

11 Income and Employment Generation from Agricultural Processing and Marketing at the Village Level: A Study in Upland Java, Indonesia

TOSHIHIKO KAWAGOE

Introduction

In the rapidly growing economies of Southeast Asia, besides the emergence of processing enterprises (as discussed in chapter 9) catering to the diversifying and growing domestic and international demand, partly combined with contract-farming systems (as discussed in chapter 10), sizable informal village-level processing and marketing activities are a feature of the rural growth process. The employment and income effects for the poor can be a major factor in the spreading of rural growth benefits of commercialization for development and nutritional improvement, as was so successfully achieved in the 1970s and 1980s in Indonesia (Java). The informal sector is known to have a high labor absorptive capacity as well as the potential to contribute to alleviation of poverty and unemployment in developing countries (ILO 1972, 1974; Oshima 1984). The informal sector's potential to generate local income and employment through farm product processing and marketing activities has been demonstrated with a case study of soybeans in Indonesia (Hayami et al. 1987, 1988a). Those results suggest a critically important role of such activities in generating income in local economies, as well as in improving income distribution by increasing employment.

The purpose of this chapter is to illustrate that significant additional income and employment can accrue to farm producers from agricultural marketing and processing activities at the village level. The policy question that arises is how to foster and enhance these favorable effects. The principal insights from the studies on market policy reform (China) and

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on the critical role of infrastructure (Bangladesh) in chapters 7 and 8 are a relevant backdrop to this village-level study. Moreover, the case studies in Part V largely have a household focus in the context of commercialization projects. This village-level study of dynamic indigenous commercialization in a growing economy serves as a complementary case to these case studies.

This chapter uses case studies of village-level processing and marketing activities of soybean, cassava, and tobacco in Indonesia. These crops are grown in typical upland areas under rain-fed conditions.

Study Site and Farming System

The study site is located in Garut District, West Java, in a typical village of a rain-fed upland area. Farming is the main occupation of the majority of the village households; more than 80 percent of the population is engaged in farming. Sixty percent of the farm households are full-time farmers and another 34 percent are part-time farmers. Only 6 percent of all households are agricultural laborers. Operational farmland area per farm household is very small, an average of 0.5 hectare. Only 8 percent of the farmers cultivate more than 1.0 hectare.

Farmers traditionally intercrop to use their limited land more efficiently. Eight main crops—soybeans, corn, tobacco, cassava, peanuts, upland rice, fruits, and vegetables—are cultivated in various combinations. The wet season normally begins in September and continues into May. There are many variations in the farming system, but a typical cropping pattern is to plant soybean with corn from September to January, followed by soybean and tobacco from February to June. Cassava is usually grown at the edges of the fields.

Only a small share of the crops produced in this village are consumed by the producing households. For instance, more than 80 percent of the total soybean output is sold, while the remainder is held back by farmers for use as seeds for the next season's production; home consumption is negligible. Tobacco leaf is processed by farm households into dried-cut tobacco materials, and almost all of the product is sold. Sixty percent of cassava is processed into chips by farm households, and most of it is sold outside the village. The remaining 40 percent of the cassava root is sold directly to middlemen at the field as standing crops. Roughly speaking, more than 70 percent of total farm output is sold in this village.

Processing Activities in the Study Site

In the study area, many farm products harvested in a village are processed within the village. Some crops are processed by farm producers

themselves at home; these activities are referred to here as "home processing." There are also part-time or full-time processors who purchase farm commodities from neighboring farmers and process them into various products. These processors usually operate on a small scale and depend mainly on family labor; they are referred to here as "cottage industry." Cottage industries and home processing are classified into two distinct categories, since the former use purchased materials and the latter process their own farm products. In reality, however, these two categories are not mutually exclusive.

Tobacco and cassava are processed by farmers themselves.¹ Most of the tobacco leaf is processed in farm households by slicing and drying, using a combination of male and female labor. Slicing with a large blade is usually done by males, and sorting and arranging the sliced tobacco for drying in the sun is usually done by females.

Farmers process cassava root, which they have harvested themselves from their fields, into several products for sale. In the study village, 60 percent of the cassava root is processed into chips, called *opak*. The process of making *opak* is very simple,² and the product is storable and can be fried as a snack. Dried *opak* is sold to consumers in urban areas through peddlers, as well as directly to neighboring villagers and grocery stores (*warung*) for retail. Farm home consumption of *opak* is less than 10 percent of total production. *Opak* is also processed by landless laborers, who purchase cassava root from neighboring farmers.

