Farmers and Traders in a Changing Maize Market in East Java

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Research and Development of Coarse
Grains, Pulses, Roots and Tuber Crops in
the Humid Tropics of Asia and the Pacific

Foreword

In recent years the so-called institutional aspects of markets are receiving more attention. In part the expanded attention for institutional explanations of markets is a counter movement against the rigid analysis of markets with a demand and supply tool only. The institutional approach is somewhat more connective. It attempts to explain the actual working of markets - imperfections, price formation etc. - from the rules of the game and power of market participants because these also determine economic exchange. Agriculture, par excellence, is a field where one also has to include biophysical factors in determining the structure of transactions. The study of Mr. Hitoshi Yonekura, who worked at the CGPRT Centre from 1989 to 1991, can be regarded as a contribution to the institutional approach in general, because of the inclusion of biophysical factors in his approach.

In studying the market of maize in East Java. Mr. Yonekura has taken into account the structure of agriculture production, which is determined by biophysical factors, and expanding demand and emerging market outlets. Dr. Yonekura has juxtaposed the structure of collection trade in harvested maize - the biophysical quality standards as induced by user requirements and the product characteristics of maize - with the structure and standards of rural finance. He observes a parallel between the lack of standardization in maize collection and the lack of standardization in rural finance for maize traders.

In a wider perspective, his hypothesis that the lack of standardization in collection of maize hangs together with the lack of standardization in rural finance is worthy of further consideration. The basic question is whether we consider a one- or two-way causal relationship. or merely an association between two phenomena. Further analysis is needed. Mr. Yonckura has, with his detailed and brilliantly researched monograph, put some very basic questions, and I trust that his work will be a solid basis for related inquiries on agriculture and institutional/ economic issues.

Haruo Inagaki
Director
CGPRT Centre

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Acknowledgements

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Heriyanto (MARIF),
Muhamad Muslim (MARIF),
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The survey was fully supported by the fellow researchers. Without their enthusiastic contributions, the research could never have been completed. They helped me to maintain favourable relations with villagers and traders in the survey areas. Dr. Heriyanto and Mr. Muslim joined the research from the very beginning and assisted me to the end. Dr. Heriyanto joined our survey whenever we went to the field. He resolved detailed farming systems and institutional environments, including questions related to complicated land ownership and the disposition of harvested crops. Mr. Muslim also checked the consistency among data and corrected many questionnaires. Without his contribution, the reliability of our research would have been substantially reduced. Pak Gunawan collected very precise and useful information in field survey, much in addition to the survey questionnaires. Ibu Ruly handled research administration, including research permitting, and she joined the field survey until her maternity leave. Dr. M. Tsuji conducted a survey on agribusiness which was very helpful in understanding the demand side of the maize economy. This book is deeply indebted to my fellow researchers, but any error and misunderstanding is my responsibility.

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Prof. A. Takashi and Prof T. Iwasaki facilitated field research in West Sumatra, my first experience in applying research methodology to Asian villages. Prof. S. Hirashima provided me an opportunity to study the role of markets. This experience stimulated my interest in the maize market of East Java.

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1. Introduction

1.1 Diversification and food and industrial crop markets

Rice and coarse grains, pulses, root and tuber (CGPRT) crops are widely grown in many Asian countries including Indonesia. CGPRT crops are considered an avenue to generate; employment and income in the rural economy. There are several reasons for such a view:

- the medium term productivity increase in rice came to an end in the late 1980s and early 1990s,
- CGPRT crops still offer possibilities for productivity increase at various market levels through diversification of agriculture, horizontally and vertically, and,
- CGPRT crops have wide potential markets under conditions of economic and income growth; for example maize, cassava and soybean still have potential in industrial uses, export and in import substitution.

Diversification is a primary issue for the development of agriculture in Asia. Diversification of agriculture does not necessarily mean diversifying farming within a household. Economic activities of households are usually diversified to take advantage of opportunities and to reduce risks, however, there are other types of diversification. Regional, vertical and sectoral diversifications are equally important as economic diversification in households. Infrastructure, processing, and market structure are important aspects of area specialization (regional diversification), efficient producer and consumer markets (vertical diversification) and sectoral diversification. With improvement in infrastructure, processing and market efficiency, it is generally assumed that production and price risk decrease. Diversification is generally understood to be a mechanism to offset one risk against another. The CGPRT *(palawija)* crops in Indonesia provide an excellent ground to investigate the various types of diversification and their effects (Achmad Suryana et al. 1990a; Pantjar Simatupang et al. 1990). Since the 1980s, many studies on CGPRT crops and rice were carried out in Indonesia (Falcon et al. 1984; Timmer 1987; Aman Djauhari et al. 1988; Morooka and Heny Mayrowani 1990; Pearson et al. 1991).

In Indonesia, as in most Asian countries, farmers cultivate CGPRT crops and rice. The farm household economy depends not only on one single crop but on several crops as well as off-farm income. Most farm households have side businesses such as petty trade or processing of agricultural products. Farmers may work as carpenters or manual workers at civil construction to diversify their income sources. Most studies on agriculture focus on individual crops and do not sufficiently take into account other crops and off-farm work. This has limited our understanding of the relation between farmers and traders and the place of both parties in the market.

One also needs to consider the socio-economic structure of rural society. In rural areas one encounters not only farmers but also people engaged in services, such as landless workers and traders in a village. Farmer and villager are not synonymous. A farmer is an owneroperator or tenant-operator of a farm; villagers is a somewhat wider category which includes landless workers, traders, local officials, shopkeepers, etc. One cannot assume that farmers

always engage exclusively in farming, because they often work in services (Koentjaraningrat 1985; Hardjono 1987; White and Gunawan Wiradi 1989; Kano 1990).

The economic system relating to CGPRT crops comprises thus various components such as the farming system, off farm activities, the marketing system of products and processing and consumption. They, as a whole, will be considered the CGPRT crop based economy. The system of CGPRT crop based economy is a framework to identify the CGPRT farmer's positions and roles in the economic system as a whole and to identify the opportunities and the critical issues for increasing farm incomes and employment opportunities.

In Indonesia both the volume and the pattern of product use has been in a process of change. New types of use of food and industrial crop produce, such as feed and industrial materials, are increasing with economic growth and a growing agricultural industry (Achmad Suryana et al. 1990b; Wirakartakusumah and Syah 1990; Kabur Santoso 1990). One would expect that the market transfers economic price and quality signals from downstream to the producers upstream. A question is whether the downstream market system of CGPRT crops can accommodate such changes.

Even though new varieties of CGPRT crops have been introduced in Indonesia, manti questions remain on how to realize the full technological or agronomical potential of CGPRT crops at the farm level (Marsum Dahlan et al. 1993a&b; Marsum Dahlan et al. 1994; Sudaryono et al. 1993a&b; Sudaryono 1994; Adisarwanto et al. 1994). One way of looking at this issue is to analyze the performance of commodity and factor markets, keeping in mind that these are adjusting to stimuli, i.e. structural change in demand and consumption, from the wider economy. Some researchers and development agencies (e.g. Tomich 1992; World Bank 1992) are of the view that the agricultural sector is involved in structural transformation.

Although agriculture in Indonesia is widely researched, we do not know the actual transitional situation and how farmers and local traders cope with the recent changes. The production increase of CGPRT crops, particularly maize, does not necessarily induce an increase of income of rural people or the creation of employment opportunity. We need to investigate the process and degree of commercialization, the links between rural and urban areas and the links among farming, trading and industry.

In our study, we will mainly focus on the maize economy, because the use of maize is changing dynamically. However, we take into consideration other commodities, such as soybean, rice and vegetables because farmers cultivate these crops and traders collect, sell and sometimes process these same crops (Hayami et al. 1991; Kawagoe et al. 1990). New ways of maize use such as feed and starch have expanded in recent years in Indonesia (Budi Tangendjaja and Gunawan 1988; Winarno 1988; Muharto and Chusnul Chotimah 1990). The development of large scale poultry farming and feed industry has induced changes in maize production and marketing in rural areas and of rural urban trade relations.

The economic system works through market channels linking rural markets, town markets and larger urban markets. Various types of traders with different turn-over, trading knowledge, and capital operate in the market channels. Through them, farmers receive information and dispose of their products. The volume and the pattern of demand for maize products are changing. New outlets such as feed and industrial uses are expanding. We need to investigate which market mechanisms and options in transaction structure convey economic signals from the demand side to the producers, also we will investigate whether the downstream market system of maize is able to cope with the changes taking place on the demand side.

There are large maize industries in East Java (Surabaya and Sidoarjo) which contract with traders to procure material and to promote the introduction and dissemination of high yielding variety (HYV) seeds. This shows vertical market integration and the dissemination of technology by industry. In some cases farmers play a role as seed growers. In Java, there is inter-seasonality between farmers in upland and lowland areas. Local traders procure the seeds and supply them to lowland farmers. This system is-called *jabal (jalinan arus benih antar lapang)* (Didik Harnowo et al. 1993). These cases show the vital role of the private sector in seed supply.

Government extension systems and farmers' organizations such as village unit operatives *(Koperasi Unit Desa* or *KUD)* have contributed to realization of self sufficiency of rice. The policy target was simple and the self-sufficiency of rice received top priority. But with diversification of agriculture, policy targets are also inevitably diversified (Faisal Kasryno . 90). Information on prices and demand and the quality improvement required by processing units or consumers is critical for farmers to increase farm profitability (Stiglitz 1987). However, it might be very costly for the government to carry out such activities, so inevitably the role of the private sector becomes larger (Hedley et al. 1987). Agricultural industry shares increasingly wider responsibilities.

The following items are conventionally considered as important elements in order to increase farmers' income or employment opportunities:

- increasing productivity per hectare (or per unit labor) by applying improved varieties, chemical fertilizer and other new technology and to improve profitability;
- practicing year-round farming of paddy and/or CGPRT crops;
- increasing added value by processing of CGPRT crops in rural areas; and
- selling products at higher prices by improving their quality.

The implementation of these basic strategies must be supported by both farming technology and transaction options in each market of inputs, labor, land (or land tenure), credit and products. These goods and factors of production are exchanged through market mechanisms, including traditional institutions. It is important to reveal the organization and structure of these market mechanisms, which enable efficient resource use, and would provide a way of improving farmers income.

On the other hand, downstream industrial linkage makes demands on farmers, including:

- production increase and increase of marketable surplus;
- stable supply and adherence to harvesting and shipping schedules required by traders and processors; and
- improved quality.

Improving quality seems to be very important to promote linkage with industry. Agricultural development policy in Indonesia has mainly been concerned with production increase. But it is very important to consider not only the production/supply side but also the usage/demand side, especially after self sufficiency of staple food is achieved (Damardjati and Barrett 1986; Damardjati et al. 1988; Moentono 1988; Tabor 1989). Processing and quality improvement should not be neglected in order to improve farmers' income and employment opportunities, because production increase does not necessarily equate with increase of income and employment if excess supply causes the price to fall. Our study addresses the question of how farmers and traders can improve quality and income. The present situation shows modern influences through the feed industry as well as an institutional development framework as set

up by the government. The larger question concerns how industry and institutional framework match.

1.2 Objectives of the study

The primary objective of this study is to explore the changes in the CGPRT crop based economy of Indonesia. By focusing on maize, this study investigates the ways and means for organizing the system towards an efficient structure so that the economy serves interests of producers, particularly small farmers and other people whose income mainly depends on CGPRT crops.

In this study, the role of the private sector and market mechanisms will be emphasized. The basic objectives of the study are as follows:

- to investigate the resource allocation in the farm household economy and to identify possible constraints to improving farm incomes and farmer employment opportunities.
- to identify market structures linking producers with consumers/end users and to review the performance of the CGPRT economy in contributing to employment opportunity and income generation for rural people.

A study of this scope needs primary data. The survey data cover not only farm management but the full household economy. This way the study can identify efficient and effective ways by which farmers can capture fair returns from CGPRT crop farming. The mechanism and structure of the factor markets depend on the institutional setup and socioeconomic situation, i.e. land tenure systems, labour practices and prevailing ways of credit provision among farmers, traders and processors (Nabli and Nugent 1989).

In developing economies, factor markets are often not complete but are linked to each other to compensate for the incompleteness (Bardhan 1989; Basu 1984; Binswanger and Rosenzweig 1984; Bell 1989; Stiglitz 1989). The feed business has drastically changed the quality standard of maize and the volume of trading. Traditional rural markets seem to be changing by this impact. The role and attitude of traders and the hierarchical system of trading are changing and new arrangements are forged. This study focuses on links among the product and factor markets.

Maize standards have been introduced and disseminated among traders and villagers. The demand increase requires farmers to use higher yielding seeds of maize and to upgrade their farming technologies to increase production. Farmers and traders have an increased need to use credit to procure new or more inputs. It is well-known that there is a wide gap in knowledge, skill and information among farmers and traders in accessing financial institutions. This study investigates how farmers and traders cope with the financial requirements induced by the changed commodity standards and increased demand.

Rural financial markets for farmers and traders, particularly for the latter, are also investigated. Standardization of financial commodities and accessibility to them are very important issues in the rural financial market (Adams 1978; Hoff et al. 1993; Bardhan 1989). The analysis focuses therefore on financial institutions. The study starts with the notion that there is always an information gap among farmers and traders and other players regarding access to quality standards of commodities, and availability and interest rates of loans from the banking system. Some may see asymmetry in information as a cause for difficulties for farmers; this study also takes into account the same for traders (Hayami and Ootsuka 1993).

1.3 Methodology and work plan

The study examines various change agents in the rural economy: farmers, traders and agribusiness. After conducting explorative interviews a survey was designed and implemented. The survey includes rice and non-rice crop cultivation, production costs, non-agricultural activities, the use of household labour and hired labour, assets, income, land ownership, etc. The survey used questionnaires. The field survey was conducted in East Java in collaboration %N ith the Malang Research Institute for Food Crops (MARIF).

With regard to farming and marketing, the following issues receive our attention:

- farming systems and marketing of products;
- land and labour resources, land tenure, labour practices;
- availability and use of credits, the role of traders and processors in credit supply;
- institutional and organizational conditions including marketing systems; and
- other socio-economic conditions in the rural society.

The study examines the role of the private sector, especially traders and agribusiness, since the private sector is a change agent in the development process. Our research includes a agribusiness survey focused on new patterns and types of CGPRT use, i.e. processed food, feed and industrial materials.

A survey site was selected in East Java as a representative CGPRT crop based economy. East Java is the most important production area of maize, soybean and cassava in Indonesia. These crops are grown both in irrigated lowland areas after rice and in upland areas. The study site is an area where diversification and commercialization have developed substantially. The survey area was selected from the view point of both agricultural and economic conditions.

Basic data were collected from seven districts in East Java. Pace was selected for indepth study after comparing harvested area data from 160 sub-districts. Pace is located 130 kilometers from the provincial capital, Surabaya. Pace is one of the most advanced areas in diversification of farming. Three regions can be distinguished in Pace: irrigated lowland, incompletely irrigated lowland, and upland area (in the foothills of mount Wilis). Pace sub-district is geographically diversified and as a consequence the farming system is also Jiversified, even within a village. A village where farm diversification and commercialization are the most advanced was selected to clarify the future prospects of CGPRT crop based economy.

In the surveyed village, farmers cultivate two or three different crops, namely, rice, soybean and maize. A small hamlet in the incompletely irrigated area was selected and a census survey undertaken. The census approach was used because of the need for longitudinal information and the need to ensure reliability of data collected.

From July 1990 through August 1991, four types of surveys were undertaken. These were: a village survey (VS), a household survey (HE), a household income survey (HI) and a market survey (MA). The surveys had the following objectives:

VS: to aid selection of the survey site and preparation of the questionnaire.
HH: to study the villagers' socio-economic condition.
HI: to investigate employment, production costs and household income.
MA: to clarify the role of traders of CGPRT crops and activities of agribusiness in agricultural diversification of Indonesian agriculture.

VS was undertaken by interviewing village officials. It included the following items:

- village statistics (population, employment, area, etc.).

- land tenure system,
- labour practices, and
- local units of area and units of measure of harvested crops.

HH was a baseline survey undertaken by interviewing 81 household heads. It contained the following:

- information about households and their members; e.g. age, job education, food consumption,
- procurement of input materials and information on farming,
- cropping pattern,
- disposition of harvested crops,
- land ownership,
- participation in government schemes such as extension, credit scheme, and
- household property.

HI was undertaken by interviewing 34 heads of farm households. This survey was carried out three times during one year just after the harvesting seasons for soybean, maize and paddy respectively. HI contained the following items:

- production,
- land use,
- current input cost,
- labour input (working hours), and
- income.

MA involved interviewing 102 traders or processors in Pace, Kediri city, Malang district and Malang city from February through July 199 L MA included the following items:

- procurement and selling of traded materials,
- trading routes,
- relation with maize production farmers,
- innovation in maize production and trade,
- quality improvement by local and urban traders (e.g. the feasibility of quality improvement and its impacts on trading and farming), and
- accessibility to funds for working and fixed capital.

Price monitoring began in December 1990 and was terminated in December 1991. It was intended to clarify the marketing margin and traders' role in the maize economy.

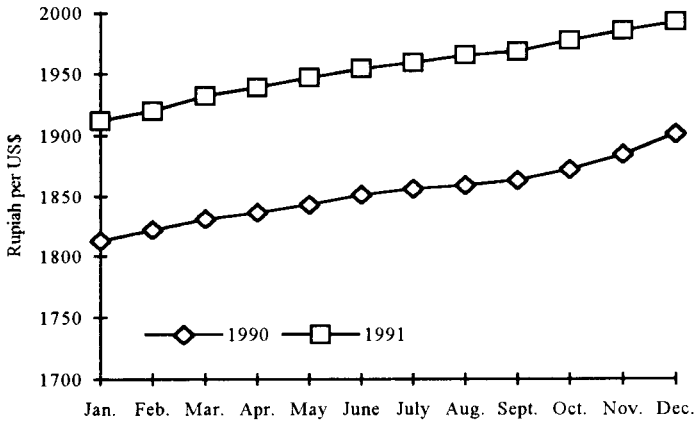
Economic data are presented in Indonesian rupiah and monthly exchange rates over the period of the study are presented in Figure 1. 1.

1.4 Plan of the volume

The concept of the CGPRT crop based economy, objectives and research methodolog} are explained in Chapter 1. Chapter 2 describes the study area, Pace and KA village, mainly based on the VS and HH surveys. Chapter 3 describes the features of farming and farm households under the CGPRT crop based economy in the commercialized rural area based on the HH and HI surveys. Particular attention is paid to the disposition of harvested crops. Chapter 4 clarifies the market structure of maize in East Java and classifies the various types of traders in producing areas and in collection and distribution centres. The development of the

feed industry has a large impact on the traditional maize economy in East Java and it can be called a newly emerging market; special attention is paid to the role of traders in this agricultural development. Chapter 5 investigates the development of agribusiness, the feed industry in particular, and its impact on the maize market and traders. The marketing route of maize, traders' margins and their profit are clarified in the following two chapters. Critical constraints and problems traders confront in industrial use of maize are identified and investigated. Chapter 6 identifies the quality problem as an essential issue for the development of industrial linkages in the maize economy. Industrial uses of maize demand high quality maize. Chapter 7 identifies another feature of the maize economy that enables traders to cope with the development of industrial linkage in East Java, namely credit which provides working capital to traders. In addition, the mechanism, role and limitations of the rural financial market are elucidated. The last chapter summarizes facts, findings and their implications.

Figure 1.1 Indonesian rupiah US dollar exchange rates, monthly 1990-1991.



2. Socio-Economic Characteristics of Pace

Maize, soybean and cassava are the major CGPRT crops in East Java (Dinas Pertanian Jawa Timur 1994). Maize is widely cultivated in the irrigated fields after the rainy season and in the dry season (A. Husni Malian and Aman Djauhari 1988). It is cultivated only once a year in upland areas. Soybean is cultivated mainly in irrigated fields after the rainy season. Cassava is planted in drier upland areas.

One encounters three basic farming patterns in East Java, namely rice, maize and cassava based farming:

- Rice based farming is located in the river basin areas such as the Brantas river basin and the Solo river basin.
- Maize based farming is located on Madura island and in the upland area of Malang.
- Cassava based farming is located in coastal areas along the Indian Ocean, e.g. south of Malang.

Agricultural land of Java is classified into three types: lowland, upland and garden land/home yards. In lowland villages, farmers can crop three or four times a year even in rainfed or incompletely irrigated fields. Many farmers use water pumps in the dry season. Vegetables and perennial crops such as bananas are planted in gardens. The following sections of this chapter describe the Pace sub-district and introduce the study village in Pace.

2.1 The agricultural economy and land in Pace

The Pace sub-district comprises 18 villages and is basically located in the rice based farming area of East Java (Map 2.1). The average altitude is 60 to 100 meters above sea level. The Pace sub-district is located at the southern part of Nganjuk district. The rainy season falls in the months December through March. The transitional season runs from April through July and the dry season runs from August through November. This temporal pattern may shift several weeks backward or forward. The rainfall in Nganjuk is about 2000 mm per year. The monthly rainfall distribution in Nganjuk is shown in Table 2.1.

Table 2.1 Rainfall in Nganjuk 1989.

Month	Season	Rainfall (mm)
January	wet	394
February	"	337
March	"	187
April	transitional	194
May	"	233
June	"	209
July	"	90
August	dry	10
September	"	1
October		54
November	"	133
December	wet	213
Total rainfall		2,055

Source: East Java Statistics Office

Map 2.1 Study areas in East Java.

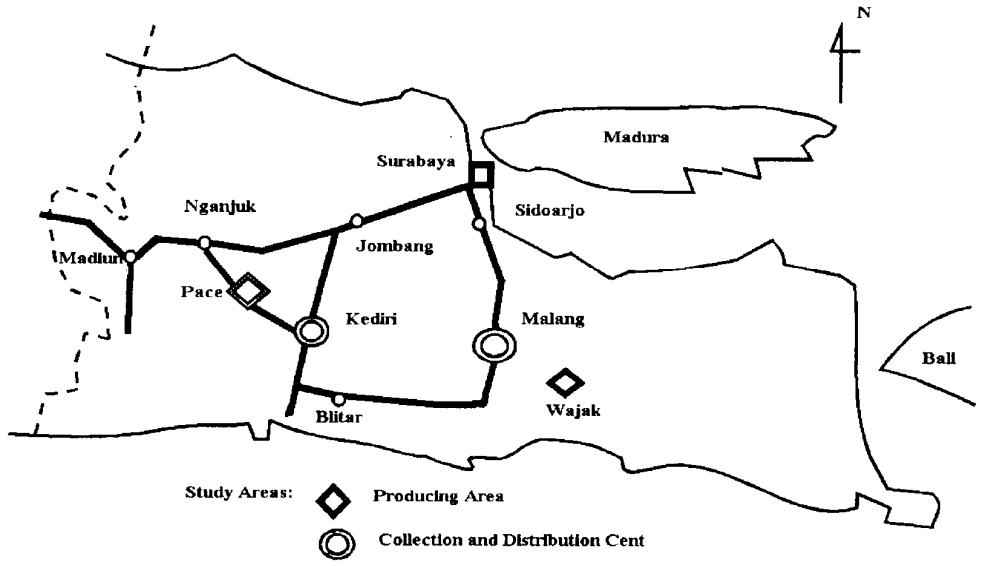
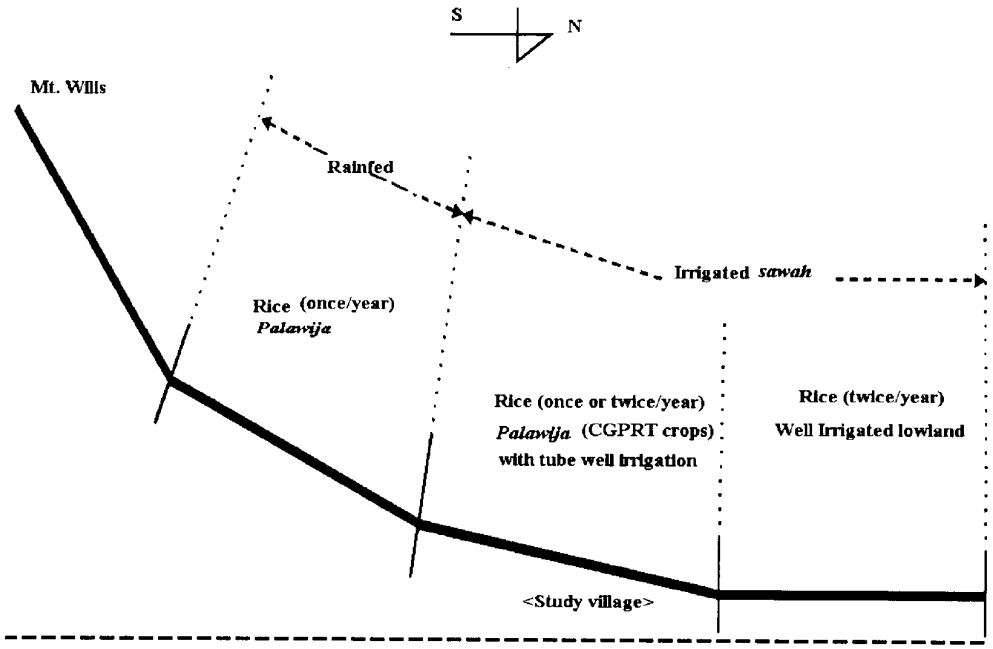


Figure 2.1 Slope transect of Pace sub-district.



Pace can be divided into three areas, the northern, central and southern parts. Rice can be planted three times a year in the northern part, twice a year in the central part and once a year in the southern part. The variations among the areas are caused by variations in water availability. The villages and their land use are listed in Table 2.2.

Table 2.2 Land use in Pace sub-district, hectares, 1992/93.

No. Village	Wet Land				Upland Total	Agricultural Land Total
	Irrigated Technical	Irrigated Semi Technical	Rainfed	Total		
1. Cerme	79	23	-	102	-	102
2. Mlandangan	101	69	1	171	27	198
3. Gondang	-	181	-	181	76	257
4. Jampes	14	59	-	73	22	95
5. Jatigreges	-	144	4	148	165	313
6. Kepanjen	218	-	1	219	-	219
7. Kecubung	129	-	-	129	-	129
8. Plosoharjo	155	-	4	159	-	159
9. Gemenggeng	134	-	8	142	-	142
10. Pace Kulon	42	135	1	178	-	178
11. Pace Wetan	241	104	4	349	-	349
12. Sanan	-	116	13	129	-	129
13. Joho	-	242	108	350	480	830
14. Batembat	99	-	-	99	-	99
15. Babadan	119	-	-	119	-	119
16. Banaran	66	-	-	66	-	66
17. Bodor	107	-	-	107	-	107
18. Jetis	111	-	-	111	-	III
Total	1,615	1,073	144	2,832	770	3,602

Source: Pace Sub-district Office.

Palawija crops are widely cultivated during the dry season in almost all villages of Pace. In the northern part, the common cropping pattern is rice-rice-maize. Soybean is sometimes cultivated instead of maize, but maize is more widely cultivated than soybean. In the central part, the major cropping patterns are rice-maize or rice-soybean-maize. Groundnut and vegetables (chili, eggplant, etc.) are also cultivated instead of maize. In the southern part located in the foothills of mount Wilis, the major cropping pattern is rice-maize plus cassava. Upland dry farming (in *tegal* land) is more important in the hilly southern part of Pace than in the other areas. Farmers of the southern part mainly cultivate maize and cassava in the upland dry areas (Figures 2.1 and 2.2).

The cropping pattern is diversified even among farmers. This diversification makes it hard for the local agricultural authorities to implement traditional extension work. Extension workers cannot unify the cropping pattern in an area where farmers do not rely on irrigation (pumped ground water) for their water supply.

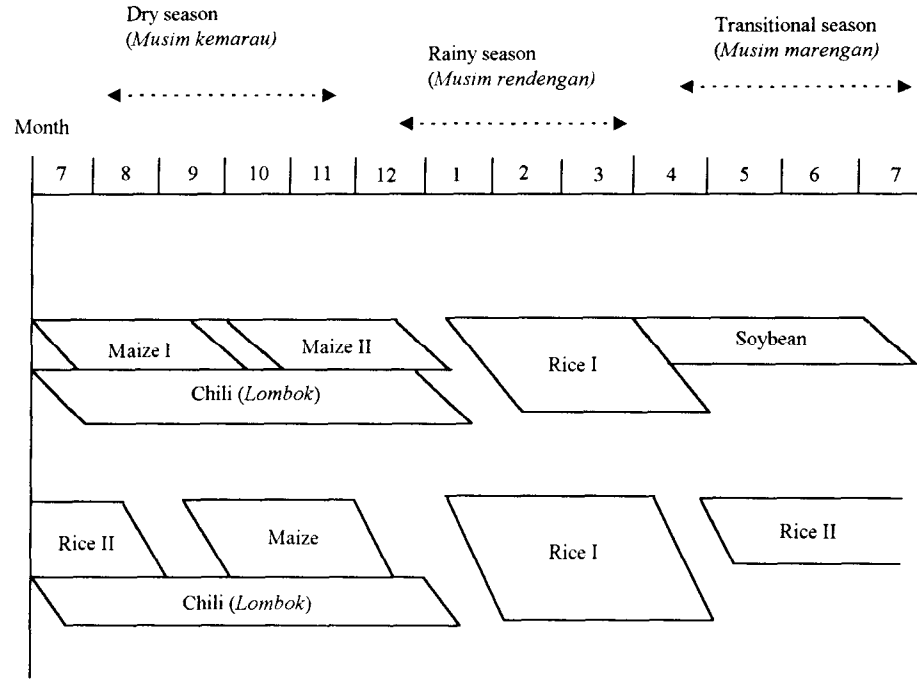
The villages in the northern part of Pace, e.g., Kepanjen and Gemenggeng are relatively well off. Plosoharjo and Kecubung have fertile agricultural land. Land in both villages, however, is not so intensively cultivated as many farmers tend to work as traders too. There are two local markets in Pace sub-district, located in Pacekulon village and Kecubung village, respectively.

The village of Kepanjen in the northern part of Pace has the best potential for rice, maize and soybean farming. Cassava is extensively planted in the foothill area, for example, in

the village of Joho and the village of Jatigreges. The study village located in the central area is the largest maize and soybean producing village in Pace sub-district.

Villagers began to use improved varieties of rice and maize near the end of the 1960s and at the beginning of the 1970s. Farmers in Pace use improved varieties such as IR 36 and IR 64 for rice, Wilis of soybean, and Arjuna BISI, Arjuna Super and CPI-1 of maize. There is no newly improved variety of cassava in the survey villages: farmers use one traditional variety (Pandemir) introduced by the Dutch colonial government.

Figure 2.2 Cropping patterns in the study village.



In an agrarian economy, there are two major players aside from farmers, namely traders and government, who share the important role of changing the agrarian economy. In the CGPRT crop based economy, private traders are particularly important for inducing change. The harvesting contractor *(penebas)* and the accompanying transaction structure represent change in Pace.

There are several harvesting contractors in each village of Pace. Each hamlet has several small traders of harvested crops known as *bakul.* In our marketing survey, 36 harvesting contractors were interviewed, approximately two per village. There are many collectors in Kecubung village where commercialization is the most advanced. Each village of Pace, except Jatigreges, which has no processing unit for agricultural products, has a few rice millers.

