java. One of the traders interviewed in Sokobanah Laok village sells to five wholesalers in Cibitung market, near Jakarta. The fact that all his buyers in Cibitung were born and raised in Sokobanah Laok was the reason why this trader was able to develop linkages to the greater Jakarta market. It takes 24 hours for a shallot consignment from Sampang to arrive in Cibitung, compared to just two or three hours in the case of Surabaya. The trader in question will supply Cibitung if the price per kilogram in that location is at least IDR 2,000 higher than in Surabaya.

Despite being linked to important inter-island distribution centres, such as Surabaya, Probolinggo, and Brebes, and having an advantageous position as an early supplier, shallots from Sokobanah are rarely marketed outside Java. During the fieldwork, it was mentioned that a few traders in Sokobanah Tengah may occasionally send small

consignments to Bali or to relatives in Papua, but inter-island flows from Sampang are marginal. This trade is constrained by poor knowledge of markets outside Java, a lack of business linkages with wholesale buyers in those markets, and higher marketing costs.

3.3 Chain Actors and Linkages

3.3.1 Input distribution

Farmers with good access to water from wells produce seed bulbs late in the year for use on their own farm and for sale to other growers in the area. The bulbs are left hanging in bundles at home or on verandas for at least eight weeks before planting.

Traders and farmers bringing in seed bulbs from Pamekasan and Brebes around December or January are an even more important source of planting material. Traders will often supply farmers who will in turn sell them the crop at harvest time. This relationship may break down in the event of poor seed bulb performance that is unrelated to unusually adverse weather conditions. The seed bulbs are sold soon after arrival from Pamekasan or Brebes, with farmers keeping them for six to eight weeks before propagation in the field. One local trader claimed that farmers use inappropriate methods for storing the seed bulbs. These include storage in the open, under high-humidity conditions, which is conducive to sprouting and a consequent loss of vigour. In contrast, traders tend to keep the seed bulbs on bamboo beds inside their house or storage facilities. When asked why traders do not keep the seed bulbs until planting, the key informant replied that such a strategy is not in his interest because he would have to charge farmers much higher prices to account for weight losses of about 25% and the opportunity cost of funds used to purchase the planting material. According to the trader, this would deter many farmers from buying seed bulbs from him.

The sale of seed bulbs is an important source of income for traders in the four villages where shallots are a major crop. For example, in December 2012, Pak Matsuri, a trader from Tamberu Laok, purchased 32 tonnes of seed bulbs from Brebes. That same month, Pak Syaidul, from Sokobanah Tengah, purchased 25 tonnes from Brebes. Pak Matsuri claimed that some seed bulbs were sold to farmers on credit, whereas all farmers purchasing planting material from Pak Syaidul paid him upon delivery.

Fertilisers, insecticides, and fungicides are mainly purchased on a cash-and-carry basis from stores in Sampang town and neighbouring Wary sub-district of Pamekasan. Often farmers will purchase inputs on behalf of relatives and other farmers in their village. Inputs are sometimes purchased from shops within Sokobanah, but these offer a limited range and charge higher prices than competitors in Sampang or Wary. None of the two input stores visited in Sokobanah town supply seeds. One does not sell any fertiliser. These shops retail a wide range of items, including daily necessities, construction materials, and even tombstones, not just agricultural inputs. The lack of a network of specialised agricultural dealers in Sokobanah is a good indicator of relatively limited local demand for farm inputs.

A few village traders in Sokobanah may at times provide fertiliser to some shallot growers. Pak Matsuri is one example. In 2012 he supplied fertiliser to some 30 growers who also purchased seed bulbs from him. The value of the inputs supplied averaged about IDR 4-5 million per grower. This cost was deducted at harvest time from the value of the shallot crop. The trader in question claims that no interest was charged, although he may well

have sold the inputs for a higher price than what he paid. In Sokobanah Laok, farmers mentioned a local extension officer as a supplier of agro-chemicals.

According to farmers, input retailers provide no technical information or advice about shallot cultivation. These views are consistent with the discussions held with three input store owners. They had no specific knowledge about shallot cultivation, were never visited by staff from chemical companies, and never participated in farm demonstrations organised by Dinas Pertanian, such as the one implemented in 2012 to expose farmers in Sokobanah to the Bauji variety.[7]

Agro-chemical companies are not present in Sokobanah. None of the shallot farmers interviewed had ever been visited by their staff. However, in 2012, some participated in a meeting in Sampang town organised by Dinas Pertanian, where Petro Kayaku, a company based in Gresik, East Java, introduced a micro-fertiliser and distributed some free samples.

Some of the traders selling seed bulbs and other inputs may deliver some technical information to farmers, but such knowledge transfers are relatively limited. None of the farmers interviewed mentioned traders as an important source of information about shallot cultivation, although Pak Matsuri claimed that he provides some advice on fertilisation and disease and pest control to growers purchasing inputs from him. Traders in Brebes are his main source of information. Pak Duliadi, another village trader, mentioned that the cultivation methods applied by shallot growers are similar to those followed by him and other local traders on their own farms. In his opinion, traders have little new knowledge that can be transferred to farmers.

In short, farmer-to-farmer exchanges remain the main vehicle for transmission of information about shallot cultivation technologies and practices. Many shallot farmers in Sokobanah interact with local extension staff, but little new knowledge about shallot cultivation is transferred through the public extension system. Government extension services are not only under-staffed and under-resourced, but also lack critical technical expertise about major vegetable crops, such as shallot. For decades, rice has been prioritised at the expense of horticultural and other crops.

3.3.2 Product assembly

The shallot chain in Sampang is represented in Figure 4. Farmers normally sell their crop within one week of harvest. The crop is left to dry for one to four days, depending on weather conditions, market prices, and other considerations. When deciding drying times, farmers have to weigh the potential quality price gains against labour costs, weight losses, and the risk that prices may actually fall in the following days. When market prices are high, as in 2013, farmers will dry the bulbs for just one or two days. Most of the harvested bulbs are then sold without the leafy tops, as they will be retailed in nearby markets within one or two days.

[7] *None of the farmers participating in the demonstration subsequently adopted this variety, as they were not particularly impressed with its performance.*

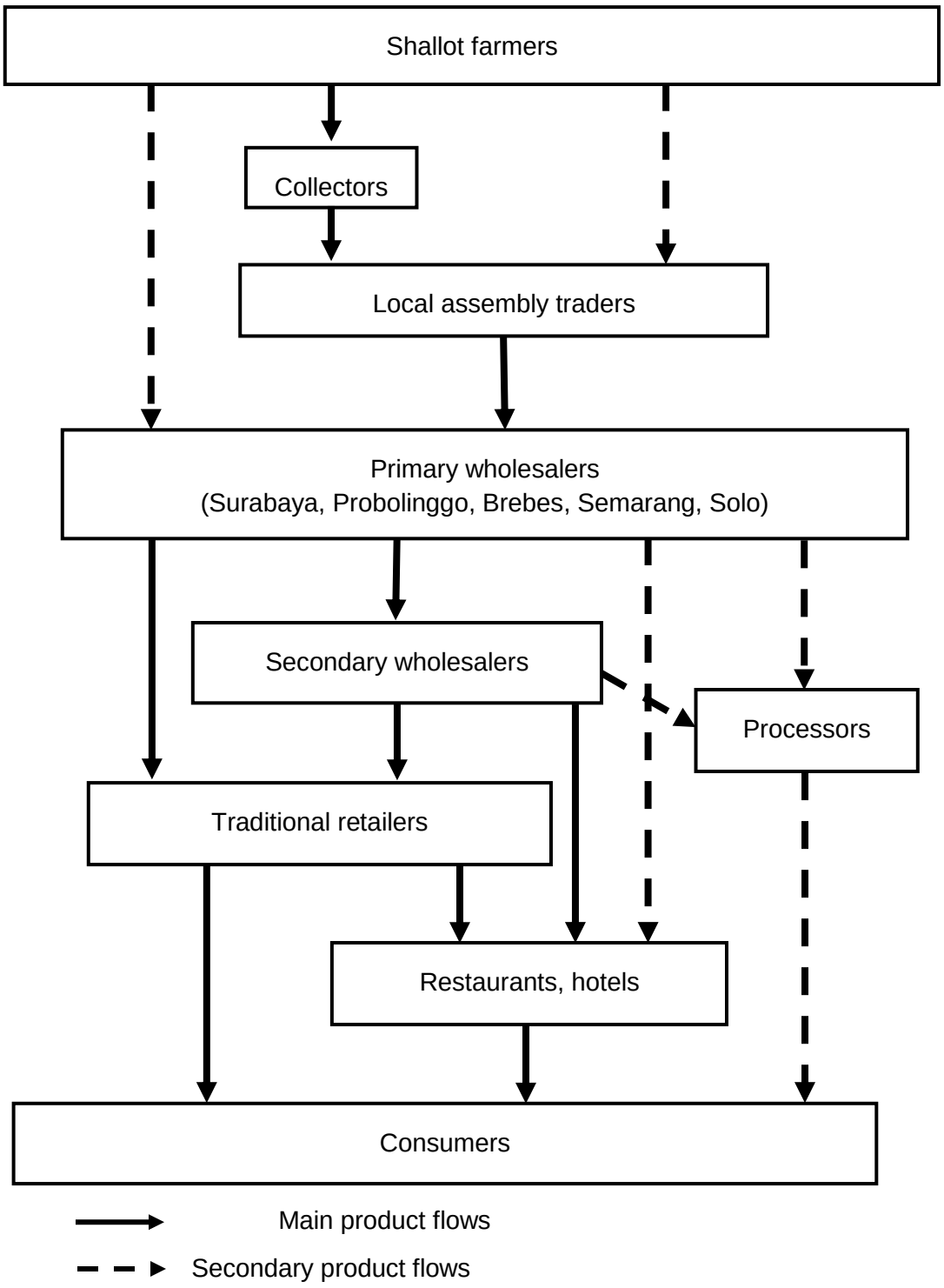


Figure 4 Simplified representation of the shallot value chain in Sampang

The research team found no evidence of organised collective action in the marketing sphere. In Tamberu Laok village, for example, there are four farmer groups, each comprising 50 to 80 members, but these have been formed to receive technical and in-kind assistance from government, not to market the produce from members. Some farmers may share transport of shallots for Pabean or Keputran markets in Surabaya. The bulbs are sold to market wholesalers.

Some farmers may take their crop to the premises of collectors and assembly traders, but most sell from their homes or at Tamberu market. Farmers often take market prices in

Tamberu as a reference in their negotiation with buyers coming to their houses. Most farmers will also check prices with other farmers in the area before selling the crop. Prompt payment is the norm. The transaction is usually carried out by men, but women are often consulted before a transaction is agreed.

While some assembly traders may buy directly from farmers, most will procure shallots through their own network of collectors, to whom they advance funds for the purchase of bulbs and pay a fixed commission. During the 2013 marketing season, collectors in Sokobanah Laok were paid a commission of IDR 1,000 per kilogram, twice the amount received in 2012, when market prices were much lower.

Tamberu Laok has the largest concentration of assembly traders, estimated at about 25. Sokobanah Tengah has about 15. Sokobanah Laok has eight. Larger traders buy shallots from several villages. A few traders in Sokobanah Tengah market around 100 tonnes of shallots for consumption per season, but most sell between 50 and 70 tonnes. Tamberu Laok has some larger traders who buy 200 tonnes or more throughout the marketing season. During other periods of the year, traders will manage other businesses. Most have their own farms and sell other crops, such as tobacco, maize, chilli, black pepper, and soybean. One of the traders interviewed had a construction business. When prices are high, as in 2013, assembly traders tend to operate with a gross margin of about IDR 2,000 per kilogram, of which IDR 1,000 is spent on labour and transportation. Traders will operate with a lower margin when market prices are low.

According to some informants, the linkages between assembly traders and collectors and between collectors and farmers are fairly stable. Traders will often offer the same price to farmers as their collectors so as not to undercut them. Many shallot farm households, in turn, will sell their harvest to the same collector year after year. A collector will often buy from most farmers in a particular hamlet or neighbourhood within the village, a system that reduces search costs and facilitates the planning of procurement activities. There is no indication, however, that collectors are able to take advantage of what may at first look like a monopolistic position because farmers are normally aware of spot market prices in Sokobanah, using this information to negotiate transactions. A collector that consistently pays lower prices than what farmers could fetch by selling to other buyers is likely to lose his supply base.

3.3.3 The wholesale market channel

Village assembly traders sell the shallots one or two days after collection. Many traders have small storage facilities at their homes, but these are used to assemble supplies, not to hold stocks. Storing shallots for consumption for several weeks or months is not advantageous because Sampang supplies the market during the off-season, when prices are relatively high. Storage for several days or a week could be justified when there is a sudden fall in market prices, but traders lack the required storage capacity to hold inventories. One of the traders interviewed in Tamberu Laok can keep up to 40 tonnes in his semi-open warehouse, but this is an unusual case. Most local traders can only store 5 to 10 tonnes at a time, equivalent to one truckload or less.

Shallots are sold to traditional wholesalers in a few selected locations in east and central Java. The larger traders in Sokobanah usually sell to a selected number of buyers in two to four different market locations with whom they have been doing business for many years. For example, Pak Abidigani, from Tamberu Laok village, has three regular customers in Keputran wholesale market in Surabaya, three other in Probolinggo, and

another three in Solo City. He also sells to selected buyers in Brebes. Smaller traders will usually channel their supplies to Surabaya. Some may supply the same buyers throughout the entire season, but many prefer to sell to the highest bidder at the market.

Pick-up trucks with 2 to 2.5 tonnes capacities and larger trucks with 7 to 7.5 tonne capacities are used to transport shallots to Surabaya. Only the latter are used when shallots are sent to more distant locations. Small traders sometimes work together to fill a truck. In Surabaya, most shallots from Sampang are sent to Pabean, the main primary wholesale market for imported shallots, onions, and garlic. However, many wholesalers from Keputran market stand outside Pabean in order to buy shallots directly from suppliers coming from Sampang and other districts of Madura, particularly Pamekasan and Sumenep. The dominance of Pabean as a destination market in Surabaya can be explained by its central position in the dry vegetable wholesale trade and the fact that only mini-vans are authorised to unload produce in Keputran.

