CHARACTERISTICS AND PERFORMANCE OF SHALOT INDUSTRY IN INDONESIA

Kuntoro Boga Andri[1], Tiago Wandschneider[2] and Teddy Kristedy[3]

[1]BPTP East Java, Indonesian Agency for Agriculture Research and Development, Minister of Agriculture, Malang, Indonesia;
Email: kuntoro@gmail.com
[2]Agribusiness and Development Expert – Lisbon, Portugal;
[3]The ACIAR Project Coordinator for Eastern Indonesia Agribuessines Development Opportunities (EI-ADO), Denpasar, Indonesia.

ABSTRACT

In Indonesia, shallot ranks third amongst all vegetable crops in terms of cultivated area. Between 90,000 and 110,000 hectares are harvested every year and it is assumed that at least 100,000 rural households can be classified as shallot farm households. In addition, many men and women are working or hired in shallot farms and business at different stages along the product chain. This study was conducted to provide a description and analysis of the shallot Industry in Indonesia. Some information and analysis of the shallot chain are also provided due to the close links between shallot production and marketing. A review of existing studies, reports, and government statistics was carried out early on during the research and qualitative methods were employed for collection of primary data. The fieldwork was carried out in January, February and December 2012 using Focus group discussions (FGD) with farmers and semi-structured interviews (SSI) with producers, other chain actors, and some knowledgeable observers in East Java and NTB. This study shows the productivity of shallot is still below the level of potential. Some production constraints encountered due endemic pests and diseases as well as quality of seed. Besides, post-harvest handling is also less of a concern because it is still traditional. Thus there are still opportunities to be able to increase the production of shallot by improving seed genetic resources and farming technologies. Government support is needed for the provision of warehouse facilities in strategic markets and improved transportation facilities to maintain the quality.

Keywords

shallot industry, value chain analysis, cultivation practices, Indonesia

INTRODUCTION

For Indonesian vegetable production, shallot ranks third amongst all vegetable crops in terms of cultivated area, under chili and cabbage. Between 90,000 and 110,000 hectares are harvested every year (Pusdatin, 2013). Given a shallot farming landscape dominated by farms under 0.5 hectares, where shallot may be grown in the same farm once, twice or even three times during the year, it is safe to assume that between100,000 and 200,000 rural households in Indonesia earn an income from shallot farming. In addition, many men and women are hired to work in 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, for example (APO, 1997).

Table 1. Shallot harvested area per province, 2009-2011

	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: Pusdatin (The center of data and agricultural information system), MOA, Republic of Indonesia, 2013

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, in areas where farmers have access to irrigation (Table 1). With more than 20,000hectares allocated every year to the crop, Brebes stands out as the main shallot production and marketing center 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.

METHODOLOGY

This study was conducted to provide a description and deep analysis of the shallot Industry in Indonesia. Some information and analysis of the shallot chain are also provided due to the close links between shallot production and marketing. A review of existing studies, reports, and government statistics was carried out early on during the research and qualitative methods were employed for collection of primary data. The fieldwork was carried out in January, February and December 2012 using Focus group discussions (FGD) with farmers and semi-structured interviews (SSI) with producers, other chain actors, and some knowledgeable observers in East Java (Malang, Kediri, Nganjuk, Sampang, Surabaya) and NTB (Mataram, Lombok Timur, Lombok Barat, Bima).

RESULTS AND DISCUSSIONS

1. Production and seasonality

Shallot production peaked in 2010 at nearly 1.05 million tons, after several years of continuous expansion (see Table 2). 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 percent, from 8.8 to 9.6 tons per hectare. This trend came to a halt in 2011, when a significant reduction in harvested area led to a 15-percent decline in production.While production recovered in 2012, it was still 9.4 percent below the 2010 record harvest.

In recent years, shallot farm yields have fluctuated around 9.5 tons per hectare (see Table 3). 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 percent lower than the national average.

Table 2. Shallot harvested area, production and yield in Indonesia, 2005-2012

	2005	2007	2009	2010	2011	2012	Change (%)	
							2005-10	2010-11
Harvested area (ha)	83,503	93,694	104,009	109,634	93,667	99,315	31.3	-9.4
Production (tons)	732,400	802,810	965,164	1,048,934	893,124	960,072	43.2	-8.5
Yield (tons/ha)	8.8	8.6	9.3	9.6	9.5	9.5	9.1	-1

Source: Pusdatin (The Center of Data and agricultural information system), MOA, Republic of Indonesia, 2013

Table 3. 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: Pusdatin (The Center of Data and agricultural information system), MOA, Republic of Indonesia, 2013

The shallot is 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 percent is harvested between June and September, with a clear peak in August and September (see Figure 1). Growing shallot 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.