There are agricultural trading companies in Pace, such as CV. A in Kecubung village and UD. B in Babadan village. Both started as rice millers and recently moved into cattle breeding and fattening. CV. A also deals in used cars, while UD. B owns transportation

companies and a sugarcane farm of approximately 500 ha in the surrounding districts. It seems that rural entrepreneurship and capitalism have developed in Pace (cf. Husken 1989).

Processing factories, in general, are small in scale and sometimes have sales shops too. Typical processing industries are *tahu* (a cake of soybean curd), *tempe* (a cake of fermented soybean), *kerupuk* (baked crisp of tapioca) and *tape* (cake of fermented cassava). Processing agricultural products is important in increasing farmers income and employment opportunities in Pace.

Government activities are very limited in the study village. The extension service and irrigation water supply are limited, if not inadequate. The farming performance in the study village is inferior compared to other villages where governmental supports are well provided.

The farmers of the study village understand that fertilizer, improved seed and pesticide increase productivity and their income, even without much information and government support. According to a former hamlet *(dusun)* head of the study village, 73 households participated in the farmers group *(kelompok tani).* The survey of individual villagers, however, clarified that the villagers' participation in government programs was negligible. Table 2.3 shows the number of farmers who have participated or are participating in the government programs. INMUM is the normal extension service formerly called BIMAS (mass guidance) or INMAS (intensified mass guidance). INSUS is the further intensification of INMUM in well irrigated areas. SUPRA INSUS is new version of INSUS with complete control of fertilizer, pesticides and irrigation water. TRI *(Tebu Rakyat Intensifikasi)* is the extension program for the intensification of smallholders sugarcane farming. Of the total number of farm households of 44, only around 20% participate in government programs.

Table 2.3 Number of farmers participating in government extension programs in the study village, 1989/90.

Paddy			Palawija		Sugarcane
INMUM	INSUS	SUPRA INSUS	INMUM	INSUS	TRI
3	9	4	0	0	2

The local government needs some device to induce farmer's interest and positive participation in extension programs. The farmers group *(kelompok tani)* in Pace sometimes includes a rotating credit scheme in its activities. This is aimed at inducing farmers to come together to receive extension instruction. On the 17th of each month, leaders of the farmers group in Nganjuk district assemble in Nganjuk to discuss agricultural problems with the district heads *(bupati).*

2.2 Socio-economic structure and land tenancy of the study village

A case study was undertaken in one hamlet (called the study village) which contains 81 households with a total of 388 members. The demographic structure is shown in Table 2.4.

The study village contains 44 farm households. Of these, 31 households are owner operators including those partly renting land. The difference is due to land tenure. Land can be rented for fixed cash, which is usually paid up front in September. There are also 31 households whose heads work as agricultural labourers including part time. Fifteen households

are landless labourers. There are 20 former *gogol* members who communally owned irrigated land for rice cultivation *(sawah).* They are considered farmers *(tani).* The rest of the villagers a have been considered as labourers *(buruh).* In earlier days, plots of land were rotated among original farmers. Long before dissolving *gogolan (gogol* institution), the rotation system had ceased. In the early 1960s the communal right was dissolved finally *(diyasankan)* and the land became the property of the original farmers (Fox 1993). They consider themselves as *tani* and sometimes call the rest of villagers *buruh.* Most of the 31 owner operators are original farmers or their descendants. Some of them, on the other hand, were originally landless, which shows internal mobility in the village. These usually worked as traders, carpenters or labourers, saved money and bought land from the original farmers. Thus the number of owner operators has increased from 20 to 31 over the last 30 years (Table 2.5).

Table 2.4 Population of the study village.

Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Male	22	22	25	9	23	16	19	15
Female	14	21	17	18	17	18	1S	10
Total	36	43	42	27	40	34	34	25
Age	40-44	45-49	50-54	55-59	60-64	65-69	> 70	Total
Male	8	7	10	7	6	5	5	199
Female	5	18	8	12	3	5	8	189
Total	13	25	18	19	9	10	13	388

Source: Household survey in the study village, pace sub-district, Nganjuk

Table 2.5 Land and labour in the study village.

	Gogol	Farm Household		Total	Landless	Employment			Farmers
	Member (household)	Owner operator*	Total	Cultivated Land (ha)	Labourer's Household	Ag. Labourer** HH Head	HH Member	Employed Total	Group Member
Total	20	31	44	16.0	15	31	52	189	73

Notes: * Includes partly renting; ** Includes part time work.

There are many agricultural wage labourers in rural Java. In the study village, the total employed population is 189 and the economically dependent population numbers 199. Sixtytwo persons work primarily as agricultural labourers. Eighty-three persons are employed as agricultural labourers, this number includes those working on a part time basis. Agricultural labour is mainly male (about 70%). The role of agricultural labourers is very important in agriculture of rural Java since more than half of the total labour input for farming is done by them. The occupation of the villagers is shown in Table 2.6. Farming and agricultural labour are the major occupations in the village, but there is a significant number of traders. The number of farmers given in Table 2.6 includes not only household heads but also their family members, many of whom work as wage workers for other farmers.

Table 2.6 Employment in the study village (number of people).

Farmer	Agricultural Labourer	Non Ag. Labourer	Employee	Craftsman	Small Shop (warung)	Trader	Teacher	Midwife
70	62	2	11	3	6	27	7	1

Traditional mutual labour exchange in rural Java usually takes place in rice harvesting but it is now limited to close relatives. In the HI survey, mutual labour exchange *(sambatan)* was reported only during overlap of the maize harvesting season and rice planting, from the end of December through the beginning of January.

The total area under farming was 19 ha, including 3 ha of *sawah* bestowed on the hamlet head as land for his use. The head rented out this land for sugarcane farming. The average farming area per household was 0.365 ha, which is close to the average of the whole of Java. There were 24 households of owner farmers; 7 households were owner farmers who also rented some land; and 13 households were tenant farmers who rented all their farm land. Four households rented out all their land and became non-farm villagers (Table 2.7).

Land tenure provides the channel for the landless to access land resources, and for some farmers to further extend their farm size. During the last two years, 26 tenure contracts were observed. Among these, twenty-three were fixed rent *(sewa)* and the rest were sharecropping *(bagi hasin* contracts. The rent of sharecropping was *maro* (1/2 of produce). The sharecropping contract is fixed on an annual basis. Tenant farmers can cultivate more than three crops per year and the rent depends on the kind of crop. Rent for paddy and soybean is *1/2 (maro)* of the harvested crop after paying the harvesting cost, but rent for maize cropping is 1/3 in general. Recently, sharecropping has become rare and it is now limited to irrigated fields. The other tenancy form is a fixed rent contract with payment in cash *(sewa).* This contract is also on an annual basis.

Table 2.7 Farm size and land tenure status by number of households.

Farm size (ha)	Owner farmer	Owner farmer also renting	Tenant farmer	Total
< 0.25	16	1	8	25
0.25-0.49	3	3	4	10
0.50-0.74	3	0	1	4
0.75-0.99	0	1	0	1
1.00- 1.24	0	0	0	0
1.25- 1.49	1	1	0	2
1.50- 1.74	1	1	0	2
1.75-2.00	0	0	0	0
Total households	24	7	13	44
Total (ha)	7.71	5.14	3.20	16.04
Average (ha)	0.321	0.734	0.246	0.365

At the beginning of 1991, nine households consisting of five landless villagers and four farmers who terminated renting out of their land, began farming. The rent is paid in advance, usually in September when the land tenure contract is renewed. The new contract comes into force when rice cultivation in the wet season starts.

Fixed rent was around 700,000 rupiah per hectare per year. The lowest rent was 200,000 rupiah for a contract of 5 years duration. Although the one year contract is standard, there were several cases of two year or longer contracts. The annual rent is cheaper for longer contracts, so poor farmers tend to contract for longer duration.

Only two farmers were observed to operate with a sharecropping contract in the study village in the HI survey. Both tenants cultivated four times per year: maize I, maize II, rice and soybean. The tenants use land efficiently all year round. The rent share is 1/2 for each crop except maize which is often only 1/3. The rent in terms of money is far more expensive than

the fixed rent contract. The rent came in one case to 1.11 million rupiah for one year and in the other case the rent was 1.64 million. The rent for sharecropping is approximately twice that of fixed rent. Payment is made in kind and in money. Land owners rarely paid expenses of tenants in Pace. This might be caused by the fact that fixed rent is paid several months before the harvesting of rice and other crops. The interest during this period could equal the difference of the rents (Morooka and Hayami 1984).

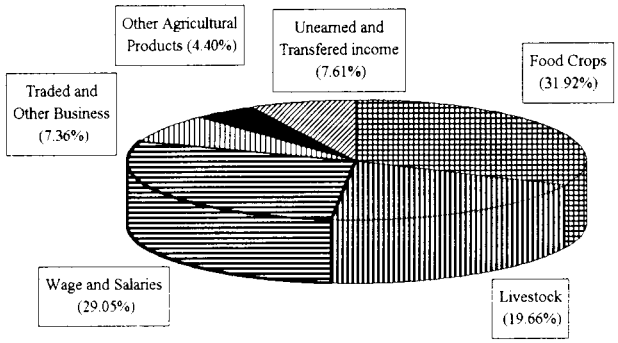
The land owner of the two sharecropping contracts was same; he lived in Kediri. One case of sharecropping was not supervised by the land owner; the other case was supervised by the land owner. When a tenant farmer uses *tebasan,* his landowner receives the rent in cash. In the case of sharecropping, if the owner comes to the land to supervise the harvesting work, we consider that the rent of the sharecropping is paid in kind, even though he receives the rent in cash, if an owner does not come to supervise harvesting, the rent payment is considered to be made in cash. The high load of labour input during the transitional period from harvesting to seeding the next crop makes even small farmers (such as tenant) use the *tebasan* system.

2.3 Income of farmers

In the farm income survey 36 farmers were investigated. The survey was repeated three times during the year. Year-round data on income were obtained for 32 farmers. Data covered August 1990 through July 1991, and covered 73% of total farm households in the study village.

The total income of farmers comes from several sectors (Figure 2.3). Income from food crops generates the largest part of income; its share is 31.9%. It is followed by wages & salaries at 29.1%, livestock at 19.7%, unearned and transferred income at 7.6%, and trade & other business at 7.4%. Other agricultural products include vegetables, fruits, poultry and other home yard products, which are grown in the land surrounding the house *(pekarangan)* and are mainly for home consumption. Other agricultural products were counted as off farm income for the convenience of this survey.

Figure 2.3 Income sources of farm households in the study village.



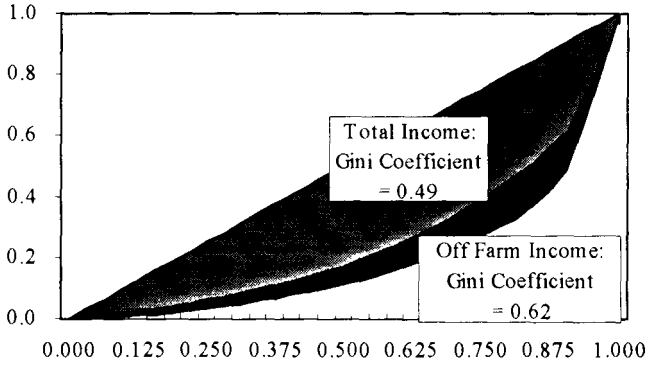
Farmers diversify their income sources as induced by the temporal structure of the many options in agricultural production and trade. One farm household usually has two or three

income sources. It was surprising that even farmers, who depend on cropping and livestock, generate only 60% of their income from agriculture. Agricultural byproducts such as leaves, stems and husked maize cob which are tradable as feed, fuel or manure are equivalent to approximately 7% of income from foodcrops.

The sample of 32 farmers includes two teachers and one clerk of the elementary school. Salaries and unearned income (pensions) mainly come from government. Wages mainly come from agricultural labour, civil work, etc. One harvest contractor *(penebas)* is included as a part ame farmer. There were many small traders in the study village, but they are not included in :he 32 farmers interviewed. Unearned and transferred income includes remittance from -nigrants (both seasonal and permanent), land rent received, lottery and others. The outside -emittance for non residents such as for schooling of children who usually live out of the %illage is counted as a minus value.

Income disparity is indicated by gini coefficient in Figure 2.4. The coefficient for 32 households is 0.49, but the off-farm income shows a less smooth distribution, and gives a higher gini coefficient of 0.62. Incomes from non agriculture increase the degree of income disparity. In particular, some households with salaries, such as government officials, are rich within the study village. This situation is generally observed in rural Java.

Figure 2.4 Income disparity of farm households (n-32) in the study village.



3. Changes in Agriculture

3.1 Farming systems in the study village

The cropping pattern of the study village is diversified (Table 3. 1). Farmers generally crop three or four times a year. A common cropping pattern practiced in 1990 was ricesoybean-maize-maize. Farmers seeded soybean less than one week after rice harvesting, because soil moisture is critical for germination of soybean. For rice harvesting, farmers employed harvesting contractors *(penebas)* in order to finish harvesting as fast as possible and to prepare for cultivation of soybean. The contractual choice in rice harvesting depends thus on the choice of the second crop.

Crop selection for the transitional season *(musim marengan)* therefore needs attention. Many farmers planted soybean as a second crop. Some grew rice, maize or a mix of rice, soybean or maize. Farmers select cropping sequences based on long term weather forecasts and the water condition of their land. Farmers consider that farming in the drier transitional season is risky.

First crops in the dry season need to be fast growing. Maize is therefore the most important crop during the dry season. The variability in selection of cropping sequences reflect thus business strategies and water conditions. The strategies included options of higher value perishables. Some farmers grew chili or groundnut after or with maize. Farmers divided one plot of land into two or three parts and planted groundnut, chili or cucumbers. Vegetables such cucumber and chili were very lucrative for farmers as their price was relatively high and the harvesting season is long.

Table 3.1 Cropping patterns by farmers in the study village from August 1989 through July 1990 (numbers of farmers).

Crop in Rainy Season	Crops in Transitional Season	Cropping Intensity per Year				
		1	2	3	4	Total
Rice	Rice	0	0	1	4	5
	Soybean	0	0	9	15	24
	Maize	0	0	5	2	7
	Rice and Soybean	0	0	0	3	3
	Rice and Maize	0	0	0	0	0
	Soybean and Maize	0	0	2	0	2
Non-rice	Orange	1	0	0	0	1
	Other	0	0		0	2
Total		1	0	19	24	44

Farmers continue cultivation after soybean with a quick maize crop. If the dry season is long, maize is cultivated twice especially by small farmers. In 1990, the long term weather forecast predicted that the dry season would be long. This meant that the beginning of the next rainy season would be delayed, so many farmers cultivated a second maize crop from October through January 1991. Approximately two weeks before the harvest of the first maize crop, the second maize crop was sown. The second maize was harvested from the end of December

through the beginning of January 1991. During three weeks, maize was entirely harvested and rice was transplanted.

Agriculture in the study village is an intensive business. Land is cultivated all year round and farmers work all year round. There is no idle season. Labour and land were efficiently used. This type of farming (rice-soybean-maize) was already established by the early 1970s. The oldest villager said that this multiple cropping system was already there in the 1940s. Although production per hectare was low, a substantial part of the harvest was sold in this area. Thus, commercial and intensive agriculture seems to stem from earlier decades in Pace.

Maize has various kinds of by-products such as fodder from leaves, fuel from plant stems and shelled cob and cigarette rolling paper from maize husk. These by-products account for approximately 10% of the total value of harvested maize. This is higher than the value of by-products of other crops. This value cannot be neglected and attention must paid to postharvest activities generated by agricultural by-products. Many villagers breed cattle and they receive substantial amounts of income by renting or selling cattle. Leaves or plants of CGPRT crops such as maize, soybean and groundnut are utilized as fodder. The leaves, plants and the cattle dung are often utilized as manure.

Wet land can not be irrigated from May onwards because there is no surface irrigation water supply. Most farmers in the study village therefore consider such land as rainfed. In the transitional season from May to July, water shortage makes it hard for farmers to choose between rice and soybean. Water shortage sometimes causes serious pest attacks and yield failure. Many farmers in the study village choose soybean during the transitional season but it is risky cropping. Many crops fail from April through July.

The Pace branch of the Public Works Department regards the irrigation system in Pace as belonging to the class of "technical irrigation". On the other hand the villagers regard the irrigation as semi-technical or rainfed. The question is whether to speak of a semantic or a perception gap between the two parties. It depends on whether one attaches greater importance to the irrigation infrastructure or to the water availability. Even though there was the infrastructure of irrigation, farmers consider the system as semi-technical irrigation or rainfed if the irrigation water was not available during crop seasons.

Rental of water pumps has been practiced since the early 1980s. This seems to be a spill over effect of a World Bank project in surrounding areas. Other than pump irrigation, mechanization seems not to have made progress in the study village. Only one farmer used a tractor for land preparation. All farmers in the study village still use plows drawn by a pair of cattle.

Since water pumps became popular in Pace, water resources for the canal irrigation system have become short. Since the beginning of the 1980s, the irrigation system in Pace has not been able to supply water after May or June every year. The system can supply water only for two months in the transitional season. As this water shortage coincides with the beginning of extensive use of tube wells, people suspect causality between the two observations.

It is very important to know measurement systems in the study area, not only for field research but also for understanding the degree of commercialization. Commercialization requires standardization of commodities traded, otherwise transactions between villagers and traders are rarely concluded. Villagers have a long tradition in using metric measurement systems due to the long history of commercialization since the colonial area. Nevertheless, villagers also use traditional and convenient measurements such as the *blek*, which comes from

the Dutch *blik,* or can. It is usually a content measure, but is sometimes implicitly used as a weight measure. In the villages of Pace, farmers generally use *ron* (or *ru = 1/700* ha) unit for lowland, upland or home yard.

Farmers have used metric units which they call *kiloan* (kilo, weight) or *meteran* (meter. length). Weight, however in practice, is measured by various kinds of equipment. The names of the equipment are used as measure units. Villagers measure weight based on *kiloan* (kilogram). Quintal is a weight unit used in sales from farmers to traders. Farmers, however, often use *blek* (oil can) and *ornplong* (can) as the measures of harvested crops. Another type of weight unit often used is the *dacin* can (Table 3.2).

Table 3.2 Units of measurement applied in the study village.

1 kwintal unhulled rice	= 60 kg hulled rice	12.5 kg
1 blek unhulled rice	= 10 omplong	
1 blek soybean	= 10 omplong	16.25 kg
1 blek maize	= 10 omplong	16.25 kg
1 dacin	= 5 blek unhulled rice	62.5 kg
	= 4 blek maize/soybean	65 kg
I pikul	= 50 kg	
1 bongkok	= 1/2 pikul$_2$	
Iru	=14.193m	
I bow	= 500 ru = 7096.49 m^2	
1 ha	= 700 ru	
1 gogol	= 420 ru	
1 gang	= 100 ru	

Note: 1 blek = 10 omplong = approximately 20 liter oil can.
1 omplong = 1.25 kg of unhulled rice or 1.6 kg maize/soybean.

3.2 Labor practices and harvesting

Labor practices and the level and form of wages will be discussed in this section. Farming in Pace largely depends on family labor and employed workers. Small farmers commonly do almost all kinds of farming activities with their household members, including cultivating, seeding, fertilizing, pesticide spraying and irrigating. However, relatively large farmers with *0.5* ha and more, usually employ agricultural laborers from the same hamlet or % village. In the villages of Pace, *sambatan* (mutual help for farming work) is rarely observed except among relatives. There are, in general, *3* types of working hours:

- *Sekesuk:* from *6:00* to 11:00 A.M.
  Male wage: Rp *750* + *1* meal + 1 glass of coffee + *2* cigarettes (cash for transportation: Rp 1,000).
  Female wage: Rp *625* + *1* meal + 1 glass of coffee.
- *Nerus* from *6:00* AAl to 1: 00 P.M.
  Male wage: Rp *1,250* + *2* meals + *2* glasses of coffee + *2* cigarettes (cash reduced to Rp *750* if meals and coffee are provided three times).
  Female wage: Rp 1,000 + *2* meals + *2* glasses of coffee.
- *Harian: 6:00-11:00 AA-1* and *2:00-4:00* e.\t.
  Wage is same as *A'erus.*

The value of payment in kind is: one meal = Rp 250; snack = Rp 150; 1 glass of coffee = Rp 50 or tea = Rp 25; and 2 cigarettes = Rp 75. The daily wage of harvesting work differs sometimes from the usual rates. These are: Rp 2,000 for cutting, Rp 3,000 for transporting and Rp 1,500 for drying harvested crops.

Contract labour *(borongan)* is often used in Pace. Contract work is usually used for hoeing and plowing, and sometimes for planting. Hoeing and plowing is observed in rice and other CGPRT crops. Plowing of TRI fields *(Tebu Rakyat Intensifikasi:* intensification program for small holder sugarcane) which is implemented under contract with P.G. Mrican, a sugarcane factory in Mrican, Kediri district, is carried out by big tractors sent from the company.

Plowing by cattle is usually done under a kind of piece rate wage contract *(borongan).* but daily wage payment was also observed in the HI survey for the soybean season. The wage system seems to be diversified with the type of work. The average rate for plowing is 3,000 rupiah per day with meals, drink and cigarettes.

Farmers use *tebasan* contract harvesting throughout the Pace sub-district, especially in the harvesting of rice, maize and cassava. Price and estimation of harvestable amount are taken into deliberation between a contractor *(penebas* or *tengkulak)* and a farmer within 15 days before harvesting. When they reach an agreement, the *penebas* pays approximately 10% of the total agreed price and the rest is paid at harvesting time. The *penebas* employs several harvest workers who move from place to place for the harvesting season. The activity of the contract harvester is, in general, negatively evaluated by scholars and government. This has been the case in Nganjuk, too. However, relatively large farmers appreciate the harvesting contract because it is a convenient way for them obtain harvest workers as required. Because ease of operation facilitates the timely planting of the risky crop in the transitional season, one can safely assume that contract harvesting benefits both parties.

Tebasan contract harvesting is commonly used by larger farmers. There were four contract harvesters at the study village who were active in the last paddy harvesting season in 1990. Under the *tebasan* system, it is easy for farmers to manage and supervise the work of harvesting and post-harvesting activities. *Tebasan* saves the farmer a lot of work as it takes several days for post-harvest work and selling of harvested crops. Many household heads of relatively large farms are also employed workers in government or other offices. Some part time farmers who were. for example teachers of elementary school, did not have enough time to supervise the harvesting work, so they used *tebasan.*

Rice I and maize I are the most important crops for farmers. Relatively large farmers often use *tebasan* for harvesting of these two crops to promptly complete harvesting and to prepare for the next cropping. According the HI survey, contract harvesting of these two crops accounts for 85% of all area under *tebasan* (Table 3.3). In maize I and rice I, *tebasan* is the preferred transaction in more than 30% of the harvested area. The *penebas,* instead of the farmer, organizes workers. supervises harvesting work and sells the harvested crops to collectors.

Table 3.3 Harvested area under *tebasan* contract by crop from August 1990 through July 1991.

Crop	Maize I	Maize II	Rice I	Rice II	Soybean	Total
Harvested Area (ha)	8.618	7.246	11.986	3.950	6.464	38.264
Under'rebasan Contract:						
Area (ha)	2.964	0.643	3.714	0.357	0.143	7.821
Valne (Rp)	2,355.000	315,000	5,215,000	425,000	50,000	8,360,000

Derapan is a traditional harvesting system in which the wage is a piece rate for harvesting work(see Scheltema 1985). This system is commonly observed in rice cropping. In the study village this was also observed in cassava harvesting. *Bawon* (share) in the *derapan* system is between 1/8 and 1/10 (sometimes 1/11) for paddy and 1/5 for cassava. In the HI survey, there were 39 cases of *derapan* for paddy in both rainy and transitional seasons. The share varied from 1/5 to 1/10. Sometimes family members work with harvesting workers *(penderep).* Then the share or *bawon* is not necessarily actually gained by harvesting workers (Table 3.4)(see also Ellis 1993).

In general, farmers hired workers from their own hamlet. However in cultivating and harvesting seasons, they sometimes hired workers from other hamlets or from other villages, because the demand for laborers peaks at the time of hoeing, transplanting and harvesting. Harvesting contractors bring harvest workers from other villages.

Table 3.4 *Bawon:* **harvesting share in** *derepan* **system from August 1990 through July 1991.**

Season	Area under *Derapan* (ha)	Number of Workers (persons/ha)							Average *Bawon*
		Family		*Penderep*		Total			
		male	female	male	female	male	female	female	
Rainy (n = 28)	8.45	8(0.9)	2(0.2)	84(9.9)	68(8.0)	92	(10.9)	70(8.3)	12.1
Transitional (n= 11)	1.94	0	0	31 (16.0)	34 (17.6)	31	(16.0)	34 (17.6)	13.1
Total (n = 39)	10.39	8(0.8)	2(0.2)	115(1l.1)	102 (9.8)	123	(11.8)	104 (10.0)	12.3

3.3 Post harvest practices and selling

In this section we investigate the disposition of harvested crops. The seasonality affects the disposition of each crop. Maize is mainly grown in the dry season, and many farmers harvest maize twice in the dry season. Rice production in the transitional season is approximately one third that of the rainy season. Three crops, rice, soybean and maize are grown during the transitional season, with soybean occupying the largest area and maize the smallest.

Table 3.5 Disoosition of harvested crops (kg) in the study village from August 1989 through July 1990.

Crop	Season"	Sales	Land Rent in Kind	Bawon	Seed	Home Consumption	Production Total
.Maize	Transitional	1,550	0	0	0	0	1,550
Maize (Mz 1)	Early Dry	37,781	800	0	0	700	3,928
Maize (Mz II)	Late Dry	17,744	425	0	0	1,805	19,974
Rice (Rc I)	Rainy	39,548	1,600	3,591	21	11,400	56,353
Rice (Rc II)	Transitional	3,300	0	677	0	1,535	5,512
Soybean	Transitional	4,266	80	0	14	15	4,375

***** In 1990: rainy season January-April; Transitional =May-July; Dry=August-December; Early Dry harvested September-November; Late Dry harvested December-January.

The disposition of harvested crops is shown in Table 3.5 based on the HH survey. Disposition includes selling, payment in kind for land rent, *bawon* for harvesting, seed for next planting, and home consumption. Land rent payment in kind took place in transitional season soybean, dry season maize, and rainy season rice. Most farmers sell their crops just after

harvesting. The maize reserved for self-consumption was a relatively small share, 1.8% and 10.2% in the first dry season harvest and the second dry season harvest, respectively. In the case of rice, the shares were 28.8% and 46.5% in the rainy season and transitional season, respectively. Most soybean is sold, a very small part is consumed.

According to the HH survey, the amount of home consumption mainly depends on the crop season in the study village (Table 3.6). Only 1.8% of the total amount harvested for Mz I for the early dry season is home-consumed. In the late dry season, on the other hand, 9% is home-consumed. Farmers keep maize until the next harvest time of rice. In the case of maize, home consumption by type of farmer does not show a clear pattern.

Rice is grown twice a year in the rainy and transitional seasons. Only a small number of farmers cultivate paddy in the transitional season, but the rate of home consumption is higher than in the rainy season. Owner farmers show the highest rate of home consumption (40%) of Rc IL Owner farmers who partly rent harvest enough rice in the rainy season. They mainly grow soybean in the dry season because it is a lucrative crop if well managed. Since the average farm size of owner farms is small, the rate of home consumption of rice is high.

Table 3.6 Home consumption (% of production) by season and type of farmer from August 1989 through July 1990.

	Maize		Rice	
Farmer	Mz I (Early Dry)	Mz II (Late Dry)	Re I (Rainy)	Rc II (Transitional)
Owner farmer	2.0	12.1	28.7	39.8
Owner fanner (also renting)	2.7	7.2	16.5	0.0
Tenant fanner	0.0	9.1	14.0	no production
Average	1.8	9.0	20.2	27.8

Table 3.7 shows the time from harvesting to selling of crops, except for the stock retained for home consumption, seeds, and land rent. The table shows that farmers sold their maize only 8.3 days after harvesting. In the case of soybean, farmers sold it 11.5 days after harvest. On the other hand, farmers who consume some part of their paddy sold on average 24.4 days after harvesting.

Table 3.7 Number of days between harvesting and selling, from August 1989 through July 1990.

Trader (buyer) Category	Maize	Rice	Soybean	Groundnut	Chili	Sugarcane	Orange
Bakul	10.2	40.3	12.4	3.7	0.0		
Penebas	1.1	5.3	16.0	0.0			
Collector	10.7	30.7	12.8	3.0	0.0		
Collector & Rice Miller	8.8	8.3	7.5				-25
Villager		0.0					
Shop	5.0	5.0	7.3				
Other		60.0	6.3			0.0	
Average	8.3	24.4	11.5	2.9	0.0	0.0	-25
Number of Harvest	73	48	28	10	13	1	2

Chili and sugar cane are sold directly after harvesting. Chili harvesting lasts about one month or more. Chili is harvested every few days during the harvest period in the dry season. Then, the frequency of harvest work increases. Almost all harvested chili is sold directly to collectors who come to the farm. Orange and other fruits are usually sold to *penebas* from one

to three weeks before harvest. A farmer and a harvest contractor enter into a *tebasan* contract, so the duration between harvesting and selling is negative. Orange traders come from outside the district. They promise to buy from a farmer and give a down payment to the farmer. The harvesting cost is borne by the *penebas.*

Maize, soybean, and groundnut are, in general, sold quickly. Farmers rarely store their crops, except rice, which is sold several times during the year. Because rice is easily stored, farmers have the option of selling or consuming. Commercialization penetrates deeply in the local economy.

Relations between villagers and traders are shown in Table 3.8. Figures are based on farmers' answers about the frequency of transaction with traders to whom farmers sold their harvested crops during the last year. "Always" means a farmer sold his crops to traders to whom he always sold. On the other hand, "first time" means that a farmer sold to a trader to whom he had never sold. Farmers most frequently sold their crops to the *bakul* (small scale collector within a hamlet or village). *Penebases* and collectors *(pengumpul)* follow *bakul. Bakul* includes *loper* (from Dutch, meaning: runner) who move from market to market in rural areas (see Dewey 1962). Rural markets, in general, are located at each sub-district capital. In our survey at Pace, there is no *bakul* (or *loper)* who trades more than 100 tons per year. Their business scale was small.