Several types of cottage industries also operate in the study area by purchasing farm produce from farmers in the village as well as from other nearby villages. Typical outputs are fermented soybean cake (*tempe*) and crude tapioca flour. *Tempe* is processed in rural areas on a very small scale.³ In the study village, about 20 *tempe* processors operate, handling, at most, 10 kilograms of soybean per day. Most operators are housewives of farmers and use simple facilities found in most ordinary farm kitchens.

Besides the home processing of *opak* by farmers, cassava roots are

1. The highly storable nature of dried tobacco material enables it to be held for a long time until attractive marketing opportunities arise.

2. This is usually done by a housewife with the aid of her daughters. Ground fresh roots are mixed with several ingredients, such as oil, salt, and spices, and are formed by hand into flat elliptical shapes for steaming. Then they are spread out on a bamboo tray for drying under the sun for a few days.

3. The process of making *tempe* is simple and does not require special equipment. *Tempe* is the fermented product of soybean, using the mold *Rhizopus oligosporus* (Winarno, Haryadi, and Satiawiharja 1985). The soybean is soaked, boiled, and hulled. Then it is inoculated with mold, wrapped in plastic or banana leaves, and kept one or two days for fermentation in a warm place. Finally, the soybean is knitted together tightly by fibrous mold.

sold through village-based collectors to processors to make crude tapioca. Many local factories of differing operational size process fresh cassava root into crude tapioca flour in cassava-producing areas.⁴ Some cottage-industry-type factories process less than 500 kilograms of cassava roots at one time, but other local factories process more than 40 tons of roots every day. The cottage industry processors are mostly farmers who engage in processing only when fresh cassava root is available in the village.

Marketing Channels

Marketing of farm products is carried out mainly by informal agents who do business on a small scale and have few permanent employees. These agents are linked to each other through informal contracts and tacit understanding to form an intricate marketing network. Typical marketing and processing channels for soybean, cassava, and tobacco as well as their products are illustrated in figure 11.1. Typical of the informal sector, there exists an almost infinite variety of agents and channels for marketing agricultural commodities and their products. Hence, figure 11.1 is limited to showing typical marketing channels in a village.

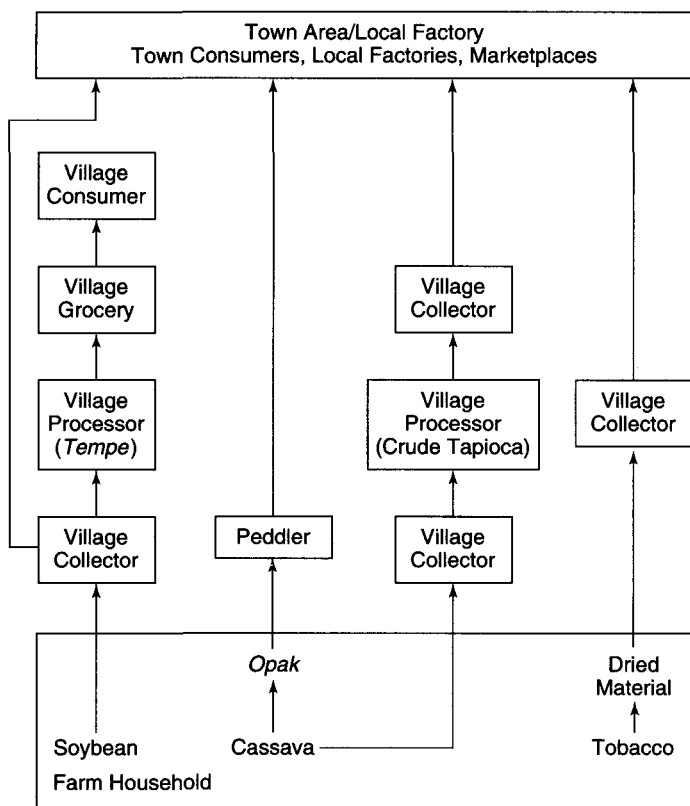
Most marketing tasks at the village level are done by farmers as a side job or by housewives of farmers. We may classify these marketing agents into farmers themselves and middlemen. Farm producers play an important role in marketing their products. It is not uncommon for farmers' wives and daughters to peddle home produce outside the village. It is also not uncommon for farmers themselves to carry their products to town for sale to traders or for direct supply to processors.