Buyers in Surabaya will pay upon delivery of the bulbs. For supplies sent to more distant locations, Sokobanah traders will often be paid a few days later. While Surabaya wholesalers never advance funds to Sampang traders, those sending supplies to Brebes sometimes receive partial payment in advance. However, this is not a major source of working capital. Sokobanah traders tend to operate with their own funds. Some also rely on seasonal bank loans. Two of the traders interviewed, for example, specifically mentioned Bank Negara Indonesia (BNI) as a source of finance.

Assembly traders supplying more than one location will normally check prices in different markets before deciding where to send their supplies. While this may enable them to take advantage of short-term spatial arbitrage opportunities, the gains are likely to be limited, as highlighted by one of the key informants. Shallot markets in east and central Java are spatially integrated, i.e. prices do not differ much across locations.

Some traders complained that buyers in Surabaya sometimes pay a different price than that discussed over the phone prior to the delivery of a consignment. A sudden fall in market prices or failure to comply with the quality expectations of the buyer are two reasons why Surabaya wholesalers may at times pay a lower price than what suppliers from Sampang expected. One wholesaler in Pabean referred to past situations where she had to renegotiate prices with her suppliers in Sampang because of poor product quality. In more distant markets, however, prices are usually agreed before a consignment is sent.

Despite some perceptions to the contrary, it is unlikely that wholesalers are able to take advantage of their Sampang suppliers by offering lower prices than those dictated by the market conditions prevailing at the time of the transaction. The shallot marketing system is characterised by strong competition at all levels in the chain. Consequently, traders in any given market location will have to pay similar prices for produce of similar quality if they are to secure regular supplies over time. There is limited scope for opportunistic pricing.

3.3.4 Downstream market channels

The largest primary wholesalers in Surabaya have premises outside Pabean market. They supply traders inside the market and in other wholesale markets within Surabaya, secondary wholesalers and inter-district traders from different parts of East Java, and secondary wholesalers in other islands. Smaller primary wholesalers, who typically sell between 0.8 and three tonnes of shallots per day, have small stores inside Pabean or Keputran and supply small inter-district traders, traditional retailers, small processors, and

restaurants in and around the city. Many send small consignments to clients in other islands, such as Kalimantan or Papua.

During the visits to assembly markets in Nganjuk and Kediri and wholesale markets in Surabaya, the research team could confirm that women are heavily involved in the shallot trade. Market stalls are often managed by women or by the husband and wife. Larger wholesaling businesses in the vicinity of Pabean tend to be managed by men, although their wives often help in the management of the family business.

Shallots from Sampang are retailed through traditional channels, i.e. by market traders and street vendors. The research team interviewed more than 10 wholesalers in Pabean and Keputran markets. None mentioned modern retail outlets as customers. Likewise, when asked about their customer portfolio, none of the wholesalers interviewed in Nggrongo wholesale market in Kediri town or in Sokomoro assembly market in Nganjuk mentioned hypermarkets or supermarkets as clients.

The manager of one Giant Hypermart outlet in Surabaya indicated that most vegetables sold in his store, including shallots, are procured from Pious wholesale market. Occasionally he will buy vegetables from wholesalers in Keputran. The volumes in question are very small. In one month, his store sells about 250 kilograms of shallots, less than many traditional market retailers in the city. No shallots from Sampang are sold in the store, as the product does not meet the supermarket requirements regarding bulb size (medium to large), colour (bright red), shape (round), and shelf life. During the Sampang marketing season, Giant mainly sells shallots from the Philippines and Thailand. The research team also interviewed the Store Manager and the Fresh Produce Manager of one Matahari Hypermarket outlet in Surabaya. All the vegetables sold in their store are procured from four specialised vegetable suppliers. The origin of the shallots retailed in the store is unknown. Less than 50 kilograms are sold in a month. One Carrefour outlet in Surabaya also procures vegetables from a small number of vegetable trading enterprises that supply the modern retail sector. During promotion periods, the store sells about 200 kilograms of shallots per month. At other times it only sells around 50 kilograms per month.

These findings are not surprising. The modern retail sector accounts for a very marginal share of the shallot retail trade. According to a market research projectacross a representative sample of consumers in Surabaya, (Solo and Bogor, unpublished data), only 1.4% of households in those three cities rely on hypermarkets and supermarkets as the main outlet for their shallot purchases (Wendy Umberger, pers. comm.).

It is possible that some Sampang shallots are absorbed by the processing industry, which buys the lowest-grade bulbs and has the least stringent requirements regarding moisture content. Wings, the second largest industrial buyer of shallots in Indonesia, after Indo-Food, have large processing facilities in the Surabaya port area. Shallots are used in the sauces that accompany the noodles produced by Wings. Somewhat surprisingly, Wings was never mentioned during the interviews with traders in Sampang and Surabaya. The research team made several attempts to interview company staff, without success. The team did visit Indra Mukti Segara, the largest fried shallot processor in East Java. During the peak marketing months, Indra Mukti Segara buys most of its shallots from Nganjuk. During the off-season, the company relies heavily on imported bulbs. In May 2013, all the processing bulbs were from India, which at the time were the cheapest in the market. Other, smaller-scale fried shallot processors located in and around Surabaya are supplied by wholesalers in the city. For example, one female trader in Keputran who buys

ungraded bulbs from Sukomoro assembly market in Nganjuk and Dlingu assembly market in Probolinggo sells grades A and B to retailers around Surabaya and grade C to nearby processors and restaurants. While she does not trade shallots from Sampang, other wholesalers supplying the small-scale processing industry may.

3.4 Quality Management Systems

Shallots from Sampang have a poor reputation. There was a consensus amongst traders in Sokobanah and Surabaya about their low quality. Despite the poor reputation, there is no shortage of buyers for Sampang shallots, as they are marketed at a time when there are few alternative sources of supply.

The fact that Sampang supplies low-quality shallots is not surprising, as the crop is grown during the wet season. Some traders mentioned excessive on-farm use of nitrogen as also having a negative impact on product quality, an issue that requires further research. Premature harvesting may be another contributing factor due to its impact on bulb size. It should also be noted that Manjung, the main variety grown in Sampang, lacks some of the quality attributes most favoured by consumers, particularly with regards to size, shape, and colour, although traders did acknowledge its good eating quality.

Furthermore, as stressed by many of the wholesalers interviewed in Surabaya, shallots from Sampang have a short shelf life. This is likely to be associated with wet weather conditions at harvest time and poor post-harvest drying. It should be noted, however, that a short shelf-life does not pose major market access problems because Sampang shallots are sold at a time when there is limited competition from other origins within Indonesia. The bulbs will be retailed within two or three days after purchase from farmers. Wholesalers in Pabean and Keputran normally sell their stock within one day and therefore are not particularly concerned with the product's shelf-life.

Shallots from Sampang are sent to the market without the leafy tops. This is the standard in areas supplying nearby markets. However, some buyers in Brebes sometimes order untrimmed shallots from their suppliers in Sokobanah, most likely because the bulbs will be stored for some time or sent to other islands.[8]

Sampang traders sell mostly mixed grades. The marketing of graded shallots is uncommon because in the off-season many wholesalers and retailers are reluctant to sell grade A, which is too expensive for most consumers. However, when supplying Brebes, assembly traders may sometimes send graded bulbs at the request of buyers.

3.5 Problems and Constraints

3.5.1 Poor access to water

Most shallot growing villages of Sokobanah have very poor access to water, as they have no irrigation infrastructure and wells run dry around April. This largely explains why farmers choose to grow shallots between February and April, during the rainy season. Yield and bulb quality are affected negatively as a result.

[8] *Leafy tops must be kept when bulbs are stored because these will be left hanging in bamboo frames, a system that allows for airflow. Leafy tops also offer some protection to the bulbs when these are transported over long distances.*

3.5.2 Undeveloped local input distribution networks

Sokobanah sub-district has a very weak input retailing network. Local shops sell a very limited range of agricultural inputs. Prices are higher than in Sampang town and neighbouring Pamekasan district. As a result, farmers often have to spend time and money procuring inputs from shops in these locations. Consequently, it is possible that key inputs are not always accessed at the right time.

An undeveloped input retailing system at the village and sub-district levels is a consequence of low demand for seed and agro-chemicals from local farmers. Rice is not a major crop in Sokobanah. Shallots and tobacco are the only cash crops in the area, but many of the inputs used for tobacco crops are provided by the tobacco companies. Maize is widely grown, but mainly for household consumption, with farmers planting open-pollinated varieties and following low-input management practices. Given this context, chemical companies and input distributors have shown no interest in having a presence in Sokobanah. The input retail market in the area is small.

3.5.3 Poor technical knowledge

Farmers in Sokobanah have relatively poor knowledge of shallot cultivation. Most have only been exposed to one or two varieties. In addition, as recognised by many farmers, their knowledge of fertilisation, pest management, and disease control is weak.

Shallot growers in Sokobanah are operating in a rather closed traditional system, without much access to outside knowledge. The fact that farmers in one village are unaware of the variety grown in the neighbouring village is revealing. Such context is not conducive to technical innovation at farm level. Farmers rely primarily on each other as sources of technical information, but knowledge levels do not differ much across farm households. Government extension services are weak. Local input dealers have no relevant information to offer. Chemical companies provide no research and extension services in the area. Finally, traders are poorly positioned to contribute to technical innovation processes because they themselves lack the required know-how. They have poor understanding of different varieties and are not much more knowledgeable about shallot cultivation than the average local farmer.

3.5.4 High labour costs

Labour is expensive in Sokobanah. The normal local daily wage for men is IDR 60,000, plus food, which is high by Indonesian standards. Widespread emigration to Malaysia has certainly had a major impact on the structure and functioning of local labour markets. Unusually for rural Indonesia, women are occasionally paid the same daily wage rate as men, and are often hired to perform “male” tasks. High labour costs inflate production and post-harvest costs and depress the demand for labour, which is likely to affect yields negatively.

3.5.5 Financial constraints

In Sokobanah, both farmers and traders face cash constraints. These reflect, amongst other factors, a local farming and trading landscape composed of small, resource-constrained, and risk-averse enterprises; a banking system that is not geared to meeting the liquidity and investment needs of smallholder farmers and small-scale trading businesses; and a product chain characterised by opportunistic spot market transactions and a lack of buyer-supplier financing.

Financial constraints reduce the ability of shallot growers to invest in their farms, hire labour, and purchase other farm inputs. This is certainly one of the causes of low farm productivity. Cash constraints also help explain why farmers often harvest immature shallots, although at times such practices may be triggered by short-term market conditions, with farmers harvesting earlier than recommended in order to take advantage of high prices.

In some of the discussions, key informants made a link between under-investment in storage by assembly traders and capital constraints. However, the picture is more complex. Traders in Sokobanah sell shallots for only three or four weeks during the year, from late March to late April, at a time when storage is a very risky and potentially unprofitable venture. In 2012, Sokobanah traders would have earned a profit if they had held on to some bulbs for two months (see Figure 3). Yet, in 2011 they would have lost money if they had kept the bulbs for more than three or four weeks (see Figure 3). Price data from Pare market in Kediri, which is not included in this report, further shows that storage would have been a loss-making exercise in the three previous seasons, as prices in April were fairly similar to those in May and June. In short, traders seem to lack clear financial incentives to invest in storage.

3.5.6 Lack of linkages with markets outside Java

Despite its favourable geographical position, Sampang does not supply shallots to other islands. This limits the scope for spatial arbitrage. Currently, traders may be missing profitable marketing opportunities because they have no contact with traders outside Java. As a result, they are unable to assess whether prices on different islands justify the additional marketing costs and risks associated with inter-island trade.

3.6 Opportunities for Pro-Poor Chain Upgrading

3.6.1 Some general considerations

The research team has identified two chain upgrading opportunities in Sampang that could be supported by AIPD-Rural: the adoption of more productive, higher-value varieties and the development of inter-island trade linkages. The latter would require investment in storage facilities by traders and improved quality management systems, a process that could also be supported by AIPD-Rural.

Proposed interventions are aligned with the philosophy of AIPD-Rural, which is to support pro-poor, private-sector-driven value chain innovations. They seek to address knowledge, risk, and social capital barriers to innovations in the production and marketing spheres that can lift the incomes of local chain participants, particularly farmers.

Clearly, the proposed interventions do not address all the constraints identified. For example, farmers would benefit from a more developed network of input retail stores at the village and sub-district levels. The development of direct linkages between input dealers and distributors would be an important step in that direction. However, input distributors are unlikely to have an interest in expanding their area of operation to Sokobanah, which represents a very small market.

There is also a clear need for knowledge transfer in areas such as fertilisation, pest management, and disease control. This in itself would increase local demand for inputs, thereby stimulating the development of local input distribution systems. Any intervention in

this area would have a strong agronomic research component to test the cost-effectiveness of different farm technologies and practices under local agro-climatic conditions. While AIPD could facilitate the implementation of a series of participatory farm trials and demonstrations, this is not being proposed because the research team does not see a clear role for the private sector, as intended by the project. It would also take some time for demo-trials to generate significant changes in local farming practices.

Finally, the research team could not identify any interventions with the potential to address the capital constraints faced by farmers and traders. In the area of chain financing, for example, the team cannot envisage scenarios where traditional wholesaler buyers would be encouraged to advance working capital funds to Sampang traders. Likewise, local chain innovations likely to stimulate the provision of seasonal loans or input credit to farmers by village traders could not be identified.

3.6.2 Developing local markets for more productive, higher-value varieties

Most shallot growers in Sampang have been planting Manjung, a variety from Madura that performs reasonably wellunder rainy conditions, for many years. Its dominance, however, is not the outcome of a long process of experimentation, whereby farmers have tried several varieties and concluded that Manjung is the most suitable.

In 2012, Dinas Pertanian implemented a demonstration in Tamberu Barat village to expose local farmers to the Bauji variety, but participants deemed it inferior to Manjung. In Sokobanah Tengah, farmers used to plant Bauji but shifted to Bima Curut when local seed bulb traders were offered this variety by suppliers in Brebes. In Sokobanah Tengah, farmers have recently stopped growing a “local” variety they cannot name, which had probably degenerated after many years of cultivation, shifting to Manjung, which can be sourced from the neighbouring Pamekasan district. What these experiences show is that farmers are receptive to new varieties, provided these out-perform current ones and can be accessed through commercial channels.