The popular relation between farmers and traders is the relation implied by the answer "often" (62 cases out of 182). Farmers tend to sell their crops to *bakul, penebas,* or *pengumpul* who often visit their house and farm fields. Collectors who have rice mills also often buy from farmers. This frequent transaction allows the farmers and traders to get to know each other, and it creates mutual credibility between them. However, there were many answers of "first time", indicating no particular relation between farmers and traders. The relation between them is anonymous to a substantial extent. Among the total answers of 182, "first time" shares 29%. In the case of *penebas* or *bakul,* the category of "first time" or "rare" shares 50% or more. These figures indicate that there is no peculiar tie between farmers and traders. The relation between them is not stable but ad hoc, and it is hard to find continuous relations between them. This also means that a substantial proportion of traders who work as *bakul* or *penebas,* particularly the latter, are newcomers to the collecting and trading business in the rural area. Production increases have created new trading opportunities and this situation has induced the villagers' entrance into the trading sector as *bakul* and *penebas.*

Table 3.8 Frequency of transaction of farmers with traders from August 1989 through July 1990. (Number of fanners)

Trader (buyer) Category	Always	Often	Ra	First Time	Total
Bakul	4	19	27	29	79
Penebas	5	11	6	10	32
Collector	2	21	6	4	33
Collector & Rice Miller	9	6	5	5	25
Villager	0	1	1	1	3
Shop	1	4	0	0	5
Others	0	0	2	3	5
Total	21	62	47	52	182

The relation between villagers and traders shown in Table 3.9 implies that many collectors and other types of traders come from outside the village. There are only five *bakuls* and one *penebas* in the study village. There are a few food crop traders who operate shops in

the nearby sub-district market in a neighbouring village. Some villagers often bring theiY harvested crops to the shops and sell them. Most traders who visited the study village were from outside the nearest village. The outsiders were involved in 63% of total transactions with the farmers. Although a *bakuls'* business is generally limited to within a village, they often visit the study village from outside. Five *bakuls* and *one penebas* in the study village usually procured crops from the same hamlet, but they often do business outside of their own villages.

Table 3.9 Traders from outside PW village from August 1989 through July 1990.
(Unit: total number of farmers)

Trader Category	Neighbour in hamlet	Same hamlet	Same village	Outside of village	Total
Bakul	0	16	17	36	69
Penebas	0	22	1	9	32
Collector	0	0	2	28	30
Collector & Rice Miller	0	0	0	23	23
Villager	1	1	0	0	2
Shop	0	0	0	5	5
Others	0	1	1	3	5
Total	1	40	21	104	166

Villagers often sold their crops to rice millers in other nearby villages. A Chinese rice miller in a neighbouring village widely collected rice and maize from several villages, including the study village. Although traders, especially rice millers, come from outside the village, they have close relations with the villagers. Many villagers visit the millers for hulling rice and selling harvested crops, and the millers often send trucks to farm fields to collect harvested crops.

Table 3.10 shows the mutual relation between farmers and traders. Owner farmers sell their crops mostly to *bakuls* and rather rarely sell to *penebases.* On the other hand, farmers partly renting and tenant farmers often sell to *penebases.* Since some farmers (partly renting land) have larger farms, they use the *tebasan* system in order to save family labour during harvesting and planting seasons. However, selling to *penebas* does not necessarily mean by *tebasan* contract. In some cases, farmers harvested by themselves, and then sold to *penebases.*

Table 3.10 Sales by farmers to traders (number of farmers) from August 1989 through July 1990.

Trader (buyer) Category	Owner Fanner	Farmer Partly Renting	Tenant Farmer	Other Villagers*	Total
Bakul	55	12	12	1	80
Penebas	8	11	12	1	32
Collector	18	3	12	0	33
Collector & Rice Miller	9	5	11	0	15
Villager	1	1	1	0	3
Shop	5	0	0	0	5
Others	4	0	1	0	5
Total	100	32	49	2	183

* Includes non farmers such as landless workers who obtain paddy or maize in the form *of bawon* (wage for harvesting work).

Tenant farmers diversify their selling routes by selling to *bakuls, penebases,* collectors and collector/rice millers.

The mode of payment is shown in Table 3.11. Almost all transactions (96%) are cash and carry. Payment in advance occurred in only six cases and deferred payment only once. This reflects the fact that there was no particular tie between traders and farmers. Food crops trading in rural areas is highly competitive among local traders. *Penebas* and collector/rice millers sometimes pay in advance as a promise to buy harvested crops, otherwise the farmers sell their crops to other traders.

There are approximately 11 large collectors in Pace sub-district, living in six villages. A large collector is usually associated with 3-5 *penebases.* Large collectors provide some facilities, such as a drying yard and funds for procurement to *penebases* to support their collecting business. Many large farmers sell their crops to *penebases* or collectors. This creates a longer indirect procurement channel for the KUD, which is assigned to procure rice for DOLOG (regional office of National Logistics Agency). This seems to be one reason why the district head of Nganjuk was opposed to *penebas.*

Table 3.11 Mode of oavment bv traders from August 1989 through July 1990.

(Number of farmers)

Trader (buyer) Category	Payment in Total	Advance in Part	Cash at Buying	Partly Deferred	Total
Bakul	1	0	79	0	80
Penebas	1	2	28	1	32
Collector	0	0	33	0	33
Collector & Rice Miller	0	2	23	0	25
Villager	0	0	3	0	3
Shop	0	0	5	0	5
Others	0	0	5	0	5
Total	2	4	176	1	183

3.4 Employment and production

Farm work is mainly undertaken by hired workers in rural Java. This is changing since the introduction and dissemination of new technologies, particularly on rice in the mid 1960s.

Labor input per hectare for crops in 1990/91 (August-July) was 1,100 hours for maize in the dry season, and 1,300 and 1,500 hours for rice in the rainy season and the transitional season, respectively (Table 3.12). Labour input for soybean was only 650 hours. According to a previous study on rice farming in 10 villages of Indonesia, labour input per hectare for rice was about 900 hours (Faisal Kasryno 1984). Our study indicates longer hours of farm work except for soybean (Morooka and Mayrowani 1990).

Table 3.12 based on the HI survey, shows labour inputs by farm activity and crop. In the first maize (Mz I) during 3 months from August through October, land preparation absorbed more hours of work. In the second maize (Mz II), harvesting needed more hours. The second maize crop was mainly planted by small tenant farmers who need to utilize land efficiently to ensure a subsistence income level from farming year round.

The first rice crop (Rc I) followed in the wake of the second maize. Land preparation, seeding and transplanting of the rice overlapped with the harvesting of second maize. This caused a peak in labour demand in the study village. Planting and harvesting were the greatest

labor absorbing activities for both the first and the second rice farming in the transitional season. Irrigation during the transitional and dry seasons needed more time. In general, land was irrigated approximately 8 or 9 times for one maize crop. Farmers used a pump to irrigate land with ground water pumped up from a tube well. The pump is usually rented from its owners.

The share of family labor has tended to increase since the introduction of modern technologies. The share of hired labor to total labor input declined from 86% in 1970/71 to 73% in 1980/81 (Faisal Kasryno 1984). According to our study in 1990/91, the share was even smaller at approximately 50% over all crops (Table 3.13). It therefore seems that farming in Java has been dependent on hired labor, but that it is gradually changing towards the family operated farm. Nevertheless, the employment opportunity of villagers has increased. Many young people, in fact, leave the village in search of higher education and jobs and many villagers work as seasonal workers in urban areas. Although there are still many landless workers in villages, the socio-economic structure of Javanese villages is being transformed by such labor migration.

Table 3.12 Total labour input (man hours per hectare) by crop from August 1990 through July 1991.

Activity	Mz I	Mz II	Rc I	Rc II	Soybean
hand preparation	367	215	190	190	16
Planting	134	154	369	379	33
Applying fertilizer	74	70	58	30	8
Weeding 1)	0	0	258	205	23
Spraying insecticide	1	1	21	12	32
Irrigation	254	213	41	205	169
Harvesting	257	414	354	483	359
Others*	59*	80*	21	3	12
Total/ha	1,146	1,147	1,311	1,506	653
Harvested Area (ha)	8.62	7.25	11.99	3.95	6.46

* Including weeding and furrowing for maize.

Table 3.13 Share (%) of hired labor.

Labour	Male	Female	Total
Family	34.0	11.5	45.5
Mutual Exchange	0.2	0.1	0.3
Hired	36.4	17.9	54.3
Total	70.6	29.4	100.0

There is an institution of mutual labor exchange among villagers, called *sambatan* or *gotong royong*. However, it has been limited mainly to house building, road repair and irrigation maintenance. Mutual help for farming *(sambatan)* has become rare and it has been substituted by wage workers. Wage is paid both in cash and in kind. Wage for harvesting is still generally paid by a piece rate in kind sometimes even though harvesting is under a *tebasan* contract. This wage institution helps poor landless workers get food, particularly, rice. However, young workers tend to appreciate cash wage instead of in kind. These young people work as harvest workers employed by *penebases.*

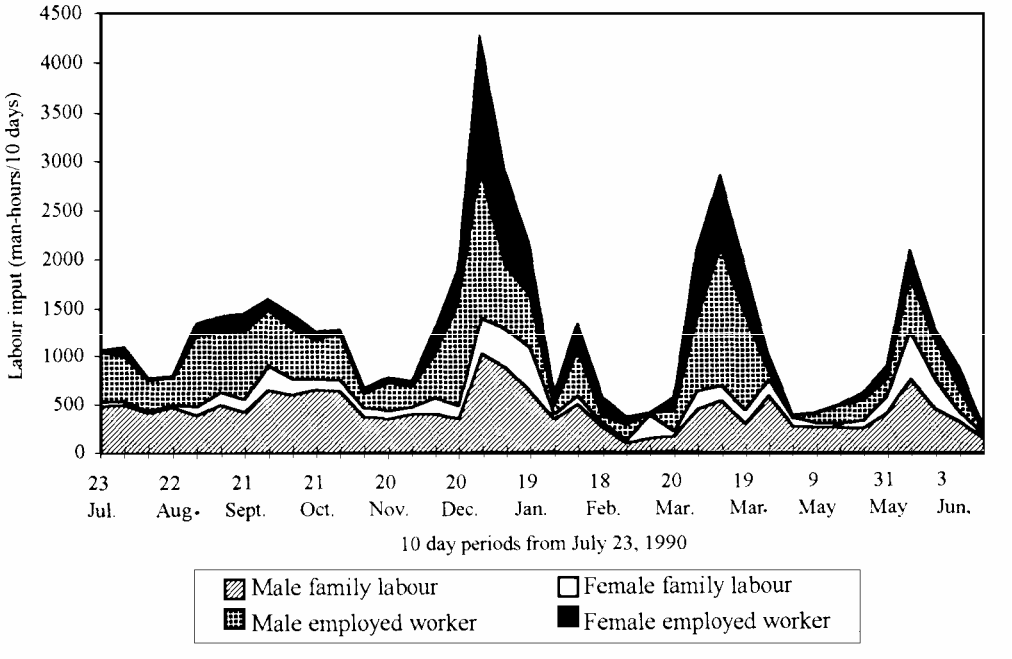
Figure 3.1 indicates labor input of 36 farm households in the study village. The ordinate indicates the labor input per ten day period and the abscissa indicates date by ten day period from 23 July in 1990 through 28 July 1991. The figure reflects the typical cropping pattern: (1) rice, (2) rice or soybean, (3) maize and (4) maize in the study village. December January, April, June-July are the peak load of labor inputs. These peak loads are in the transitional periods from harvesting of previous crops to transplanting or seeding of following crops.

The highest labor demand fell in December and January. Total labor input of 36 households was about 4,300 hours per 10 days. If each farmer works 9 days of each 10 days, average work hours per day per household become 13.3 hours. Since family labor shared in this season approximately 1/3 of total labor input, 4.4 hours was family labor and 8.9 hours was hired labor. Average work per day of family labor all the year round was approximately 1.7 hours per household. At the peak load, family labor input becomes two or three times that of the non-peak season. Family labor supply, however, can not satisfy the labor demand and employment of hired labor suddenly increases at the peak load seasons. Hired labor has an important role in the transition from harvesting to planting. During the dry season from August through October, demand for hired labor increases for irrigating maize and vegetables.

The role of hired labor can be analyzed from the production cost. Among the cost items, wage payment for hired workers occupied the largest share (Table 3.14). For maize, wage payment accounts for 30% of total production cost. In rice, the share is over 40%.

Soybean used less hired labor than the other crops, but it is peculiar in that seed cost was very high. Wage payment is responsible for the low rate of farm factor income.

Figure 3.1 Seasonal fluctuation of labor in out.



The next major cost item is chemical fertilizer, followed by the rental cost of machines, equipment, cattle and others. The cost structure of soybean differs from maize and rice, because the seed cost of soybean is 25% of the production cost. This implies that improvement of the seed supply system is critical to profitability of soybean cropping.

Current input cost is around 35% of total cost of the respective crops. Except for soybean, fertilizers, particularly urea, are the biggest cost item of inputs. Soybean does not need much nitrogen but requires non nitrogen fertilizer, such as KCI. However, the input level of non urea fertilizers was still low. On the other hand, urea application for maize and paddy was very high. Farmers in the study village used 450 kg or more of urea and 200 kg or more of non-nitrogenous chemical fertilizer. This level is above the average of Java, possibly due to over-estimation of inputs. Data collected for each plot show that farmers often combine chemical inputs for other plots or other crops, because it was difficult for them to separate each purpose and each volume of application.

Table 3.14 Structure of production cost (%) **in 1990/91.**

Expenditure	Mz I	Mz II	Re I	Rc II	Sy
1. Seed total	3.6	2.9	4.8	5.6	25.4
a. Bought	3.1	1.7	3.5	1.2	22.3
b. Own	0.5	1.2	1.3	4.5	3.0
2. Chemical fertilizer total	25.5	31.2	28.0	23.8	8.1
a. Urea	18.3	20.6	14.4	15.9	1.8
b. Non Urea	7.2	10.5	13.7	7.9	6.4
3. Manure	2.7	1.4	1.0	1.2	0.0
4. Insecticide & pesticide	0.9	0.1	3.2	2.2	9.8
5. Transportation & others	0.4	0.2	0.1	0.8	0.0
6. Sub-total current input (1-2+3+4+5)	33.0	35.8	37.1	33.6	43.3
7. Irrigation fee and others	4.0	6.1	0.2	7.8	1.8
8. Water pump rental & others	11.7	11.7	0.8	6.6	5.2
9. Maintenance & spray rental	2.1	0.0	0.1	0.1	0.3
10. Cattle rental	6.7	1.4	7.9	8.5	0.5
11. Interest	1.4	0.0	0.0	0.0	0.0
12. Sub-total equipment & fees (7+8-9+10+11)	26.0	19.2	8.9	22.9	7.8
13. Land rent (net)	11.3	15.1	9.6	2.0	22.1
14. Wage payment	29.7	29.9	44.4	41.5	26.8
15. Sub-total (13+14)	41.0	45.1	54.0	43.5	48.9
16. Cost total (6+12+15)	100.0	100.0	100.0	100.0	100.0
Total cost in Rp	556,580	426,030	713,929	647,979	313,194

The high level of reported input is common in Java (Kesaran et al. 1993; Roche 1994). The average fertilizer input in Java was reported to be about 420 kg at the end of the 1980s (Central Bureau of Statistics 1991). In less fertile areas, for example, the recommended level of chemical fertilizer input for maize was 500 kg per hectare in total. Application of chemical fertilizers has progressed in the 1980s. The study village is included in the advanced area of commercialization, but as far as farming technology is concerned, farmers are not skillful. The application of seeds and chemical fertilizer must be improved.

Seeds are also applied to such an extent that paddy and soybean seed inputs are more than 60 kg, causing the high seed cost of paddy and soybean. Farmers use home grown seed in addition to purchased seed to secure seeding. Maize seed, mostly purchased, is applied at a rate

of approximately 30 kg per hectare, not much higher than the input level of 25 kg recommended by the ministry of agriculture.

Capital cost includes machines and equipment, irrigation, draught cattle power, and others. The share of capital cost varied by crop. A relatively large cost was incurred for irrigation and pump rental to irrigate land for Mz I, Mz II and Rc II in the transitional and dry seasons. Since Rc I farming can use rainfall, irrigation and related costs were not so high. Soybean does not need much capital, but almost all was devoted toward irrigation and its related cost.

Added value from each crop production is shown in Table 3.15. Added value ratios of Mz I and Re II production were low, 58% and 54%, respectively. Re I and soybean have relatively high ratios, more than 70%. However, these ratios are lower than the estimation of the Central Bureau of Statistics.

Table 3.15 Harvested area, production and family factor income in 1990/91.

	Mz I	Mz II	Re I	Re II	Sy	Total
1. Harvested area (ha)	8.618	7.246	11.986	3.950	6.464	38.264
2. Disaster area (ha)	0.000	0.000	0.000	0.043	0.286	0.329
3. Production (kg/ha)	3,170	2,945	4,206	3,094	574	
4. Production value (Rp/ha)	787,237	668,036	1,296,423	793,726	597,319	
5. Added value ratio (%)*	58.3	65.0	74.7	53.9	73.2	
6 Family factor income (%) **	29.3	36.2	44.9	18.4	47.6	

* Production value minus total cost excluding land rent and wage payment as a percentage of production value.
**Production value minus total cost as a percentage of production value.

It is likely that our data over-estimate cost, since they cover plots. Another reason is the low production per hectare. Farming during the transitional season is risky because of the unstable rainfall. Second rice cropping and soybean have low production per hectare. Average production per hectare of soybean is close to one ton in this area. The study village is not irrigated well because of insufficient irrigation water supply, particularly during the transitional season. In the dry season, there is no water source except tube wells. Villagers consider their land as non irrigated by canal although there was an irrigation canal system constructed by the government. They sometimes refer to their land as rainfed.

In rice II and soybean farming in the transitional season, farmers experience crop failure. Farming in the transitional season is risky, because rainfall is not stable and it is difficult to forecast. Irrigation water supply is not ensured and this is reflected in the low output per hectare. Rice yield in the transitional season was almost 70% of that in the rainy season. Soybean production also was at a very low level. Since irrigation and extension systems do not work well in the study village, rice and soybean in the transitional season were risky crops.

Total harvested area was 38.3 ha and the farm land area was 16.04 ha (Tables 3.15 and 2.6) to give a cropping intensity of 239%. The farm land area of the household survey covers all households in the village. However, the harvested area of the household income survey does not include several farmers. Therefore real crop intensity must be 10 or 20% higher than reported.

Wage payment for hired labor is a large part of the factor income so rewards to family factors become small. Family factor income for Mz I and Mz II is about 30% to 36% of gross value of production. Re I and soybean is higher than maize, and Rc II is the lowest at only 18%, due to the low production. The reduction of family factor income is compensated for by the mutual employment system within the village. This is clearly indicated in rice farming by

its high rate of wage payment. Farmers and their family members can be employed as wage workers by other farmers, particularly in planting and harvesting seasons. This system is changing with the increase of employment opportunity in urban areas and the increasing attendance of young people at higher grades in school.

The results of estimation (OLS) of Cobb-Douglas production functions of maize and rice are summarized in Table 3.16. The dependent variable is the harvested amount of each crop in terms of kg. Independent valuables are land (ha), labour (man hour) and current input cost (Rp). Records were by household and by crop. The dummy is land tenure of fixed rent and a few cases of sharecropping.

Table 3.16 Estimation of Cobb-Douglas production function of maize and paddy in 1990/91.

	Mz I		Mz II		Re I		Re II	
	Coeff.	S.E.	Coefl	S.E.	Coeff.	S.E.	Coeff.	S.E
Constant	0.499	4.333	5.792**	2.604	6.867**	2.511	10.856 ***	2.716
Land (ha)	0.246	0.449	0.808***	0.286	0.962***	0.226	1.349 ***	0.263
Labour (man hour)	0.032	0.356	0.432	0.284	-0.329*	0.169	-0.889 ***	0.246
Current input (Rp)	0.579	0.339	-0.062	0.186	0.316	0.201	0.260	0.199
Dummy: land tenure	0.394	0.230	0.139	0.202	0.209	0.140	0.124	0.215
ADJ. R2	0.694		0.779		0.907		0.855	
F-Ratio	14.031***		23.911***		57.023***		26.110 ***	
N	24		27		21		18	

Note: Record by farm. * coefficient significant at 10% level; ** at 5% level; and *** at 1% level.

The estimations on Mz I and Mz II are not significant at conventional levels of significance except for land. The estimates of paddy, on the other hand, are all significant except for current input. The coefficients of the land tenancy dummy are not significant but all of their values are positive, implying that tenant farmers under fixed rent contract work as efficiently as owner operators or more so.

The production functions show that there is no economy of scale in maize and rice farming. The null hypotheses that the sum of coefficients of land labor and current input were 1 cannot be rejected.

Land was efficiently utilized in the study village, but attention should be given to the sustainability of land use. Green manure and compost are important resources to maintain the fertility and to avoid over-exploitation of land.

Many villagers breed livestock, which helps to supply organic fertilizer to agriculture Poultry, goats and cattle are the major livestock in the study village (Table 3.17). Eight} percent of village households raise poultry and 40% of them have cattle. Poultry and eggs are sold or consumed by farm households. Cattle are an important asset of each household used as draught power and the dung is utilized as stable manure. Farmers also make compost. These manures are applied mainly for rainy season rice and dry season maize. It is difficult to estimate the work input for manure making. If feeding livestock is considered as a work input for manure making, some farmers devoted more than 500 hours for manure making in 1990/1991. Eighteen households made and applied manure, working on average 139 hours in one year for manure making.

Farmers who can not make manure buy it from neighbors. This is consistent with the fact that by-products of crops such as maize leaves have market value. The share of by-products was about 7% of added value of food crops production value (see Figure 2.3).

Table 3.17 Major livestock in the study village.

Type of Livestock	Number of Livestock	Number of Households
Poultry	235	66
Goats	19	8
Cattle	47	34

The observations and analysis are summarized as follows. Chemical fertilizer and other current inputs are applied at higher than optimum levels or the data on current input may have been overestimated.

Optimization of inputs can reduce of the total cost of current inputs by 20% or 30%. It could bring a 10% reduction of production cost in each cropping. In the transitional season, paddy yield can be improved by about 50% and soybean by approximately 100%. There still exists much room to improve farming technology in the study area.

Special attention should be paid to the sustainability of farming. Manure making is linked to livestock breeding and by-products of processing, such as maize leaves. If employment opportunities from non-agricultural activities develop in the future (Naylor 1991 & 1992), the real wage cost would increase in the rural area too, causing villagers to cease manure making to maintain soil conditions. Because the sustainability of agriculture depends to a large extend of wage levels, it is fragile from the economic point of view (see Nibbering 1993).

4. Maize Marketing and the Role of Traders

Market surveys were undertaken in 18 villages of Pace, six villages of Malang, and in two cities, Kediri and Malang. Three to five traders (including processing industries of *tahu, tempe* or tapioca flour) were interviewed in each village. Seventy-six traders were interviewed in Pace and eleven in Kediri city. The other 15 traders were interviewed in Wajak of Malang district (13 traders) and Malang city (two traders). Selection of traders for interview was based on information from households and household income surveys. Traders who procured commodities from the survey sub-districts, particularly from the farmers in the study village, were selected.

Price data of maize, rice and soybean were collected from the monitors in two villages in Pace.

This chapter focuses on (1) traders and their role in the strata of marketing routes from producing areas to processing and consuming areas, (2) trading practices and mutual relations among traders, (3) traders' margins and their profitability, and (4) dynamic changes occurring in the maize market.

4.1 Market structure in East Java

East Java is the largest maize producing province in Indonesia. It produces 50% of the total maize production of Indonesia. The highest producing area in East Java is the Sumenep district on Madura Island, where maize is the staple crop. Kediri, Nganjuk, Malang, and Probolinggo are known as commercialized maize production areas. Production per hectare is relatively high in Kediri and Nganjuk. Malang and Kediri are well known as the centers of maize collection and distribution in East Java. The two largest feed companies have their feed concentrate factories in Sidoarjo near Surabaya, and large poultry farms are located in the area between Malang and Sidoarjo.

Table 4.1 shows the major CGPRT crop production areas in East Java. Maize marketing in East Java is shown schematically in Figure 4. L The consumption and processing center is Surabaya and its southern neighbouring area, Sidoarjo.

The largest cassava trading centres are Kediri and Malang. Soybean production centers are Jember. Banyuwangi, Ponorogo, Pasuruan and Nganjuk. Seventy-five percent of the soybean is produced in paddy fields during the transitional season. *Tahu* and *tempe* are the typical consumption forms in Indonesia. The processors are mostly small-scale and scattered in urban and rural areas (Djaborotan Nasution 1990).

4.2 Classification of traders

Traders (including processing units) are classified in this section by their role and trading scale. We are mainly concerned with traders in the marketing channel from rural farming areas to processing industries owned by agribusiness. Thus, traders who work for

traditional local markets for local consumption are not our main concern. Table 4.2 gives an overview of the coding system used to identify traders (also see Appendix 10.2).

Figure 4.1 Maize marketing in East Java.

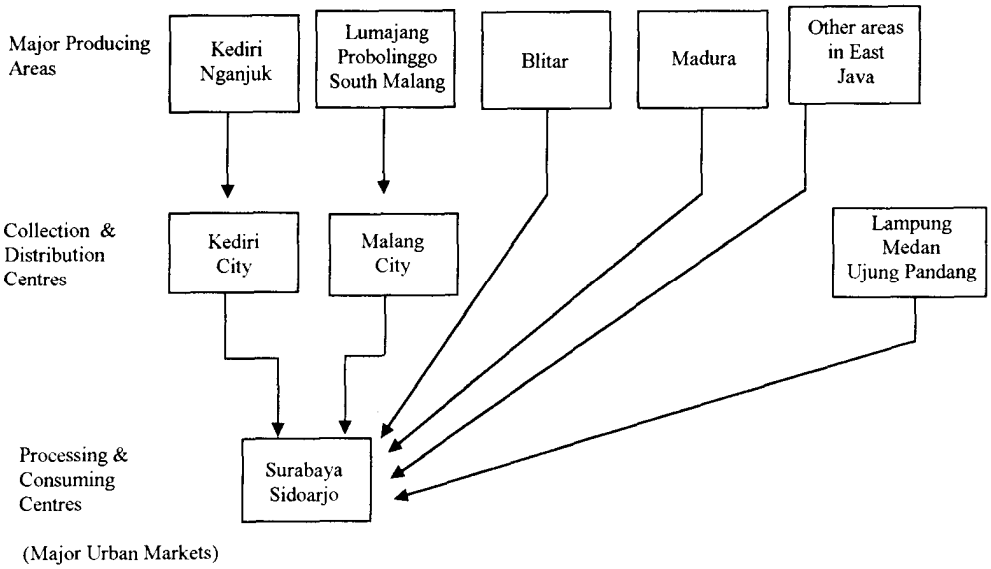


Table 4.1 Major production areas of GGPRT crops in East Java.

Crop	Productivity		
	High	Middle	Low
Maize	Kediri Nganjuk	Malang (TG*) Jombang	Pasuruan (TG)
Cassava	Malang (TG)		Pacitan Ponorogo Trenggalek
Soybean	Jember Nganjuk Pasuruan JombanQ		Blitar (TG) Lumajang (TG)

Table 4.3 shows commodities handled by each type of trader. The most important commodities are rice, maize and soybean, reflecting the features of the survey area where these three crops are intensively and extensively cultivated. Rice and maize are mostly handled by the same traders in the marketing route. Processing industries are classified as 91PBR+TH or 92PBR+TP. The former is a small home industry making *tahu* in the village. The latter, which processes cassava and produces tapioca, is located in a rural area but it has legal status as a share company (PT), Characteristics of other groups of traders are explained in the following paragraphs.

4.2.1 Small collectors and village collectors

There are small collectors (1BB, 1BB+PC) within a hamlet or village. They collect maize and other harvested crops from villagers and sell them to inter-village collectors (3PG) or large local collectors (4PG+HL). Some of them are known as *bakuls.* The hamlet or village collector's activity is limited to within his own hamlet or village. Inter-village collectors cover a few neighbouring villages. However, they rarely go out of their sub-districts to collect crops, except for collectors who live in a village by a sub-district boundary. Some collectors, called *lopers,* usually travel around from market to market in different sub-districts and buy and sell commodities on each market day.

Table 4.2 Classification of traders.

Code	Explanation
Producing Area	
1* BB	small collector = *bakul*
1 BB + PC	small collector + groceries
1 PP	market trader
2 T	harvesting contractor = *penebas*
3 PG	(inter)village collector = *pengumpul, bakul timbang tengkulak*
4 HL	miller primarily
4 PG + HL	large local collector + miller
5 PB	large local broker (wholesale trader),
5 PB + HL	large local broker + miller
91 PBR + TH	other industry - tahu
92 PBR + TP	other industry - tapioca
Collection + Distribution Centre	
6 PB + HL	wholesaler + miller (large urban trader)
7 PB + TH	wholesaler + tahu industry
7 PB + TK	wholesaler + retailer
8 PB + EX	wholesaler + international trader

* Numbers 1-8 roughly indicate scale of trade in ascending order; numbers 91 and 92 are processors.

The average quantity of maize traded by a small collector per year is approximately 11 tons (Table 4.4). Small *bakul,* however handle only 2 or 3 tons per year at most. Their major business is to collect unhulled rice from villagers, and sometimes hull and mill it to *beras* for sale at the market of Pace or in neighbouring sub-districts. However, small collectors instead of villagers usually hull and mill *gabah,* unhulled rice into rice at the mill and bring it back to the villagers for a fee. Their typical transportation is by bicycle, so it is hard to carry more than 100 kg at once.

There are several retail shops called *warungs* in each village, and they sometimes sell hulled rice and maize to villagers. The scale of collection within their business has increased with the commercialization of food crops, especially maize. They buy maize from farmers and sell to the sub-district market, collectors or rice millers.

Village collectors whose trade scale is relatively large are called *bakul timbang,* since they have weight measures *(timbang* means weight measure). Collectors, known as *pengumpul, bakul timbang* and *tengkulak* (broker or middleman), whose business territory comprises several villages, are larger in scale than *bakul.* Most of them are classified as 3PG (inter-village collector), known hereafter, as village collector. Rice millers who procure crops like collectors are also sometimes called *penguntpul* or *tengkulak.* Thus, some *pengumpul* or

tengkulak are classified as large local collectors (4PG + HL), collecting commodities from almost a whole sub-district area.

4.2.2 Penebas (harvesting contractors)

The appearance of *penebas (2T)* since the 1970s would seem to be a notable change in Javanese market institutions and add to transactional options. *Penebas* is a harvesting contractor who employs harvesting workers. The workers are usually his family members, relatives or intimate villagers, particularly youth. However, they are not mere harvestors but also traders. The average trade scale of a *penebas* is approximately 50 tons per year each of rice and maize (Table 4.4). Some *penebas* are large collectors; one handles 100 to *200* tons each of paddy and maize per year. The *penebas* does not deal in other annual crops under *tebasan* contract.

Table 4.3 Number of traders by type of trader and type of commodity".

Trader	Mz	Pd	Re	Sy	Cv	Gn	Tt	S	GI	Fr	Oth
Producing Area											
1BB	17	16	4	10	0	0	0	0	0	0	0
1BB+pC	2	1	1	2	0	0	0	0	0	0	0
1PP	0	0	0	1	0	0	1	0	0	0	0
2T	36	36	1	19	1	4	0	2	0	1	0
3PG	11	11	0	5	2	0	0	0	0	0	0
4HL	2	5	1	0	0	0	0	0	0	0	0
4PG+HL	5	7	1	1	0	1	0	0	0	0	0
5PB	1	1	0	1	0	0	0	0	0	0	0
5PB+HL	3	3	1	I	2	0	0	0	0	1	0
91PBR+TH	0	0	0	5	0	0	5	0	0	0	0
92PBR+TP	0	0	0	0	1	0	0	0	0	0	0
Collection and Distribution Center											
61`13+HL	8	10	9	4	4	1	0	0	1	0	0
7PB+TH	1	1	1	1	0	0	0	0	0	0	0
7PB+TK	0	0	0	1	0	0	0	0	0	0	I
8PB+EX	1	0	0	0	I	0	0	0	0	0	0
Total	87	91	I9	51	11	6	6	2	1	2	1

* Commodities: Mz = maize, Pd = paddy, Re = hulled rice, Sy = soybean, Cv = cassava (including *gaplek),* Gn = groundnut, Tt = *tahu* or *tempe,* Sc = sugarcane, GI = sugar, Fr = fruit, Oth = others.