Village-based middlemen are peddlers, grocery stores, and collectors. Peddlers, who are mostly women, collect a basketful of products from farmers for sale directly to consumers by door-to-door visits in nearby towns and villages or to stall vendors in town marketplaces. Peddlers handle mainly ready-to-eat or ready-to-cook perishable commodities, such as *opak*, fruits, and vegetables.

Grocery stores, which are usually attached to villagers' houses, are mostly managed by housewives. Such stores carry urban commodities for sale to villagers, as well as merchandise produced in the village, such as *tempe* and *opak*.

While peddlers and grocery store keepers are essentially retailers,

4. Cassava roots, brought to a factory by collectors, are first soaked in water to remove dirt and then crushed by a simple grinding machine. Then crushed cassava roots are separated into residue, and water that contains starch. The water is stored in a big wooden barrel and is allowed to settle for one night. After removing the water, crude tapioca starch is obtained. It is spread out on bamboo trays and dried in the sun for two or three days. Usually, crude starch is sold to refineries that process it into refined starch, and it is also sold to nearby towns through collectors.

FIGURE 11.1 Typical marketing and processing channels for farm products at the village level

collectors are wholesalers. They collect farm products for delivery to processors in villages and towns and also to traders in towns. Most collectors are middle-class farmers whose farm operations are based mainly on family labor. They often use assistants, mainly landless farm laborers and marginal farmers, to collect directly from farmers. The wives and daughters of these landless farm households and marginal farmers are peddlers. Small returns from petty trades are important supplements to the income of people in the poorest class in the village community. The distinction between farmers and village-based middlemen is, therefore, not complete.

Production Structure of Agricultural Commodities and Activities

Table 11.1 presents input and output data as well as farm production costs and returns for individual crops in the study area. Total value

TABLE 11.1 Value added and employment indicators for selected crops per hectare of intercropped harvested area, Garut, Indonesia, 1986 (average of 18 sample farms)

Item	Soybean ^a	Tobacco	Cassava ^a	Others ^b	Total
Value-added ratio (percent) ^c	69	80	84	90	82
Labor income share (percent) ^d	60	37	56	49	47
Labor employment (days/hectare) ^e	73	99	11	170	352

^aSum of the first and second crop seasons.

^bCorn, upland rice, vegetables, and fruits.

^cValue added/output. Value added = output - current inputs.

^dLabor income/value added.

^eAssuming six hours of work per day.

added from one hectare of upland farmland per year was Rupiah (Rp) 783,000 (US\$695 based on the exchange rate of Rp 1,126 per US\$1 in 1986). About half of the total value added is derived from soybean, tobacco, and cassava production, and the rest comes from production of other crops, such as corn, upland rice, vegetables, and fruits, which are not processed in the village. Total labor income, including both family and hired labor, is estimated to be about half of total value added and is equivalent to 352 working days per hectare per year.

Home Processing

Since home processing is done by farmers themselves, using their own-farm produce, they acquire the income and employment generated by this activity. In the case of tobacco processing, the value of the dried material produced from one kilogram of leaf is estimated at Rp 420. The gross value added from home processing of tobacco amounts to Rp 170 per kilogram of leaf. The value-added ratio is about 40 percent, which implies that 40 percent of the market value of dried tobacco material is acquired by farmers as income from home processing. Labor's share of this income, which is measured by comparing the estimated cost of family labor with the total income from the processing, is as high as 97 percent, reflecting the highly labor-intensive nature of home processing of tobacco.⁵

The gross value added of cassava processing amounts to Rp 43 per kilogram and the value-added ratio is 55 percent. Assuming that 16 kilograms of cassava root are processed per day, the total income from processing is Rp 688, which is slightly higher than the typical female

5. In order to estimate the cost of family labor, typical daily wage rates for hired farm work for upland areas (Rp 1,200 for males and Rp 600 for females, assuming six hours of work per day) have been used. In the case of tobacco processing, an average wage rate of Rp 150 per hour is assumed.

wage rate for farm work of Rp 600 per day. However, if we take into account the capital depreciation of processing equipment, the net income would be almost equal the wage rate. The high labor-income share of 88 percent for *opak* processing also reflects the highly labor-intensive nature of home processing of cassava.

Cottage Industry

Compared with the home processing of tobacco and *opak*, *tempe* and tapioca manufacturing—typical examples of cottage industry—have very low value-added ratios, but similar shares of income for labor. This seems to reflect the fact that cottage industries and home processing are both highly labor intensive. It appears that both home processing and cottage industries supplement farm household income by increasing the use of family labor. Family members engaged in these activities receive incomes of about equal or slightly better than for those engaged in farm work.