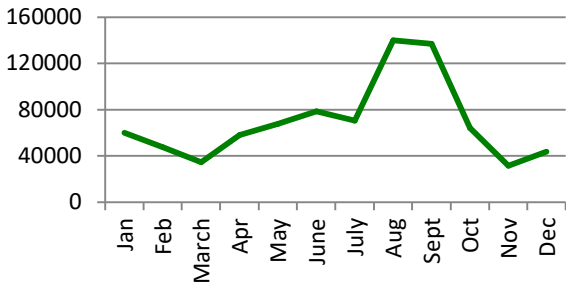

Figure 1. Monthly production of shallot in Indonesia in 2004 (tons)

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

2 Economic and Social Impacts

Table 4 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.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 4. Estimated annual income impacts from shallot

	'000 IDR	USD*
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*

** USD 1 = IDR 9,600*

Source: Field data, December 2012

According to the data collected, one hectare under shallot generates, on average, USD 5,600 as net farm and wage income. An extrapolation to the whole country provides an indicative farm income figure of about USD 560 million. Around 75 percent of this income flows to shallot farm households, with the remainder representing wages paid for farm labor. These estimates exclude the incomes accruing to traders in production areas, the labor employed by these trading enterprises, and the incomes generated for all those employed in shallot trading and processing activities outside production areas.

Table 5. Employment impacts of shallot cultivation

	Sampang East Java (N=3)	Bima NTB (N=3)	Nganjuk East Java (N=2)
Average employment (person-days/ha)	197	294	439
Wage farm labour/total farm labour (%)	74	84	100
Wage farm labour costs/ total cultivation costs (%)	51	32	45
Female employment/ total employment (%)	58	42	25
Hired female workers/ total hired workers (%)	68	46	25

Source: Field data, December 2012

The shallot is a labor-intensive crop. In the farms surveyed, 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 labor than those in the other three districts (see Table 5). Hired labor represented nearly 90 percent of total on-farm employment and nearly 40 percent 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 in shallot farms belong to households with very limited or no land, i.e. marginal and landless farmers.

3. Varieties

A large number of varieties are grown across the country. 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, including yield, resistance to pests and diseases, number of days to harvest, and bulb stability and marketability (Basuki, 2007). Local varieties are commonly used, for example, Bauji, a local cultivar that is well adapted to rainy-season conditions and appreciated for the relatively large bulb size, is widely grown in Nganjuk, Kediri and Blitar during the rainy season. In Sampang, East Java, farmers mainly grow Manjung, a variety with limited yield potential but well adapted to rainy-season conditions.

Seed tubers imported from other countries, especially the Philippines and Thailand, are also widely grown in Indonesia. In Probolinggo and Kediri, Ilocos and Tanduyung, two varieties from the Philippines, are popular in Probolinggo and Kediri. In Nganjuk and Kediri, farmers also reported using planting material from Thailand and the Philippines. Some improved shallot varieties have been released over the past 15 years. These are the product of one or more cycles of mass selection and rigorous roguing of off-types to improve uniformity, performance, size, and other quality traits. Breeder seed is generally maintained by the originating government Institution.

The Indonesian Vegetable Research Institute (BALITSA) in Lembang, West Java, has recently released the Pikatun and Trisula varieties, two short-duration, high-yielding varieties that can be harvested just 55 days after planting and have a potential yield of 23 tons per hectare under research station conditions (source). These two varieties have not yet been adopted in any of the locations in East Java and NTB visited by the research team. BPTP East Java has released Super-Philip, a high-yielding variety with red, medium to large bulbs. Super-Phillip is harvested 65 to 70 days after planting and yields between 17 and 22 tons per hectare under research station conditions (source). Traders referred to Probolinggo as the district where most Super-Philip shallot is produced. Some farmers in Bima also plant Super-Philip.

4. Farming Practices

In Indonesia shallot is normally grown during the dry season. In key production districts, such as Brebes, farmers may produce up to three consecutive shallot crops in the same farm, a system that 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-croppingis also common(Harper *et al*, 2010).