Table 4.4 Commodity turnover in ton/trader/year by type of trader.

	Hamlet or Village Collector		Penebas		(Inter-) Village Collector		Large Local Collector		Large Local Broker				(n)	Large Urban Trader	(n)
	1BB	(n)	2T	(n)	3PG	(n)	4PG+H	(n)	5PB+HL	(n)	SPB			6PB+HL	
Maize	11	(17)	51	(36)	259	(11)	144	(5)	1,700	(3)	3,000		(1)	2,219	(8)
Paddy	14	(16)	53	(36)	243	(11)	456	(7)	2,073	(3)	3,000		(1)	3,383	(8)
Rice	11	(3)	5	(1)	0	(0)	38	(1)	465	(1)	0		(0)	1,779	(7)
Soybean	4	(10	11	(19)	51	(5)	40	(I)	333	(3)	35		(1)	575	(4)

Fruits such as *durian* are commonly traded under the *tebasan* system by the *penebas* They usually specialize in a certain fruit, which they purchase by tree a few months before harvesting season. During the harvesting season, they visit villages, pick and gather fruit. which is then sold in urban markets such as Malang or sold to large traders in major cities such

as Surabaya. In East Java, for instance, *durian, kelengken* (longan), orange and *pete* (peas on trees) are harvested by *penebas* under *tebasan* contract.

Since the *ijon* institution of food crops was suppressed by the government, *tebasan* which is similar to *ijon* has flourished and replaced it (Ace Partadirejo 1974).

The *penebas* sells collected food crops (mainly paddy and maize) to large local collectors or brokers. The *penebas* is sometimes advanced money by the large collector to procure maize or paddy. They create a credit tie between them and then the *penebas* can pay in advance for the right of harvesting from farmers. *A penebas* generally covers several villages and sometimes crosses the boundary of sub-districts or districts. He tends to get harvesting contracts with large farmers in each village as reported by Timmer (1987).

Penebas traders have different social relations with farmers compared to traditional small collectors who are usually acquainted with the villagers. Farmers and *penebas* are often strangers. Many farmers, in fact, do not know the name of the *penebas.* This implies that farmers and *penebas* do not maintain constant business relations.

4.2.3 Rice millers and large local collectors

The processing capacity of village rice mills is two or three tons per day. They employ a few workers. The average rice miller (4HL) handles 300 tons of rice and maize per year, but his main business is rice milling. Collecting commodities is a minor part of his business. A typical rice miller has a warehouse and drying yard where he dries *gabah* and maize. He sometimes provides the facility to collectors or *penebas* traders to dry their crops. There are one or two rice millers in each village. In the market survey, however, most rice millers were classified as large local collectors (4PG+HL), because rice millers work as collectors too (Appendix 2).

A large local collector who has a rice mill procures harvested crops from farmers, small collectors, *penebas* and village collectors and sells them after milling the paddy into rice or drying the maize. He has a small or middle sized truck and handles from 300 to 500 tons per year of each crop.

4.2.4 Large local brokers with and without rice mills

There is an ethnic Chinese large broker (5PB) in Pace who does not have a rice mill but concentrates his business on collecting paddy and maize. He procures commodities from farmers, small collectors, village collectors and *penebases*. He also procures from rice millers with whom he has a credit tie or family relationship. He sells the crops to wholesale traders in the city, for instance Kediri, a collection and distribution center of food crops in East Java. He has a relatively small warehouse with storage capacity of only 200 tons, compared to his business size. He handles 3,000 tons each of unhulled rice and maize per year (Table 4.4). Paddy is sold to large wholesale traders in Kediri. After the paddy is milled and processed into hulled rice, they deliver the rice to BULOG (food logistics agency) through KUD (village unit cooperatives). The other large local brokers, coded SPB+HL, have rice mills and deal with traders even outside of East Java.

The traders described above are located in producing areas, that is, at sub-district *(kecamatan)* or district *(kabupaten)* levels.

4.2.5 Large urban wholesale traders

Large wholesale traders in urban areas take the role of collection and distribution between producing area and processing/consuming area. Thirteen large urban traders (6PB+HL, 7PB+TH, 7PB+TK, 8PB+EX) were interviewed in Kediri, Jombang and Malang. There are several types of wholesale traders, most of whom operate processing units such as a rice mill, tapioca flour mill or *tahu* factory (7PB+TH) which form their core business, besides trading. Some of the CGPRT commodity large traders operate a retail business (7PB+TK), mainly beans, at shops in downtown Kediri. A few of them are legally registered as PT *(perseroan terbatas:* share company). A large urban trader who has an export and import license is coded 8PB+EX. The largest trader handles from 10,000 to 20,000 tons of maize per year and the storage capacity of his warehouse is 10,000 tons. Most of the traders in Kediri have several large trucks and some traders engage in the transportation business.

Large urban wholesale traders of maize in Kediri provide procurement funds to large local collectors (4PG+HL) and brokers (5PB) to ensure the procurement of commodities from producing areas. After receiving credit (or payment in advance) for the procurement, local traders collect the ordered amount of maize within a few days. The wholesale traders send double trailer trucks *(gandengan:* legal loading capacity of 18 ton per truck) to the large local collectors/brokers. When the large urban traders transport the commodities to Surabaya, they often load more than 25 ton on each truck to save on transportation costs.

4.3 Trade practices

This section reviews the efficiency of the maize market with respect to transportation cost and marketing margins. First trade relations among traders, mutual distances and carriers used are described.

Table 4.5 Classification of major buyers.

	Buyer (Number of Traders)											
From \to	PT	1B	3PG	4HL	4PG	5+6PB	FC	KUD	PCPP	TK	Oth	Total
Producing Area												
1BB	1	0	13	0	0	2	0	0	0	0	0	16
1BB+pC	0	0	1	0	0	0	0	0	0	0	0	1
2T	0	0	14	2	1	17	0	1	0	0	0	35
3PG	0	0	2	2	0	6	0	0	0	0	0	10
4PG+HL	0	1	0	0	0	4	0	0	0	0	0	5
5PB	0	0	0	0	0	1	0	0	0	0	0	1
5PB+HL	0	0	0	0	0	1	1	0	0	0	0	2
Collection and Distribution Center												
6PB+HL	0	0	0	0	0	1	7	0	1	0	2	11
7PB+TH	0	0	0	0	0	0	1	0	0	0	0	1
7PB+TK	0	0	0	0	0	0	1	0	0	0	0	1
8PB+EX	0	0	0	0	0	0	2	0	0	1	0	3
Sample No.	1	1	30	4	1	32	12	1	1	1	2	86

Note: Code as in Table 4.2. PT = villager; FC = feed company/factory; TK = retail shop; KUD = village unit cooperative; PCPP = small shop (warung) in villages or in sub-district market; Oth = others.

Table 4.5 shows to whom each trader mainly sells his harvested or collected maize. It indicates the trade relation among traders in Pace/Kediri and Wajak/Malang. *Bakuls* (1BB)

sold their crops mainly to inter-village collectors (3PG: 13 cases). *Penebas (2T)* sold to intervillage collectors (14 cases) or directly to large local brokers or large urban traders in Kediri (5+6PB: 17 cases). Large local collectors and large brokers were the most important collectors for large urban traders, who then sold the maize mainly to feed factories in Sidoarjo, Semarang and Jakarta. The distance between Kediri and Jakarta is approximately 800 km (Table 4.6). Through this channel, maize grown in Pace is distributed to Surabaya, Jakarta and many other places in Java.

Table 4.6 Distance to buver in kilometers.

From \ to	PT	1BB	3PG	4HL	4PG	5+6PB	FC	KU	PCP	TK	Oth	Average
1BB	4.0	0	4.0	0	0	3.0	0	0	0	0	0	3.9
1BB+PC	0	0	2.5	0	0	0	0	0	0	0	0	2.5
2T	0	0	36.5	3.5	25.0	3.3	0	20	0	0	0	17.2
3PG	0	0	38	43	0	19	0	0	0	0	0	27
4PG+HL	0	2.0	0	0	0	225	0	0	0	0	0	180
5PB	0	0	0	0	0	30	0	0	0	0	0	30
5PB+HL	0	0	0	0	0	80	120	0	0	0	0	100
6PB+HL	0	0	0	0	0	20	417	0	20	0	550	369
7PB+TH	0	0	0	0	0	0	800	0	0	0	0	800
7PB+TK	0	0	0	0	0	0	800	0	0	0	0	800
8PB+EX	0	0	0	0	0	0	550	0	0	120	0	407
Average	4.0	2.0	21	23	25	38	478	2.0	20	120	550	104

Note: Code as in previous table.

Table 4.7 shows the source of maize for collectors and traders. *Bakul* and *penebas* mainly procured maize from farmers through direct contact. Inter-village collectors and large local collectors (3PG, 4PG+HL) procured mainly from *penebas* but rarely bought from farmers directly. Large local brokers in Pace (5PB, 5PB+HL) procured from inter-village collectors and *penebas.* Large traders in the cities mainly collected from large local collectors (4PG+HL) or large brokers (5PB). However urban traders who were not familiar with the rural economy, replied that they bought from collectors, rice millers or farmers, referring in this case not to farmers but to local collectors in the producing area. The rice millers and collectors can be considered large local collectors whose business territory covers the sub-district level. In our classification, they are classified into 4PG+HL or 5PB+HL.

Tables 4.5 and 4.7 indicate that *bakul* and *penebas* play a major role in maize marketing at the village level. Table 4.5 shows that they sold crops to inter-village collectors (3PG). *Penebas (2T),* in particular, sold the crops to large local brokers 5PB(+HL). As shown in Table 4.7, 5PB(+HL) bought from 2T and 3PG, and 4PG+HL also bought from 2T. Taking into consideration business size of large local collectors and brokers occupy the major share of marketing from the producing area to large urban traders (Table 4.4). The route of maize marketing from Pace to Surabaya and Jakarta is shown in Figure 4.2.

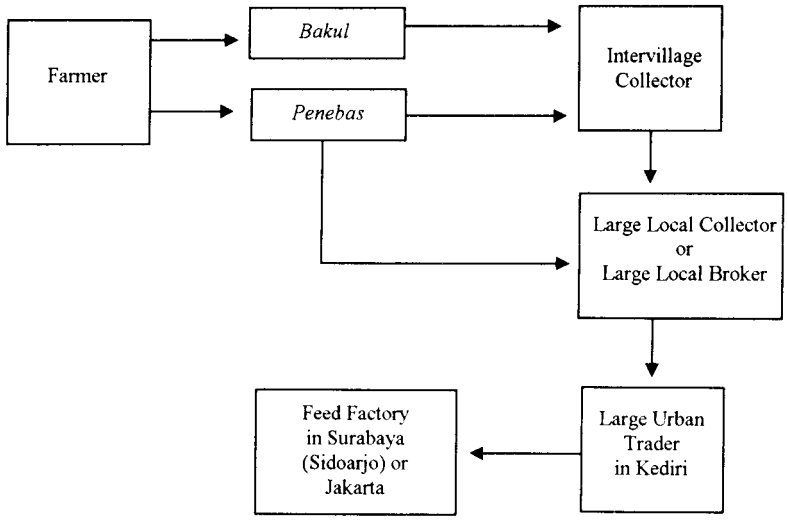
Carriers used by traders to transport their goods indicate the scale of their business and capital, and define the lot size for transportation. Table 4.8 shows the carrier used for selling maize, paddy, rice, soybean and other food crops. Bicycle, colt (cab, mini bus or mini truck with one to two ton capacity) and truck (3-5 ton) are the major carriers. Even local traders such as *bakul* and *penebas* sometimes use a colt, but this does not mean they own it. Colts or trucks are usually sent by large local brokers (5PB, 5PB+HL) or large local collectors (4PG+HL), who procure crops from *bakul, penebas* or village collectors (3PG). Large urban

traders send a large truck with two trailers *(gandengan)* to large local collectors and brokers when they buy paddy or maize.

Table 4.7 Major source of maize by trader.

	Seller (Number of Traders)						
From	PT	1BB	2T	3PG/4PG +HL/5PB	8PB+EK	TK	Total
Producing Area							
1BB	16	0	0	0	0	1	17
IBB+PC	1	1	0	0	0	0	2
2T	36	0	0	0	0	0	36
3PG	1	1	9	0	0	0	11
4PG+HL	1	1	3	0	0	0	5
5PB	0	0	0	1	0	0	1
5PB+HL	0	0	1	1	0	0	2
Collection and Distribution Center							
6PB+HL	0	1	1	6	0	0	8
7PB+TH	0	0	0	1	0	0	1
7PB + TK	0	0	0	1	0	0	1
8PB + EX	0	0	0	0	1	0	1
Sample No.	55	4	14	10	1	1	85

Figure 4.2 Major market route from Pace to Surabaya and Jakarta.



Small traders such as *bakul* (1BB) and *penebas (2T)* own at most bicycles. Their trading scale is so small that bicycles are appropriate for their business. The motorcycle, however, is rarely used as a carrier. It is difficult for small collectors and *penebas* to afford it, and for inter-village collectors (3PG) or larger scale traders, the motorcycle is not able to

transport more than 200 or 300 kg. Since they rarely own a truck themselves, they use colts or trucks sent by large local collectors (including rice millers, 4HL) or brokers.

Penebas, in collaboration with large local collectors or brokers, use transportation services provided to them to save the costs of transportation, loading and unloading. This can help large local collectors and brokers to save the cost of collecting and to ensure stable procurement.

Table 4.8 Carriers used to transuort all crops bv trader.

	Number of traders								
	Becak	Cab	Bicycle	Bicycle with Cart	Motor-cycle	Colt	Truck	Large Truck	Total
Producing Area									
1BB	0	0	35	3	0	10	2	0	50
1BB+pC,1PP	0	0	3	0	0	5	0	0	8
2T	4	2	11	0	0	21	66	0	104
3PG	0	0	0	0	0	1	28	3	32
4PG+HL	0	0	0	0	0	1	8	5	14
5PB	0	0	0	0	0	0	1	2	3
5PB+HL	0	0	0	0	0	0	4	4	8
Collection and Distribution Center									
6PB+HL	0	0	0	0	0	4	14	16	34
7PB+TH	0	0	0	0	0	2	0	3	5
7PB+TK	0	0	0	0	0	0	0	2	2
8PB+EX	0	0	0	0	0	2	0	4	6
91PBR+TH	1	0	0	0	2	1	0	0	5
Total	5	2	50	3	2	47	123	39	271

4.4 Transportation and handling costs

4.4.1 Transportation cost

The transportation cost depends on the trading scale and work area of the trader. Table 4.9 shows the transportation cost per km per kg by type of trader. Commodities include maize, paddy and soybean in 130 buying and selling transactions with major customers. Since the ways of transporting maize, paddy, rice and soybean are almost the same; data in the table are not separated by commodity. Distance from traders is the distance from sellers to buyers. Since the small collector's *(bakul: 11313)* business is small in scale and limited to his hamlet or his village, he usually uses a bicycle. Most *bakul,* therefore could not estimate a transportation .ost. Since *penebas* or the larger traders generally use motorcycles or trucks, they could assign a transportation cost.

A smaller scale of trade tends to cause a higher unit cost of transportation (Table 4.9). The larger trader has a wider business area, and he gets a lower unit cost of transportation. The unit cost of large traders whose trading area is province-wide (> 150 km) is approximately 1/40 ,he unit cost of the village level local trader such as *bakul* and *penebas.* A distance of less than 10 km corresponds to the business area within a village or within several surrounding villages. Village level traders rarely go out of the sub-district.

The distance 10 to 19 km almost covers one sub-district. The distance 20 to 29 km is the .area that comprises several surrounding sub-districts or covers almost one district, ie. Nganjuk

district or the eastern part of Malang district. The distance 30 to 49 km is approximately equal to the distance between the producing areas and Kediri or Malang city. The distance 50 to 150 km is the distance between Kediri and Surabaya/Sidoarjo or between Malang and Surabaya/Sidoarjo.

Table 4.9 Unit cost of transportation(Rp/km/kg) for maize, paddy and soybean

	Average Distance (km) Between Traders							Sample
	<10	10-19	20-29	30-49	50-149	> 150	Average	No.
Producing Area								
IBB	0.833						0.833	2
2T	1.394	1.292	0.378				1.292	57
3PG	0.792	0.088	0.125		0.134		0.563	15
4PG+HL	0.455		0.117				0.370	4
5PB	0.100	0.100			0.100		0.100	3
5PB+HL		0.042		0.109	0.050		0.073	9
Collection and Distribution Center								
6PB+HL		0.111		0.063	0.049	0.035	0.073	27
7PB+TH		0.083	0.083			0.054	0.074	6
7PB+TK					0.030	0.029	0.030	4
8pB+EX						0.042	0.042	3
Average	1.184	0.348	0.243	0.093	0.056	0.039	0.683	
Sample No.	64	28	6	6	15	11		130

The transactions between districts are mainly between Pace and Kediri city (or between Wajak and Malang city). The distance between the two places is approximately 25 km and the road is well developed. *Penebas* in Pace sold their procured commodities in neighbouring subdistricts of Kediri district or Kediri city (7 cases). Large urban traders (6PB+HL, etc.) in Kediri city procured crops in Pace near the city (10 cases).

4.4.2 Loading-unloading cost

Our study differs from that of Hayami and Kawagoe (1987) by taking into consideration loading and unloading costs. The loading and unloading cost per unit weight is fairly constant and is not influenced by scale of trading, since the commodity is stocked and transported in sacks. Since loading and unloading increases the transportation cost, some traders have tried to reduce its frequency.

Loading and unloading costs do not depend on trade volume and distance. Tables 4.10 and 4.11 show that the average cost was 0.75 to 0.76 Rp/kg, not related to distance. Loading and unloading work is carried out by manual workers. Many traders both in producing areas and in urban centers indicated that the standard wage for loading or unloading was Rp 0.5 to Rp 1 per kg. The loading cost is usually the shippers' responsibility and the unloading cost is the transporter's responsibility.

Both loading and unloading costs, however, are sometimes borne by the shipper. A small collector or a village collector, for example *bakul* or *penebos*,, usually pays loading and unloading costs for every operation of selling and buying. Even when they sell commodities. they are responsible for the unloading cost at the point of selling. *A penebas* or a village collector often dries collected maize or paddy in his home yard. In this case, he has to load at

the paddy field and unload at his home yard when he buys. When he sells the commodity, he loads again at his home and unloads at the gate of a large local collector/broker. If he has no particular tie with the large local collector/broker, he has to bear the cost of loading and unloading when he both buy and sells. The local small collectors' burden of loading and unloading costs is greater than that of large local collectors/brokers and urban traders.

Table 4.10 Loadine cost (Rn/kr) for buvine and selline: maize, naddv, and sovbean

	Average Distance Between Traders							Number of samples
	< 10	10-19	20-29	30-49	50-149	> 150	All	
Producing Area								
1BB	0.875						0.875	12
1BB+PC	0.400						0.400	5
2T	0.775	0.816			0.750		0.779	88
3PG	0.700	0.768	1.000		0.583		0.718	27
4PG+HL	0.600	1.000		1.000		0.600	0.829	7
5PB	1.200	1.200		1.200	1.200		1.200	6
5PB+HL		1.000		1.000	1.000		1.000	4
Collection and Distribution Center								
6PB+HL		0.602	0.400		0.441	0.438	0.471	14
7PB+TH		0.650				0.650	0.650	3
7PB+TK						1.176	1.176	2
8PB+EX					0.400	0.400	0.400	3
Average	0.759	0.828	0.700	1.040	0.637	0.599	0.758	
Number of samples	108	30	2	5	15	11		171

If rice millers or large local collectors/brokers provide a drying facility to small or village collectors (1BB or 3PG) and *penebas,* collectors and *penebas* can save half of the loading and unloading cost. Large local collectors/brokers (4PG+IHI,, SPB, 5PB+HL) collaborate with collectors or *penebas* by providing services of transportation and their dryer facilities to give them an incentive to sell the crops to the large collectors/brokers. Village collectors and *penebas* need not pay unloading costs and the transportation cost. Thus, they can save the transaction cost of managing transportation and searching for buyers.

In our study on both buying and selling transactions, 130 cases were responsible for transportation cost of maize, paddy and soybean, while 264 cases were not responsible for transportation costs. In 57 out of 130 transactions, the *penebas* bore the cost of transportation. *Penebas* who did not bear this cost comprised 113 out of 264 transactions, 33 at buying and 80 at selling.

Penebas tend to bear no cost in selling transactions. This can be explained mainly by their collaboration with large local collectors/brokers as mentioned previously. The development of this new type of trader, the *penebas,* has several cost saving features. The harvesting cost, transportation cost, and loading cost are reduced by the *tebasan* system that has been institutionalized by collaboration between *penebas* and large local collectors/ brokers (4PB+HL, SPB±HL). Large urban traders who collaborate with large local collectors/ brokers tend not to be responsible for loading and unloading costs. When they buy at the gate of large local collectors/brokers, the sellers load the commodities on trucks. When they sell the commodity to feed companies, unloading is done by the companies.

There was no case of large local brokers (5PB and 5PB+HL) or large urban traders (6PB+HI,, 7PB+TH/TK) paying the unloading cost when they sold commodities to their customers, for instance, feed companies (see Table 4.12). When large urban traders buy commodities, they are not responsible for the loading cost, although they are responsible for the unloading cost if they store the commodity at their warehouse.

Table 4.11 Unloading cost (Rp/kg) for buying and selling: maize, paddy and soybean.

	Average Distance Between Traders							Number of
	< 10	10 - 19	20-29	30-49	50-149	>150	All	samples
Producing Area								
I BB	0.875						0.875	12
1 BB+pC	0.400						0.400	5
2T	0.787	0.650			0.750		0.774	86
3PG	0.871	0.607					0.836	15
4PG+HL	0.500		1.000				0.667	3
5PB	0.600	0.600			0.600		0.600	3
5PB+HL				1.000			1.000	2
Collection and Distribution Center								
6PB+HL		0.455	0.500	0. 514	0.686	1.200	0.567	19
7PB+TH		0.650	0.650			0.650	0.650	3
7pB+TK					1.176		1.176	2
8PB+EX					0.400	0.400	0.400	1
Average	0.782	0.555	0.717	0.708	0.782	0.750	0.748	

Market margins of *penebas* and large local brokers can be relatively large compared to that of other groups of traders. This will be analyzed in the next chapter. The development of *penebas* and the expansion of large local brokers' businesses is a noticeable change of the 1980s. This change is due to commercialization of the maize economy of rural Java, brought about by the development of the feed industry for poultry farming.

Table 4.12 Summary of loading and unloading cost responsibilities.

	Buying		Selling	
Trader	Loading	Unloading	Loading	Unloading
Producing area				
Typical practice of small collector	+	+	+	+
Penebas	+	+	+	+
In collaboration with large local Collectors/brokers	+	-	-	-
Large local broker	-	+	+	-
Collection and distribution center				
Large urban trader	-	+	+	-
In collaboration with large local Collectors/brokers (directly send to feed factories)	-	-	-	-

Note: += responsible; -= not responsible. *A penebas* buys from farmers. The large urban trader buys from rice millers (4HL) and/or large local collectors/brokers (4PG+HL, PB+HL) and sells to feed companies.

4.5 The emerging maize market

The characteristics of the maize market in East Java can be summarized as follows. Many farmers sell their maize and other CGPRT crops immediately after harvesting or even before harvesting under *tebasan* transaction. They rarely keep their crops for home consumption. The volume of maize traded has increased and even the shipment size from producing area to feed companies has become large. Big trucks with two trailers are commonly used between producing areas and feed companies. The transportation distance has become longer and maize is often transported to Surabaya, Jakarta and surrounding areas where feed factories are located. Stable procurement is critical for feed companies to reduce the production cost. Quality standards have also become critical and rigid. These requirements are transferred to traders, particularly large urban traders. It has become important for traders and feed companies to reduce transportation and transaction costs. Information on production price and storage has become important. The development of the *penebas* and large local broker indicates the changes listed above. They have most efficiently accommodated the changes in the maize market. Mutual collaboration between them reduces the various kinds of costs and their business has benefited compared with other groups of traders. The market margin of the *penebas* and large local broker could be larger than that of any other group of traders. This hypothesis will be examined in the next chapter. Credit tie between them ensures stable procurement by providing funds and helping to improve information exchange between them.

A hierarchical structure can be observed in the maize market. Traders are competitive within producing areas and urban centers. However, traders are not necessarily competitive between producing areas and urban centers, because there are gaps of information and access to credit, especially bank loans. In this sense competition is not symmetric between sellers and buyers. This will be investigated in Chapter 7.

5. The Changing Maize Economy

Since the mid 1980s, the maize market expanded with the development of demand, particularly from the feed and food processing industries (Achmad Suryana 1988). Dynamism in the economy transformed the traditional maize market. This chapter will clarify critical characteristics of the maize market that allowed it to adapt to structural change in demand accompanying income growth.

An ideal market basically satisfies the following three conditions. First, complete competitive equilibrium (market clearance) ensures efficient allocation of resources. This makes a market work as a consistent incentive system. The ideal market includes mechanisms to effectively evict free riders and avoid moral hazards, and has low entry and exit costs. Second, theoretically, complete information is provided. There should be no asymmetry of information and no adverse selection by players. Third, the transaction cost to exchange goods or services in the market is negligible for each player.

The reality does not satisfy these conditions. The maize economy in East Java does not satisfy these three points. Therefore, we will pay attention to the features that indicate incompleteness of the market and the way the problems are overcome.

In the following discussion, the focal points of the analysis are structured in accordance to the basic features of an ideal market:

- The incentive system is consistent for each player such as trader, farmer and others. If there is a trader group which has a relatively large margin, free entry and free exit conditions are not satisfied. Market margins shed light on the competitive structure.
- Price and other kinds of information are equally accessible to all the persons concerned without time lag. In an efficient market there is no asymmetry of information. An essential condition is whether the market can correctly identify each good exchanged in the market. This is related to the standardization, measurement and quality definition of goods.
- Negligible transaction cost supports the exchange of goods through the market, otherwise the market itself cannot exist. Any market has a certain innovative potential to reorganize and transform itself to reduce transaction costs. This change might be undertaken mainly by traders.

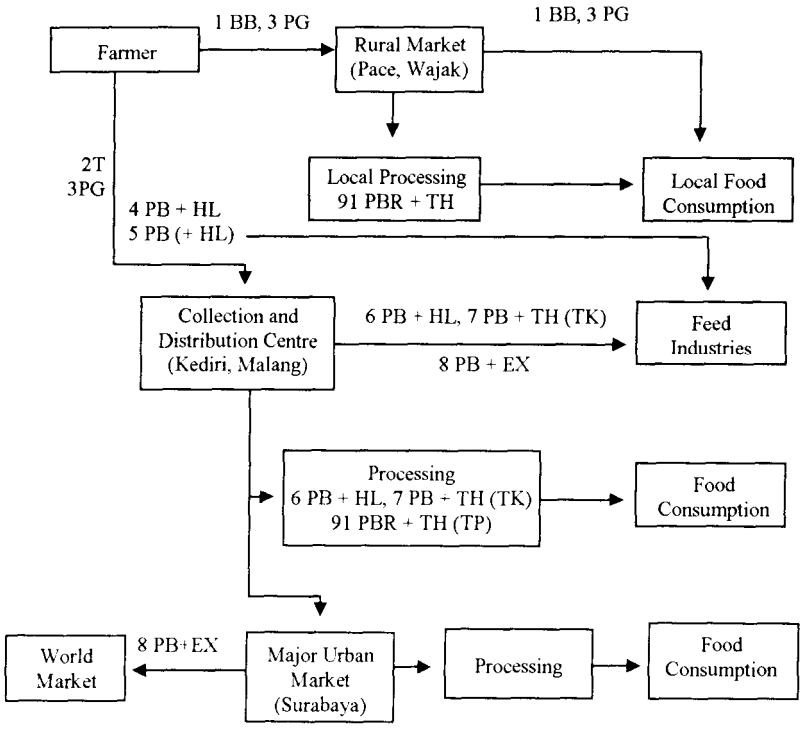
In the previous chapters we observed that the change of farmers' attitude in selling maize was an essential feature of commercialization. We also clarified the classification of traders and their features along with the marketing route in the producing areas and urban trading centers of maize. The role of *penebas* and large local brokers was noteworthy. In this chapter we will describe the features of a changing maize market from the three essential conditions of the market as pointed out above. The previous chapter clarified that traders organize the flow of goods with the aim of reducing loading and unloading costs and stabilizing supply to feed companies. Large feed companies have tried to integrate their related businesses and organize large urban traders.

5.1 Market margins

In this section we will investigate the hierarchical structure of the maize market and margin of each stratum of marketing. We will examine the condition of free entry and free exit by comparing market margins among trader groups. The driving force of the economy is economic incentive, namely the benefit and utility derived from economic activities. If a market cannot give a certain economic benefit to each player, the player will leave the market in the long run. When the market can give a certain level of economic surplus to its participants and the entrance barrier of the market is not high, the market can avoid monopolistic structures.

The maize market structure, linking farmers with consumers, consists of local markets. urban centers (collection and distribution centers) markets and major urban markets (Figure 5.1) (cf. Alexander 1987; Directorate of Food Crop Economics and Postharvest Processing 1988). There are various kinds of traders in terms of size, trading knowledge, capital, etc Through the market system, a farmer receives information regarding demand for his products The wider market system is structured by various players such as producers and their groups *(kelompok tani),* agricultural cooperatives *(KUD),* traders at each level of marketing. processors and government (cf. Burhan 1986; Shiraishi 1986). We are mainly concerned with traders mediating between farmers and product users, eg. feed companies.

Figure 5.1 Market system of maize.



Price depends on the form of the maize. There are three forms of maize, unshelled maize, called *glondong,* shelled maize, called *ose,* and milled maize, called *beras jagung* or simply *beras. A* trader may handle two or three forms of ma:ze.

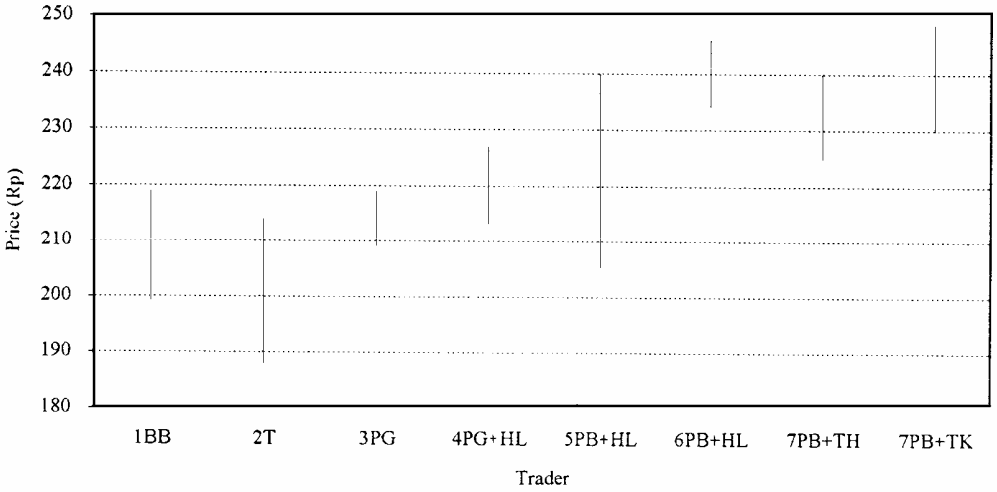
Unhulled rice *(gabah)* is milled at rice mills in producing areas or urban areas. It is rather rare that a trader deals in both unhulled rice and milled rice at the same time. *Bakuls* buy paddy (unhulled rice) and sell to larger collectors, or they mill it in village rice mills for villagers, for which they receive a commission from villagers for labour and rice milling costs. Large urban traders procure paddy from producing areas and usually process it into rice. There is no selling of *gabah* in urban areas. Soybean retains the same form among traders until sold to *tahu* or *tempe* industries.