Marketing

The prices of soybean, cassava, tobacco, and their products at various points in the marketing chain are summarized in table 11.2. For example, village collectors purchase soybean from farmers at the price of Rp 580 per kilogram and sell it to *tempe* processors at Rp 590, implying a unit marketing margin of Rp 10. Then, *tempe* processors make soybean into *tempe* and sell it to village groceries at Rp 40 per piece. Village groceries retail it to consumers at Rp 50, which also implies a unit marketing margin of Rp 10.

Total value added from the marketing can be estimated after deducting transportation costs paid to public transporting agents or private transporters for chartering trucks. This deduction may result in an underestimation of the value added from marketing activities, since value is also added from transportation activities themselves. However, most of the transporting agents are town based and full time in their operation. Since the analysis in this study limits income and employment generation to the village level, the decision to exclude transportation activities is realistic.

Judging from the labor-intensive nature of village-level marketing, income accruing to local labor is assumed to be the same as the marketing margins.⁶

Since the middlemen's working hours are difficult to measure di-

6. This calculation neglects the interest on working capital. Turnaround of working capital is usually very short in the case of village collectors, however, and thus it seems to be negligible in the middlemen's profit.

TABLE 11.2 Prices and marketing margins of selected agricultural commodities at various points in the marketing chain

Crop/Product	Seller	Buyer	Sale Location	Price (Rp/ kilogram)	Marketing Margins (percent)
Soybean	Farmer	Village collector	Farmgate	580	
	Village collector	Village processor	Factory	590	2
<i>Tempe</i>	Village processor	Village grocery	Store	40 ^a	
	Village grocery	Village consumer	Store	50 ^a	25
Tobacco	Farmer	Village collector	Farmgate	3,000	
Dried material	Village collector	Local factory	Factory	3,500	17
Cassava	Farmer	Village collector	Field	30	
Fresh roots	Village collector	Village processor	Factory	40	33
	Village processor	Village collector	Factory	240	
Crude tapioca	Village collector	Local factory	Factory	250	4
	Farmer	Peddler	Farmgate	250	
<i>Opak</i>	Peddler	Town consumer	Consumer's house	400	67

^aPrice per piece of 90 grams.

rectly, they are estimated indirectly by dividing the income of middlemen by the standard wage rates of hired farm workers. This calculation assumes that village collectors and village grocery store keepers are earning an average income per hour used for marketing activities in the village. This is not an unrealistic assumption given the fact that those marketing agents are themselves farmers or farm laborers. It has already been identified (Hayami et al. 1987) that the local marketing system can be approximated by perfect competition. The price spread between different locations corresponds almost exactly to the cost of transportation, suggesting a competitive market in this area. This implies that collectors have little room to gain additional profit beyond an average income from the marketing activities.

For the purpose of illustration, table 11.3 presents estimates of income and employment generated for the most typical marketing and processing channels in the village. Two marketing and processing channels are considered for both soybean and cassava. More than 35 percent of soybeans are processed into *tempe* in Indonesia (Winarno, Haryadi, and Satiawiharja 1985). We apply that share to the soybean produced in the village, processed into *tempe* by village processors and sold to villagers through village groceries (case 1), and assume that the remainder, 65 percent, is shipped to town areas by village collectors (case 2). In the case of cassava, 60 percent of fresh cassava roots harvested in the village is processed into *opak* by farmers, and the product is sold by peddlers to town consumers (case 1), and another 40 percent is processed into crude tapioca flour and sold in town areas by village collectors (case 2). All the harvested tobacco leaf is assumed to be processed into dried material by farmers and sold to local processors by village collectors. These marketing and processing channels are shown in figure 11.1.

Marketing margins in the case of *tempe*, for instance, were 25 percent of the farmgate price; for *opak*, they were 67 percent; and for dried tobacco, 17 percent. Marketing margins for unprocessed or less processed commodities were, of course, much less: 2 percent for soybeans and 4 percent for crude tapioca (table 11.2).

Income and Employment Generation

Significant income and employment were generated from processing and marketing of soybeans, cassava, and tobacco (table 11.3).⁷ In the case of *tempe* processing and marketing, total value added per year was about Rp 77,000 of which about 60 percent was produced on the farm and the rest was added in processing and marketing. If the soybean crop was shipped directly to other sectors, little income was added to the village community (case 2). Thus, a high contribution of marketing and processing to income is expected when farm produce is processed in the village and then marketed.