Given this context, it is recommended that AIPD-Rural explores opportunities for exposing local chain actors to other rain-tolerant cultivars and developing linkages to suppliers of quality material for varieties attracting the interest of farmers. In other words, AIPD-Rural is well positioned to work with local seed bulb traders to develop the demand for and supply of varieties that are more productive than current ones. The mainstreaming of such varieties has the potential to increase the incomes of 2,000-3,000 shallot farm households.

A series of participatory, on-farm trials involving local extension staff, farmers, and traders would be required to test the agronomic performance of different varieties and determine their profitability. Selected traders could be responsible for managing the demo-trials with advisory input from qualified researchers. Their main role would be to manage the demo-trial plots, mobilise farmers for participation in field days, and develop the supply of promising varieties. Possible improvements in crop management practices, including planting densities, fertilization, and pest management, could also be tested as part of a farm trial programme due to their potential contribution to raising the productivity and profitability of shallot cultivation.

Selection of varieties should be based on an understanding of potential agronomic performance under wet weather conditions and the marketability of the bulbs. Consultations with researchers at IVEGRI should be carried out during the trial design

phase to inform varietal choices. Visits to selected production areas could also be conducted to identify suppliers of quality planting material. Bima Curut would be an obvious choice: while farmers in Sokobanah Tengah already grow this variety and are satisfied with its performance, those in other villages have not yet been exposed to it. Katamocha also merits serious consideration: it performs relatively well under rainy and low-input conditions, has good storability, and has just been the focus of a re-selection and multiplication programme in Bima. Moreover, the adoption of Katamocha in Sampang would generate income opportunities in Bima, another target district of AIPD. Bauji should also be considered, despite the poor trial results in 2012. Bauji is successfully grown in Nganjuk during the rainy season. The research team interviewed one farmer in that district who achieved a yield of 14 tonnes per hectare in 2012. Other options for consideration include Batu Iju, a variety grown in Malang, Biru Lancor, a variety from Probolinggo, and Maja Cipanas, from West Java (R. Basuki, pers. comm.).

Variety trials should be implemented across different villages and over a two or three-year period. This is necessary to generate robust findings and enable participation of large numbers of farmers and traders. While the trials will offer opportunities for exposure to improved cultivation methods, very intensive treatments should be avoided, as these are not aligned with local practices. If some varieties are identified as particularly promising, attracting the interest of local farmers, AIPD-Rural could work with village traders to develop the seed bulb chain. The project could assist these traders to identify suppliers of quality planting material and facilitate introductory meetings.

3.6.3 Enabling the development of inter-island trade

Sampang enjoys favourable conditions for the development of inter-island trade. The district is located just two hours away from Surabaya, one of the main ports of exit for shallots going to Kalimantan, Sulawesi, Maluku, Flores, and Papua. The district is also geographically well positioned to supply Bali and Lombok.

The development of inter-island trade from Sampang may offer opportunities for improving farm-gate prices and the profits from shallot trading. Diversion of supplies to other islands could also lead to an increase in prices in Surabaya markets, which currently absorb most production from Sampang. At the moment, however, Sokobanah traders cannot explore inter-island trading opportunities because they lack the links to buyers outside Java.

AIPD-Rural is in a position to lower the costs and risks that local traders face in developing direct supplies to other islands through the implementation of market trials. These would enable participating traders to learn about markets on different islands, see how they compare with Surabaya and other markets on Java in terms of risk and profitability, and develop linkages with buyers in target locations, a critical outcome in a context where trust is a critical ingredient in long-distance trading relations. Provision of advisory services in the post-harvest sphere could be considered in order to ensure that Sokobanah traders are able to meet the quality requirements of buyers in distant markets.

Mobilisation of village traders for participation in trial shipments is likely to require some form of risk sharing. Buyers in target markets willing to engage in commercial transactions with Sampang suppliers, in the context of seasonal market trials, would also need to be identified. Possible trial locations include Banjarmarsin in South Kalimantan, Kupang in West Timor, Denpasar in Bali, and Mataram in Lombok. A selection of several locations would allow for a comparison between market locations.

The proposed intervention will require careful preparation and active involvement of project staff. The level of innovation involved, the challenges associated with a short marketing season, and the need for regular feedback from buyers in trial markets should not be underestimated. Moreover, comparative data for transactions in trial and current (control) markets should be used to inform discussions with local chain stakeholders, as part of participatory monitoring and evaluation of results, outcomes, lessons, and implications. These assessments should be carried out throughout trial seasons, not just at the end of each marketing season. Face-to-face meetings between participating traders and buyers in target markets, both before and after each trial season, should be organised in order to foster the necessary trust between trading partners.

Ideally, the proposed market trials should be implemented over two or three seasons. This would allow for an increasing number of local traders to join the initiative. Higher prices will only be transmitted to farmers if many assembly traders become involved in the inter-island trade, competing with each other for local supplies.

Inter-island flows will only attract the interest of chain actors in Sokobanah if prices are significantly higher than on Java. Otherwise traders will lack the incentive to pay farmers for extended and improved drying of the bulbs, incur additional post-harvest management and transportation costs, and deal with new and distant buyers, with all the risks involved. It should be noted that the proposed intervention can only succeed in a normal market environment, where government is not hindering imports to the extent observed during the first semester of 2013. In a scenario where prices overshoot due to very high import barriers, traders in Sampang will have no incentive to search for new markets.

If inter-island trade from Sampang develops successfully, AIPD-Rural could consider implementing a similar intervention in Pamekasan and Sumenep. Although these are not AIPD-Rural target areas, it would be a shame to miss the opportunity to spread the benefits to neighbouring districts.

3.6.4 Supporting investments in drying and storage capacity

Successful inter-island trade would create a demand for increased drying and storage facilities. Traders developing the supply of quality shallots for long-distance transportation would need to increase their capacity to undertake additional drying and assemble larger volumes. In order to support this development, AIPD-Rural could consider subsidising investments in drying yards and storage facilities by traders. The project would only spend resources if traders see a need for this type of investment and are willing to contribute a significant share of the cost. Traders themselves would carry out their own assessments of the feasibility of the investment and the size of the facilities. Exposing traders to good drying and storage practices in other areas could also be considered.

4 The Shallot Value Chain in Bima and Great Sumbawa, NTB

4.1 Production Context

Bima is known as the main shallot production centre outside Java. Shallots are the main source of farm employment in the district, where some 7,000 hectares are allocated every year to the crop. The shallot area is concentrated in six sub-districts: Belo, Lambu, Woha, Wera, Monta, and Sape. During the fieldwork, the study visited Belo and Sape.

In Bima, shallots for consumption are harvested between June and October. While some farmers may harvest three crops during this period, most grow shallots twice. In areas with good conditions for irrigated rice production, farmers may only plant shallots for one season, between August and October. For example, in eight villages of Sape farmers grow two consecutive shallot crops, whereas in four other villages in this sub-district they only produce one harvest. Sape has another four villages where shallots are a marginal crop.

Local shallot farms typically range from 0.1 to 0.5 hectares. Key informants reported an average farm size of 0.2 hectares in Renda village, Belo Sub-district. For Naru, West Naru, and Sangia, three villages of Sape sub-district, reports of average farm size figures ranged from 0.25 to 0.5 hectares. The head of Dinas Pertanian in Bima provided a figure of 0.35 hectares for the whole district. Given a cultivated area of about 7,000 hectares per annum and the fact that most growers grow shallot twice during the year, it is reasonable to assume that Bima has approximately 10,000 shallot farm households.

Availability of land for expansion of shallot cultivation is a constraint. This has prompted many growers, especially in Belo, Woha, and Monta sub-districts, to develop shallot farming in Sumbawa Besar district, a process that started some nine years ago. Around this time, many shallot farmers rented land in Dompu district. Some still do, but to a much lesser extent than in Sumbawa Besar, a district with low population density, fertile volcanic soils, very dry weather between May and October, and where large tracts of farmland along the main road, with good drainage and good access to groundwater, are available for rent. Incidence of shallot diseases is much lower than in Bima and other production areas on Java.

During the fieldwork, it was reported that some 5,000 shallot farming households currently rent farms in Sumbawa Besar from March-April to August-September. Most rent between 1 and 2 hectares at a cost of IDR 5-15 million per hectare. Shallot farming in Sumbawa Besar is expanding. The district currently has a larger cultivated area than Bima, estimated by some key informants at around 10,000 hectares, although this is not reflected in government statistics.

Men stay in Sumbawa Besar during the two shallot seasons managing their farms. They are accompanied by workers who also stay at the farm for the duration of the two seasons. Women stay behind to take care of the family's farm, the children, and other household affairs. Casual labourers are hired in Bima to perform specific tasks, staying in Great Sumbawa for just a few days. Women are mainly hired for weeding and harvesting. Men are hired for spraying, irrigating, and fertilising the crop.

As an example, in 2012 one of the farmers interviewed rented one hectare in Sumbawa Besar from March to September. He stayed in that district during the entire period together with two farm workers from Bima, goinghome for just a few short stays. Each worker was paid IDR 3.5 million per season, given 50 kilograms of rice for their wives back in Bima, and provided with accommodation, daily meals, cigarettes, and coffee. Teams of about 30 workers were hired repeatedly during the season for periods of two or three days. Each was paid a daily wage rate of IDR 50,000, in addition to accommodation and food. The men were also provided with cigarettes and coffee.

Super-Philip is the main variety in Bima and Sumbawa Besar. Some farmers in Bima grow Katamocha during the rainy season. This variety is originally from Bima. It was popular during the 1990's, but presently only 5 to 10% of farmers in the district use it. It appears that some farmers also grow Ilokos and Tanduyung. In 2012, for example, one input dealer interviewed in Bima town purchased these two varieties from one supplier in East Java for local distribution.

There appears to be considerable variation in yields across farms, even within the same village. Informants in Bima reported yields ranging from 8 to 15 tonnes per hectare. On average, farmers in Belo sub-district seem to achieve higher yields than their counterparts in Sape sub-district. Shallot farms are much more productive in Sumbawa Besar, with key informants reporting 13 to 20 tonnes as the normal yield range. In a good year, some Bima growers renting land in Sumbawa Besar may harvest up to 25 tonnes per hectare. Differences in the productivity of shallot farms in the two districts can be largely explained by differences in soils, access to water, and incidence of diseases. Significant variations in the quality of seed bulbs planted by farmers, in turn, were cited as the main explanation for differences in farm productivity within the same location.

4.2 Product Flows

Inter-island flows account for most of the shallot trade from Bima and Sumbawa Besar. According to the head of the district extension, 70% of the shallot from Bima is channelled to markets outside NTB. Mataram, the provincial capital, in neighbouring Lombok Island, is the other major market destination.

Between June and October, significant quantities of shallots are exported to Lombok, Bali and Java by road and ferry. Supplies in open-air cargo ships to Kalimantan, Sulawesi, Flores, Maluku, West Timor, and Papua are equally (if not more) significant. Many inter-island traders in Bima target island's north and east of Sumbawa. Traders operating from Lombok tend to focus on Mataram, neighbouring Bali, and Java. From Java some shallots may be channelled to other islands. The team met several traders in Surabaya that buy shallots from Bima and supply traders in Kalimantan, Sulawesi, Maluku, and Papua.

Traders in NTB mentioned many market destinations in Java, including Banyuwangi, Probolinggo, Nganjuk, Jember, Mojokorto, Malang, Surabaya, Solo, Semarang, Brebes and Cirebon. It appears, however, that shallots from Bima and Sumbawa Besar are not sent to Jakarta, which is supplied by major production areas within Java itself. Shallots sent to Brebes and Cirebon are sold to exporters or companies that work with export agents. Most of the supplies to those companies come from Sumbawa Besar, which produces larger and drier shallots than other areas within NTB, although traders also named Bima as a source of supplies for the export market.

4.3 Chain Actors and Linkages

4.3.1 Input distribution

As in most other production areas, most farmers in Bima retain some of their shallot crop for use as planting material. Part of the June harvest is replanted around August and part of the October harvest is stored for propagation the following April. Some seed bulbs are also produced late in the year for planting in April.

Many farmers also rely on other farmers, local traders, and some input retailers as sources of planting material. Inter-island traders buy seed bulbs from suppliers in East Java. This trade is concentrated during the months of February to July. At least one input retailing enterprise in Bima town, Mulia Jaya, sells seed bulbs procured in East Java. In 2012, it sold approximately 40 tonnes during the months of June and July.

In 2009, in an attempt to promote the emergence of a local market for true seed shallot, Mulia Jaya purchased some 60 kilograms of Tuk Tuk seed. One kilogram of seed was sold to farmers for IDR 100,000. Farmers only used the variety once and Mulia Jaya stopped selling it after the first year. Farmers not only lacked critical technical expertise, failing to apply the distinctive techniques needed for effective seedling production and transplanting, but also complained about an excessively long cultivation period. The retailer claimed that his technical recommendations were not followed, but he himself made a loss on the true seed shallot grown on rented farms. He also recognised that the long time it takes to grow Tuk Tuk constitutes a major barrier to adoption.

Between 2009 and 2011, Dinas Pertanian implemented a project under the government's "Integrated Facilitation for Investment in Horticulture", or FATIH, whose aim was to promote a revival of the Katamocha variety. The government sees potential for wider adoption of this local cultivar, which was released as a national variety in 2002. Katamocha is tolerant to rain and therefore particularly suited to rainy-season conditions. Resistance to *Fusarium* and relatively low input requirements are two other strengths of this variety. Some farmers in Bima were supported by FATIH to produce seed bulbs as part of a reselection and multiplication programme. While the project has not had significant impacts within Bima, Dinas reported increased adoption in West Timor and Papua. During the focus group discussions, it was clear that local farmers are well aware of the advantages of Katamocha, even mentioning strong aroma as one of its strengths, but they prefer to grow Super-Philip, which is more productive and can be sold for a higher price. While Katamocha copes well with rainy conditions, most local shallots are grown during the dry season.