The maize price is based on the form in which it is traded. It is difficult to clarify the price by classification of buyer or seller, because they deal in many forms of maize at the same time as mentioned above. Figure 5.2 and Table 5.1 indicate the margins and prices of *ose* by trader.

Table 5.1 Traders' gross margin (rupiah/Icg): shelled maize *(ose)*.

	Buying			Selling			Gross Margin
	Price	N	SD	Price	N	SD	
Producing area							
1BB	199	20	29.6	219	15	17.4	20
2T	188	2	12.5	214	31	17.0	26
3PG	209	10	17.7	219	11	17.3	10
4PG+HL	213	4	18.2	227	3	12.5	14
SPB+HL	205	2	5.0	240	2	10.0	35
Collection and distribution center							
6PB+HL	243	8	22.6	246	7	26.3	12
7PB+TH	225	1	0.0	240	1	0.0	15
7PB+TK	230	1	0.0	250	1	0.0	20

Figure 5.2 Gross margin in maize marketing.



unshelled maize) which is the typical form within villages. Its price was approximately Rp 120 per kg. *A bakul* just buys maize within his village (or hamlet) and sells it in the market or to village collectors or large local collectors. Since *a penebas* undertakes several kinds of activities, such as harvesting, drying and transporting, his gross margin is greater than that of any other group of local trader. His gross margin for shelled maize was Rp 26 per kg (Table 5.1). The large local collectors' (4PG+HL) margin was small (Rp 14).

Table 5.2 Traders' gross margin (Rp/kg): *gabah* and soybean.

	Gabah		Soybean	
	Buying Price	Margin	Buying Price	Margin
Producing area				
1BB	234	39	746	95
2T	208	47	682	149
3PG	266	21	710	73
4PG+HL	262	28	800	100
5PB+HL	243	na	815	95
Collection and distribution center				
6PB+HL	273	na	800	110

Table 5.3 Margin of maize traders.

	Buying Point of	Selling	Average Distance* (k-)	Transport Cost (RP/kg)	Margin** (RP/kg)
Producing area					
1BB	Farm	3PG,4PG+HL, Market	10	8.33	11.7
2T	Farm	4PG+HL, 5PB (+HL)	24	9.07	16.9
3PG	Farm, IBB, 2T	4PG+HL, 5PB(+HL), Market	33	3.96	6.0
4PG+HL	2T, 3PG, Gate	Gate	7	2.59	11.4
5PB+HL	Gate	6PB+HL, Surabaya	150	7.50	27.5
Collection and distribution area					
6PB+HL	4PG(5PB)+HL Surabaya	Surabaya	170	5.95	6.1

* Average distance of I BB, 2'f and 3YU is the sum of distance to seller and to buyer (cf Table 4.6). 4PG+HL is distance from 2T. SPB+HL is to Surabaya. 6 PB+HL is from local traders to Surabaya too.

** Margin = gross margin - transportation cost. Loading and unloading cost and other cost not yet deducted.

Table 5.4 Trader's annual income from maize dealing.

	Dealing Volume (ton/year)	Loading * and Unloading Cost (Rp/kg)	Drying ** and Other Cost (Rp/kg)	Income (Rp/kg)	Traders' Income (Rp '000)
Producing area					
1BB	11	(1.75)	(1)	11.7	129
2T	47	1.55	1	14.3	672
3PG	259	1.55	1	3.49	904
4PG+HL	144	1.50	1	8.90	1,282
5PB+HL	1,700	2,00	1	24.5	41,650
Collection and distribution area					
6PB+HL	2,219	1.04	1	4.01	8,898

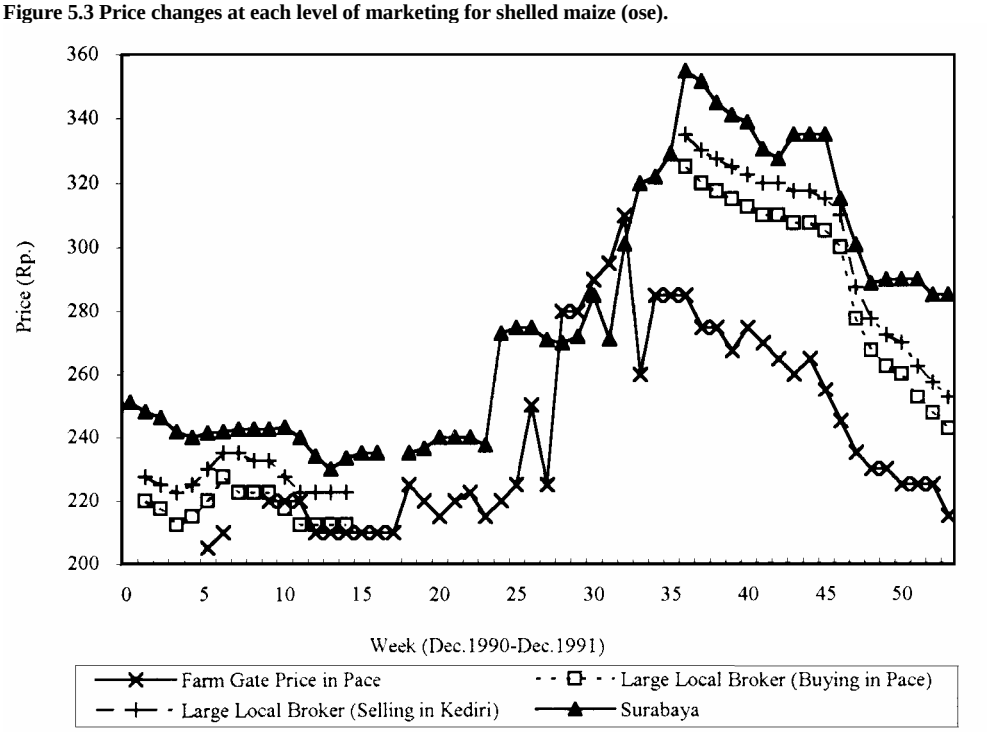
* It is assumed that each trader bears the cost of loading and unloading except for 1BB. 1BB does not use employed workers for loading unloading and drying (cf Tables 4.10 and 4.11).

** Manual workers' piece rate for drying each quintal is assumed to be equivalent to twice the cost of conveyance of maize between warehouse and drying yard. The rate is Rp 35 per quintal for conveying once. Including other costs, it is assumed that each trader bears the cost of Rp 1 per kg as the drying and other cost.

Large local brokers (5PB, 5PB+HL) appreciate wide margins, because they can transport the commodity by themselves and sell in urban areas. However, their gross margin could be overestimated, because price data are less reliable. The small sample number of 5PB+HL reduces the reliability of the data on their income. Weekly data on the prices at Pace, Kediri and Surabaya indicated that the difference between the buying price of large local brokers (5PB) and the price in Surabaya was approximately Rp 20 to Rp 30. The difference fluctuated and was higher before harvesting in the dry season, reaching about Rp 40 (Figure 5.3). If the gross margin of 5PB+HL is assumed to be Rp 25, his net margin (income/kg) becomes Rp 14 and his total income from maize dealing is approximately 24 million rupiah.

Large urban traders bought shelled maize at Rp 230 per kg from large local collectors (4PG+HL) or large local brokers (5PB; SPB+HL). The large urban traders sold the maize mainly to feed companies at prices from Rp 240 to Rp 250/kg.

Figure 5.3 Price changes at each level of marketing for shelled maize (ose).



In East Java price information is widely transferred among farmers and any group of traders without time lag. Farmers listen to radio programs on prices of crops traded in Surabaya. Local newspapers printed in Surabaya have a daily column on prices of agricultural commodities. Crop prices in the producing area often increase before they increase in the urban market when excess demand is predicted. *Penebas* and village collectors try to increase the price when they sell to large local collectors or brokers, often during crop off-seasons. Large consumers of maize, eg. feed companies, collect information on crop forecasts and stock from throughout Java to enable stable procurement. As far as price information is concerned, there is no asymmetry in the market.

Margin (or income per kg in Tables 5.1-5.4) varied by group of trader. This implies that neither free entry nor free exit conditions are satisfied, particularly in the case of large local brokers and *penebas.* These two groups have developed in recent years in response to commercialization of maize and other crops in the study area. Thus, the difference of market margin by trader group is caused by dynamic change rather than by a static incomplete market structure. However, the two groups of traders show some features of barriers to entry into the job market of traders.

Large local brokers (5PB+HL) and large collectors (4PB+HL) have transactions with state or private banks located at urban centers, where they can get government subsidized loans. It is very hard for local traders to get loans from banks. One of the brokers in Pace, a rice miller, visited a state bank *office* in Kediri almost every day for about one year to become familiar with bank clerks and to establish his credibility. After a one year effort, he could get a loan to extend his business in his village. Local traders in producing areas, except for large brokers or large collectors, in general, do not have sufficient self confidence and capability to access the established state or private banks. Large brokers and large collectors must own valuable assets, such as land, a rice mill or trucks, to get a loan from the bank.

Large local brokers have a certain tie with small traders, especially with *penebas,* athey advance procurement funds to them. Bank loans are the original source of the funds Large local brokers (and large collectors) have a stable relationship with large urban trader' too. They work as agents for the large urban traders to procure maize and other food crop' These relations have been established through long and frequent transactions among them. I such ties or relations are not firm, one cannot work as a large local broker or *peneb as.*

The *bakul's* net margin was also higher than that of village collectors and large local collectors. However, they get very little annual income, because their trade scale is so small. They are mostly landless villagers without access to a~ny other lucrative job in the rural areas They are obliged to work as small collectors within villages. They need a relatively high net margin to maintain a certain level of income.

5.2 Traders, their business careers and assets

This section investigates the traders' potential to adapt to changing markets. The traders' role has changed with the changes in the demand side, ie. the development of the feed industry. We need to examine the traders' ability to adapt to the changes and their potential The analysis of traders' skills, their careers and formal education is most relevant. How do the get trained as traders and how are they educated? To what extent does education contribute to the traders' business skill?

Large local brokers and *penebas (2T)* are the most profitable businesses in the producing areas. They integrate jobs from harvesting on-farm through trading, and the represent the dynamic change in producing areas. Large urban traders, on the other hand, receive a small margin. Their major role in maize marketing has gradually shifted from mere trading, ie buying, transporting and selling maize, to that like an agent, connecting feed companies and local traders. They transfer information on price, quality requirements and demand from feed companies or major urban markets to local collectors and brokers. They work for feed companies to procure materials, and they have much information on local crop, forecasts, quality, the time of harvesting, and stocks of crops through frequent contact with large local collectors and brokers. They retain local market information and thus bargaining power over feed companies and other large buyers.

Another important role of the large urban traders concerns access to financial institutions, particularly state or private banks, to get procurement funds (see Chapter 7). These funds are provided to large local collectors/brokers to ensure procurement. Some large urban traders have entered the transportation sector and transport any non-agricultural commodities to utilize their trucks. Some other traders, who have not been interested in establishing new relations with local traders, have tried new profitable businesses such as maize oil or starch production, which need more sophisticated technologies, compared to the traditional food processing industries, such as shelling and drying maize, making tapioca flour or milling rice.

. In our market survey, almost all traders in the producing area were ethnic Javanese, while some traders such as large collectors or brokers were Chinese. In the collection and distribution centers, ie. urban centers, most large traders were Chinese. More than 90% (11 out of 12) of large traders in the urban area had worked more than 10 years as traders, and five of them had worked more than 20 years (Table 5.5). Only 60% of local traders (48 traders out of 82) had worked more than 10 years. Only 13 local traders out of 82 had 20 years or longer experience as traders.

Javanese small traders in producing areas tend to have shorter experience compared to Chinese large traders in urban centers (Tables 5.5 and 5.6). Javanese traders in the producing areas had approximately three to five years experience of trading before becoming independent traders. On the other hand, large traders in urban centers had training periods of about nine years. Chinese and larger traders have more experience before becoming independent.

Both Javanese and Chinese traders commonly worked in their parents' businesses during the training periods. Approximately 50% trained with their parents while the other 50% worked for relatives or other persons.

The formal school education of traders is shown in Table 5.7. The smaller traders had less education, and traders in the producing areas had less education than large traders in the urban centers. Most small traders entered elementary school but did not graduate from it. Fifteen *bakul* (small collectors: 1BB) out of 17 in the producing areas entered elementary school, but only *9 bakul* graduated from it. No *bakul* entered higher school levels. In the producing areas, however, relatively large traders such as large local collectors or brokers have more schooling. Even in the producing areas, there were two graduates of junior college who worked as village collectors (3PG). Village collectors generally have high school education, and some of then represent active businesses that transform the market system in producing areas.

Profitability, indicatei by net margin and business scale, does not necessarily depend on schooling but rather on experience as a trader. A typical *penebas* generally graduates from elementary school only, but he works as *a penebas* (or a collector) for more than 10 years. The most active and influential broker in Pace (5PB) did not graduate from elementary school, but he worked as a trader more than 30 years. Through on the job training, traders acquire their skills and accumulate knowledge of trading. They develop the marketing route and establish close and reliable relations with their trade partners. Through such connections, they obtain various kinds of information, for instance, quality, stock, funds for business, and government regulations. Both Chinese and Javanese large traders tend to inherit their business from their parents. In contrast to large urban traders and large local brokers (or collectors), small local traders like *bakul*, *pengunipul* and *penebas* rarely inherit their businesses from their ancestors. Trade skill, knowledge, information, business assets and long relations with other traders that belong to the business family play a substantial role in sustaining and developing a business. In this point, the small traders have a critical disadvantage.

Table 5.5 Bussiness experience of traders: number of traders by years of experience

Trader	<5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	Total
Producing area										
IBB	3	2	5	3	0	2	0	0	2	17
1BB+PC	0	1	0	0	1	0	0	0	0	2
1PP	1	0	0	0	0	0	0	0	0	1
2T	3	12	12	7	2	0	0	0	0	36
3PG	5	1	2	1	1	0	1	0	0	11
4HL	3	0	0	1	1	0	0	0	0	5
4PG+HL	1	1	1	2	1	0	0	1	0	7
5PB	0	0	0	0	0	0	1	0	0	I1
5PB+HL	1	0	1	0	0	0	0	0	0	2
Collection and Distibution center										
6PB+HL	0	1	1	4	2	0	0	1	1	10
7PB+TH	0	1	0	0	0	0	0	0	0	1
7PB+TK	0	0	0	0	1	0	0	0	0	I
8PB+EX	0	0	1	0	0	0	0	0	0	1
91PBR+TH	0	0	0	2	1	1	0	1	0	5
92PBR+TP	1	0	0	0	0	0	0	0	0	1
Total	19	19	23	20	10	3		3	3	101

Traders' business assets consist of warehouses, trucks and other vehicles, equipment and land. Equipment includes machines such as a rice mill. Land was valued by its current price at survey. Others were valued based on acquisition costs and depreciation. Durable years are 45 years for a warehouse, *office*, factory and other buildings, ten years for a truck and other vehicle, five years for a motorcycle, bicycle, equipment and machines. Scrap value is 10% of acquisition cost.

Table 5.6 Training experience in years and by employer before becoming independent trader.

	Employer* Before Independence				
Trader	a	a+c	b	c	Average
Producing area					
1BB	3.17 (6)**			1 (1)	2.86(7)
1BB+PC					
1PP					
2T	5(3)		7(2)	2(2)	4.5(8)
3PG	3(2)		1(2)		2(4)
4HL	4(2)			0.06(l)	2.69(3)
4PG+HL			9.5(2)		9.5(2)
5PB					
5PB+HL			10(l)		10(l)
Collection and distribution center					
6PB+HL	9(5)		10(l)	4(1)	8.63(8)
7PB+TH		9(1)			9(1)
7PB+TK					
8PB+EX					
91PBR+TH	4(l)			2(3)	2.5(4)
92PBR+TP	2(l)				2(l)
Average	4.95 (20) (1)	9	6.88(8)	1.88(8)	4.8(40)

*** a** = parents, b = relatives, c = other persons.

** Number in parentheses is the number of traders. Data were not available for all traders.

The scale of assets is diversified by group of trader (Figure 5.4). A small collector such as *a bakul (1BB)* had on average asset values less than one million rupiah. *A penebas* had two

or three million rupiah. A village collector or a rice miller had more than 10 million rupiah. A large local collector (4PB+HL) had about 30 million rupiah. Only one large broker (5PB) had an asset value about 20 million; since the value of his land was not available, his total asset is under-estimated. If the land value were available, his assets would have been similar or greater than the average of large local collectors. The average asset value of other large local brokers (5PB+HL) was far greater than that of other local collectors, close to 300 million rupiah.

Table 5.7 Numbers of traders by level of education achieved.

Trader	#na	0	ES		JI-IS		SHS		JC		Total	
			EN	G	EN	G	E	G	E	G	EN	GD
Producing area												
IBB	0	2	1S	9	0	0	0	0	0	0	15	9
IgB+pC	0	0	2	0	0	0	0	0	0	0	2	0
1PP	0	0	0	0	1	1	0	0	0	0	1	1
2T	0	1	32	21	3	1	0	0	0	0	35	22
3PG	0	0	4	4	2	2	3	3	2	2	11	11
4HL	0	0	3	2	1	1	1	1	0	0	S	4
4PG+HL	0	0	5	3	0	0	2	2	0	0	7	5
SPB	0	0	1	0	0	0	0	0	0	0	1	0
SPB+Hh	1	0	0	0	0	0	2	2	0	0	2	2
Collection and Distribution center												
6PB+HL	0	0	0	0	2	1	7	4	1	1	10	6
7PB+TH	0	0	0	0	0	0	1	1	0	0	1	1
7pB+TK	0	0	0	0	0	0	1	1	0	0	1	1
8pB+EX	0	0	0	0	0	0	1	0	0	0	1	0
91PBR+TH	0	0	S	3	0	0	0	0	0	0	5	3
92PBR+TP	0	0	0	0	1	1	0	0	0	0	1	1
Total	1	3	67	42	10	7	18	14	3	3	98	66

Note: 0= no school, ES = elementary school, JHS =junior high school, SHS = senior high school, JC = junior college EN = entered school, GD = graduate of final school entered.

Large urban traders in collection and distribution centers have far greater assets than local traders in producing areas. A large trader with a rice mill (6PB+HL) had assets of more than 800 million rupiah. One large trader operating a retail shop (7PB+TK) had more than 500 million rupiah, excluding land assets. Only one 7PB+TK type trader was interviewed, and data on the value of his land were not available. If his land asset value were counted, his total asset value could be the same as or greater than that of 6PB+HL. Large urban traders' assets were far greater than those of any local traders.

The difference between large local brokers and large urban traders is the possession of assets such as land and equipment/machines. Land value per unit area is far higher in the urban centers such as Kediri and Malang than in producing areas such as Pace and Wajak. Furthermore, many large urban traders owned several trucks and operated transportation businesses, too. Large local brokers also have transportation businesses the but the scale was smaller than that of large urban traders.

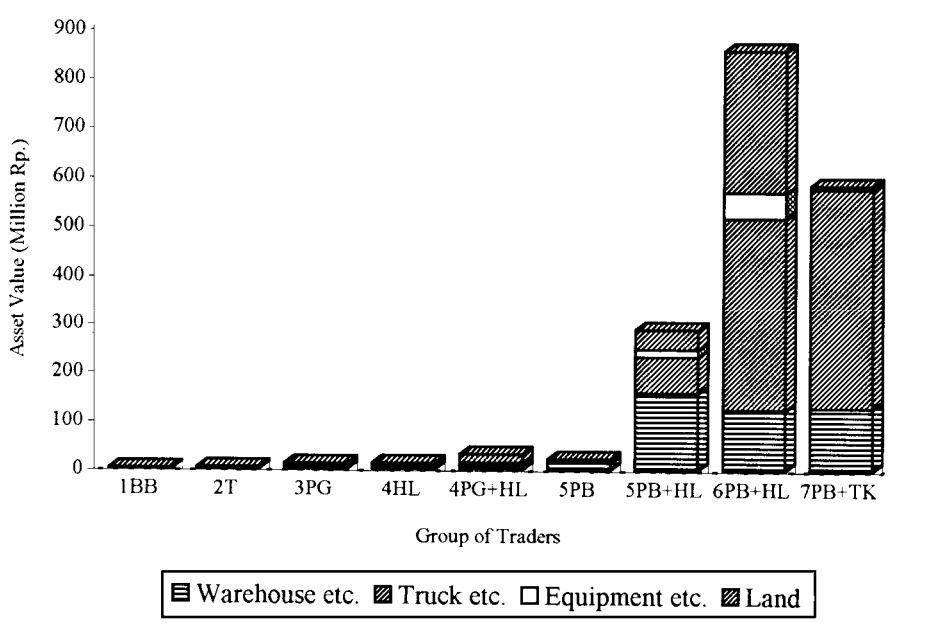
The traders can be divided into four groups based on size:

- small collectors such *bakul* (1BB) and *penebas (2T)*,
- village collectors (3PG) and rice millers (4HL),
- large local collectors (4PB+HL) and large brokers (5PB, SPB+HI,), and
- large urban traders (6PB+HL, 7PB+TK).

An active *penebas* can climb up to the second group. The third group links the producing area with urban centers. Some of members of the third group, particularly large brokers, have a trade scale equivalent to that of large urban traders and have expanded their business territory to other provinces.

The large urban traders and the large local collectors/brokers (fourth and third groups) can access institutional lenders such as state or private banks, because they have sufficient collateral in terms of land and any other assets (see Chapter 7). The second group of traders can access institutional lenders, but they can only get small loans for working capital because of their small amount of collateral. From the viewpoint of size of dealing and capability of funding, the third group has bargaining power over the first and second groups. The fourth group retains bargaining power over the third group of traders, yet third level traders can and do expand to inter-local business. Within each group, traders compete with each other for business opportunities. Between groups of traders, on the other hand, there is a stratified structure based on the trade scale and the capability of funding, that is mainly based on the asset value.

Figure 5.4 Traders' assets.



5.3 The development of agribusiness

The role of traders is essential for the transformation of the crop economy, both in vertical integration and diversification of agriculture. There are of three aspects of the change in the crop economy; (i) changes of production on farm, (ii) changes in marketing of agricultural products, and (iii) development of downstream industry such as crop processing and food industries. Maize is a crop which shows changes in the above three aspects. Aspects (i) and (iii) have drawn the attention of government and agribusinesses (cf. Effendi et al. 1989; Pantjar Simatupang et al. 1990). The marketing aspect, on the other hand, seems to have not received a square deal in agricultural development policy. The changes since the 1980s have increased the importance of marketing. In this section, we will overview agribusiness and traders.

5.3.1 Feed industries

Most agribusiness (or agro-industry) in Indonesia has been related to estate agriculture that includes oil palm, rubber and sugarcane. In 1980s and 1990s, however, non-estate agribusinesses and agro-industry, such as livestock, feed industry, seed business, food processing, and canning factories expanded. New uses of maize, such as feed for livestock or ingredients for processed food, have developed rapidly (BULOG and Universitas Brawijaya 1982; Ridwan Thahir et al. 1988; Muharto and Chusnul Chotimah 1990). Uses as feed for poultry, starch, alcohol, maize oil, ketchup and other ingredients are expected to become large industries in Indonesia. Processing factories for monosodium glutamate from molasses, ketchup from soybean, and the feed industry are located at Surabaya and surrounding areas in East Java. They produce for the domestic economy.

In the downstream maize market, the feed industry has developed in conjunction with the growth of the poultry industry since the latter half of the 1980s. Broiler farming developed rapidly after its introduction into Indonesia (Figure 5.5). This new change downstream of the CGPRT crop based economy, especially the maize economy, substantially affected farmers and traders, since these new industries use crops that are cultivated by small farmers. The development of these industries has changed the marketing of the CGPRT commodities and transformed the market system.

In 1990, production capacity of the stock feed industry was 3.1 million tons per year (Table 5.8). There were 78 feed mills in total. Most of the capacity (ie, 78.5%) was located on Java. Sumatra was second with 12.8% of total capacity. On Java, there were 42 feed mills, 6 in Jakarta, 20 in West Java, 10 in Central Java, and 6 in East Java. Two major feed companies, PT. Japfa Comfeed Indonesia and PT. Charoen Pokphand, shared 44% of total production capacity of Indonesia in 1990. Both companies have feed mills in Sidoarjo, East Java. Feed production in Indonesia rapidly increased in the later half of 1980s from 1,088 thousand tons in 1986 to 2,456 thousand tons in 1990. Feed production was 85% for poultry (broilers and layers), 10% for shrimp and fish, and 5% for cattle and others.

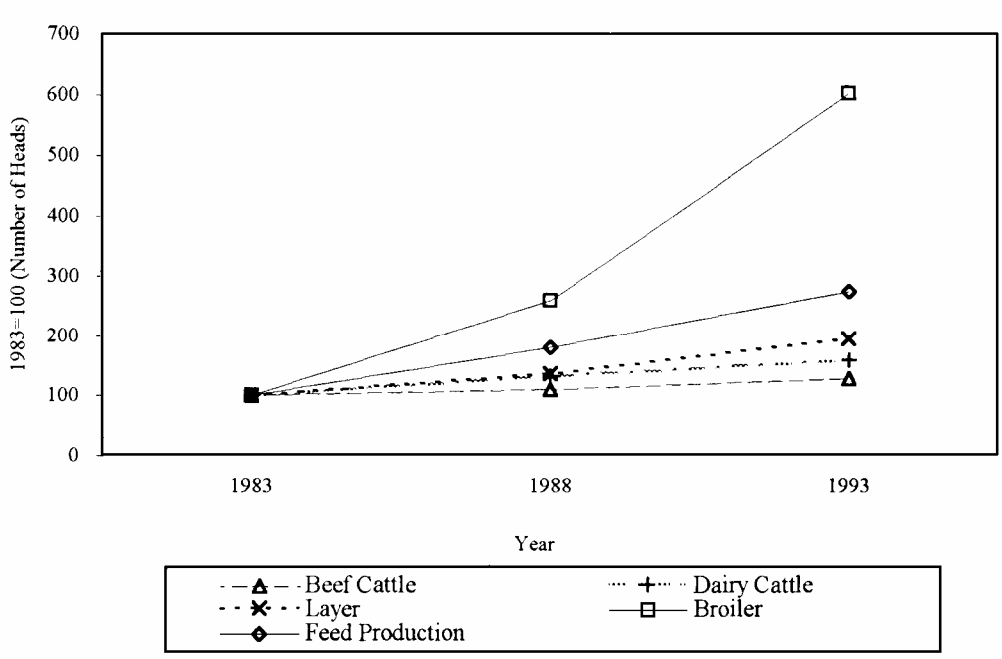
Rapid growth of the feed industry attracted investors, including overseas investors. In 1991, the Investment Coordinating Board (BKPM) permitted 11 companies to set up new feed mills and expand existing mills. Their permitted total production capacity was 1,068 thousand tons.

Table 5.8 Major feed companies in Indonesia.

Company	Feed Mill Location	Production Capacity ('000 ton/year)
PT. Japfa Comfeed Indonesia	Tangerang, West Java	340
	Sidoarjo, East Java	370
PT Charoen Pokphand	Medan, North Sumatra	200
	Sidoardjo, East Java	250
	Jakarta	200
PT Buana Superior Feed Mill	Bekasi, West Java	202
PT. Multi Daya Pertiwi	Pemalang, Central Java	130
PT. Gold Coin Indonesia	Bekasi, West Java	59
	Surabaya, East Java	23
	Medan, North Sumatra	12
	Jakarta	32
PT. Cargill Indonesia	Bogor, West Java	50
	Semarang, Central Java	30
	Ujung Pandang, South Sulawesi	31
Others		1,176
Total in Indonesia		3,105

Source: Market survey and Department of Industry Indonesia.

Figure 5.5 Development of livestock and poultry.



5.3.2 Relative decline of local markets

The increase of demand for poultry meat, the increased production of broilers and the development of the feed industry have had great impact on the market structure of CGPRT crops, particularly maize.

Small farmers in rural areas cultivate food crops for home consumption, or else they sell them for the local processing industry, such as *tempe* (fermented soybean cake), *tahu* (soybean protein curd), and *gaplek* (chopped and dried cassava) processing factories. In commercialized production areas where farmers mainly produce for selling, maize is sold just after harvesting (see Chapter 3). The development of a giant feed industry has resulted in absorption of the marketed surplus of maize in East Java. The local use of maize has declined, while provincial and island-wide maize markets have emerged and developed. Large urban traders and some large local brokers send their maize to Surabaya and even Jakarta. They procure maize not only from surrounding business territories but also from other provinces, even off Java (see Chapter 4).

The development of large local traders in addition to *penebas* indicates the structural change of the maize market in producing areas. The role of large local brokers and large collectors became important to link the local market and urban markets. Large local brokers procure commodities and send them directly to the feed company. They work as agents of large urban traders, who have shifted their major role from collecting in local areas to providing information, credit and other services to large local brokers or collectors. The feed company uses large urban traders to save the transaction cost of searching for and procuring commodities.

The local market has consisted mainly of the activities of small traders such as *bakul* and village collectors, *pengumpul.* Village collectors have potential to adapt to the changing

situation and work for the large local collectors and brokers. The role of *bakul,* on the other hand, has decreased with the shrinking of the local market caused by the development of commercialization. Some of the *bakul* extended their business and became village collectors or *penebas* so as to adapt to the changing market situation.

Many people had become small collectors *(bakun* or other small traders in the study site. There were 15 small traders trading harvested crops and other materials (scrap iron, etc.) in the study village. Most of them were originally landless villagers and they took a role in the village economy as traders. Careful attention must be given to the socio-economic conditions in rural areas where many landless labourers are involved in trading paddy and CGPRT crops. Village unit cooperatives (KUD, *koperasi unit desa)* receive high priority in the economic development strategy. The KUD system was established to improve farmers' bargaining power against large traders or non-agricultural sectors. Cooperative development policy, however, must give attention to landless traders in order to upgrade their economic welfare, because alleviation of rural poverty will not be achieved if they are ignored. Moreover, procurement of foodstuffs for the KUD and the national stock cannot be carried out by rural people themselves.