In the case of cassava processing, although both *opak* and tapioca are processed in the village, *opak* is sold as a final product to consumers by peddlers, while crude tapioca is shipped to local factories for further processing. Processing and marketing of *opak* contributed more than 70 percent of total income compared with 35 percent for crude tapioca. This finding implies that more income is generated if the crop is pro-

7. The calculations are considered to represent lower-bound estimates, since only the direct contributions of marketing and processing are counted; the indirect multiplier effects through forward and backward linkages with other activities in the village communities are not counted.

TABLE 11.3 Income and employment generation from production, processing, and marketing of selected upland crops, per hectare of harvested area

Item ^a	Soybean		Cassava		Tobacco (Dried Material)	Total
	Case 1 ^b (<i>Tempe</i>)	Case 2 ^c (Soybean)	Case 1 ^d (<i>Opak</i>)	Case 2 ^e (Tapioca)		
Farm production (kilogram/ hectare)		321		821	1,433	
Crop allocated to the marketing channel (kilogram/hectare) ¹	12	208	492	328		
Value added (Rp 1,000/ hectare)						
Farm production	44 (57)	83 (99)	13 (24)	8 (65)	275 (44)	423 (49)
Processing	11 (14)	0 (0)	21 (40)	3 (20)	257 (41)	291 (34)
Marketing	226 (28)	1 (1)	19 (36)	26 (15)	97 (15)	142 (17)
Total	77 (100)	84 (100)	53 (100)	13 (100)	629 (100)	856 (100)
Labor income (Rp 1,000/ hectare)						
Farm production	27 (46)	49 (98)	7 (16)	5 (51)	103 (23)	191 (31)
Processing	9 (16)	0 (0)	19 (41)	3 (28)	245 (55)	275 (45)
Marketing	22 (38)	1 (2)	19 (43)	2 (21)	97 (22)	142 (23)
Total	57 (100)	50 (100)	45 (100)	9 (100)	445 (100)	608 (100)
(Labor's share, percent) ^f	(74)	(60)	(85)	(72)	(71)	(71)
Labor employment (days/hectare)						
Farm production	26 (33)	47 (96)	7 (10)	4 (50)	99 (22)	183 (28)
Processing	15 (19)	0 (0)	31 (44)	3 (31)	273 (60)	321 (49)
Marketing	37 (47)	2 (4)	32 (46)	2 (19)	81 (18)	153 (23)
Total	77 (100)	49 (100)	69 (100)	9 (100)	453 (100)	658 (100)

^aNumbers in parentheses are percentages.^bSoybean produced in the village that is processed into *tempe* by village processors and sold to villagers through village groceries.^cSoybean that is shipped to town areas by village collectors.^dFresh cassava roots harvested in the village that are processed into *opak* by farmers and sold by peddlers to town consumers.^eFresh cassava roots processed into crude tapioca flour and sold in town areas by village collectors.^fTotal labor income divided by total value added.

cessed into final products and marketed to consumers by village-based middlemen.

Total value added from home processing of tobacco nearly equaled income from tobacco production. This result shows that farmers could double their income from tobacco by processing it themselves. Since the product, dried tobacco material, was sold to local factories, not much income was added from marketing activities.

Almost half of the total income generated from these three products was added from marketing and processing activities (column 6, table 11.3). This suggests that about half as much income would have accrued to villagers if marketing and processing activities had not been developed. The relative contribution of marketing and processing to labor income and employment were approximately 70 percent, even higher than the relative contributions to total value added. In the case of *opak*, it is remarkable to see that the contributions of marketing and processing were almost 90 percent of total income and employment generation. It should be noted that most of this income and employment accrued to women whose opportunity cost is lower.

Conclusion

These findings suggest that the processing and marketing of farm products play a critically important role in generating income in village communities. Income from marketing and processing is almost equal to income from farm production, and it is especially prominent when crops are processed into final products and marketed to consumers by members of a village community.

Another important role of marketing and processing is in equalizing income distribution by increasing employment and the share of income accruing to labor. Such activities provide plenty of employment opportunities to farmers and their family members, especially to the poorest class of people in the village community, such as farm laborers and marginal farmers. It is clear that promotion of village-level processing activities may be used as a means of alleviating poverty and inequality.

The estimations here show only part of the total income and employment that is being generated from processing and marketing activities, since the analysis is limited to the village level. The crops shipped to local towns are processed widely by local factories, and if these activities are taken into account, the income and employment generation in local communities would be even greater. This should be resolved in future studies.

PART V

The Diverse Experience