Farmers typically plant between 800 kilograms and 1.2 tons 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 percent (small cloves) to 20 percent (large bulbs) of the value of the crop produced.

Soil preparation commences with the establishment of raised beds alternating with 50-80 cm 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.That is the case, for example, of 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 20 cm apart, and bulbs are set at approximately 15 cm 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 added about 20 and again 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 percent have been reported (Harper *et al*, 2010). Many growers also apply foliar spray applications of minor- and micro-nutrient solutions, such as “Green Tonic”, “Gandasil”, 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 main 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 for selection of effectiveinsecticides, regularly spraying their crops at concentrations 150 to 200 percent 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, thereby being exposed to the chemicals. Very 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 growersuse 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 guidance.

4. Price trends and volatility

During the past five years, the real price of shallot in Indonesia has not followed any clear trend (see Figure 2). The lack of an upward price trend is not only a consequence of significant increases in domestic production, but also reflects the fact that the demand for shallot is not very

responsive to (and may even be characterized by a negative correlation with) per capita income.

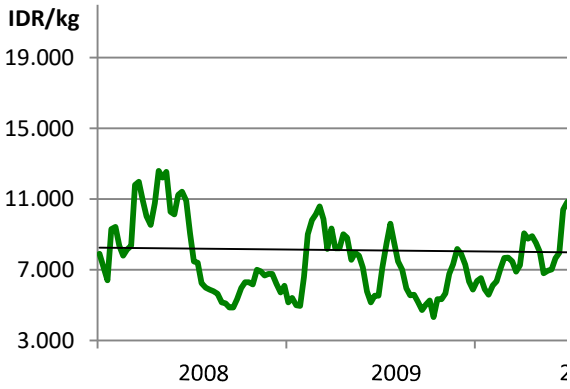

Figure 2. Average real wholesaleselling price of shallot, Pare market, Kediri, 2008-11

As expected, the price of shallot normally reaches its lowest levels during the peak harvesting months, i.e. in August and September (see Figure 3). Prices will then start rising gradually, peaking sometime in the first or second quarter of the next calendar year. Storage by farmers and traders during the October-December period is the main market stabilization factor. During the first three months of the year, price patterns in the domestic market will be heavily influenced by CIF import prices.During the second quarter, market prices will reflect the size of the local harvest and import volumes. In recent years, however, prices have deviated somewhat from this normal pattern. For example, prices were exceptionally high in late 2010, the first three months of 2011, and March 2012, and unusually low in December 2011 and in January and February 2012. As mentioned, the reasons behind such deviations from the norm are unclear.

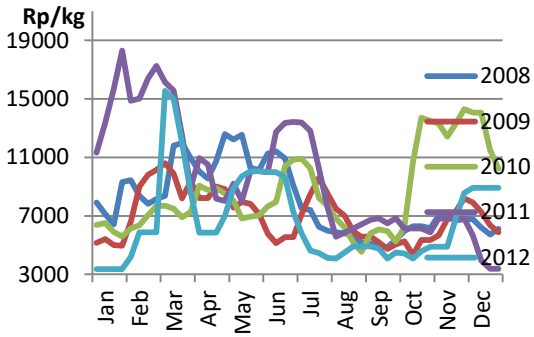

Figure 3 Price seasonality in Pare market, Kediri, 2008-12

CONCLUSION AND SUGGESTIONS

Productivity of vegetables at the study site is still below the level of potential. Some production constraints encountered in the region partly due endemic pests and diseases in certain plants such as tomato bacterial wilt and fail by curly chili anthracnose and virus infected Gemini. There are some problems of soil fertility and plant nutrition related soil conditions. Besides, post-harvest handling is also less of a concern because it is still traditional. Thus there are still opportunities to be able to increase the production of vegetables in the area. Improve genetic resources and technologies can increase the production of vegetables. Farmers' access to appropriate information related to the technical aspects should also be provided.

To reduce the risk of marketing, the government needs to issue a consistent policy to ensure the quality of vegetables, facilitate access to capital for farmers and traders so that they can perform the contract planting vegetables. Another important effort is the need for information and training for farmers and traders,

especially in the case of post-harvest vegetables. Also the need for the provision of cold storage facilities and warehouses in strategic markets and improved transportation facilities to maintain the quality of the vegetables.

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