Shallot growers buy other inputs from local stores. These transactions are usually carried out by male members of farming households. The inputs are purchased individually. No cases of collective action for the purchase of inputs such as herbicides, fertilisers, insecticides, and pesticides were reported during the field discussions.

There is an extensive network of well-stocked input outlets in villages where shallots are widely grown. For example, Renda, a village in the Belo sub-district, has five input stores. Ngali, in the same sub-district, has nine. In both villages, sales to shallot growers account for a significant share of their turnover. Inputs are often sold on credit, especially to larger growers who also rent farms in Sumbawa Besar. For example, one input dealer in Ngali sells on credit to about 20% of his clientele. Delayed payment for orders worth IDR 10 million or more is common. Some store owners also provide cash loans to farmers buying

inputs on credit. Clearly, the provision of credit constitutes a key strategy for increasing sales. In a context characterised by strong competition between outlets, having a wide product range available all year round is also critical for the success of input retailing businesses.

Larger growers, particularly those renting farms in Sumbawa Besar, have considerable cash needs as they tend to cultivate one hectare or more of shallots and use a significant amount of external inputs, including hired labour, while also having to cover land rental costs. In addition to receiving credit from local stores, some of the larger growers access seasonal loans from local inter-island traders, Bank Rakyat Indonesia (BRI), and pawn shops. Land certificates are used as collateral for bank loans. Gold and motorbikes are commonly used as collateral for pawn shop loans. There are four such shops in Belo sub-district. An interest of 15% per annum is paid on bank loans, whereas pawn shops charge 25% over a four-month period.

Smaller farmers have much poorer access to trader financing and institutional credit. Sometimes they have no option but to rely on loans from informal moneylenders in the area. The interest on these loans can be quite high. In Ngali village, for example, farmers mentioned interest rates around 50% on loans with a two-month maturity.

Farmers in Bima have significant experience growing shallots. Over the years, they have tried different inputs and different levels of input application on their farms. It is only natural that these experiences are shared between farmers. The most successful growers are regarded as particularly valuable sources of technical information.

In addition, many farmers are visited regularly by staff from different chemical companies, who often stay in the area for periods of several months promoting their company's products. These representatives may sometimes distribute product samples and implement demo-trials. Some companies also have staff stationed permanently in Bima town. Syngenta and Bayer were mentioned during an interview as two examples. However, despite their strong presence in the area, chemical companies were not considered by farmers as major sources of new technical knowledge.

While local farmers are more knowledgeable about shallot cultivation than input retailers, they may sometimes ask for their advice. This will normally be based on the information contained on product labels or received from staff working for chemical companies. Local input dealers are regularly visited by these staff and may occasionally attend meetings organised by their companies in collaboration with the district agricultural extension. Participation in demo-trials, however, is uncommon: the two input dealers interviewed in Bima district have never been invited to attend field days. This is a common weakness in the delivery of public and private extension services (D.Damyiati, pers comm.).

4.3.2 Product assembly

Product assembly and other stages along the Bima shallot chain are represented in Figure 5.

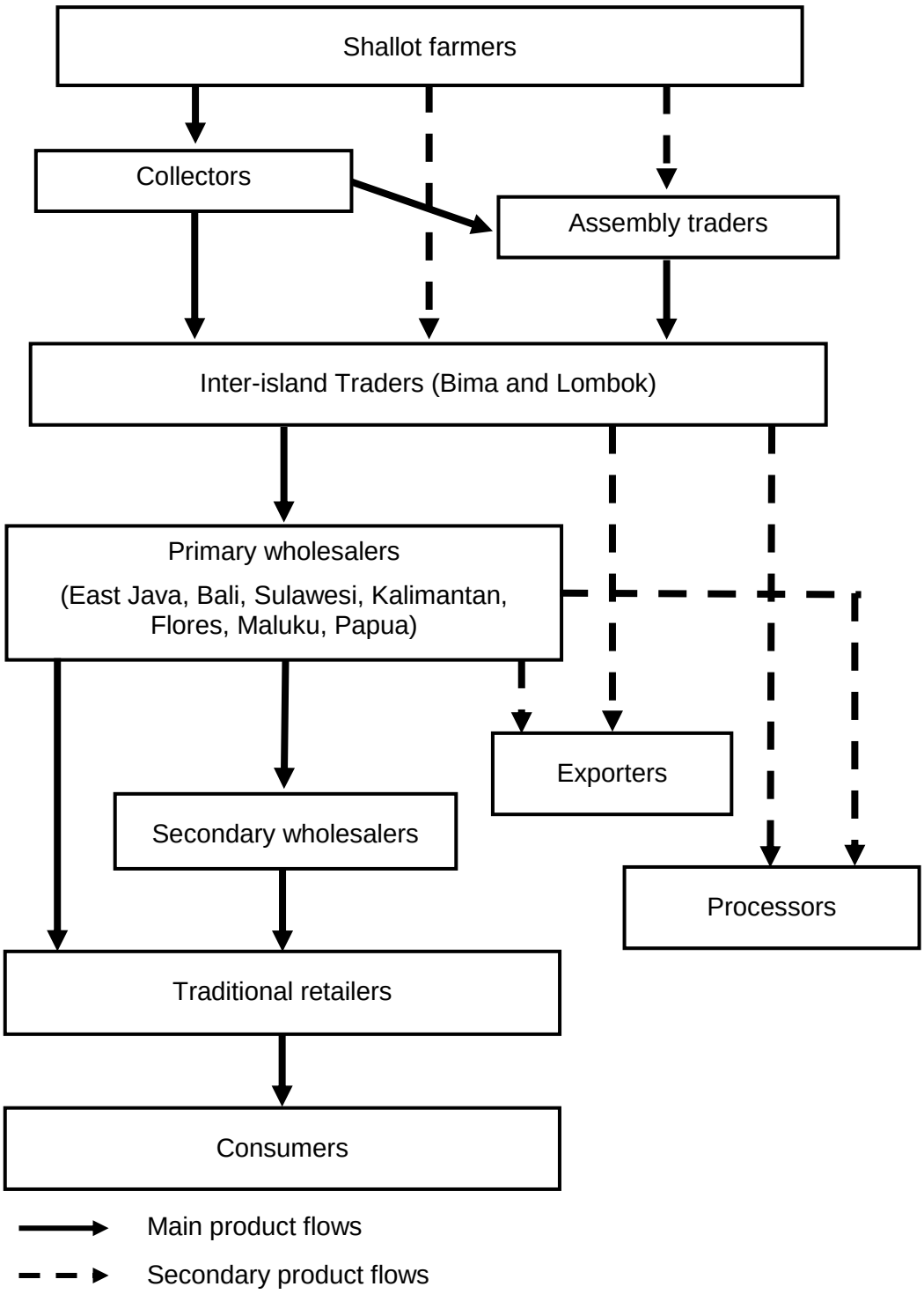


Figure 5 Simplified representation of the shallot value chain

Product assembly activities are coordinated by inter-island traders located in Bima and Lombok. Those operating from Bima buy through their own network of village collectors and directly from farmers, especially larger producers to whom they have advanced seasonal loans. Inter-island traders in Lombok buy from assembly traders based in Bima who have their own network of collectors and may also buy from farmers. Purchases through collectors account for most supplies. Direct purchases from farmers are concentrated during the peak marketing season. Interestingly, all the collectors, assembly traders, and inter-island traders interviewed also grow shallots.

Bima has a large concentration of inter-island traders. Belo-sub-district alone has around 60 traders supplying Lombok and other islands. Many of these are based in Renda village. Some 15 traders in Belo 'export' 1,000 tonnes or more during the course of the year; whereas most of the other inter-island traders market around 500 or 600 tonnes per annum. Sape, the other shallot growing sub-district visited by the research team, also has several inter-island traders. Four of them have fairly large operations, marketing over 2,000 tonnes of shallots each throughout the year. Larger inter-island traders buy from several sub-districts within Bima and Sumbawa Besar and work with at least 10 collectors each. Smaller traders may work with just two or three collectors. Some collectors travel regularly to Sumbawa Besar to buy shallots.

Collectors and assembly traders will usually work with one inter-island trader, who provides the funds for the purchase of shallots. Collectors are paid a commission of about IDR 100,000 per tonne, equivalent to about 2% of the value of the transaction. Inter-island traders will provide a vehicle for transportation of shallots or cover vehicle rental costs. Collectors may use pick-up vans (1.5 to 2 tonnes) or trucks (7 to 7.5 tonnes), depending on the volumes to be collected from a farmer or village on a given day.

Collection, assembly, and inter-island trading activities are performed by men. Traders normally interact with male members of individual farm households when coordinating and negotiating transactions and paying for the crop, usually a few days after the collection of the bulbs. The research team found no evidence of organised marketing by groups of farmers, including those belonging to extension clubs. This is to be expected. In a market where the volumes sold by farmers have little influence on the prices received and where individual growers are already rewarded (to some extent at least) for quality, there are no clear incentives for collective marketing.

Competition between collectors and assembly traders is strong. Farmers indicated that they may sell to more than one buyer within the same season and to different buyers in different seasons. Traders must therefore offer competitive prices if they are to secure access to supplies, which is key to the success of their business. This finding is at odds with the views expressed by some local key informants who claimed that farmers have low bargaining power.

Farmers sell their crop at harvest time. Storing the June harvest is not profitable, as prices will fall during the following months. Some farmers may sell part of the September or October harvest in November or December, but the volumes are small due to liquidity and storage space constraints. In late December, the research team saw two farmers in Ngali village loading shallots into pick-up vans. An assembly trader in the same village had just purchased 1.6 tonnes from a farmer who had harvested in October. Farmers normally store shallots for sale during the off-season in the veranda of their homes. The area under the roof is used to keep seed bulbs.

Larger inter-island traders also keep some stocks from the September or October harvest, usually for a period of one or two months. Discussions with local traders indicate that storage of shallots is a risky but potentially profitable activity, as prices will normally rise during the last quarter of the year. For example, in 2012, Pak Muliadin, a trader from Renda village, stored 50 tonnes of shallots from September to November. He bought the bulbs for about IDR 5,000 per kilogram and sold them for about IDR 9,000, earning a profit of IDR 7.2 million once storage and product handling costs were deducted and product weight losses of about 20% accounted for.

The volumes stored are relatively small, as traders face working capital constraints and do not want to expose themselves to too much price risk. None of the inter-island traders interviewed receives advances or seasonal loans from buyers. They are usually paid several days or even a week after delivery of a consignment, having to finance their operations with their own funds and, to a lesser extent, loans from relatives, banks, and local pawn shops. An inter-island trader procuring 1,000 tonnes of shallots per annum will spend at least IDR 5 billion (over US$ 500,000) just to pay farmers for their crop. These payments will be largely funded by sales revenue, and for this reason traders cannot afford to hold large inventories. Inter-island traders have to manage a complex and often precarious cash flow situation.

Limited storage capacity is another reason why traders do not keep large stocks. Many inter-island traders have drying yards and semi-open facilities with a capacity to store 25 to 50 tonnes of shallot bulbs at a time, equivalent to two or three days of trading activity. Very few have the facilities to store 100 or 200 tonnes, which is still modest. One trader in Sape has the capacity to store up to 400 tonnes. Storage facilities are mainly used to assemble local supplies, store shallots for consumption brought into the province during the first six months of the year, and store seed bulbs bought from suppliers in Java. Traders mentioned a lack of capital and high risk as the two main reasons why they have not invested in larger storage facilities.

Inter-island traders sell through three different channels: wholesale markets, the processing industry, and companies in Brebes and Cirebon involved in the shallot export trade. Traditional wholesale markets absorb by far the largest volumes. While small in comparison, the volumes channelled to exporters and processors have strategic importance: exporters offer a premium, low-risk market for top-quality shallots; the processing industry provides an outlet for poor-quality bulbs. These three different channels are discussed below.

4.3.3 The wholesale market channel

Assembly traders and inter-island traders target specific markets where they have an established relation with a few buyers they know well because they have been doing business with them for a long time, are family-related, or both. For example, Pak Ilham, an assembly trader from Ngali village, has been working with an inter-island trader in Aikmal wholesale market, East Lombok, for many years. He will occasionally supply a trader in Bali or his niece, a shallot retailer in Surabaya. Pak Muliadin, the trader from Renda, sells mainly to his elder brother, a wholesaler in Makassar's Penampu market. Pak Hulaemi, a large trader in Wanasaba village, East Lombok, sells to his aunt and uncle and two other buyers in Probolinggo. He also has one client in Banywangi, another in Jember, and a third in Nganjuk.

Long-standing business relations, often underpinned by family ties, are a key ingredient in long-distance traditional trading systems characterised by informal, highly personalised transactions. In such contexts, a high level of trust between trading partners is essential for reducing transaction costs and risks. Trading partners will be reluctant to cheat on each other for fear that this will undermine a business relationship that cannot be easily replaced because of the time it takes to build the necessary trust. Yet, as mentioned in the previous section, despite long and stable business linkages between inter-island traders and wholesale clients, such relations are not underpinned by the provision of buyer

finance. Traders must use their own funds and borrow from relatives, the bank, and pawn shops to finance their operations.

While some traders may supply just one market location, this is not the norm. Many will supply several locations. This has its advantages. It enhances their bargaining power, makes it easier to market produce of heterogeneous quality, and reduces exposure to price risks. Traders supplying markets far apart from each other, say Kalimantan, Sulawesi, West Timor, and Papua, are also able to take advantage of spatial arbitrage opportunities, i.e. to channel supplies to locations where spot market prices minus average transportation costs are higher.

When selling to wholesalers, inter-island traders incur some price risks. They access price information over the phone on a daily basis, often from different markets and sources, but prices can change from one day to another due to short-term fluctuations in supply. Hence, while volumes and quality are agreed and market prices discussed with buyers over the phone, the exact price will be determined when the shallot consignment arrives at its destination.

Shallots channelled through primary wholesale markets are distributed to traditional retailers as well as secondary wholesalers in the area, other locations within the province, other provinces, and even other islands. Some may also be sold to large processing enterprises (Indo-Food and Wings) and small fried shallot processors. For example, one of Pak Hulaemi clients in Probolinggo supplies Indo-Food.

A few wholesalers may channel shallots from Bima or Sumbawa Besar to supermarkets and other modern retailers, but the volumes will be insignificant, for which reason these flows are not represented in Figure 5. The modern retail sector accounts for a very marginal share of the shallot retail trade.