5.3.3 Agribusiness activities

Feed companies need to ensure stable procurement of ingredients for stable operation of their mills. Their procurement lots are large, reaching up to several hundred tons. They need detailed information on crop prospects and the stock of maize in the marketing channel. The feed companies try to establish stable transactions with large urban traders or dealers. They usually establish an association of large urban traders to organize supply and to get trader collaboration. Each company also sets maize quality standards. The companies have guided traders to set the standards by distributing instruction tables of quality standards called *rafaksi* (from Dutch: *refractie,* literally: item break-down, see Chapter 7) to each urban trader. Local traders make an effort to keep up with the conditions requested by urban traders and feed companies. Thus by these efforts, they bring about dynamic changes in rural areas.

It is noteworthy that agribusiness has penetrated into maize production. Since the latter half of the 1980s, hybrid maize seed production has developed in Sukoanyar village and Kidangbang village in Wajak sub-district and Pandangmulyo village in Tajinan sub-district. The market survey was conducted in these areas too. The agribusiness companies are Pioneer Hibrida Indonesia and Sang Hyang Sri (SHS). Pioneer procures the parent seed from Pioneer in the Philippines, and SHS gets it from Cargill.

Pioneer established its business in Wajak because the irrigation system is good in this area, and the fields are fertile and level. It is easy to isolate hybrid varieties from the other maize varieties in the area. The production of hybrid seeds needs highly skilled farming and complete quality control. The company contracts with the well organized farmers groups in Sukoanyar and Kidangbang. Farmers in Sukolilo, neighboring Sukoanyar, have introduced hybrid "Pioneer" and "CPI" since the end of the 1980s by observing the experience of Sukoanyar village. Hybrid maize is widely cropped in Lampung but the irrigation and other conditions are not suitable for F1 seed production.

In Wajak, a traditional and distinctive labor system *(pajekan)* is extensively practiced (cf. Soentro 1974; Scheltema 1985; Gunawan Wiradi 1986). A landless laborer works from transplanting to harvesting on a certain plot of field and receives a share *(bawon)* of 1/4 of the harvested paddy or maize. If the labourer *(peinajek)* also does land preparation *(bajak* and *garu),* he can receive a 2/7 share. The development and invasion of agribusiness will inevitably affect these traditional institutions.

A peculiar land tenure system, *tukar hasil*, was also observed in Wajak. During the dry season, Chinese traders from Malang City rented the plots of land and cultivated fruits such as watermelon with wage workers. Malang is a urban area and one of the centers of education and other services in East Java, where expensive fruits such as watermelon and apple find a ready market. Land rent was equivalent to the gross output value of maize on the land. Thus, it is called production *(hasil)* exchange *(tukar).* Payment of the rent was in cash, and the value of maize was evaluated by the current market price each season.

In the area of the green revolution of rice, which took place from the mid 1960s through the early 1980s, new varieties and chemical inputs, supported by agricultural experimentation and extension systems have shared key roles in agricultural development. The development programs and strategy applied in rice were devoted primarily towards production increase per hectare (cf. Booth 1989; Manning 1987). These programs and strategy were undertaken by government, but they might not be applicable to other annual food and industrial crops. The development effort for CGPRT crops, however, includes not only production increases but also innovation in processing and new uses of CGPRT crops.

The development and production of hybrid maize seeds has been carried out by private agribusiness. Traders in producing areas introduce and disseminate new maize varieties, promote the use of maize shellers and improve the quality by drying maize kernels. It seems to be necessary to involve such traders and agribusiness in the development process.

5.4 Impact of the changing maize economy on traders

In the previous analysis, it was noted that the large local broker and *penebas* obtain higher profitability than the other small traders or rice millers. These traders are effectively connecting the producing area to large urban markets and inter-regional trade. The following sections discuss some cases in depth. *Penebas,* large local collectors and brokers show dynamic activities and capacity to accommodate to the changes happening in the maize market. What are the most critical points for the traders to accommodate to the changes? We will focus on the capability to improve quality of maize and to obtain capital for operation and investment. These two elements are the most important and critical to adapt to the changing maize market.

5.4.1 Large local broker and *penebas*

Since a rice milTer's major activity is rice milling, his geographical coverage depends on farmers, collectors and *penebas. A* rice miller's coverage is generally limited to his village and its surroundings. Some rice millers have shifted their major business from rice milling to collecting crops since the 1980s. Some rice millers became large local collectors, and some large collectors expanded their business even out of the sub-district. In Pace, there are several rice millers who have extended their business and trade into other districts or out of East Java. In our survey, three such rice millers, classified as large local brokers, were interviewed.

One is a trader who inherited his business from his parents. His relatives have worked as traders and have trade skills and know-how among them. One of his relatives has a large company, with the legal status of CV *(Conrmanditaire Vennootsc/7ap:* limited partnership) in Pace, that is active in rice milling and trading, cattle breeding and sales of used cars. Another large local broker was a rich farmer who set up a rice mill. After getting to know bank officials and establishing his credibility, he could get bank loans to expand his business and deal directly with traders out of district or out of province. The third one has a company which has a

department for agribusiness in CGPRT crops in Pace, with a business license of UD *(usaha dagang).* The company mainly operates in collaboration with sugar factories, by producing and selling sugarcane by contract farming with farmers. The president of the company lives in the district capital. He is a son of retired military officer; he launched the business with capital gained from money lending.

The harvesting contractor *(penebas)* connects the larger local traders to farmers. The *tebasan* system has become popular since the introduction and dissemination of high yielding varieties of rice. As mentioned earlier, the technological innovation and diversification of agriculture have generated a labour shortage, especially a seasonal shortage during the harvesting and transplanting seasons of paddy and maize. This has changed the rewards for the factors of production and brought about a change in agrarian institutions. The *tebasan* system represents an institutional change in rural Java (Collier et al. 1973; Hayami and Kikuchi 1981). In an economy without a labour market, some analysts say, traditional institutions substitute for the role of a market mechanism. The rise of the *tebasan* practice has drawn attention to the transformation of rural society.

A penebas is considered an outsider who absorbs the employment opportunity in the village he visits. He usually employs harvesting workers from his own hamlet or village, and visits from village to village to undertake harvesting contracts. The young workers consist of landless villagers, his brothers, and other relatives. Thus, it has been considered that the *tebasan* system deprived the poor in the villages of employment opportunity and it undermined the built in mutual help system in rural Java. Local government, therefore, has not viewed *tebasan* practices favourably. Yet, they are an indispensable part of collection trade.

5.4.2 Problems of traders and agribusinesses

A penebas is skilled in harvesting and takes care of the quality of harvested crops to avoid the mixture of unqualified materials as specified by large local brokers or large collectors. He dries the crops well to prevent fungal growth. He maintains favourable relations with large local brokers and large collectors, from whom he gets various information and even procurement funds. He can cope well with price changes of crops and he is very sensitive to business opportunities. One can say that he is a rural entrepreneur. The activity of the *penebas* suggests a possibility that local small traders can promote the reorganization of the local market to cope with the development of agribusiness and the diversification of agriculture.

Most large local collectors (4PB+HL) and large brokers (5PB +_HL) in Pace collect materials from *penebas* and village collectors. They are skillful in checking the quality and moisture content of paddy and maize, since they, particularly large local brokers, own moisture testers. However, they do not give detailed pricing information to the *penebas*, village collectors, or farmers. There seems to be asymmetry of information regarding quality and pricing among traders.

Some *penebas* and village collectors, instead of extension workers, provide villagers with information on price and new technologies, such as new seeds or pesticides. The government must not neglect the potential role of traders and private business, which could accelerate agricultural development in rural areas.

Individual traders generally lack knowledge, techniques, information, and capital. However, the more critical problem is that traders in rural areas lack experience in the trading business that is essential to become an independent trader. Javanese traders' experience is generally shorter than that of Chinese traders; as clarified previously. It is rare that a Javanese trader succeeds in a business inherited from his parents. They lack trade connections, know

how and information, which might be caused by their socio-cultural background. Some system to facilitate the upgrading of traders' conditions in rural areas by improving their access to skills, information and credit is necessary.

Seeds, especially hybrid maize seeds, are produced by farmers under contract with seed agribusiness companies. Maize production has been integrated by large poultry farmers as an agribusiness. There are several large feed mills in East Java, which are far more capital intensive than local collectors and farmers. Improving the quality of harvested maize as well as stabilizing procurement of the materials are the most critical and urgent issues of the feed companies. The quality requirement for maize imposed by such agribusiness and agro-industn is so strict that the marketing system and farmers' production must be improved to satisfy the requirement. Contamination by foreign materials, fungus and the mycotoxin, aflatoxin, has become a constraint to the development of feed company and poultry farming businesses.

High quality maize is demanded by the newly developed industry. How to cope with such a new demand is an important development issue. How can farmers and traders in rural areas answer the newly emerging request from downstream of the industrial linkage? One essential measure is to quickly dry and process the harvested maize. The necessan improvement is inexpensive drying facilities, such as drying yards or small scale drying machines within a village, which permit the maize to be dried immediately after harvesting. It might also be possible for farmers and small traders to add fungal inhibitors into the sacks ot maize.

It is important to promote such improvement by giving investment incentives to farmers and traders in rural areas. Local small collectors such as *pengumpul* or *penebas* can get procurement funds from large local brokers or large collectors, but they cannot borrow investment funds. Our study indicates that access to investment capital is more limited than access to working capital. Long term credit requires collateral and the procedure requires frequent travel and is complicated for rural people. It is necessary to improve their access to banks.

6. Quality and Pricing: Measurement and Standardization of Commodities

The development of the feed business has introduced various changes in maize producing areas. One particular change is the upgrading of quality, especially, the rigid standard for moisture content. In the process of this change, the role of large local collectors and large brokers has become important. They introduced moisture testers in rural areas to cope with the quality requirements of large urban traders and feed companies. Regarding the quality check, particularly moisture content, we observed an asymmetric pattern of trader's attitudes between buying and selling.

Generally speaking, Indonesian farmers do not necessarily supply quality materials that can satisfy the requirements of the developing agribusiness, for example the feed industry. Farmers do not actively avoid the mixture of materials such as dead seeds, sand, pebbles, etc. They do not care about fungal spoilage. This has caused a bottleneck for the feed company in the procurement of quality commodities. Thus upgrading the quality of materials has become one of the most critical issues in the further development of the linkage between farmers and feed or food processing industries. There have been few studies on quality and pricing of CGPRT crops in Indonesia. Altemeier and his colleagues' study (1989) is an exception, but it mainly focuses on implicit quality rewards and econometric analysis. Actual practices of farmers or traders need more elucidation (cf. Alexsander 1987; Geertz 1978). This chapter intends to fulfill this need.

Since traders have a major role in checking the quality and upgrading harvested crops, we will focus on traders' activities related to quality. It has already been noted that the farming system is so highly intensified that there are seasonal peak loads in labour inputs particularly during the transitional period from harvesting to the next planting or seeding. Farmers need to immediately prepare for the next planting. By selling their crops to *penebas* before harvesting, far

mers get time to immediately launch the next crop. This is the reason why harvesting contractors and collection traders, instead of farmers, have the major role in improving quality. Naturally, they stand to benefit by improving quality.

Through the market system, traders are supposed to capture a fair return by taking care of quality. The most basic element for the efficient function of a market system is standardization of measurement and quality of commodities. To clarify the significance of standardization of measurement and quality of commodities, it is important to investigate the following questions:

- How do traders check quality and fix prices in selling and buying transactions? To what extent and how does the quality affect the price?
- What kind of traders mainly take care of quality in the route of marketing?
- What technology is available for alleviating the quality problem and to whom is it available?
- To what extent do quality improving activities generate income and employment opportunities?

Some large poultry farming companies have a feed mill as a part of their business in order to secure the procurement of quality material. This kind of integration has been observed in the downstream maize market. What has happened in the upstream maize market, namely, among farmers, traders in producing areas and urban traders?

There are two quality requirements in the upstream maize market, namely optimum moisture content, and other elements of quality including purity of the variety. These will be discussed in detail in this chapter.

6.1 Moisture tests and *rafaksi:* asymmetric structure of information

Moisture is the major measured quality characteristic. High moisture leads to loss of quality of feed, and collection traders therefore check it most carefully. Although traders with experience check by touch, feel and taste, the use of moisture testers has become widespread in recent years. This is not necessarily popular, but it is one of the most important innovations in the marketing of crops in contemporary rural Java. This innovation has changed the transaction between traders, particularly between large local collectors/brokers (4PB+HI.. 5PB+HL) and village collectors (3PG) or *penebas* (harvesting contractors).

Table 6.1 shows the number of traders by crop who applied moisture testers in buying and selling transactions. Moisture testing was still limited and was mainly applied to maize and paddy trading. More than 80% of traders in the producing areas, however, did not use a moisture tester when buying maize. Of the traders buying maize, only 19 checked moisture
content by tester.

When traders sold their crops, their commodities were checked by the buyers who were relatively large in scale and close to feed companies or consuming areas. Fifty-five traders out of 89 were checked by moisture tester when they sold their maize. Fifty-five traders responded that their paddy was checked by tester, too. Soybean was not checked even when it was sold to large collectors/brokers or large urban traders.

Penebas, who are the most active collectors in the producing area, did not examine the moisture content when they procured maize. Since maize (and paddy too) are sold on farm under the *tebasan* system, *penebas* do not need to use the moisture tester. When they sold the crop, however, they were checked by large local collectors/brokers. Only in two cases (one case in Mz and in Pd respectively) did *penebas* use a tester (Table 6.1). They are, however, checked by tester when they sell maize to large local collectors/brokers who deliver maize to feed companies through large urban traders.

Table 6.1 Number of traders applying moisture tester by crop at purchase and sale.

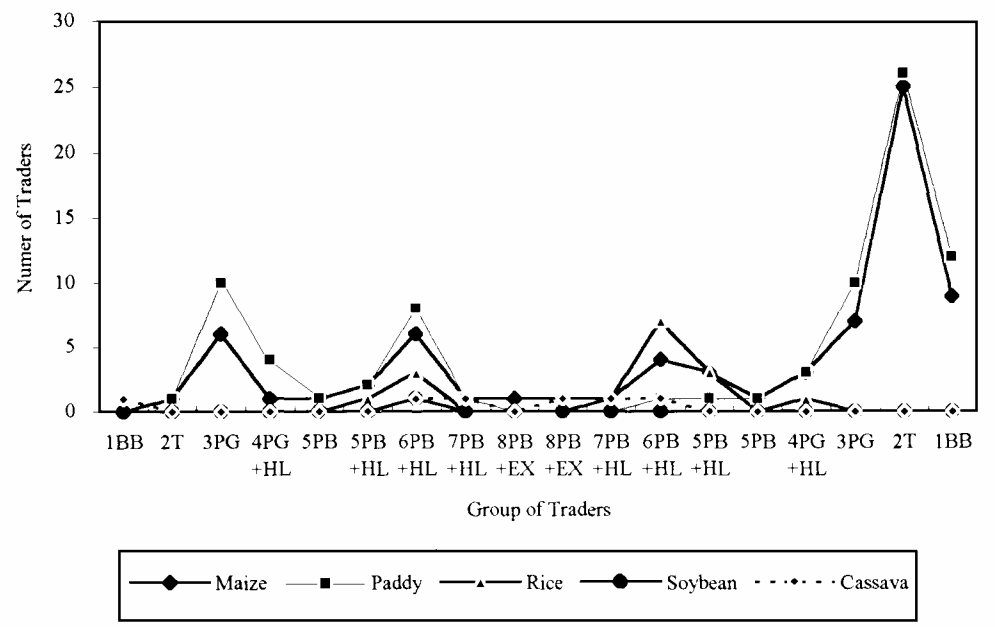
Trader	Buying						Selling						Total
Classification	Mz*	Pd	Re	Sy	Cv	All	Mz	Pd	Re	Sy	Cv	All	number of traders
Producing area													
IBB	0	0	0	0	1	1	9	12	0	0	0	21	17
1 BB+pC	0	0	0	0	0	0	1	1	0	0	0	2	2
2T	I	1	0	0	0	2	25	26	0	0	0	51	36
3PG	6	10	0	0	0	16	7	10	0	0	0	17	11
4PG+HL	1	4	0	0	0	5	3	3	1	0	0	7	7
5PB	1	1	0	0	0	2	1	1	0	0	0	2	1
5PB+HL	2	2	1	0	0	5	3	1	3	0	0	7	3
Collection and distribution center													
6PB+HL	6	8	3	1	1	19	4	1	7	0	1	13	10
7PB+TH	1	1	0	0	1	3	1	0	1	0	1	3	1
8PB+EX	1	0	0	0	0	1	1	0	0	0	1	2	1
Total	19	27	4	1	3	54	55	55	12	0	3	125	89

* Mz = maize; Pd = paddy (unhulled rice); Re = hulled rice; Sy = soybean; Cv = cassava.

Village collectors (3PG) sometimes use moisture testers when they buy harvested maize. In our survey, 6 out of 11 village collectors used a moisture tester for maize as well as paddy (10 out of 11). Large local collectors and large brokers who mediate trading between local collectors and large urban traders must use the tester to ensure the quality of materials. On the other hand, a moisture tester was rarely applied for soybean procurement by any type of trader.

Figure 6.1, based on the data of Table 6.1, shows the asymmetric attitude of traders regarding application of the moisture tester. This structure is mainly caused by the fact that small traders, *bakul* (1BB) and *penebas,* do not use a moisture tester in the buying transaction, but they are checked when they sell the maize and paddy. This implies that they capture quality rewards by drying the harvested crops and so control their quality. Thus they help large local collectors/brokers procure well dried maize and paddy.

Figure 6.1 Asymmetric structure of moisture tester appHcation



Rafaksi

Rafaksi is a rating method used to fix prices of CGPRT crops and paddy according to the percentage of impurity. It is therefore a quantification of quality standards. *Rafaksi* is derived from the Dutch word *refractie* and creative people say that *rafaksi* stands for: *"ganti rugi kerugian untuk kerusakarvcacat barang".* This means: compensation for loss or contamination of material. Price or weight is discounted according to the share of impurity. When buying maize, only 21 out of 89 traders applied *rqraksi.* Village collectors (3PG) and large urban traders (6PB+HL) more often apply *rafaksi* in buying maize.

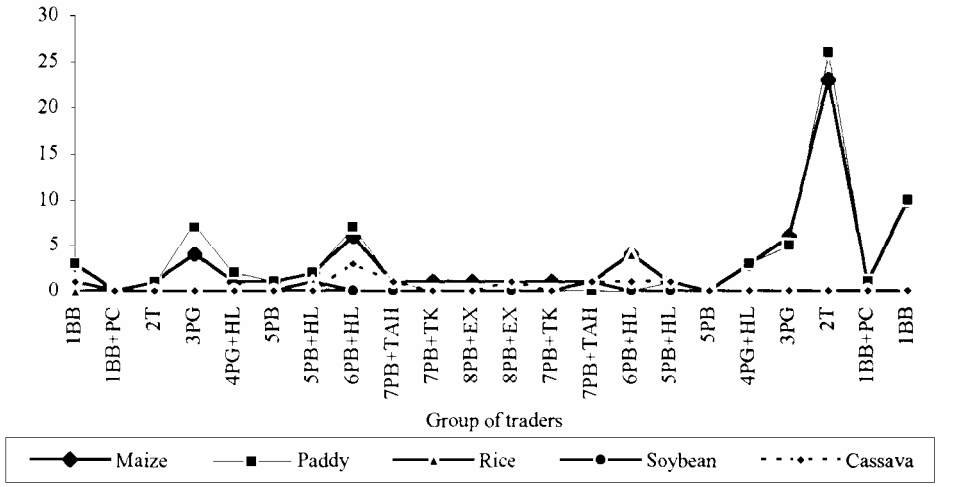
When maize was sold. 51 out of 89 traders applied *rafaksi.* Fifty-five percent (6 out of 11) of village collectors applied *rafaksi.* In sales it was applied to most *penebases* (64% or 23 out of 36) in contrast to buying. Only one *penebas* applied *rafal,si* in buying maize. This implies that the *penebas* shares a critical function not only in quality control but also in price setting in the producing area. Paddy trading also shows the same feature.

Figure 6.2 (based on the data in Table 6.2) shows the same feature as Figure 6.1, viz the asymmetric application of *rafaksi*. The traditional way of *rafaksi* has been intuitive with no substantial standard, but there is more than one type of *rafaksi* as explained later. The modern form of *rafaksi* employs a moisture tester to precisely measure the moisture content. The dissemination of moisture testers among traders, especially large local collectors/brokers, has enabled precise pricing at point of transaction with *penebas* and village collectors.

Table 6.2 Number of traders applyine *rafaksi* by crop and transaction.

Trader	Buying						Selling					
Classification	Mz	Pd	Rc	Sy	Cv	Total	Mz	Pd	Rc	Sy	Cv	Total
Producing area												
1BB	3	3	0	1	1	8	10	10	0	0	0	20
1 BB+pC	0	0	0	0	0	0	1	1	0	0	0	2
2T	1	1	0	0	0	2	23	26	0	0	0	49
3PG	4	7	0	0	0	11	6	5	0	0	0	11
4PG+HL	1	2	0	0	0	3	3	3	0	0	0	6
5PB	1	1	0	0	0	2	0	0	0	0	0	0
5PB+HL	2	2	1	0	0	5	1	1	1	0	1	4
Collection and Distribution Center												
6PB+HL	6	7	0	0	3	16	4	0	4	0	1	9
7PB+TH	1	1	0	0	1	3	1	0	1	1	1	4
7PB+TK	1	0	0	0	0	1	1	0	0	0	0	1
8PB+EX	1	0	0	0	0	1	1	0	0	0	1	2
Total	21	24	1	1	5	52	51	46	6	1	4	108

Fieure 6.2 Asymmetric structure of *rajaksi* annlication.



In paddy buying, *rafaksi* is applied for moisture contents from 14% to 23%. At selling, the range of moisture contents tends to be slightly narrowed. A higher quality of maize or paddy is required as the product moves closer to the user or consumer. In the case of hulled rice

and soybean, *rafaksi* is rarely applied. The moisture tester is not used in rice trading except for selling to DOLOG *(Depot Logistik).*

Traders in the producing area (1BB, 2T, 3PG, 4PG+HL; Table 6.2) do not use a moisture tester when dealing in rice. Even the KUD rarely uses a tester, in spite of the fact that KUD's major role is to procure paddy, mill it and supply rice to BLJLOG *(Badan Urusan Logistik:* Food Logistic Agency) or its regional branch DOLOG. Supplying rice to DOLOG is, in fact, undertaken by large urban traders. The *rafaksi* in rice is applied only between large urban traders and DOLOG. Soybean traders do not apply *rafaksi.*

Modern and standardized *rafaksi* was brought into East Java by the procurement activities of the two large feed companies in the latter half of the 1980s. They distributed *rafaksi* tables to large urban traders and required them to satisfy the conditions written in the tables. They based pricing on the tables. The quality conditions as laid down in the tables were transferred from large urban traders to large local collectors/brokers through transactions between them. The large local collectors/brokers procured maize that satisfied or almost satisfied the conditions of the *rafaksi* table in order to reduce the quality control cost and to avoid the feed companies' rejection. They use moisture testers and measure the moisture content and foreign matter. Their pricing, however, is not necessarily the same as the *rafaksi* table. The pricing is based on their experience, know-how and tactics, which are not revealed and not necessarily explained to village collectors and *penebas* who collaborate with large local collectors/brokers.

The two large feed companies in Sidoarjo near Surabaya revised the *rafaksi* table in 1990. The table was distributed to urban traders who supply maize to the companies. The rating is based on the moisture content in the *rafaksi* tables. The range of rating had previously started from about 17% moisture content (Table 6.3). The "A" company, a foreign joint venture, changed the table and reduced the starting content from 17.1% to 15.1% moisture since 1991. The reduction in the level of allowance of *rafaksi* was aimed at avoiding aflatoxin contamination and at saving fuel costs for drying. The maximum moisture content was less than 24%. Moisture content of 24% and above was rejected. This maximum condition was not changed. The company widened the range of *rafaksi* application taking into account the real situation regarding maize quality in East Java. The maximum *rafaksi, viz* the maximum price discount rate, increased from 13.5% to 17.6%.

On the other hand, "B" domestic company reduced the acceptable maximum moisture content from 23.0% to 22.0%. The maximum *rafaksi,* however, is the same as the former rate of 10%. The "A" company accepts a wider range of moisture content in procuring maize and has more classes in *rafaksi* compared to "B" company. The "A" company accepts a higher moisture content, but has a larger discount rate than the "B" company. Many large urban traders said that "A" company's application of the table was actually more strict than that of "B" company. Some traders said that sometimes their maize was rejected by the feed companies due to low quality.

Table 6.3 *Rajaksi* by feed companies in East Java.

	Moisture (%) content range		*Rajaksi (%)* price discount		No. of classes in moisture
Company	Min	Max*	Min	Max	Content range
A 1987	17.1	24.0	0.6	13.5	14
1991	15.1	24.0	0.5	17.6	18
B 1987	17.3	23.0	0.5	10.0	13
1991	17.1	22.0	0.5	10.0	10

* Maize was rejected if moisture level was greater than the maximum allowed.

6.2 Application of *rafaksi* in producing areas

Local traders estimate moisture content based on their experience. First, the range of moisture content actually applied for the pricing of traded crops will be investigated. The acceptable moisture content of maize is shown by the following tables, by category of trader.

Table 6.4 shows the lower range of moisture contents at buying. Small collectors (1BB) diversified their lowest moisture contents. It is difficult for them to make farmers reduce the moisture content, because they are so close to villagers they cannot get bargaining power against them. *Penebas* can collect maize with moisture content from 14%. They buy maize on farm, harvest and dry it by themselves in their drying yards, so `not applicable' (NA) was the most frequent answer (Tables 6.4 and 6.5). *Penebas* even procured maize with a moisture content higher than 23% (Table 6.5). The feed companies in Sidoarjo changed their procurement standard as noted previously, but its direct impact on the trade of crops in the producing area was limited. In fact, it may have reduced the return on drying of maize by collectors, because the marginal return approximates zero the closer the moisture content comes to the desired quality standard set by the large feed mills.

Table 6.4 Moisture content: number of traders applying various lower levels at maize buying

Trader	NA	NQ	14%	16%	17%	18%	19%	20%	22%	Ta	Total
Producing area											
1 BB	5	1	3	1	1	1	1	2	1	1	17
1 BB+PC	1	0	0	0	0	0	0	1	0	0	2
1PP	0	1	0	0	0	0	0	0	0	0	1
2T	21	0	11	1	2	0	0	0	1	0	36
3PG	1	1	0	0	9	0	0	0	0	0	11
4HL	0	5	0	0	0	0	0	0	0	0	5
4PG+HL	1	2	1	0	2	1	0	0	0	0	7
5PB	0	0	1	0	0	0	0	0	0	0	1
5PB+HL	0	0	0	2	1	0	0	0	0	0	3
Collection and Distribution center											
6PB+HL	0	2	5	0	2	1	0	0	0	0	10
7PB+TH	0	0	0	0	1	0	0	0	0	0	1
7PB+TK	0	1	0	0	0	0	0	0	0	0	1
8PB+EX	0	0	0	0	1	0	0	0	0	0	1
Processing (tahu and tapioca)											
91PBR+TH	0	5	0	0	0	0	0	0	0	0	5
92PBR+TP	0	1	0	0	0	0	0	0	0	0	1
Total	29	19	21	4	19	3	1	3	2	1	102

Note: NA = answer not available; NQ = not questioned because no maize dealt;
Ta = no condition is applied.

A matter of concern for *penebas* and large local collectors/brokers is the ability to procure lower moisture content maize and to reduce their burden of drying costs. The large local collectors/brokers accepted more than 23% moisture content, nevertheless they were obliged to satisfy the quality standards in force. Forty-nine out of 66 traders bought maize with a moisture content greater than 23% (Table 6.5).

Table 6.5 Moisture content: number of trades applying various upper levels at maize buying

Trader	NA	NQ	17%	18%	19%	20%	21%	22%	>23%	Ta	Total
Producing area											
1 BB	2	1	0	1	0	0	2	0	10	1	17
1 BB+PC	1	0	0	0	0	0	0	0	1	0	2
IPP	0	1	0	0	0	0	0	0	0	0	1
2T	13	0	0	1	0	0	0	0	22	0	36
3PG	1	1	1	1	0	1	0	0	6	0	11
4HL	0	5	0	0	0	0	0	0	0	0	5
4PG+HL	0	2	0	0	0	0	0	0	5	0	7
5PB	0	0	0	0	0	0	0	0	1	0	1
5PB+HL	0	0	1	0	0	0	0	1	1	0	3
Collection and distribution center											
6PB+HL	0	2	1	2	2	0	0	0	3	0	10
7PB+TH	0	0	0	0	0	0	0	1	0	0	1
7PB+TK	0	1	0	0	0	0	0	0	0	0	1
8PB+EX	0	0	0	0	1	0	0	0	0	0	1
Processing (tahu and tapioca)											
91PBR+TH	0	5	0	0	0	0	0	0	0	0	5
92PBR+TP	0	1	0	0	0	0	0	0	0	0	1
Total	17	19	3			1	2	2	49	1	102

Note: NA = answer not available; NQ = not questioned because no maize dealt; Ta = no conditions is applied.

Table 6.6 Moisture content: number of traders applying various lower levels at maize selling.

Trader	NA	N	14%	15%	16	17	Total
Producing area							
1 BB+PC	1	0	0	0	0	1	2
1 PP	0	1	0	0	0	0	1
2T	7	1	3	0	2	23	36
3PG	1	2	0	0	0	8	11
4HL	0	5	0	0	0	0	5
4PG+HL	0	2	1	0	1	3	7
5PB	0	0	0	0	0	1	1
5PB+HL	0	0	0	0	2	1	3
Collection an and distribution center							
7PB+TH	0	0	0	0	0	1	1
7PB+TK	0	0	1	0	0	0	1
8PB+EX	0	0	0	0	0	1	1
Processing (tahu and tapioca)							
91PBR+TH	0	5	0	0	0	0	5
92PBR+TP	0	1	0	0	0	0	1
Total	12	23	6	1	11	49	102

Note: NA = answer not available; NQ = not questioned because no maize dealt.

When the traders sold the procured maize, the lower moisture content was 16%-17%, and the higher range was 17% through 20%. These ranges of moisture content show the highest frequencies in Tables 6.6 and 6.7. The traders were requested by the buyers to prepare

maize within such ranges of moisture content. Large local collectors/brokers and large urban traders were requested by buyers, mainly feed companies, to meet higher quality standards as defined in the *rafaksi* tables. Then, the range of moisture content for which *rafaksi* is applied, became narrower than the range applied by small or village collectors in the producing area, viz from 16% or 17% through 17% or 18%.

Table 6.7 Moisture content: number of traders aplying various upper levels at maize sellinp.