4.3.4 The processing channel

Some 15 traders in Bima have contracts with Indo-Food, the largest shallot processing enterprise in Indonesia. The research team was unable gather information about the nature of this contractual relationship, as it did not interview any of the traders supplying the company. The team did interview one Indo-Food manager in Semarang, but he could not provide information about the relationship with suppliers.

Indo-Food uses shallots in the sauces that come with its instant noodles. These are produced in the company's factory in Cibitung, near Jakarta. Indo-Food buys small, grade C shallots. These are much cheaper than grade A. Indo-Food therefore provides an important outlet for low-quality shallots, which account for a significant 20 to 25% of the harvest in Bima and are the most difficult to market. According to traders in Bima, selling to Indo-Food is not a very interesting business. Prices are low and the company takes one month to pay suppliers. For these reasons, most local inter-island traders have no interest in supplying the company.

4.3.5 The export market channel

At least one large trader in Sape sub-district supplies companies in Brebes linked to the export trade. Another four large traders selling to exporters in Brebes and Cirebon, all based in Lombok, were identified during the fieldwork. Each supplies about 200 tonnes of shallots for export between June and August. These are procured mainly from Sumbawa

Besar. The research team interviewed two of these traders, as well as three companies linked to the export trade, two in Brebes and one in Cirebon.

Pak Hulaemi in East Lombok supplies PT HRD and PT Toko Surabaya in Brebes and PT Banyuwangi Timur in Cirebon. Pak Habibi, a large trader from Mataram, has been supplying PT Gloria in Cirebon for the past three years, although he has been purchasing imported shallots from this company for a longer period. The Director of PT Gloria is the Deputy Chairman of the National Shallot Association.

Each of these companies has been involved in the shallot trading business for more than thirty years. They all have offices in Jakarta and Surabaya, from where they conduct their inter-island, import, and export business. Toko Surabaya owns the only cold storage facility in Brebes district. The company works with farmers growing shallots over an area of 120 hectares, supplying then with planting material and agro-chemicals on credit and buying the crop at harvest time. HRD manages 280 hectares of shallot production. It is unclear whether contract farmers are involved.

Transactions with these companies are coordinated informally, over the phone and by SMS, but unlike traditional wholesalers, prices will be determined a few days before a consignment is sent. Inter-island traders use this price as the basis for determining the price offered to farmers. Hence, they are less exposed to price risks when selling through the export market channel than when supplying traditional wholesalers. However, the two channels are similar as far as financial flows are concerned: none of the two inter-island traders interviewed in Lombok receive advances from companies in Brebes and Cirebon. They are normally paid one week after product delivery.

Companies involved in the export trade may sell directly to buyers outside Indonesia (the case of Gloria) or through intermediary firms that manage the link with overseas customers (the case of HRD and Toko Surabaya). These companies follow similar systems for the importation of shallots for consumption and shallots for propagation. They may import directly or order from importers. Complex licensing procedures and requirements were cited as a major reason why many large shallot trading companies prefer to export and import shallots through other firms.

In 2012, Gloria and Toko Surabaya exported between 5,000 and 6,000 tonnes of shallots each. That year, exports accounted for approximately one-third of their total sales volume. The other two-thirds came from sales to large primary wholesalers in major cities of Java, Sumatra, Kalimantan, and Sulawesi. Residual volumes are sometimes channelled to Indo-Food and small fried shallot processing enterprises.

The relationship between inter-island traders and these companies is based on a two-way product flow. During the June-August period, traders in Lombok sell shallots for the export market. Between January and March, they buy imported shallot for sale in Lombok, Sumbawa, and other eastern islands. Most shallots brought from outside NTB are channelled to wholesalers and inter-district traders in the province through Mandalika market in Mataram. Inflows of shallots for consumption (and for propagation) during the off-season months offer these and other inter-island traders in the province, opportunities for extending the shallot trading season and expanding the scale of their business.

4.4 Quality Management Systems

The quality of the shallot crop has an impact on farm profitability. According to traders, bulb size, shape, firmness, colour, and moisture content were the main quality traits impacting on farm-gate prices. Shallots are often graded by farmers according to size. Grade A is sold for a much higher price than grade C. Some data provided by one large inter-island trader in Lombok is presented in Table 15 for illustration purposes. The figures should be treated as indicative, as they are based on one single interview.

Table 15 Example of purchasing prices paid by an inter-island trader according to grade

	Super-Jumbo	Grade A	Grade B	Grade C
Trader selling price (IDR/kg)	10,500	8,000	6,500-7,500	4,000-5,000

Source: Key informant interviews, December 2012

While more research is needed to develop more robust estimates of quality price differentials, both at the farm-gate and the assembly stage, these seem to be having an influence on technology choices, cultivation practices, and post-harvest management systems. The choice of variety is critical, as it is linked to bulb size, shape, and colour. Farmers in Bima and Sumbawa mainly grow Super-Philip, which have much-appreciated quality traits, including medium-to-large size, round shape, and bright red colour.

While farmers have an incentive to produce quality shallots, there are key variables they cannot control, particularly soil quality, weather, and access to water. This largely explains why the same farmers achieve much higher yields and produce much better quality shallots from their rented farms in Sumbawa Besar than from their own or rented farms in Bima (see Table 16).

Table 16 Share of different grades in Bima and Sumbawa Besar

	Grade A (%)	Grade B (%)	Grade C (%)
Bima	20	50	30
Sumbawa Besar	90	10	0

Source: Fieldwork data, December 2012

After harvest, farmers leave the crop drying on the farm for seven to ten days. Such long drying times are needed because shallots from Bima and Sumbawa Besar are sent to distant markets. Rain does not normally pose a challenge, as most of the crop is harvested between June and October, when the weather is usually dry. In the event of rain, the bulbs are covered with plastic sheets.

The bulbs will often be sorted and bundled by farmers according to size. This task is commonly performed by women. Each bundle will weigh about 5 kilograms. Grade C bulbs will always be sold in separate bundles, as they fetch a much lower price than grades A and B. These two grades may be separated or mixed within the same bundle, depending on buyer preferences. Farmers selling for the export market will select and supply larger bulbs separately, which are then marketed by traders as “Super-Jumbo”. Cases where farmers sell ungraded bulbs were also reported.

The crop will be visually inspected at the time of a transaction. In some cases, traders may ask for a sample before negotiation with farmers. When the shallots supplied do not meet the specifications agreed with the farmer, traders may impose a price penalty. In the

case of shallots for the export market, this was reported to be as high as IDR 2,000 per kilogram.

While collectors may sometimes sort the bundles by grade and remove some foreign matter, sorting, drying, and cleaning functions are more commonly performed by inter-island traders. These sometimes grade the shallots or re-bundle some of the graded bulbs in order to ensure stricter adherence to grade specifications and/or that the needs of specific buyers are met. Traders often leave the bulbs drying for up to two days. Small fans are used when the shallots are dried inside the trader facilities. The shallots are then cleaned and packed into 65kg bags before being loaded onto trucks.

Packing and loading or unloading activities are carried out by men. Bundling may be performed by men, women, or both. Women are often responsible for cleaning and drying the shallots. Labour hired to perform these tasks usually works in teams and is paid by task, according to output. When converted into a daily wage rate, women will generally earn less than men. Using the example of Pak Muliadin, an inter-island trader from Renda, women and men working at his facility will take home around IDR 40,000 and IDR 60,000, respectively, at the end of a working day.

Shallots are transported to downstream markets with the leafy tops, as this will reduce post-harvest losses. Shallots from Bima (and Sumbawa Besar) are transported over long distances, often in poor conditions. The bulbs sent to the eastern islands, for example, are transported in open cargo ships, exposed to the elements for several days. The tops will be removed at key distribution centres, close to terminal markets, or by wholesalers selling to retailers.

The quality standards of inter-island traders in Bima and Lombok will depend on their target markets and the requirements of their clients. Some traders will only sell grades A and B. One of the traders interviewed only sends grade A to his client in Cirebon and grades A and B to his buyers in Surabaya and Banyuwangi. He can supply all grades to Nganjuk. The smallest bulbs are usually sold to one supplier of Indo-Food in Probolinggo.

As expected, the strictest quality standards are applied to shallots assembled for the export market. Inter-island traders must supply mature, well-dried, and firm bulbs with at least 1.5 centimetre diameter, a round shape and bright red colour. The tops should not break easily. In order to meet these requirements, inter-island traders need to be particularly selective in their procurement activities and pay considerable attention to the drying of the bulbs. One large trader in Sape mentioned that, when selling to exporters, he may dry the shallots for up to one week.

Companies in Brebes and Cirebon involved in the export trade will undertake additional drying. Bulbs for the Singaporean and Malaysian markets will be trimmed, whereas shallots for the Thai and Vietnamese markets will be exported in bundles, with the leafy tops on. Some bundles may be re-assembled at the export end to meet importer requirements. Singapore and Malaysia have different bulb size requirements than Thailand and Vietnam. The first two markets mainly buy bulbs with a minimum diameter of 2.5cm, whereas the standard for Thailand and Vietnam is about 1.5cm.

4.5 Problems and Constraints

The research team identified five sets of problems and constraints in the Bima shallot chain. These are discussed below.

4.5.1 Land availability

Rural households in Bima face acute land constraints. The average size of shallot farms in the district is under 0.5 hectares. Households have developed a number of coping strategies, including renting land in Sumbawa Besar and Dompu, wage employment in local farm and non-farm enterprises, self-employment, and migration to areas within the province and country or emigration, particularly to Malaysia. The shallot sub-sector alone provides significant employment opportunities, from the farm up to the product collection and assembly stages.

For example, in 2012, one landless farmer participating in one of the focus group discussions rented a farm plot of 0.3 hectares in Bima for cultivation of shallots. He lacks the resources to develop shallot farming in Sumbawa Besar. In order to complement his income from shallot cultivation, he also worked as a shallot collector and provided regular cleaning services to the local mosque.

4.5.2 Variable quality of planting material

Some informants in Bima referred to the quality of planting material asa major influence on farm yields. It appears that many farmers rely on their own harvest or that of neighbours as a source of planting material. Seed diseases are likely to be a major problem in a context where the same bulbs have been re-planted many times over the years. Traders also complained that they lack knowledge about suppliers of quality planting material and are ill-equipped to assess the quality of seed bulbs procured on Java.

4.5.3 Financial constraints

Nearly all informants in Bima and Lombok, including traders, made reference to finance as a key constraint affecting shallot farm households. Interestingly, the traders interviewed did not place much emphasis on their own capital constraints. They did mention it, however, alongside risk, when asked about opportunities for investment in storage.

Financial constraints inhibit inter-seasonal storage by farmers, with negative impacts on their income. Many farmers are also constrained in their ability to hire labour and purchase inputs because they lack working capital and cannot access affordable credit. This has negative impacts on farm yields and the quality of the shallot crop.

4.5.4 Pests and diseases

Pests and disease problems were alluded to in all the focus group discussions with farmers, and many of the discussions with other key informants. In one interview, it was hinted that a lack of crop rotation, with many farmers growing shallots over two or three consecutive seasons, was a contributing factor. Moreover, it is possible that certain pests have developed resistance to insecticides.

In an attempt to deal with these problems, farmers follow intensive spray programmes. Application of cocktails of chemicals is common practice. Label recommendations regarding application doses are frequently disregarded. It is likely that farmers sometimes apply the wrong insecticides to deal with particular pest problems or spray the crop when insect populations have had the time to develop. Despite facing financial constraints, many local shallot farmers seem to apply excessive amounts of agro-chemicals, with negative impacts on farm profitability, human health, and the environment.

4.5.5 Logistical constraints

Good logistics are important where shallots are sent to other islands. Traders did not raise any issues about the functioning of the Bima port, which is used to ship supplies to islands located north and east of Sumbawa, but the research team heard complaints about ferry services in Lombok and Bali. Some traders claimed that the service is not as regular as they would like and that delays in the schedule are common. This has implications for the quality of the bulbs upon arrival in Bali and Java. Road congestion in Java is also likely to have some impact on the quality of bulbs sent from Bima and Sumbawa Besar.

4.6 Opportunities for Pro-Poor Interventions

4.6.1 Some general considerations

Bima has a much more mature and developed shallot sub-sector than Sampang. Shallot farmers in this district benefit from the existence of a dense network of input retail outlets that are well supplied and offer credit services to a significant number of clients, particularly larger growers. Some of these growers also have access to seasonal loans from inter-island traders, banks, and pawn shops. Furthermore, many farmers in Bima are taking advantage of opportunities to expand shallot production by renting land in Sumbawa Besar district. Traders have good links to a wide range of markets in different islands, particularly in the traditional wholesale trade. Some also supply the processing industry, a small but important channel as it provides an outlet for the lowest-quality shallots. The export market segment is also small but pays a significant price premium. Local quality management systems are organised to meet the requirements of buyers in each of these three market channels. It is not easy to identify opportunities for chain upgrading in such a mature context.

The interventions proposed focus on the development of storage, the promotion of true seed shallot, and an upgrading of conventional seed bulb chains. Storage has the potential to increase the prices that farmers receive for their crop. Improvements in seed chains, in turn, can have significant positive impacts on farm productivity. Both outcomes are critically important in the context of acute land access constraints and where shallots are a major source of income for large numbers of farmers.

The promotion of true seed shallot has already been selected by AIPD-Rural as an area for intervention (Swisscontact, 2013a). Interestingly, the intervention envisaged by the project has the potential to also address key knowledge gaps in fertilisation, pest management, and disease control. AIPD-Rural is also assessing the opportunity to support the establishment of an assembly market in Bima, under a public-private partnership model (Swisscontact, 2013b). Some reflections on the rationale for this intervention are presented in this section with a view to inform the thinking around the idea.

4.6.2 Developing a local market for true seed shallot

AIPD-Rural has identified an opportunity for promoting adoption of true seed shallot in Bima and Sumbawa Besar through a partnership with two private sector actors: EWINDO and CV PHS. EWINDO has selected Bima as a target district for increasing sales of Tuk Tuk seed. The company has established one small pilot nursery in Lambu sub-district that will supply planting bulbs to farmers and has plans to develop other local nurseries in the

coming years. CV PHS has been testing the performance of different true seed shallot varieties and cultivation methods on its farm in Sumbawa Besar.

At the time of writing, the EWINDO model for production and multiplication of mini-bulbs was still under development. It is likely that smallholders managing nursery and multiplication farms with technical and financial assistance from the company will be involved. These farmers will supply planting material as well as technical advice to other farmers in the district. An intervention with EWINDO will focus on the Tuk Tuk variety, as Sanren seed is not yet available in sufficient quantities for commercial development.

Maserati, a Dutch variety that produces higher yields than both Sanren and Tuk Tuk, will be the main focus of the intervention in Sumbawa Besar. CV PHS is already growing this variety on its own farm. The company is currently in the process of developing a smallholder contract farming system for production of G1 from mini-bulbs supplied by CV PHS, with participation by 20 growers. Contract farmers will receive technical assistance and mechanised land preparation services from the company. Each will also borrow one irrigation pump and one power sprayer for the duration of the contract. CV PHS will buy back G1 seed bulbs according to a pre-determined pricing formula for further multiplication on its own farm and subsequent distribution as planting material to local farmers. AIPD-Rural will provide some financial assistance for the purchase of equipment and support the development of manuals for transfer of technical knowledge to contract growers and farmers buying clean planting material from CV PHS. It is projected that 250 farmers in Sumbawa Besar will adopt true seed shallot during the first two years of the intervention, with the number of adopters increasing to 1,000 or more by the fourth year.

These collaborative initiatives are likely to address one of the bottlenecks that have hindered adoption of true seed shallot in Indonesia, namely the lack of technical knowledge for production of G0 and G1 bulbs. Provision of financial assistance to farmers developing multiplication farms and of technical services to farmers propagating true seed shallot bulbs are two other important features of the intervention.

It is still unclear, however, whether a significant number of farmers in Bima and Sumbawa Besar will shift from conventional seed bulbs to true seed shallot bulbs. The fact that true seed shallot does not fit with current crop rotations because of its longer growing cycle constitutes a major barrier to adoption. Farmers will therefore need to be rewarded with a significant increase in yields. In Sumbawa Besar, where the conditions for shallot cultivation are very favourable, current yields are already much higher than the national average. Tuk Tuk, the chosen variety for Bima, is very sensitive to rain and therefore a risky option. There are also some questions about its marketability.

It is important that AIPD-Rural is aware of these challenges. For example, it is recommended that the project considers adding a market research and linkage component to the intervention. In addition, it is crucial that the monitoring and evaluation system is designed to provide a sound understanding of the conditions favouring adoption of true seed shallot, including agro-climatic factors, farmer attitudes and farming systems. Outcomes and impacts will need to be monitored and evaluated on a regular basis, and the findings used to inform business models and targeting strategies. These may need to be refined over the course of the intervention.

4.6.3 Upgrading conventional seed bulb chains

True seed shallot does not provide the only possible avenue for improving the quality of planting material used by farmers. A parallel strategy aimed at upgrading the structure, conduct, and performance of conventional seed bulb chains is recommended. Two options are presented for consideration.

The development of linkages between traders in Bima and suppliers of certified or good quality Super-Philip in East Java is one possible intervention. The role of AIPD-Rural would be to identify such suppliers and facilitate trader visits to their farms or premises for discussion of future transactions.

Another option would be to support the development of certified producers of Super-Philip seed bulbs in Bima. Farmers supported under the Katamocha selection and multiplication programme and traders are two potential target groups. The intervention would need to include a technology transfer component. Backward linkages to good suppliers of planting material would also need to be developed. Dinas Pertanian could be involved as the certifying body. A market promotion component consisting of farmer visits to certified seed bulb production farms could also be considered in order to build the demand for locally produced planting material. The traders and farmers involved could be asked to contribute to the cost of the intervention.

4.6.4 Developing storage for off-season marketing

Investment in storage capacity by shallot farm households would enable an increase in inter-seasonal arbitrage, whereby a larger share of the September or October harvest would be retained for sale in November or December, for a profit. At the moment, few farmers store part of their September-October harvest because many cannot afford the investment and risk, or they face acute liquidity constraints, or both.

AIPD-Rural could consider developing a co-funding scheme similar to that proposed for Sampang. In this case, farmers, not traders, would be the main target group. The purpose of such a scheme would be to overcome farmers' reluctance to invest in storage facilities due to a lack of investment funds. The development of crop storage protocols would help farmers to minimize post-harvest losses and therefore could be justified as a complementary intervention.

A simple, somewhat speculative exercise suggests that storage can be a profitable enterprise. Let's take the example of a family who, after investing in appropriate facilities with financial assistance from AIPD-Rural, stores 2 tonnes for two months, from October to December. Let's also consider a 20% weight loss during that period. And let's assume that the shallots are sold in December for IDR 6,500 per kilogram, compared to a price of IDR 4,500 in October. The farmer in question would earn an additional net income of IDR 1.4 million, i.e. about US$ 150. If 500 households in Bima had also developed storage capacity with the assistance of the project and done the same as the household in our example, the impact of the intervention that year would amount to US$ 75,000.

The research team is not recommending the inclusion of traders as direct beneficiaries of the co-funding scheme because the impacts at the farm level would be relatively small. Storage by traders in NTB would only increase farm-gate prices during September and October if developed to such an extent that it had a discernible impact on the overall supply. This is an unlikely scenario. Let's assume that 50 traders were to join the scheme and that each would expand the volumes stored in September and October by 100 tonnes as a result. This would lead to a reduction of supplies from NTB to Bali, Java, and other islands during those two months of 5,000 tonnes, i.e. about 80 tonnes per day. Such a reduction is unlikely to impact on prices in destination markets.

The inclusion of traders as beneficiaries of the co-funding scheme should only be considered if their involvement was conditional on the provision of storage services to

farmers. In other words, traders accessing funds for investment in storage would make their facilities available to farmers, who could use them to store their shallots in exchange for a fee. This model would only succeed if efficient and effective mechanisms for addressing likely conflicts around weight and quality losses during storage are built into the contractual arrangements between service providers and farmers.

AIPD-Rural sees farmer organisations as a possible vehicle for development of storage for off-season marketing (Swisscontact, 2013b). The study team has a different view: it does not regard collective action in the storage sphere as an important enabling condition. Shallot growers have small farms, typically harvesting between 2 tonnes and 20 tonnes per season. Hence, they can keep part of their harvest in a relatively small store. Collective action could be justified if farmers were to enjoy economies of scale in marketing, thereby having an incentive to assemble bulk volumes to be marketed by a representative organisation or group later in the year. However, at that time, local prices are higher than in Java, which is the main source of shallots consumed in NTB. Consequently, farmers will face no problems selling small volumes in local markets for a relatively high price.

The only plausible argument in favour of collective storage would be a situation where farmers lack the space around their houses to build storage units. This seems to be the case in Ngali village of Belo sub-district, for example. In such contexts, it may make sense for farmers to collaborate and invest in a joint storage unit on land purchased for that purpose. The benefits of such venture will have to be weighed against the costs and risks of collective action. These are often under-estimated.

4.6.5 Establishing an assembly market in Bima

The establishment of an assembly market in Bima has been proposed on the grounds that this would allow traders to increase volumes, while also improving the flow and quality of market information and enabling the development of services such as sorting and grading (Swisscontact, 2013b). The research team has a different view about the rationale for establishment of an assembly market, as it cannot see how this would lead to a significant improvement in the conduct and performance of the local shallot value chain.

Procurement systems in Bima are fairly similar to those adopted by traders operating in shallot assembly markets in major production areas of Java. These are based on informal and fairly stable relations with upstream suppliers and downstream buyers. Transactions are agreed and coordinated at distance, over the phone, before the shallots arrive in the market. In other words, shallot assembly markets in Indonesia do not function as an auction, with buyers making offers for specific supplies as they arrive in the market.

Sorting and grading in Bima are performed by farmers and traders according to market standards and buyer requirements. The study team cannot envisage major improvements in these marketing functions as a result of a physical market. Moreover, the study team found no evident weaknesses in the flow of price information. Prices are determined in major terminal consumer markets according to prevailing supply and demand conditions. Traders in Bima access this information on a daily basis and use it to determine the prices they are willing to offer. During harvest farmers in the district also have regular access to price information: they learn about prices from other growers and from traders. One cannot over-emphasise the ability of shallot farm households to receive a fair price, within a local context characterised by the presence of many competing traders, multiple daily transactions and where shallots are a critical source of household income. An assembly

market is unlikely to bring about significant improvements in access to market information by farmers or traders.

5 Key Research Findings, Recommendations, and Gaps

5.1 Socio-Economic Importance of Shallot

Shallot has clear socio-economic importance in Indonesia, not only in districts where it is a major crop, but also at the national level. It is the third most important vegetable in terms of cultivated area and the second most important in terms of household expenditure. Shallot is an important component of household livelihood portfolios in many rural areas of Java and NTB, where a large number of households grow it as a cash crop or have one or more members working as wage labour on shallot farms and for trading enterprises. Outside production areas, significant employment is created in the transportation, handling, processing, and retailing of shallot bulbs.

Special attention is paid in this study to the production and marketing of shallots in two AIPD target districts: Sampang and Bima. Sampang has the highest poverty rate in East Java: over 75% of the district population is either income-poor or has an income just above the poverty line (Collin Higgins Consulting Group, 2012). Shallots are the main cash crop in Sokobanah, one of the poorest sub-districts of Sampang. In Bima, nearly 60% of the population lives below or just above the poverty line (Collin Higgins Consulting Group, 2012). In this district, shallots are the main source of farm income and employment. AIPD-Rural has already started designing some interventions in the Bima shallot chain. Such interest is justified by the potential socio-economic impacts of improvements in shallot production and marketing in that district.

5.2 Gender Issues

Women are heavily involved in all stages of the shallot chain, from cultivation to post-harvest handling, wholesaling, retailing, and processing. In such a context, both women and children are likely to benefit from improvements in the profitability of shallot farming and increased opportunities for self- or wage-employment along the shallot chain. High female participation rates are conducive to intra-household decision-making processes where women have a say about the allocation of revenues from the sale of shallots and wage income from work on shallot farms and for trading enterprises. As in the case of other crops, however, women consistently earn lower wages than men. In the areas visited by the study team, the wages paid to men were 10 to 50% higher than those paid to women.

5.3 Environmental Issues

As in the case of other vegetable crops, the spraying of chemicals for pest and disease control constitutes the main environmental (and human health) issue in the shallot sub-sector. Large amounts of fungicides and insecticides are applied on shallot farms, often with poor results, partly because of incorrect choice of chemicals. Impacts on the health of farmers and farm workers are a particularly serious issue, as no protective masks, clothing, or footwear are used when the crop is sprayed. Consumers are likely to be affected by high levels of chemical residues in the bulbs. Problems associated with

excessive and incorrect use of agro-chemicals are more acute in Bima than in Sampang due to far more frequent spraying of the shallot crops.

While there is scope for reducing the negative impacts of spraying on the environment and human health, this is a very challenging task. There are many barriers to widespread change in spray practices, including a lack of critical knowledge within the agricultural extension system, a lack of price incentives for production of shallot bulbs that are safe for human consumption, and farmers' strong resistance to wearing protective masks, clothes, and footwear.

5.4 Structure, Conduct and Performance of Shallot Value Chains

Bima has a much more mature and developed shallot value chain landscape than Sampang. Farmers in this district benefit from the existence of a dense network of well-stocked input retail outlets and a large concentration of shallot traders. A significant number access credit from input retailers, banks, pawn shops, and inter-island traders. Many are also taking advantage of opportunities for expanding production by renting land in Sumbawa Besar. The marketing system is characterised by strong competition at all levels, with limited opportunities for unfair pricing. Local traders have well-established links to wholesale buyers on different islands. Some supply the processing industry, a small but important channel that provides an outlet for low-quality bulbs, as well as the export market segment, which is also small but pays a significant price premium. Local quality management systems are organised to meet the requirements of buyers in these different market segments.

The quality of planting material was identified as one of the weaknesses of the Bima shallot chain, with negative impacts on farm productivity. Knowledge transfer systems are also weak, with farmers having limited access to advisory services on critical areas such as fertilisation and disease and pest management. Storage of shallots for sale during the off-season remains somewhat underdeveloped due to capital and liquidity constraints at the farmer and trader level and the reluctance of local chain actors to expose themselves to marketing risk. Poor functioning of ferry services to Bali and East Java is an issue of concern to some traders.

In Sampang, farmers rely on outlets outside the sub-district for the purchase of agro-chemicals, have very poor access to chain financing and institutional loans, and follow low-input production strategies. They have had limited exposure to new varieties and lack critical knowledge on cultivation. Farmers and traders benefit from proximity to Surabaya and other large consumption centres in Java and face limited competition from production areas outside Madura, as shallots are marketed during the off-season. The local harvest is sold in spot markets and through traditional market channels. As in the case of Bima, spot market transactions are the norm. Direct sales to markets outside Java could potentially result in higher farm-gate prices, but at the moment local traders lack the necessary links to wholesale buyers on islands such as Bali, Kalimantan, Sulawesi, Flores, or Timor.

5.5 Opportunities for Intervention

In Indonesia, the shallot marketing system is characterised by informal transactions in traditional spot markets. Sampang and Bima are no exception. This presents a challenging context for value chain upgrading interventions. Shallot trading enterprises

manage relatively small volumes and operate in mature and relatively undifferentiated markets characterised by fierce competition. These companies seem to lack the means, expertise, and/or incentives to lead chain upgrading processes. Processing enterprises are very price-sensitive and purchase the lowest-quality bulbs, having no interest in acting as agents of change. Modern retailers have a very marginal share of the market. They buy small volumes of standard-quality bulbs from a select number of small trading enterprises that can cope with delayed payment and other contractual requirements and that operate on the basis of small-volume, high-margin business models. Chemical companies lack clear incentives for knowledge transfer on pest and disease management, in part because such investments have positive externalities, i.e. any commercial benefits would be shared with competing firms. Knowledge transfer by such companies is also unlikely to result in a significant expansion of their market, as farmers are already applying excessive levels of fungicides and pesticides.