Trader	NA	NQ	15%	16%	17%	18%	19%	20%	21%	22%	>23%	Total
Producing area												
1BB	1	2	0	0	4	3	3	0	1	0	3	17
1BB+pC	1	0	0	0	0	0	0	0	0	0	1	2
IPP	0	1	0	0	0	0	0	0	0	0	0	1
2T	5	1	0	1	2	7	7	9	0	0	4	36
3PG	1	2	0	0	1	3	2	1	0	0	1	11
4HL	0	5	0	0	0	0	0	0	0	0	0	5
4PG+HL	1	2	1	0	0	3	0	0	0	0	0	7
5PB	0	0	0	0	1	0	0	0	0	0	0	1
5PB+HL	0	0	0	0	2	0	0	1	0	0	0	3
Collection and distribution center												
6PB+HL	1	4	0	0	2	3	0	0	0	0	0	10
7PB+TH	0	0	0	0	0	0	0	0	0	1	0	1
7PB+TK	0	0	0	0	1	0	0	0	0	0	0	1
8PB+EX	0	0	0	0	0	1	0	0	0	0	0	1
Processing (tahu and tapioca)												
91PBR+TH	0	5	0	0	0	0	0	0	0	0	0	5
92PBR+TP		1	0	0	0	0	0	0	0	0	0	1
Total		23	1	1	13	20	12	11	1	1	9	102

Note: NA = answer not available; NQ = not questioned because no maize dealt.

Maize with moisture content of 19% or higher was rarely sold by the large urban traders. Large local brokers (5PB, 5PB+HL) who could satisfy such strict conditions, sent their maize directly to the feed companies, in collaboration with *penebas* and large urban traders thereby saving on loading and unloading costs. Some urban traders who were agents of the feed companies, provided the large local brokers/collectors with necessary information, capital and transportation services. Large local brokers increased the employment opportunity in the producing area, too, by drying and controlling quality of collected maize. This role and process had been formerly undertaken mainly by urban traders. The use of price discounts for moisture and foreign matter has therefore led to extra activity in the producer areas, albeit that the primary producers, farmers, rarely have time to engage in adding value. Traders have shifted the activity from the urban area to the producing area and created employment opportunity in the rural area.

There are basically three ways of *rafaksi* application in the producing area (Tables 6.8 and 6.9):

- Type A: discounts price or weight in percentage terms for each percent increase of moisture content.
- Type B: fixes the discount price at Rp 2 or Rp 3 for each percent increase of moisture content in the case of maize. The discount price is determined by crop price; the range of discount for paddy was generally from Rp 3 through Rp 5 in 1991.
- Type C: distinguishes just two categories of crops wet and dried. Each category has its price.

The percentage discount type (A) is usually 1%-1.5% discount of price or weight for each percent of moisture content. This is the original type of *rafaksi* applied by the feed companies. If 1 kg maize contains moisture 1% higher than the upper permitted level of, for example 17%, its price is discounted by 1%, or sometimes its net weight may be considered as 0.99 kg. Some traders indicated that the discount rate was 3% or more for each percent of moisture content, but it is not clear whether the price was discounted for each 1% increase of moisture content or more. It is reasonable to assume that in general the discount per 1% of moisture content is approximately 1% or at most 2%.

Traders in producing areas tend to use type (B) or (C), because they are easy to calculate and omit fractions. The price difference between wet and dry in type (C) was usually from Rp 10 through Rp 50/kg but the range of moisture contents was not strictly fixed. This type (C) was commonly practiced in the producing area (Tables 6.8 and 6.9). The difference in moisture content between `wet' and `dry' was from 2% or 3% through 6% or 7%. This type of *rafaksi* simultaneously assesses the mixture of other contaminating materials and other quality parameters, such as taste, colour, etc. There is no standard method for measuring such multiple elements of impurity and intuitive factors like taste. Thus, the assessment is not standardized and it is substantially intuitive in the producing area where harvested crops are often contaminated by various quality-reducing materials. Buyers only state price differences to sellers; they cannot explain the way of pricing because there are no scientific standards.

Table 6.8 Number of traders applying *rafaksi* in buying maize.

Trader Classification	Type of *Rafaksi* Discount														
	(A) % price/impurity			(B) Rp/impurity %			(C) Rp/wet or dry								
	1%	1.5%	3	Rpl	Rp2	Rp3	05	10	20	30	40	50	RJ	NA	Total
Producing area															
1BB	0	0	0	0	0	0	0	2	0	2	0	1	0	0	5
1BB+PC	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2T	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
3PG	0	0	0	1	3	0	0	1	0	0	0	0	1	0	6
4PG+HL	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5PB	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
5PB+HL	0	0	0	0	2	0	0	0	0	0	0	0	1	0	3
Collection and distribution center															
6PB+HL	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1
7PB+TH	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8PB+EX	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	3	1	1	2	6	0	0	4	0	3	0	1	2	1	24

Note: RJ = rejection of commodity with moisture content higher than a certain level, eg., 18% or 19%.
NA = answer not available because pricing basis was not clear.

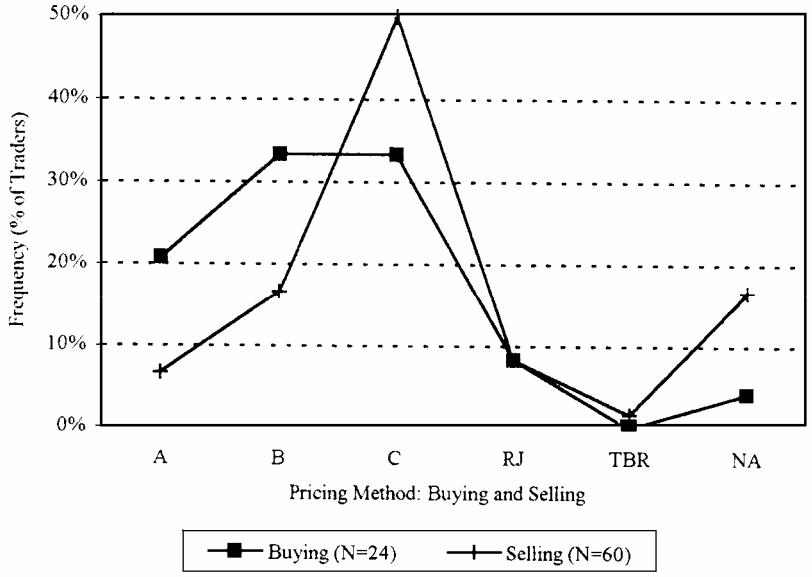
Small collectors and village level collectors (1BB, 2T, 3PG) generally do not know the method of *rafaksi*. They are not told by buyers, ie. large local collectors/brokers, how the price is fixed and what the levels of moisture and of any other quality-reducing materials were. Large local collectors/brokers do not explain the pricing system even when they based the pricing on the *rafaksi* using standards dictated by the feed companies. In fact, it is difficult for them to explain the details even if they have no intention of hiding the information. Thus it is inevitable that there is a natural information gap between producers and users regarding *rafaksi* and price fixing.

Table 6.9 Number of traders applying *rafaksi* in selling maize.

Trader	Type of *Rafaksi* Discount															
Classification	(A) % price/impurity %			(B) Rp/impurity %			(C) Rp/wet or dry									
	1%	1.5%	3%	Rp1	Rp2	Rp3	5	10	20	30	40	50	RJ	TBR	NA	Total
Producing area																
1BB	0	0	0	1	0	0	7	0	1	0	0	0	0	0	3	12
1BB+PC	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2T	0	0	0	3	2	0	12	7	0	0	0	1	2	0	3	30
3PG	1	0	0	3	0	0	1	0	0	0	0	0	1	0	1	7
4PG+HL	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5PB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
5PB+HL	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2
Collection and distribution center																
6PB+HL	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
7PB+TH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
8PB+EX	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total	3	1	0	8	2	0	20	7	1	0	1	1	5	1	10	60

Note: RJ = rejection of commodity with moisture content higher than a certain level, eg., 18% or19%.
TBR = follow the *rajaksi* table of feed companies.
NA = answer not available because pricing basis was not clear.

Figure 6.3 Shift of pricing method between buying and selling.



It was observed that *rafaksi* application was adapted to the real situation under specific conditions in the producing area. Regarding the choice of pricing type (A, B and C), a change of choice can be observed between buying and selling (Figure 6.3). The type of *rafaksi* shifts from the precise method (A) towards the more simplified method (C) in selling. With no standardized scientific and objective method, local traders (and farmers too) generally apply more conventional and simplified methods represented by type C. When traders procure maize, they use as precise a method as possible, but when they sell, they are not informed about the pricing basis so they consider that type C is applied when they sell. Figure 6.3 implies that there is an information gap between buyers and sellers.

The standard *rafaksi* type (A) produced by feed companies has not penetrated among local traders yet. Only large local traders/brokers who understand *rafaksi* and who have a moisture tester, can satisfy the requirements of large urban traders and feed companies. They function as an intermediary between the standard method and simplified conventional method of local traders within the producing area.

6.3 Control of other quality characteristics

Quality checking is not limited to moisture content. Several items which affect the quality of crops will be examined in this section. Practical ways to assess quality of crops have been employed by traders in the producing area. Procurement by feed companies, however, has introduced stricter quality standards in the area, and these may be grouped into four categories: (1DF) dead seeds and fungus; (2D) soil and foreign matter content; (3v) the mixture of different varieties; and (4C) different coloured kernels.

In the maize trade, item (1DF) is the most critical problem. Fungal attack of seeds is strictly checked by feed companies. If feed is contaminated by aflatoxin, it will affect poultry production and health. If a batch of maize contains many dead seeds or fungus, the lot is rejected by buyers, especially by feed companies. Regarding the content of dead seeds and fungus in buying maize, 55 traders replied to our question. Six of them answered `reject' if the minimum condition was not satisfied. In the case of selling maize, 5 out of 55 traders answered `could be rejected' if they could not satisfy the minimum condition. The minimum condition, however, is not necessarily clear. Traders cannot measure the aflatoxin concentration. They can just avoid visible fungus or dead seeds. The condition is flexible and might be dealt with on a case by case basis depending on personal relationships.

In paddy dealing, different seeds such as IR 64 and IR 36 are sometimes mixed. The price is generally fixed by taking account into the degree of mixture. It seems that the degree of mixing of different varieties is not strictly controlled in the producing area, if the level is within a certain range. *Penebas* commonly apply the price of the lower priced paddy when they find a mixture of different varieties of paddy.

The color of maize seed is strictly limited to yellow. White maize is rejected by feed companies because it is not suitable for poultry feed. Since only yellow maize is cropped in the producing area, colour is not a serious cause for rejection.

6.3.1 Pricing methods

According to our market survey, pricing methods are classified as follows:

A: price or weight is discounted by the level of impurity but the *rafaksi* is in % terms not in rupiah terms.
B: price is discounted by the level of impurity (%). *Rafaksi* is expressed in rupiah terms.
C: the lower or lowest price is applied if two or more quality groups are mixed.
D: the level of mixture is measured and the prices of each quality group are applied.
E: if a certain condition is not met, trade is rejected.
F: the basis of pricing is obscure and another price is applied.

A and B here correspond with the types (A) and (B) in the previous section. C and D are mainly applied to paddy lots that contain a mixture of different prices or varieties. C was not observed in either buying or selling maize, as shown in the following tables. The most

popular answer was E: rejection of low quality commodities. The criteria, however, was not necessarily clear.

An important difference between selling and buying is the increase-in answers NA and E (Tables 6.10 and 6.11). NA in selling indicates that the basis of the buyer's offering price is not clear, and the seller just accepts the offered price, otherwise the transaction is rejected. This NA is, in fact, close to the answer E. Maize and paddy trading show almost the same features. When a trader buys a commodity, he tends to check the quality more precisely. However, when he sells the commodity, the basis of the pricing is not explained to him.

Maize traders primarily use type A or B *rafaksi* which are based on the level of the impurity. This is more often applied in maize and paddy pricing. The other crops, ie. soybean, cassava, groundnut and rice, rarely apply *rafaksi* for non-moisture quality parameters. The following tables (Tables 6.10, 6.11 and 6.12) show the application of *rafaksi* by transaction and by commodity.

Rafaksi is mainly applied by the pricing type A or B, but data on *rafaksi* in Table 6.12 are not entirely consistent with A and B in Tables 6.10 and 6.11. In Table 6.12 *rafaksi* in both buying and selling of maize was applied to 46 cases. On the other hand, Table 6.10 indicates that the number of traders who use (or encounter) type A or B is 40 for buying and 35 for selling. Traders answers about *rafaksi* do not necessarily correspond with the pricing types A and B. This might be caused by traders shifting responses from rafaksi to NA or type E.

Table 6.10 Number of traders applying various discount methods on other types of impurity in maize transactions.

	Buying Maize							Selling Maize							
Rafaksi	NA	A	B	C	D	E	Total	NA	A	B	C	D	E	F	Total
1DF	4	3	14	0	0	28	50	7	3	12	0	0	38	0	60
2D	3	6	12	0	0	23	44	9	6	8	0	0	34	0	57
3V	4	0	0	0	1	9	14	5	0	1	0	0	7	0	13
4C	3	3	2	0	0	16	24	2	3	2	0	0	26	1	34

Note: I DF = dead and fungus damaged kernels, 2D = soil and other extraneous material, 3V = different varieties, 4C = different colours..

Table 6.11 Number of traders applying various discount methods on other types of impurity in paddy transactions.

	Buying Maize						Selling maize							
Rafaksi	NA	A	B	E	F	Total	NA	A	B	C	D	E	F	Total
IDF	2	7	23	27	2	61	5	1	19	0	0	25	0	50
2D	1	8	24	16	0	49	1	5	16	0	0	24	0	46
3 V	0	0	5	19	2	50	1	1	6	5	22	7	4	46
4C	2	2	10	28	4	46	0	2	10	0	0	27	0	39

Table 6.12 Number of traders applying *rafaksi* on other types of impurity by commodity.

Rafaksi	Buying Paddy							Selling						
	Mz	Pd	R	Sy	C	C	Total	Mz	Pd		Re Sy	Cv	Gn	Total
IDF	17	29	2	5	3	0	56	19	23	3	1	1	0	47
2D	21	34	2	5	6	1	69	18	20	2	6	3	1	50
3V	1	5	0	0	0	0	6	3	9	2	0	0	0	14
4C	7	12	1	0	4	0	24	6	11	3	1	2	0	23

6.3.2 Application pattern of pricing methods

Tables 6.13 and 6.14 show the pricing method of maize and other crops regarding other impurity'. A difference from the *rafaksi* application for moisture content is that there is

no shift of distribution pattern of pricing type between buying and selling (Figure 6.4). Type E or NA are simplified pricing methods common in both buying and selling.

In practice, it is impossible to precisely assess the mixture of low quality components without any scientific standard measures. Traders do not have the advanced technology required to measure the various kinds of defects except for moisture testing. Thus, traders in the producing area can only apply simple and traditionally accepted types such as E, which does not have any rational basis for pricing. Large urban traders who are trying to regulate quality, tend to apply *rafaksi*, namely type A or B, even if they rely mainly on their intuition and experience. In this case, it is very hard for the traders to explain the basis for pricing.

Table 6.13 Number of maize traders applying various discount methods.

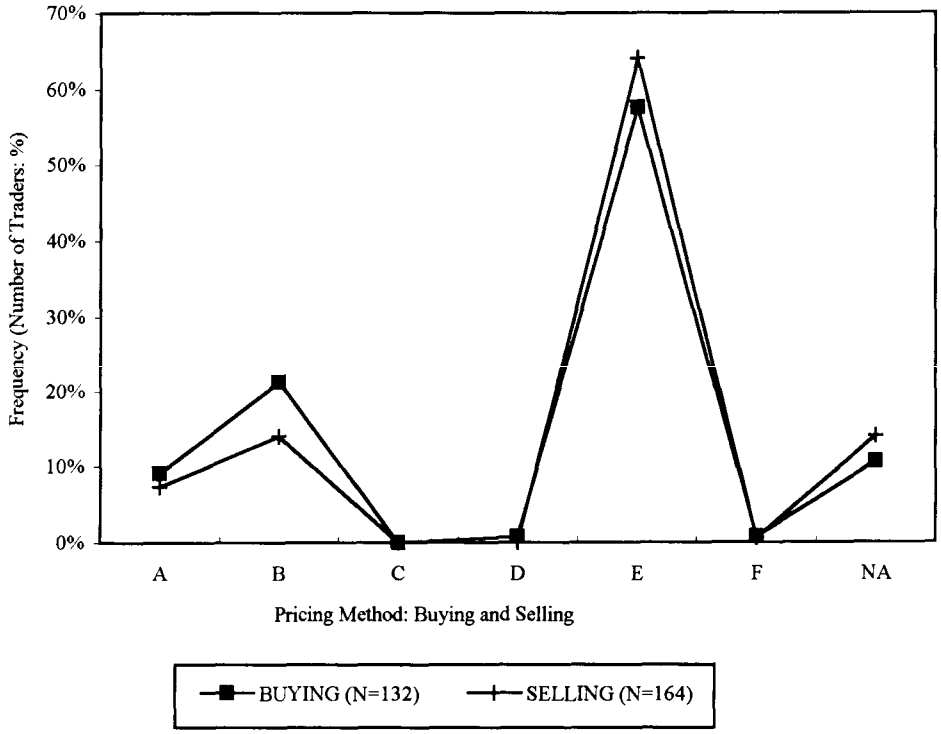
Trader	Buying Maize							Selling Maize						
Classification	NA	A	B	D	E	F	Total	NA	A	B	D	E	F	Total
Producing area														
1BB	2	1	8	0	15	1	27	4	0	2	0	26	0	32
1BB+pC	0	0	0	0	3	0	3	2	0	0	0	2	0	4
1PP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2T	2	0	6	1	25	0	34	5	0	14	0	36	0	55
3PG	1	1	8	0	14	0	24	1	1	5	0	18	0	25
4PG+HL	1	1	1	0	7	0	10	5	1	0	0	4	0	10
SPB	0	0	0	0	0	0	0	0	2	0	0	0	1	3
SPB+HL	0	0	3	0	4	0	7	0	0	2	0	4	0	6
Collection and distribution center														
6PB+HL	5	3	2	0	8	0	18	5	2	0	0	14	0	21
7PB+TH	0	3	0	0	0	0	3	0	3	0	0	0	0	3
7PB+TK	3	0	0	0	0	0	3	1	0	0	0	1	0	2
8PB+EX	0	3	0	0	0	0	3	0	3	0	0	0	0	3
Processing (tahu and tapioca)														
91PBR+TH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92PBR+TP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	14	12	28	1	76	1	132	23	12	23	0	105	1	164

Table 6.14 Number of traders applying discount methods A and B by crop.

Trader	Buying							Selling						
Classification	NA	Pd	Rc	Sy	Cv	Gn	Total	Mz	Pd	Rc	Cv	Sy	Gn	Total
Producing area														
1BB	9	25	0	2	0	0	36	2	13	2	0	1	0	18
1BB+pC	0	1	0	0	0	0	1	0	0	0	0	0	0	0
2T	6	20	0	2	1	0	29	14	34	0	1	3	1	53
3PG	9	16	0	2	0	0	27	6	7	0	0	0	0	13
4PG+HL	2	6	0	0	0	1	9	1	1	0	0	1	0	3
SPB	0	0	0	0	0	0	0	2	2	0	0	0	0	4
SPB+HL	3	S	3	0	3	0	14	2	3	3	3	0	0	11
Collection and distribution center														
6PB+HL	5	5	2	2	3	0	17	2	0	4	0	1	0	7
7PB+TH	3	1	0	1	1	0	6	3	0	1	1	0	0	S
8PB+EX	3	0	0	0	2	0	5	3	0	0	0	0	0	3
Processing (tahu and tapioca)														
91PBR+TH	0	0	0	1	0	0	1	0	0	0	0	0	0	0
92PBR+TP	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Total	40	79	5	10	11	1	146	35	60	10	5	6	1	117

Since there is no field level technology for rating quality on various criteria, except for moisture content, there is no change of choice of method of measurement between buying and selling (Figure 6.4). Both sellers and buyers tended to answer E. However, they cannot get mutual understanding about the basis for pricing. Since buyers fix the price mainly going by their experience, they cannot objectively explain the basis to sellers. Thus buyers tend to answer E. The sellers, on the other hand, feel that they can just sell without understanding the basis of pricing regarding `other impurity'. Information on pricing regarding `other impurity' is not completely transferred to sellers from buyers who fix the price. It is difficult to erase uncertainty about the quality of commodities because there is no standard field method of measuring quality.

Figure 6.4 Pricing method for other impurities in buying/selling transactions



Rafaksi types A or B are more commonly applied to paddy (unhulled rice). Rice trading has a long tradition and the methods are established among traders. The food procurement agency has enough experience in this activity and has produced a pricing standard that reflects the quality of the commodity. Paddy is processed by rice millers in the producing area or by urban traders, and the quality regulated at these points of marketing.

On the other hand, maize commercialization was launched in the early 1980s, with the development of poultry farming and the feed industry. The standard of quality and its pricing method do not necessarily penetrate into the rural areas. The newly emerging maize market has not yet settled this issue.

6.4 Technological innovation for improving quality

The development of downstream industry such as poultry and feed industries has increased demand for maize. This demand, however, is not limited to volume, but includes quality improvement. In this section we will discuss technical aspects of quality improvement, particularly maize drying, which is critical for avoiding aflatoxin contamination.

Table 6.15 Specifications of dryers.

	Sun-drying Yard	Continuous Dryer by Fuel		Drying & Storage (DS) System	
		Small	Large	DS+Sun-dry	DS+Fuel F
Price (million Rp)	1.99	17.50	35.00	2.81	4.81
Economic life (years)	10	10	10	10	10
Capacity (tons/batch)					
Paddy	15	5	15	3	3
Cob maize	13.5				
Shelled maize	15	5	15	4	4
Processing time (hours)					
Paddy*	32	8	10	16	16
Cob maize*	8				
Shelled maize	16	8	10	16	16
Processing operation (hours/day)	8	16	16	16	16
Processing capacity (tons/day)					
Paddy*	3.8	10	24	3	3
Cob maize*	6.8				
Shelled maize	7.5	10	24	4	4
Processing cost (Rp/kg)					
Paddy*	1.75	10.66	na	3.46	5.36
Cob maize*	na				
Shelled maize	0.85	10.66	na	na	na

Source: Data for sun-drying yard and continuous dryer from 1986 Kediri, East Java (BULOG, IPB and UGM 1988); data for drying and storage system from 1993, Serpong West Java, (Tegu Wikan et al. 1994) and personal communication with Tokumoto 1994.

* Moisture content: paddy from 31% to 16% (rainy season); cob maize from 41-48% to 25-29% (dry season); and shelled maize 28-41% to 20% (dry season).

6.4.1 Drying technology

Several types of dryers are available in producing areas, including the sun-drying yard *(lantai jemur)*, the continuous dryer using fuel, and the drying and storage system (Table 6.15). A survey of drying technology commissioned by IDRC was conducted at Pagu, Kediri District, near our study village in 1986 (BULOG, IPB and UGM 1988). The basic situation and conditions were similar to our study areas. According to this survey, sun-drying was the cheapest method in terms of initial investment and operational costs. It is also important that sun-drying can create major employment opportunities for unskilled manual workers, both in producing and in urban areas.

The initial investment cost of a large dryer amounts to 35 million rupiah, which is too expensive even for large urban traders. Within the urban area, it is a better choice even for the large traders to buy land and construct a sun-drying floor. They can expect an increase of land value and the land can serve as collateral when they need a loan from the bank. The small capacity continuous dryer is also too expensive an investment for most local traders in producing areas.

Another drying method is the drying and storage system (DS) being improved by the Center for Development of Appropriate Agricultural Engineering Technology in collaboration

with the Japan International Cooperation Agency. This is closer to the sun-drying yard than the continuous dryer, as far as investment and operational costs are concerned. The sun-drying yard is presently the most lucrative available technology for traders in producing areas.

Table 6.16 Summary of drying technologies*.

Drying Technology	Investment Cost	Processing Cost	Divisibility
Sun-drying yard	Low	low	high
Dryer by fuel	High	high	low
DS system	medium	medium	high

* Price increase between 1986 and 1993 disregarded.

The features of drying technologies are summarized (Table 6.16). A lower cost of investment, operation, and of maintenance is the better choice for farmers and traders in the producing area. The higher divisibility enables greater availability for rural people. Since any size of sun-drying yard can be constructed according to availability of money and land, sundrying is the most appropriate technology in the rural area (see Binswanger and Von Braun 1991).

Other applicable technologies have been examined. Mold inhibitors and storage in plastic sacks can prevent growth of fungus. This is another divisible and low cost technology. A small drying shed using cheap fuel like rice husks could also be an applicable technology for farmers and local traders in the sense of investment and operational cost. This technology as well as the DS system can be placed at an intermediate position between the sun-drying yard and the continuous dryer.

6.4.2 Employment creation, reducing asymmetric information and uncertainty of quality

More details on sun-drying activities are needed to understand the impact on employment and to ensure improvement of maize quality. The average work hours for drying have been calculated by source of labour, namely family labour, family labour plus employed worker and only employed worker. Urban traders use employed workers only. The families of traders do not work as manual workers in general. It is difficult to separate the work for maize and paddy precisely, so Tables 6.17 and 6.18 could be over-estimations. However the data help explain the situation regarding quality improvement activities.

For maize drying, 66 traders employed 130 thousand man hours, which is approximately equivalent to 18,600 man-days (Table 6.17). For paddy drying, 61 traders employed 160 thousand man hours, equivalent to 22,800 man-days (Table 6.18). These are not small numbers. It cannot be denied that drying, particularly sun-drying, provides substantial employment opportunity.

Small collectors *(bakul;* 1BB) mainly depend on family labour. *Penebas* and village collectors still use family labour but they also depend on employed workers. Large local brokers and large urban traders rely on employed workers for drying work. Some of the large urban traders have mechanical dryers but these are rare.

Small collectors work most intensively at drying on a per ton basis. They deal in maize and paddy mainly for local consumption. *Penebas* also dry both maize and paddy. Large local brokers and large urban traders deal in many tons of maize and paddy, but hours of work per ton are few. As they have a wide area of sun-drying yard or mechanical dryers, they can efficiently dry commodities. Sample numbers do not necessarily indicate the distribution

pattern of the traders by classification. We can, however, note that large local collectors/brokers and large urban traders share a major role in drying maize and paddy. This implies that quality is controlled by them.

Table 6.17 Labor input in hours/trader for drying maize.

Trader Classification	Labour Input for Drying .					No. of traders	Total work hours
	Family	Family+ employed labour	Employed labour	Average per trader	per ton		
I BB	496	308		471	41.7	15	7,066
1 BB+pC	900			900	90.0	1	900
2T	863	533	1,139	839	16.5	30	25,181
3PG		3,390	2,235	2,730	10.5	7	19,110
4PG+HL		1,920	2,147	2,090	14.6	4	8,360
5PB			6,720	6,720	2.2	1	6,720
5PB+HL			7,040	7,040	4.1	2	14,080
6PB+HL		15,750	4,380	7,223	3.3	4	28,890
8PB+EX			9,675	9,675	na	2	19,350
Average	700	2,181	3,484	1,964			
No. of traders	29	15	22			66	
Total	20,296	32,716	76,645				129,657

If such drying processes could be shifted from larger traders to smaller traders such as *penebas* or village collectors, at least two important changes would follow. The first is that employment opportunity in the rural area would be created by shifting the work from urban to producing areas. This could contribute to increasing economic welfare of landless workers in rural areas.

The second is that the asymmetric structure of information regarding pricing could be reduced by completing quality control at the start of the marketing channel (Stiglitz 1987). A seller and a buyer could get the same information on quality and pricing at their transaction, if the commodity were well regulated and, particularly, the other impurities were substantially reduced. Farmers and traders could reduce the mystery of quality issues attached to every commodity, particularly non-moisture content parameters. Then, traders and farmers could reduce the possibility of adverse selection.

The large local brokers control the quality of maize well and they have established credibility with large urban traders. As a result, maize regulated by the brokers is often directly sent to feed companies. If farmers and smaller traders can improve the quality by drying and quality control, pricing will become easier and more transparent at selling and buying transactions in producing areas. This could substantially improve the market structure in producing areas.

6.5 Quality improvement and reward

Improving quality will require further labour input by farmers or traders. An important issue is whether farmers would be better off if they attempted to improve quality. If the market system were well structured, high quality commodities could receive higher prices and farmers would have incentive to guard quality. A commodity market can work well if participants can identify differences in quality in each lot of commodity. Identification or standardization of

every commodity is essential, and this condition has not been satisfied in rural Java, especialh among farmers and small traders of maize.

Table 6.18 Labor input for drying paddy.

Trader Classification	Labour Input for Dying (hours/traders)					No. of traders	Total work hours
	Family	Family+ employed labour	Employed labour	Average per trader	per ton		
1BB	916	4,530		1,398	101.3	15	20,970
1BB+pC	900			900	45.0	1	900
2T	760	703	1,018	794	15.0	26	20,651
3PG		3,390	1,992	2,516	10.3	8	20,130
4PG+HL		1,920	3,680	3,387	7.4	6	20,320
5PB			5,040	5,040	1.7	1	5,040
5PB+HL			5,920	5,920	2.9	2	11,840
6PB+HL			29,910	29,910	7.8	2	59,820
Average	838	2,005	5,508	2,618			
No. of traders	28	13	20			61	
Total	23,451	26,070	110,150				159,671

As mentioned before, farmers do not have much interest in upgrading the quality of their crops, because there is a severe peak of labor input in the transition period from harvesting to the next planting. Without some innovation in farming, it will not be possible for farmers to dry their maize well. It is necessary to solve this issue within the marketing channel of maize. Regarding the quality problem, our study has clarified the following four points:

- Quality improvement activities, eg. drying crops, can increase rural employment opportunity and income levels. There are appropriate technologies such as sun-drying, but it is hard to avoid fungus in the rainy season.
- Large local traders/brokers take an important role in drying crops and regulating their quality.
- Farmers and traders in East Java cannot yet adapt to the requirement from the downstream maize market. High quality commodities would result in increasing demand from related industries such as the feed industry. Introduction of the mechanical dryer is a possible innovation, but it is too expensive for individual farmers and small traders. Large local collectors/brokers have moisture testers and control moisture content of crops, but it is difficult even for them to avoid fungi.
- There is a shift of pricing method choice between buying and selling regarding the moisture test. Traders perceive that less precise pricing methods are applied when they sell than when they buy. Regarding `other impurity', quality improvement at the farm or small trader level would contribute to reducing the uncertainty and information gap between buyers and sellers and to standardizing a commodity. This can reduce the market incompleteness and can improve the efficiency of the market mechanism.

Regarding the necessary innovation in the market system, an in-depth study from the view point of rural financial markets will be made in the next chapter. Particular attention will be given to the availability of capital for traders in producing areas and for the necessary conditions in which traders can commit themselves to improving their quality control and farmers' crop income.

7. Traders in Incomplete Rural Financial Markets

This chapter will investigate financial aspects of the maize market. Particular attention will be devoted to traders' access to business capital. Farmers' access to institutional lenders was also investigated. However, only six cases were observed in the study village of Pace, consisting of four instances of credit borrowing, one account opening and one savings deposit. One can therefore conclude that farmers rarely access institutional lenders. It is well known that traders make more use of institutional lenders than farmers. Regarding access to the rural financial market, traders have an advantage over farmers. They, therefore, can take the major role in introducing innovation, not only in marketing, but in agriculture too.

Traders and farmers in the producing area need to invest to cope with the changes in demand, both in terms of quality and stability of supply. They need drying facilities, warehouses, moisture testers, and trucks to deal with the increased volume of maize and other crops. With the development of new uses, particularly industrial uses as investigated already, they are required to upgrade various aspects of quality of marketed crops. They still do not have enough personal capital to invest in their business, but it is not easy for them to access institutional lenders.