An increase in farm productivity and improvements in farm-gate prices are the two most obvious pathways for pro-poor impacts at scale in the shallot sub-sector. Despite a challenging context, some intervention options with the potential to achieve these outcomes, with the involvement of local chain players, have been identified in this study. Intervention strategies that address critical knowledge and social capital barriers, while lowering the costs and risks of participation by farmers and traders , are proposed.

For Sampang, emphasis is given to the testing of new varieties and the development of linkages between local traders and outside suppliers of quality planting material; the testing of new markets outside Java and the facilitation of linkages between local traders and wholesale buyers in these markets; and subsidisation of investments in drying and storage facilities by village traders targeting new and distant markets. Local traders can benefit directly from innovations in these areas, a critical condition for their involvement as partners in piloting processes facilitated by AIPD-Rural.

While no opportunities for development of new, downstream market channels were identified in Bima, there is potential for improving the profitability of shallot cultivation through an upgrading of seed chains and the development of storage at the farmer level. Three options are discussed in the report including: the piloting of true seed shallot with the involvement of a large seed company and a private shallot farming enterprise; interventions to improve the production and marketing of conventional seed bulbs; and subsidies to farmers investing in storage facilities.

5.6 Research Gaps

Most research to date on the Indonesian shallot sub-sector has focused on farmer varietal choices and pest management practiceswithin specific districts, in particular Brebes and Cirebon. The team could not find any major studies on shallot production and marketing in other strategic locations. This is the case for Nganjuk, which has the largest area under production in East Java and the second largest in Indonesia; Probolinggo, which supplies the best-quality bulbs; Madura Island, the main source of domestic supplies during the May and April months and an obvious area for development of off-season production; and Bima and Sumbawa Besar, which account for the bulk of supplies from NTB.

This study provides some understanding of shallot production and marketing systems in Sampang, Bima and Sumbawa Besar. However, a study such as this one, based on rapid appraisal methods and less than three weeks of fieldwork, cannot provide complete

answers to many critical questions. Understandably, many of the intervention opportunities identified have a strong action-research element. A clear understanding of the feasibility of the proposed innovations can only be developed through carefully-designed pilot interventions involving local and other chain players.

For example, the potential for adoption of true seed shallot remains unclear due to the level of innovation required and the trade-offs involved. A much clearer perspective on this issue will be gained during pilot interventions by AIPD-Rural. The project will soon test new models for the commercial development of true seed shallot varieties in Bima and Sumbawa Besar in partnership with two private sector enterprises. This constitutes the most ambitious attempt to date to mainstream these varieties within smallholder shallot production systems in Indonesia.

The scope for mainstreaming new conventional varieties in a district such as Sampang is also unclear because such varieties have not yet been properly tested on local farms. There is a need for greater understanding of conventional seed bulb production and marketing systems in a district such as Bima, to be able to assess upgrading options and strategies. Consequently, the seed chain interventions proposed in this study have a strong learning component. Similar remarks apply to the development of inter-island trade from Sampang, another recommended area for intervention. In theory, diversification of product flows to markets outside Java offers an opportunity for improving the prices that farmers in Sampang fetch for their crop, but this hypothesis can only be tested through commercial trials with active involvement of local traders.

Finally, no interventions in the export chain are discussed in this report, despite the strategic importance of export development in the context of stagnant price trends. This is because a proper understanding of the true potential for export growth and the type of strategic sub-sector interventions likely to address key bottlenecks or constraints is missing. Indeed, no research on the Indonesian shallot export chain has been conducted to date. Shallot exports from Indonesia have stagnated at very low levels, but whether this is due to supply-side factors, limited import demand in the Asian region, or both, is unclear.

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7 Annexes

Annex 1: Field work schedule

Dates	Location	Purpose
4-5 December 2012	Kediri Travel to Nganjuk	Interviews with wholesalers in Nggrongo and Pare markets
6 December	Nganjuk Travel to Surabaya	Interviews with Dinas staff, Chairman of the East Java Shallot Association, farmers and wholesalers in Sokomoro market
7-9 December	Surabaya Travel to Sampang	Interviews with traditional wholesalers in Keputran and Pabean markets, retailers in Wonokromo market, and supermarkets
10-12 December	Sampang	Interviews with extension staff in Sampang town, input dealers in Sokobanah sub-district and Sampang town, and farmers and traders in Sokobanah
16 December	Travel to Mataram Mataram	Interviews with shallot traders
17 December	West Lombok Travel to Bima	Interview with seed bulb producers
18-20 December	Bima	Interviews with Dinas staff in Bima town and with farmers and traders in Belo sub-district and Sape sub-district
21 December	Travel back to Lombok East Lombok	Interview with one inter-island trader in Wanasaba sub-district of East Lombok
27 December	Semarang	Interview with Indo-Food
3 January 2013	Brebes	Interview with two shallot importers-exporters
4 January	Cirebon	Interview with one shallot importer-exporter
19-21 May	Travel to Surabaya Surabaya Travel to Sampang	Interviews with shallot wholesalers in Keputran and Pabean markets Interview with one fried shallot processor
22-23 May	Sampang	Interviews with extension officers, farmers, and traders in Sokobanah sub-district
4 June	Denpasar	Interview with Frans Serhalawan from CV. PHS

Annex 2: Checklists

Input Suppliers	
1. Background information	▪ Location/address/contact ▪ No. and location of field staff (if seed or agro-chemical company) ▪ Product portfolio ▪ Other background information
2. Technical know-how	▪ Knowledge of shallot cultivation and post-harvest technologies ▪ Sources of technical information and knowledge about shallot ▪ Knowledge gaps
3. Input sales	▪ Inputs sold to shallot growers (including brands) ▪ Gaps in product portfolio and reasons ▪ Importance of shallot growers as clients ▪ Main barriers to an increase in input sales to shallot growers ▪ Strategies to increase input sales
4. Environment and human health	▪ Environmental and human safety issues associated with agro-chemical use ▪ Are farmers aware of these issues? Are these issues discussed with farmers?
5. Linkages with suppliers	▪ From whom does the retailer purchase agro-chemicals? ▪ Services provided by suppliers (training, trials and demos, technical information, samples, credit, etc.) ▪ Strengths and weaknesses in the relationship with suppliers
6. Linkages with buyers	▪ Profile of buyers (farmers versus traders, gender, location, etc.) ▪ Services provided to buyers (technical information and advice, trials and demos, product samples, credit, …) ▪ Strengths and weaknesses in the relationship with buyers
7. Constraints, opportunities and interventions (wrap-up)	▪ Key constraints faced by the retailer (w/ranking) ▪ Opportunities for increasing input sales to shallot growers ▪ Does the key informant see any opportunities for collaboration with a development project intervening in the shallot sub-sector? If yes, what are the opportunities for collaboration?

Farmers (Focus Group Discussions)	
1. Background information	▪ Village / district ▪ Number of households living in the village
2. Socio-economic importance of shallots	▪ Ranking of crops in terms of area and income ▪ Importance of livestock ▪ Ranking of household income sources (farm and non-farm) ▪ Approximate contribution of shallot to household income: < 10%; <20%; … ▪ How typical or atypical is the village as far as the socio-economic importance of shallot is concerned?
3. Shallot development processes	▪ Timeline of shallot production and marketing development in the village; comparison w/ other villages
4. Typology of shallot growers	▪ Approximate % of households in the village that grow shallots ▪ Typical farm size and range
5. Shallot production systems	▪ Shallot varieties grown in the village, ranking of varieties, and differences with other villages in the area ▪ Reasons behind varietal choices ▪ Planting and harvesting times ▪ Irrigation, fertilisation, disease and pest control, other cultivation practices ▪ Harvest and post-harvest practices ▪ Hiring of labour ▪ Key changes in cultivation and post-harvest practices (last 5 years) ▪ Possible improvements to current production and post-harvest systems ▪ Factors driving or hindering technology adoption (e.g. price incentives, technical know-how, physical access to inputs, cost of inputs, other)
6. Gender (production)	▪ Gender division of labour within the household ▪ Gender composition of hired labour ▪ Gender roles in input purchases and product sales
7. Environment and human safety	▪ Key environmental issues in shallot cultivation ▪ On-farm use of chemicals; storage and handling of agro-chemicals

8. Input purchases	▪ Input suppliers, including bulbs for propagation (profile and location) ▪ No. of input dealers in the area and distance ▪ Input payment procedures (prompt/delayed payment; payment in kind) ▪ Provision of technical information and advice by input suppliers ▪ Other services provided by input suppliers (e.g. credit, trials and demonstrations, free product samples) ▪ Constraints/problems in access to inputs (price incentives, technical know-how, physical access, cost, credit, etc.)
9. Buyers and transactions	▪ Buyers of shallot bulbs and their relative importance ▪ Number of shallot collectors/buyers in the area ▪ Stability in farmers-buyer relationship ▪ Forms of payment (advance payment, on the spot, delayed payments) ▪ Services provided by collectors and other buyers (inputs, credit, …) ▪ Information flows between farmers and buyers (technical/market) ▪ Strengths and weaknesses in the relationship with buyers
10. Product quality	▪ Quality standards of buyers ▪ Farmers' awareness and assessment of the quality of their shallot
11. Prices	▪ Price trends (farm-gate) and expectations about future prices ▪ Price seasonality (farm-gate) ▪ Price differences between different varieties, grades, and qualities ▪ Price determination processes (negotiation, competition between buyers)
12. Sources of technical information	▪ Main sources of technical information (ranking and gender differences) ▪ Assessment of different sources (regularity of interaction, type of information provided, and reliability of the information provided) ▪ Knowledge gaps (cultivation and post-harvest, incl. gender differences)
13. Sources of market information	▪ Main sources of market information (ranking and gender differences) ▪ Assessment of different sources (regularity of interaction, type of information provided, and reliability of the information provided) ▪ Strengths and weaknesses in farmers' knowledge of markets (incl. differences between men and women)
14. Credit	▪ Sources of credit for households in the village (formal and informal) ▪ Ranking of credit sources in terms of their importance ▪ Advantages and disadvantages of different sources of credit ▪ Changes in access to credit over the past 5 years ▪ Gender differences in access to credit

15. Constraints and opportunities	▪ Key problems and constraints (production and marketing) ▪ Key opportunities (production and marketing) ▪ Barriers to access to these opportunities ▪ Recommendations for intervention: what type of interventions would enable farmers to improve shallot production and marketing? Please prioritise…

Collectors and Assembly Traders	
1. Background information	▪ Location/address/contact ▪ Number of years trading shallots
2. Shallot sales	▪ Tons of shallot traded per annum (last 3 years) ▪ Distribution of sales within the year and changes over the past 3 years ▪ Challenges and strategies to increase shallot sales
3. Varieties	▪ Varieties traded ▪ Share of different varieties, and reasons ▪ Recent changes in variety portfolio, and reasons ▪ Assessment of different varieties (agronomic performance, seasonality, appearance, eating quality, consumer demand, export potential, price)
4. Production systems in the area	▪ Cultivation and post-harvest practices ▪ Farm productivity and product quality; changes over the past three years and reasons ▪ Innovations with greatest potential to increase farm productivity and incomes, and barriers ▪ Environmental issues associated with local shallot production systems
5. Linkages with suppliers	▪ Villages from where the trader procures shallot ▪ Number of shallot farmers supplying the trader ▪ Does the trader buy from the same farmers in different years? ▪ Services provided to farmers (e.g. input credit) ▪ Information flows from the trader to farmers, and vice-versa ▪ Purchasing conditions set by the trader (variety, quality, pricing, payment procedures, other) ▪ How does the trader coordinate purchases from farmers? How is the negotiation process conducted? ▪ Strengths and weaknesses in the relationship with farmers
6. Linkages with buyers	▪ Main buyers, their profile (location, legal status, scale) ▪ Changes in the last 3 years and reasons ▪ Stability in the relationship with buyers ▪ Services provided by buyers (e.g. advances) ▪ Information flows from the trader to buyers, and vice-versa ▪ Conditions set by buyers (quality, volumes, delivery times, pricing, payment procedures, other) ▪ Contractual relationship with buyers, coordination of supplies, negotiation of transactions…

	▪ Strengths and weaknesses in the relationship with buyers
7. Quality management systems	▪ Quality grades and standards applied by the trader and buyers ▪ Quality management systems by the trader, upstream suppliers and downstream buyers (e.g. sorting, grading, packaging, transportation) ▪ Coordination systems for compliance with quality grades and standards ▪ Sanctions for non-compliance ▪ Strengths and weaknesses in quality management systems ▪ Typical quantitative and qualitative product losses experienced ▪ Strategies to improve quality management and challenges
8. Sources of market information	▪ Main sources of information about shallot markets (ranking) ▪ Assessment of different sources of market information (regularity of interaction, type of information provided, and reliability of the information) ▪ Gaps in market information and market know-how
9. Services	▪ Key external services for a successful shallot trading business ▪ Who provides these services? ▪ Main weaknesses and gaps in service provision; how can these be addressed?
10. Gender	▪ Gender of suppliers ▪ Gender of collectors and assembly traders ▪ Gender of buyers
11. Prices	▪ Current purchasing and selling prices ▪ Price trends, expectations about future prices, and reasons ▪ Differences in the prices paid by different buyers ▪ Price seasonality ▪ Current shallot purchasing and selling prices for different varieties and grades
12. Costs	▪ Main marketing costs (variable and fixed) ▪ Costs per ton sold
13. Business environment	▪ Assessment of the policy and regulatory environment ▪ Assessment of support infrastructure ▪ Assessment of other business environment dimensions

14. Constraints, opportunities and interventions (wrap-up)	▪ Opportunities for the development of the shallot collection business ▪ Strategies and barriers to develop or access these opportunities ▪ Key challenges and constraints (w/prioritisation) ▪ What should be done to address challenges and constraints? ▪ Recommendations for public and project interventions aimed at enabling these developments ▪ Does the trader see any opportunities for collaboration with a development project intervening in the shallot sub-sector? If not, why not? If yes, what are the opportunities for collaboration? How would s/he rank them?

Wholesalers / Inter-island Traders	
1. Background information	▪ Location/address/contact ▪ Range of vegetables traded ▪ Number of years trading shallots
2. Shallot sales	▪ Tonnes of shallots traded per annum ▪ Distribution of sales within the year ▪ Different market channels and their relative importance ▪ Growth trends in different market channels/segments ▪ Challenges and strategies to increase shallot sales
3. Varieties	▪ Varieties traded ▪ Ranking of different varieties according to sales, and reasons ▪ Differences in varieties traded per market channel or type of client ▪ Key changes in the variety portfolio (last 3 years) and reasons ▪ Assessment of different varieties in terms of seasonality, appearance, eating quality, consumer demand, export potential, and market prices
4. Supplying areas	▪ Relative importance of different provinces / districts, and reasons ▪ Differences between supplying areas in terms of variety and quality ▪ Changes in the relative importance of different supplying areas, and reasons
5. Linkages with suppliers	▪ Type and profile of suppliers, and relative importance ▪ Services provided by the trader to suppliers (e.g. advances) ▪ Information flows from the trader to suppliers, and vice-versa ▪ Purchasing conditions set by the trader (variety, quality, pricing, payment procedures, other) ▪ Does the trader have a contractual relationship with suppliers? If yes, what are the terms of the contract? If not, how does s/he coordinate with suppliers? How is the negotiation process conducted? ▪ Strengths and weaknesses in the relationship with suppliers ▪ Trader's strategy to address weaknesses in the relationship with suppliers
6. Linkages with buyers	▪ Main buyers: location, legal status, and scale ▪ Changes in buyer portfolio during the last 3 years, and reasons ▪ Services received from buyers (e.g. advisory, market information, …) ▪ Information flows from the trader to buyers, and vice-versa ▪ Conditions set by buyers (quality, volumes, delivery times, pricing, payment procedures, other) ▪ Does the trader have a contractual relationship with buyers? If yes, what are the terms of the contract? If not, how does s/he coordinate with buyers?

	How are transactions negotiated? ▪ Strengths and weaknesses in the relationship with buyers and strategies to address weaknesses
7. Quality management systems	▪ Quality grades and standards of the trader and buyers ▪ Quality management systems by the trader, upstream suppliers, and downstream buyers ▪ Coordination systems for ensuring that quality grades and standards are met ▪ Sanctions to suppliers and the trader for non-compliance ▪ Strengths and weaknesses in quality management systems ▪ Typical quantitative and qualitative product losses experienced
8. Sources of market information	▪ Trader's assessment of his/her access to information about shallot markets ▪ Main sources of information about shallot markets ▪ Assessment of different sources of market information (regularity, type of information, and reliability of the information) ▪ Gaps in market know-how
9. Prices	▪ Current purchasing and selling prices (different varieties, different grades) ▪ Shallot price trends for different varieties, and reasons ▪ Are there any clear differences in the prices paid by different buyers? ▪ Price seasonality within Indonesia
10. Costs	▪ Main costs to the wholesaler (variable and fixed) ▪ Costs per tonne sold
11. Business environment	▪ Assessment of the policy and regulatory environment in Indonesia ▪ Trader's assessment of support infrastructure ▪ Trader's assessment of other important business environment dimensions
12. Constraints, opportunities and interventions (wrap-up)	▪ Key opportunities for the development of the shallot trading business ▪ Barriers to develop or access these opportunities ▪ Strategies to develop or access these opportunities ▪ Key challenges and constraints (w/prioritisation) ▪ What should be done to address challenges and constraints? ▪ What are the key changes or developments that can enable the development of shallot trading? What needs to change? What are the key innovations required? ▪ Recommendations for public and project interventions aimed at enabling these developments ▪ Does the trader see any opportunities for collaboration with a development project intervening in the mango sub-sector?

Traditional Retailers	
1. Background information	• Location/address/contact
2. Shallot sales	• Quantity of shallot sold per week/month/year • Seasonality in shallot sales • Share of Indonesian and imported shallots in total sales • Timing and trends in the sale of imported shallots • Origin of imported shallots
3. Varieties	• Varieties sold • Share of different varieties in shallot sales • Key changes in the variety portfolio (last three years) and reasons • Assessment of different varieties in terms of seasonality, appearance, eating quality, consumer demand, export potential, and market price
4. Linkages with suppliers	• Type and profile of suppliers • Information flows from the retailer to suppliers, and vice-versa • Strengths and weaknesses in the relationship with suppliers
5. Quality management systems	• Quality grades and standards at the retail end • Typical quantitative and qualitative product losses at the retail end
6. Gender	• Gender of traditional retailers
7. Prices	• Price differences between varieties and grades, and reasons • Price seasonality, and reasons • Current shallot purchasing and selling prices (different varieties, different grades)
8. Costs	▪ Main costs to the retailer (variable and fixed) ▪ Costs per kg

Modern Retailers	
1. Background information	▪ Location/address/contact ▪ Number of outlets and geographical distribution ▪ Offices responsible for procurement of vegetables
2. Shallot sales	▪ Weekly / monthly / annual shallot sales ▪ Tends in shallot sales (last 3 years) ▪ Seasonality in shallot sales ▪ Ranking of varieties according to sales volume ▪ Trends in the sale of different varieties, and reasons ▪ Share of Indonesian and imported shallots in total sales ▪ Timing and trends in the sale of imported shallot, and reasons ▪ Origin of imported shallots, and reasons
3. Linkages with domestic suppliers	▪ Origin of shallots within Indonesia, and reasons ▪ Who supplies shallots to the retailer? ▪ Requirements to become a registered supplier ▪ Number and profile of suppliers (location, scale, legal status, etc.) ▪ Stability/changes in the supplier portfolio ▪ Terms of the contract with shallot suppliers (e.g. quality, volumes, delivery times, pricing, payment procedures, other) ▪ Strengths and weaknesses in the relationship with suppliers
4. Quality management systems	▪ Quality specifications of the retailer ▪ How have these changed over the past 3 or 5 years? ▪ Sanctions for non-compliance with quality standards (and other contractual requirements) ▪ Strengths and weaknesses in quality management systems along the retailer's shallot chain
5. Prices	▪ Price differences across varieties and grades ▪ Differences between the price of local and imported shallots ▪ Seasonality of shallot prices
6. Opportunities and interventions (wrap-up)	▪ Opportunities for development of contractual relationships with new suppliers ▪ Recommendations for public and project interventions aimed at supporting the development of high-quality modern retail chains for shallot ▪ Does the supermarket see any opportunities for collaboration with a development project intervening in the shallot sub-sector? If yes, what should be the focus of the collaboration?

Exporters	
1. Background information	▪ Location/address/contact ▪ Number of employees ▪ Number of years exporting shallot
2. Shallot exports	▪ Quantity of shallot exported in the last 3 years, and reasons behind inter-annual variations ▪ Relative importance of exports (% of total shallot sales, with indication of other market channels) ▪ Timing of shallot exports and reasons ▪ Varieties exported and reasons ▪ Export potential of different varieties ▪ Strengths and weaknesses of Indonesia as a shallot exporter ▪ Potential for development of shallot exports
3. Destination markets, regulations and requirements in these markets	▪ Destination markets, relative importance, and reasons ▪ Main competitors in these markets ▪ Export regulations in Indonesia ▪ Import regulations in destination markets ▪ Quality and other requirements in different export markets
4. Quality management systems	▪ Export quality standards ▪ Quality management systems by the company and upstream suppliers (e.g. cleaning, drying, sorting, grading, packaging) ▪ Coordination systems for ensuring compliance with export standards ▪ Strengths and weaknesses of quality management systems along the exporter's chain ▪ Sanctions for non-compliance with importers' requirements ▪ Typical quantitative and qualitative losses in the shallot export trade ▪ Quality of shallot exported by the company and competitors in Indonesia
5. Linkages with buyers	▪ Who buys from the exporter in destination markets? ▪ Since when does the exporter have a business relationship with different buyers in these markets? ▪ Services provided by importers (e.g. advisory, market information, …) ▪ Information flows from the exporter to importers, and vice-versa ▪ Conditions set by importers (quality, volumes, delivery times, pricing, payment procedures, other)? ▪ Does the exporter have a contractual relationship with importers? If yes, what are the terms of the contract? If not, how does the exporter find buyers and how are transactions negotiated?

	▪ Strengths and weaknesses in the relationship with importers
6. Linkages with suppliers	▪ Who supplies the exporter? ▪ Profile of suppliers (location, scale, legal status, etc.) ▪ For how long has the exporter had a business relationship with different suppliers? ▪ Functions performed by suppliers (e.g. cultivation, sorting, grading, packaging, other) ▪ Services provided to suppliers (e.g. technical, inputs, credit, other) ▪ Information flows from the exporter to suppliers (e.g. variety, cultivation, quality, delivery times, other) ▪ Information flows from suppliers to the exporter ▪ Conditions set by the exporter (variety, quality, volumes, delivery times, pricing, payment procedures, other) ▪ Does the exporter have a contractual relationship with suppliers? If yes, what are the terms of the contract? If not, how does the exporter access supplies for export? How is the negotiation with suppliers conducted? ▪ Strengths and weaknesses in the relationship with suppliers
7. Services	▪ What are the key services for a successful shallot export business? ▪ Who provides these services? ▪ What are the main weaknesses and gaps in service provision?
8. Prices	▪ Price seasonality within Indonesia and in export markets ▪ How do export prices generally compare with domestic prices? ▪ Are there any clear differences in the prices paid in different export markets? ▪ How are purchasing prices determined? What are the price differences across varieties and grades? ▪ How are export prices determined? What are the determining factors? What are the price differences across varieties and grades?
9. Business environment	▪ Assessment of the policy and regulatory environment in Indonesia ▪ Assessment of support infrastructure
10. Constraints, opportunities and interventions (wrap-up)	▪ Key opportunities for the development of mango exports from Indonesia ▪ Key challenges and constraints: what is preventing Indonesia from becoming a significant shallot exporter? Why isn't Indonesia more competitive in regional markets? ▪ Necessary innovations and developments ▪ Recommendations for public and project interventions aimed at enabling these innovations and developments ▪ Does the exporter see any opportunities for collaboration with a development project intervening in the shallot sub-sector?

Processors	
1. Background information	▪ Location/address/contact ▪ Number of employees ▪ Range of company products ▪ Number and location of processing facilities ▪ Total turnover and export turnover
2. Purchases of shallot	▪ Tonnes of shallot purchased in 2012 ▪ Trends in shallot purchases and reasons (last 5 years)
3. Quality specifications	▪ Quality specifications for shallots
4. Procurement systems	▪ Supplying areas and reasons ▪ Number and profile of shallot suppliers ▪ Stability in the relationship with suppliers ▪ Strengths and weaknesses in the relationship with suppliers ▪ Contracting arrangements and conditions (duration of contract, varieties, quality specs, volumes, regularity of supply, pricing formula, etc) ▪ Challenges and constraints
5. Imports	▪ Tonnes of imported shallots in 2012 ▪ Trends in imports of shallot, and reasons ▪ Seasonality of imports ▪ Import regulations
6. Prices	▪ Price seasonality within Indonesia ▪ Price differentiation across grades
7. Interventions (wrap-up)	▪ Recommendations for public and project interventions in the shallot chain ▪ Does the processor see opportunities for collaboration with a development project intervening in the shallot chain?

Annex 3: Structured format for collection of farm gross margin data

Gross Margin Analysis Vegetables

Crop : **Farmer:**

Variety : **Villlage:**

Season : **Subdistrict**

Hectares: **District**

No	Component	Unit	Measurement	Price/Unit			Value(Rp)		Unit	Measurement	Price/Unit	Value (Rp)	
				Primary Crop							**Secondary Crop**		
A	**Production Cost**												
	1.Material Costs												
	a. Seed : var:		kg				-					-	
	- var:						-					-	
	- var:						-					-	
	b. Fertilizer						-					-	
	Phonska (NPK 15-15-15 slow)						-					-	
	Mutiara (NPK 16:16:16 fast release)						-					-	
	SP-36						-					-	
	Urea						-					-	
	ZA (Amm. Sulphate)						-					-	
	Dolomite						-					-	
	KCl						-					-	
	Manure (Compost)						-					-	

							-								-				
							-								-				
	c. Pesticide :						-								-				
	Agromex						-								-				
	Pegasus						-								-				
	Endure						-								-				
	Arjuna						-								-				
	Lanete						-								-				
	Prefaton						-								-				
	Supermex						-								-				
	Taldin						-								-				
	Abacyper						-								-				
	Decis - 0,5 ltr.						-								-				
	Fastax						-								-				
	Kanon 40 EC						-												
							-								-				
	d. Fungicide :						-								-				
	Antracol						-								-				
	Tyson						-								-				
	Bion M						-								-				
	Dithane						-								-				
	Unisep						-								-				
	Score						-								-				
	Mancozeb						-								-				
	Marshall						-								-				
							-								-				

	e. Catalisator (Spreader/sticker) :						-					-	
	-						-					-	
	f. Herbicide :						-					-	
	- Round Up/Gramaxone						-					-	
	- Goal						-					-	
	- Prowl						-					-	
							-					-	
	g. Plant support :						-					-	
	- Bamboo stake						-					-	
	-String						-					-	
	- Plastic Mulch						-					-	
	-Basket/Pail						-					-	
	-Nails for hanging						-					-	
		Labour (Days				Price per day	Value (Rp)	Labour (Days				Price per day	Value (Rp)
		Family		Hire				Family		Hire			
		M	F	M	F			M	F	M	F		
	3. Labour Costs												
	a. Land preparation						0						0
	b. Nursery : -						0						0
	c. Planting : -						0						0
	d. Fertilizing						0						0
	e. Weeding						0						0
	f. Stick (plant holder)						0						0

	g. Spraying						0						0
	h. Irrigation						0						0
	i. Harvesting						0						0
	j. Cleaning						0						0
	k. Handling (grading)						0						0
	l. Drying						0						0
	m. Transporting						0						0
	n. Packaging						0						0
	n. Other :						0						0
	4. Other costs :												
	- Land rents						0						0
	- Loans						0						0
	- Taxes						0						0
	- Water Contribution						0						0
	Total 1 Production Costs 1 + 2 + 3 + 4 + 5												
B	**Return and Profit**												
	1. Yield												
	- Main product												
	- Secondary product												
	2. Production Cost												
	3. Net Income												