In this chapter, the rural financial market regarding maize economy will be investigated from the following points of view:

- business practices, particularly the method of payment;
- sources of traders' working and investment capital;
- traders' access to institutional lenders, particularly banks,
- characteristics of credit which traders can access; and
- ways of coping with the incompleteness of the rural financial market.

7.1 Business practices among traders

7.1.1 Forms of payment

First, the extent of commercialization will be investigated by looking at the means of payment. Tables 7. l, 7.2 and 7.3 show the usual means of payment practiced by traders. Each figure in the table shows the number of traders' transactions for various kinds of crops. Some traders employed two or more types of transaction. The crops include maize, paddy, hulled rice, soybean and other crops. If a trader usually uses two types of payment, for example, cash and bank remittance, this is counted as the mixed type CC+B in the tables. In procurement, payment in cash (CC) took place in 232 cases and payment by remittance through bank (B) occurred in only two cases. Payment through the banking system, including cheque, increases in selling in contrast to buying, because the traders sell their crops to agribusinesses such as feed companies.

Table 7.3 shows the transaction use in maize trading. Only cash is used when traders procure crops. In nine cases traders received cheques or remittance to bank accounts when they sold collected crops. Those using banks are rice millers and/or large local collectors/brokers who trade with feed companies or traders in distant places. In the case of soybean, paddy and

rice, the banking system is rarely used except for trading with the depots of the Food Logistic: Agency (DOLOG).

Table 7.1 Number of transactions by mode of payment in buying: all crops.

Trader Classification	B	CC	In kind	Total
Producing area I BB	0	43	0	43
1BB+pC	0	6	0	6
1PP	0	1	0	1
2T	0	89	0	89
3PG	0	30	0	30
4HL	0	1	1	2
4PG+HL	0	12	0	12
5PB	0	3	0	3
5PB+HL	0	10	0	10
Collection and distribution center 6PB+HL	2	27	0	29
7PB+TH	0	4	0	4
7PB+TK	0	0	0	0
8PB+EX	0	0	0	0
Processing *(tahu* and tapioca) 91PBR+TH	0	5	0	5
92PBR+TP	0	1	0	1
Total	2	232	1	235

B = remittance to bank account, B (Chq) = cheque, CC = cash.

Table 7.2 Number of transactions by mode of payment in selling: all crops.

Trader Classification	B	B(Chq)	B(Chq)+CC	B+CC	CC	Total
Producing area I BB	0	0	0	0	46	46
1BB+PC	0	0	0	0	8	8
1PP	0	0	0	0	1	1
2T	0	0	0	0	94	94
3PG	0	0	0	0	29	29
4HL	0	0	0	0	0	0
4PG+HL	0	0	2	0	10	12
5PB	0	0	0	0	3	3
5PB+HL	0	0	0	0	10	10
Collection and distribution center 6PB+HL	11	3	3	0	15	32
7PB+TH	1	0	0	1	3	5
7PB+TK	0	0	0	0	0	0
8pB+EX	5	0	0	1	0	6
Processing (tahu and *tapioca)* 91PBR+TH	0	0	0	0	6	6
92PBR+TP	0	0	0	0	1	1
Total	17		*5*		226	253

7.1.2 Timing of payment

Tables 7.4 and 7.5 show the timing of payment in buying and selling. Each number in the tables regarding timing of payment indicates the trader's practices with his regular customers. If a trader uses two or more types of timed payment, the combination payment is noted. In buying maize, data on 86 transactions are available. Direct payment in cash (c) was

the most popular and approximated 40% of the 86 cases. Payment patterns that include prepayment but not direct payment (a, a+d, aa, aa+d, and az; deferred payment (d) is partly included) totaled 39 cases. The remaining patterns include the mixture of direct payment, prepayment or deferred payment (c+a, c+aa, c+az, c+d and c+d+dd).

Table 7.3 Number of transactions by mode of payment in maize buying and selling.

Trader Classification	Buying	Selling				
Producing Area	CC	B	B(Chq)+CC	B+CC	CC	Total
1BB	17	0	0	0	17	17
2BB+PC	2	0	0	0	3	3
3PG	12	0	0	0	11	11
4PG+HL	4	0	1	0	3	4
5PB	1	0	0	0	1	1
5PB+HL	3	0	0	0	3	3
Collection and distribution center						
6PB+HL	7	4	0	0	5	9
7PB+TH	1	0	0	1	0	1
7PB+TK	0	0	0	0	0	0
8PB+EX	0	3	0	0	0	3
Total	79	7	1	1	76	85

When the traders sold collected maize, 43 out of 92 cases directly received payment. The number receiving significant prepayment (aa, az) was 21. Direct payment or prepayment (c+a, c+aa, c+az) took place in 11 cases. Direct or deferred payment (c+d, d) took place in 15 cases. Deferred payment increased in selling rather than in buying. This was the case in rice selling too. The reason was that large urban traders and large local collectors/brokers sold crops to a feed company or *DOLOG*. In the case of soybean and paddy, this characteristic was not observed.

Table 7.4 Number of transactions according to payment timing: buying maize.

Trader Classification	na	a	a+az	a+az +d	aa	az	c	c+a	c+aa	c+az	c+d	c+d +dd	Total
Producing area													
1BB	0	0	0	0	0	0	11	2	1	0	2	1	17
I BB+pC	0	0	0	0	0	0	2	0	0	0	0	0	2
2T	0	10	0	0	18	1	6	0	1	0	0	0	36
3PG	0	0	1	0	1	0	7	1	0	2	0	0	12
4PG+HL	0	0	0	0	0	1	3	0	0	1	0	0	5
SPB	0	0	0	0	0	0	0	0	0	1	0	0	1
5PB+HL	0	0	0	1	0	1	1	0	0	0	0	0	3
Collection and distribution													
6PB+HL	0	0	0	0	2	1	3	1	1	0	0	0	8
7PB+TH	0	0	0	0	1	0	0	0	0	0	0	0	1
7PB+TK	0	0	0	0	0	1	0	0	0	0	0	0	1
8PB+EX	1	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	10	1	1	22	5	33	4	3	4	2	1	87

Note: a = a small prepayment, aa = significant prepayment, az = entire prepayment, c = direct payment in cash, d = totally deferred payment, dd = partially deferred payment, na = no answer available.

Penebas (2T) often use advance payment (a, aa, or az) both in buying and in selling. Paddy dealing by *penebas* shows the same feature. On the other hand, village collectors (3PG) such as *pengumpul* tend to pay directly in cash, since they usually receive money in advance from large local collectors/brokers to whom they will sell the crops. The large local collectors or brokers provide money for buying in advance to *penebas* or collectors in order to ensure the procurement of harvested crops. The large local collectors/brokers receive orders and money in advance to procure crops for large urban traders. The larger traders tend to have more funds to procure harvested crops. The urban traders have far more funds than traders in the rural areas Then, questions arise as to the source and amount of their capital.

7.1.3 Scale of trader's working capital

Forms and timing of payment imply that each trader needs to keep a certain amount of working capital to procure harvested crops. The scale of working capital relates to the trader's scale of dealing.

Almost all hamlet or village collectors (1BB) used working capital of less than one million rupiah (US$ 1=Rp 1,950 in 1991). Many *penebas (2T)* had working capital of less than one million rupiah, but some had more than ten million rupiah. Rice millers in the producing area (4PG) had an unexpectedly small amount of working capital, due to their small trading scale. However, large local collectors (4PG+HL) managed a lot of working capital, often more than ten million rupiah (Table 7.6).

Table 7.5 Number of transactions according to timing of receipt of payment: maize selling.

Trader	na	aa	az	c	c+a	c+aa	c+az	c+d	d	Total
Producing area										
1BB	0	0	2	12	2	0	1	0	0	17
1BB+PC	0	0	0	3	0	0	0	0	0	3
2T	0	4	10	17	3	1	1	0	0	36
3PG	0	3	1	5	0	0	2	0	0	11
4PG+HL	0	1	0	2	0	0	0	1	1	5
5PB	0	0	0	0	0	0	1	0	0	1
5PB+HL	0	0	0	2	0	0	0	0	1	3
Collection and distribution center										
6PB+HL	2	0	0	2	0	0	0	0	7	11
7PB+TH	0	0	0	0	0	0	0	0	1	1
7PB+TK	0	0	0	0	0	0	0	0	1	1
8PB+EX	0	0	0	0	0	0	0	0	3	3
Total	2	8	13	43	5	1	5	1	14	92

Large urban traders in Kediri and Malang (6PB+HL, 7PB+TK) had far more working capital than collectors in the producing area of Pace or Wajak, ranging from ten million rupiah to more than one billion rupiah. Some of the largest traders in Kediri had storage facilities of more than 10,000 tons of grain. One of them leased warehouses to BULOG (Food Logistics Agency) when the agency faced a shortage of storage capacity at the end of the 1970s and beginning of the 1980s.

Table 7.6 Number of traders by amount of worldng capital (million Rp) in East Java.

Trader	0≤1	1≤5	5≤10	10≤50	50≤100	100≤1000	≥1,000	Total
Producing area								
1BB	16	1	0	0	0	0	0	17
2T	17	16	2	1	0	0	0	36
3PG	1	4	3	3	0	0	0	11
4PG+HL	1	2	0	3	1	0	0	7
5PB	0	0	0	1		0	0	1
5PB+HL	0	0	0	1	1	0	0	2
Collection and distribution center								
6PB+HL	0	0	0	0	0	9	1	10
7PB+TK	0	0	0	0	0	0	1	1
8PB+EX	0	0	0	0	0	1	0	1
Total	35	23	5	9	2	10	2	86

7.2 Sources of capital

7.2.1 Working capital

The data on sources of working capital indicate that small collectors (1BB) did not get credit from institutional lenders such as banks (Table 7.7). Village collectors (3PG) mainly depended on their own funds or borrowing from other traders they knew. *Penebas (2T)* mainly depended on trader acquaintances for borrowing. It will be clarified later from whom they borrowed money.

Bank Rakyat Indonesia (BRI: Indonesian Peoples Bank) has sub-district offices called *Unit Desa* (village units) to provide loans to villagers. Except for BRI and credit cooperatives, there were no institutional lenders accessible for local traders in the study area, Pace. The size of loan available for villagers, however, was small, generally less than three million rupiah.

Table 7.7 Number of traders accessing various sources of worldng capital.

Trader	Own Fund	Other Traders	Village Coop.	Village (BRI)	Bank Branch (state)	BUKOPIN/ BPD Branch	Bank Branch (priv)	na	Total
Producing area									
1BB	11	3	0	3	0	0	0	0	17
2T	11	20	2	3	0	0	0	0	36
3PG	4	3	0	3	1	0	0	0	11
4PG+HL	4	1	0	0	1	1	0	0	7
5PB	0	0	0	0	0	0	1	0	1
5PB+HL	1	0	0	0	0	1	0	1	3
Collection and distribution center									
6PB+HL	0	0	0	0	4	0	6	0	10
7PB+TK		0	0	0	0	0	1	0	1
8PB+EX	1	0	0	0	0	0	0	0	1
Total	32	27	2	9	6	2	8	1	87

Note: Each fund source can include sources listed to the left. Village cooperative, for example, may include own funds - borrowing from other traders.

The traders in the producing area who can access institutional lenders such as bank branches in the urban centers of Kediri City and Malang City are large local collectors or large brokers. Their loans from the bank branch are more than ten million rupiah. There were no small *collectors/penebas* or village collectors (except one case) who reported a loan from the bank branch. *Penebas* often get working capital for crop procurement from large local collectors/brokers. The money is used to secure harvesting contracts with farmers, mainly for paddy and maize.

7.2.2 Sources of investment loans

Investment is essential in any economy. Table 7.8 shows the sources of investment capital. It is, in fact, difficult for small traders to distinguish investment for fixed capital from working capital. In their case, one would speak of starter capital. Investment for fixed capital means the money used to procure equipment, machines, transportation such as a motorcycle, and construction of a sun-drying yard, buildings and warehouses for business purposes. Personal funds shared the major part of investment capital. Sixty-eight of the 87 traders depended on their own money for investment funds.

Long term investment loans, mainly supplied by institutional lenders, usually need collateral in order to reduce risks in lending. As banks rarely get sufficient information on borrowers particularly from the producing areas, they tend to require excessively high value of collateral, which makes it difficult for traders to access institutional lenders.

7.2.3 Institutional lenders in the survey area

We will investigate briefly the institutional lenders in the producing areas and in the urban areas before analyzing the factors of incompleteness of rural financial markets.

Table 7.8 Number of traders by source of investment capital.

Trader	Own Fund	Other Traders	Village Coop.	Village (BRI)	Bank Branch (state)	BUKOPIN/ BPD Branch	Bank Branch (priv)	na	Total
Producing area									
1BB	17	0	0	0	0	0	0	0	17
2T	32	1	0	0	0	0	0	3	36
3PG	8	2	0	0	1	0	0	0	11
4PG+HL	5	0	0	1	0	0	0	1	7
5PB	1	0	0	0	0	0	0	0	1
5PB+HL	2	0	0	0	0	1	0	0	3
Collection and distribution center									
6PB+HL	2	0	0	0	1	0	7	0	10
7PB+TK	1	0	0	0	0	0	0	0	1
8PB+EX	0	0	0	0	0	0	0	1	1
Total	68	3	0	1	2	1	7	5	87

According to the household survey in the study village of Pace, farmers rarely used governmental credit schemes such as KCK (loan for small traders), KIK (small credit for investment), KMKP (small credit for working capital), and KUPEDES (general credit for villagers). They still kept gold as a safety measure. They usually borrowed money from their relatives or neighbors within the village. Relatively rich farmers who owned more than half a hectare of land could save money in credit institutions such as the village unit of BRI *(Bank*

Rakyat Indonesia: Indonesian People's Bank). They used saving schemes such as SIMPEDES (village saving program) or TABANAS (national development saving program).

There is a credit cooperative in Pace. Most customers of the cooperative were petty lenders or traders in sub-district bazaars. *Bakul* or *penebas* in the study village did not use money from formal credit institutions. *Penebas* borrow money from large collectors for short terms without interest, and they pay back the loan with harvested crops. It can be concluded that they cannot access formal financial institutions.

Large local collectors/brokers often used government credit schemes, such as KIK and KMKP. The credits were used to procure trading materials (paddy, maize, soybean, etc.), to build facilities and to procure machines. Ethnic Chinese collectors did not use governmental credit scheme but borrowed money from large traders in the city.

Reform of the rural financial markets has been implemented in Indonesia since the 1980s. The policy seems to take a step forward in mobilization of savings but not enough in the improvement of access to credit in rural areas. Accessibility of credit institutions must be improved particularly for small farmers and small traders.

Besides BRI village units, there are other credit institutions that have been established on the bases of cooperatives in Pace. The credit cooperatives were established by military veterans or the teachers' association. They provide small credits to small traders and other rural people. Formal governmental credit institutions such as BRI village units are limited only for the relatively large traders and processing factories in the producing area. Farmers' access to the formal credit institutions has not improved yet in Pace.

Institutional lenders whom the villagers and local traders in the survey areas could access were visited. There are two branches of BRI accessible for villagers in Pace, the Nganjuk Branch and the Kediri Branch. BRI, one of five state owned commercial banks, plays a major role in lending to agricultural sectors. This bank has a wide network covering the state capital through remote districts. It has three overseas offices, too. The bank has approximately 3,000 village units under the branches. One or two village units are located at each sub-district in Java. Hence, BRI has the best accessibility for local people.

The many village units and workers, however, reduce BRI's business efficiency. Branch offices of BRI are generally located at each district capital or city. Table 7.9 shows the features of three BRI branches in the survey areas, ie., Malang city, Kediri city and the town of Nganjuk. BRI branch offices at district capitals or cities control village units at sub-districts. At least one village unit is located at each sub-district, which generally comprises 20 to 30 villages in Java. Five or six staff operate one village unit which must cover a sub-district.

Table 7.9 Offices and staff of Bank Rakyat Indonesia (BR)), December 1990.

Location	Branch		Village unit		PPD		Others		Total	
					Office	Staff				
	Office	Staff	Office	Staff			Office	Staff	Office	Staff
Malang	1	147	34	210	0	0	0	0	35	357
Kediri	1	129	32	176	2	2	1	3	36	310
Nganjuk	1	62	27	148	3	4	0	0	31	214

The data on branch offices indicate the financial situations in the cities which are collection and distribution centers of crops. Table 7.10 shows types of loan source and deposit value of transactions, and number of people who took part in credit or saving programs at the branch offices of Malang, Kediri and Nganjuk.

Table 7.10 Credit and savings at BRI branch offices in Malang, Kediri and Nganjuk (end of 1990).

	Malang		Kediri		Nganjuk	
	MillionRp	Persons	Millon Rp	Persons	Million Rp	Persons
Source of Loan						
1. BRI	145,226	3,838	2,415	4,310		na
2. Bank Indonesia	15,229	1,426	23,404	1,462		na
3. Government	0	0	0	0	13,668	na
4. Foreign aid	0	0	3,727	1,229	(total)	na
5. Others	0	0	18	1		na
Deposits in BRI Branch:						
1. Postal saving	12,833	1,214	6,062	827		na
2. Demand deposit	2,124	2,916	3,537	726	7,350	na
3. Time deposit and other savings	6,134	4,296	1,738	2,446	(total)	na

Sources of BRI loans mainly consist of the funds of BRI itself and of the Central Bank (Bank Indonesia). Savings collected by the branches are very small compared to the total amount loaned to clients. Then, the ratio between deposit and loan becomes very small. Even in the urban areas, the branches collect deposits from only a few people. Villagers still rarely access the branches to deposit, even if they have money to save.

The bank branches do not have sufficient information on the clients who apply for bank loans. It is hard for them to assess the credibility of the clients, particularly small businesses that do not generally have enough collateral. A policy of January 1990 changed the KIK and KMKP programs into the KUK (investment and working capital credit for small business) program. The government instructed that KLJK must constitute more than 20% of total lending of each bank, which has created a burden for BRI too.

7.3 Factor of incompleteness of rural financial market: poor access to credit

Traders need working capital for procuring crops and, as observed, they borrow a substantial part of the capital. Traders, in general, can more easily access institutional lenders (namely banks) than farmers or landless agricultural workers. However, transaction costs of borrowing bank loans, particularly for traders in the producing area, are not low. In the following paragraphs, various transaction costs will be clarified.

7.3.1 Administrative charges of institutional lenders

Institutional lenders charge the cost of the forms, stamp, copy of application and so on. Banks require each credit applicant to submit a village head's recommendation letter as the applicant's personal reference. He has to get the letter through his hamlet head. This preparation is the burden of the applicant and takes some time. This cost, however, is not included in Table 7.11.

Borrowing from non-institutional lenders, namely commodity traders, has a lower administration cost than from institutional lenders. Borrowing from well known traders does not require any application form and copies. Credit from village unit cooperatives (KUD), which are considered institutional lenders, has a relatively low administration cost compared to other institutional lenders. Representative institutional lenders such as the village unit of BRI

and bank branches charge higher administration costs. The higher charge does not necessarily mean greater difficulty in access to credit. It, however, becomes a heavier burden to the smaller traders who borrow smaller amounts of credit, because the administrative cost per unit amount of borrowing becomes higher.

Table 7.11 Average administration charge (Rp) by loan source.

	2	3	34	4	45	5	6	7	na	Avarage
C	28	250	2,500	2,929	4,720	2,633	10,750	4,688	2,500	2,007
O				4,000		4,400	10,000	700	200	2,927
S				100	233	386		1.513	10	277
Sample no.										Total
C	36	4	2	17	5	9	2	8	7	90
O	0	0	0	2	0	5	1	5	2	15
S	0	0	0	13	3	7	0	2	3	28
Total	36	4	2	32	8	21	3	15	12	133

Note: C= borrowing credit; 0 = open account; S= saving; 2 = trader, 3= KUD (village unit cooperative), 34 = credit cooperative, 4= BRI unit desa (BRI village unit), 45 = BRI branch in district capital, 5= State owned bank, 6 = BPD (Provincial Development Bank)/ BUKOPIN (Indonesia Cooperative Bank), 7= private commercial bank.

In addition to such administration costs, borrowers are often required to keep a compensatory balance or derivative deposit in the hands of the institutional lenders, especially banks. They are also sometimes required to pay a commission or what is called *provisi (provisie,* Dutch: commission). There were 42 cases in which such gratuities were charged. The 42 cases consisted of borrowing money (39 cases), opening an account (one case), and saving deposit (2 cases). *Provisi* seems to a tradition of the banking system in Indonesia. Traders, village cooperatives and credit cooperatives do not charge this type of commission. Administration costs, derivative deposits and *provisi* are a large burden for small traders and constitute barriers to credit.

For borrowing money, *provisi* or a derivative deposit was required. Among 108 borrowing cases, 36 cases paid *provisi* and 3 cases were required to maintain derivative deposits (Table 7.12). Twenty-three cases out of 36 paid in percentage terms. This cost is often charged both at state banks and at private banks, at approximately 0.5% through 1% of the borrowed amount. Seven cases paid in cash and the terms of the rest are not clear. Most traders considered *provisi* as something like a compulsory donation charged by banks. This *provisi* also makes it difficult for traders to access institutional lenders.

Table 7.12 Number of transactions in which *prorisi* was charged for borrowing money.

	2	3	34	4	45	5	6	7	8	Total
Provisi	0	0	0	4	5	12	2	11	2	36
%	0	0	0	0	0	12	0	11	0	23
Rupiah	0	0	0	4	1	0	1	0	1	7
Na	0	0	0	0	4	0	1	0	1	6
Derivative dep.	0	0	0	0	0	2	0	0	1	3
No charge	36	4	2	14	2	4	0	2	5	69
Total	36	4	2	18	7	18	2	13	8	108

7.3.2 Other transaction costs

Not only the administrative costs within the banking system, but transportation costs and duration of the procedure also constitute barriers to accessing credit. The transportation

cost is relatively cheap, mostly less than Rp 500 for borrowers within the same sub-district as the lenders (Table 7.13). Institutional lenders, except for village units of BRI or cooperatives, are located at the district capital. Borrowers must use a motorcycle, car or bus, which is expensive for villagers.

Large traders in the urban areas, on the other hand, tend to have bank accounts in other cities where business partners such as feed companies are located. They usually use their own cars to visit bank branches, so costs become higher for example, more than Rp 20,000.

Table 7.13 Average transportation cost in rupiah/round trip to visit lenders.

	2	3	34	4	45	5	6	7	na	Avarage
C	519	0	0	117	600	673	16,500	14,217	86	1,627
O				100		740	30,000	20,075	200	8,186
S				215	133	620		2,650	400	492
Average	519	0	0	155	460	676	21,000	14,242	183	2,095
Sample no.										Total
C	36	4	2	18	7	11	2	6	7	93
O	0	0	0	2	0	5	1	4	2	14
S	0	0	0	13	3	5	0	2	3	26
Total	36	4	2	33	10	21	3	12	12	133

It takes a long time to complete banking procedures (Table 7.14). Opening an account and borrowing money from institutional lenders takes more than ten days. State owned banks need about one month to open a new account. Banks usually take two weeks to approve a loan. On the other hand, it takes only one day for traders to save money in the banks. This implies that a bank can operate quickly except for the assessment of the credit worthiness of borrowers. If this assessment procedure is efficiently implemented, borrowers can receive credit more quickly and efficiently satisfy their short term money needs.

Table 7.14 Time in days required to complete procedure

	2	3	34	4	45	5	6	7	8	Average
C	1.2	8.8	1.0	10.3	12.	16.0	18.5	2.7	13.9	7.5
O				11.0		28.9	14.0	2.5	1.0	14.2
S				1.0	1.O	0.9		0.7	0.8	0.9
Sample No.										Total
C	36	4	2	18	7	16	2	11	7	103
O	0	0	0	2	0	7	1	6	2	18
S	0	0	0	13	3	7	0	3	4	30
Total	36	4	2	33	10	30	3	20	13	151

Table 7.15 Number of visits to lender's office to complete procedure

	2	3	34	4	45	5	6	7	8	Average
C	1.1	2.0	1.0	2.3	1.6	3.0	2.0	1.3	2.1	1.9
O				2.0		2.4	3.0	1.5	1.0	1.9
S				1.1	1.0	1.0		1.0	1.0	1.0
Sample No.										Total
C	32	4	1	18	7	16	2	10	7	97
O	0	0	0	2	0	7	1	6	2	18
S	0	0	0	13	3	7	0	4	4	31
Total	32	4	1	33	10	30	3	20	13	146

Furthermore, time for visiting offices to complete procedures is also a constraint to accessing loans. It takes only one visit for a borrower to obtain money from traders or from the

credit cooperative (Table 7.15). On the other hand, in the case of borrowing from institutional lenders such as the village unit cooperative (KUD) and banks, a borrower is required to visit the lenders approximately twice. State owned or provincial banks need three visits. It appears that government banks are less efficiently managed compared to private banks in our study areas.

The above analysis indicates that non-institutional lenders such as traders have an advantage in providing money to borrowers in rural areas. Institutional lenders such as the banking system are still open only for rich and large traders in urban areas. The village unit of BRI and the village cooperative provide formal credit to rural traders; however compared to money lenders such as rich traders in the producing areas, access to these institutional lenders is not easy for small traders.

The development of the demand side, namely processing industries of maize and other CGPRT crops, has induced marketing innovations in East Java. The question is whether traders in the rural area can cope with or promote such innovation. It is necessary to investigate the capability of traders from various points of view. In particular, the role of rural financial markets is important to support the activities of traders who could generate innovation in marketing of crops. Further characteristics of the rural financial market will be examined in the following section.

7.4 Duration, interest rate and collateral of the credits available for traders

The major business asset of small traders in villages is a bicycle. Many traders cannot yet own even motorcycles. If traders or farmers could get a mini truck or any other cheap and appropriate transportation, it would make substantial progress in the distribution and marketing in rural areas. By such innovation in transportation, villagers would be able to easily get input materials for agriculture and daily goods and they could easily bring their harvested crops to market places or to the center of collection and distribution. This innovation is essential to increase the economic welfare of rural people.

The participants operating in the market channels have a critical role in transferring the changes happening in downstream industries to rural areas, for example, a new use of crops or a new standard of quality. The prevention of aflatoxin contamination, for example, is an urgent issue for the development of the maize economy in Indonesia. The outbreak of fungus and aflatoxin can be prevented by, for example, putting a mould inhibitor into the plastic sacks just after harvesting even though drying is not completed. The cost of the use of plastic sacks and mould inhibitors could be carried by farmers and local traders if financial support were available. Divisible technology such as sacks, mould inhibitor or small scale drying machines would in all probability be accepted by farmers and local traders, if they were financially supported in a proper manner.

The improvement of access to institutional lending in rural areas has been given attention in development policy. Loans provided by institutional lenders have become available within rural areas, but limited only to rich local traders or rich farmers. Furthermore, the loans are still limited primarily to short term working capital (see Tables 7.6 and 7.7). Capital for investment is not well provided by institutional lenders such as bank branches or BRI village units (Table 7.8). Credit rationing constrains investment by local traders for their business, preventing them from bringing about innovations in rural areas.

Further in-depth investigation on the characteristics of loans available for traders cover duration of loans, interest rates, and collateral required by lenders.

7.4.1 Duration

Borrowing for working capital is short term (Table 7.16), with most cases having a duration under four months. The share of less than half month is about 30%. There are borrowings for more than one year, but these are mainly short term credits from banks that were rolled over several times. Many traders borrow money and use it for buying crops. In other words, short term money for buying is supplied to a certain extent, and it is relativelN easy for the traders to access.

On the other hand, investment credit is longer term, mainly from one year through four years. It is, however, relatively difficult for traders in the producing areas to get such investment credit. Only 14 traders used credit for investment, which indicates the poor access of traders to investment credit (Table 7.17).

Table 7.16 Number of traders borrowing worldng capital for various durations.

Duration	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
<15 days	6	0	0	11	2	0	0	0	0	0	0	0	0	0	0	19
<4 months	0	0	0	12	3	0	1	1	0	0	0	0	0	0	0	17
4-11 m	2	0	0	2	0	0	0	0	0	5	0	1	0	0	0	10
1-2.9 years	1	0	0	3	1	0	1	0	0	4	1	0	0	3	0	14
> 3 year	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	3
na	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	5
Total	9	1	1	28	9	1	3	1	0	9	1	1	0	3	1	68

Table 7.17 Number of traders borrowing investment credit for various durations.

Duration	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
≥ 6 month	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
≥ 1 years	0	0	0	0	1	1	1	0	0	0	0	0	0	2	0	5
≥ 2 years	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
≥ 3 years	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	3
≥ 4 years	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
na	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	3
Total	0	0	0	0	2	2	2	0	0	5	0	0	1	2	0	14

Table 7.18 Number of traders paying various interest rates for working capital.

Interest rate (% / month)	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
0	6	0	1	25	4	0	0	0	0	0	0	0	0	0	0	36
0.1-0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-1.9	1	0	0	0	2	0	1	0	0	2	0	0	0	0	0	6
2-2.9	0	0	0	0	2	0	2	1	0	7	1	1	0	0	0	14
3-3.9	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3
na	1	1	0	2	1	1	0	0	0	0	0	0	0	2	1	9
Total	9	1	1	28	9	1	3	1	0	9	1	1	0	3	1	68

Note: If a trader had more than one loan, the lower rate of interest was used.

7.4.2 Interest rates

Interest rates for working capital were approximately 2% through 3% per month (Table 7.18). On the other hand, interest rates of credit for investment were approximately 1% through 2% (Table 7.19). Investment credit, with low interest rate supplied by institutional lenders in the collection and distribution centers, was mainly used not by local traders but by large urban traders. Borrowed working capital was shorter in term and the traders paid higher interest rates. In spite of the high interest rate, the total amount of repayment for principal and

interest of a working capital credit was not large because of its short term and the small amount of principal.

Table 7.19 Number of traders paying various interest rates for investment credit.

Interest rate (% / month)	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0.1-0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-1.9	0	0	0	0	0	1	2	0	0	1	0	0	0	2	0	6
2-2.9	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
na	0	0	0	0	1	1	0	0	0	2	0	0	1	0	0	5
Total	0	0	0	0	2	2	2	0	0	5	0	0	1	2	0	14

7.4.3 Collateral

Collateral for investment credit is required by lenders in the case of long term and large amount. Tables 7.20 and 7.21 show the collateral required to get credit. Twenty out of 68 stated no collateral and 14 answered mutual credibility in the borrowing of working capital. Fifty percent of lending for working capital did not require collateral. Credit for working capital usually did not need collateral, except if the credit was from institutional lenders. *Penebas* are the most active users of credit. Their major credit source was traders who know them well, so no collateral was required. Mutual credibility substituted for collateral. It is hard for small collectors or *penebas* in the producing areas to provide valuable collateral, so they usually get funds from their own savings or by borrowing from traders they know.

Table 7. 20 Number of traders reoortinQ collateral reauirement: credit for working CaDital.

	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
Land	2	0	0	4	2	0	0	0	0	7	1	0	0	1	0	17
Land+mac Car, Siup, House	1	0	0	0	2	0	2	1	0	2	0	1	0	0	0	9
Car/Truck	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Petok D	0	1	0	2	0	0	0	0	0	0	0	0	0	1	0	4
Mutual Cr.	4	0	0	9	1	0	0	0	0	0	0	0	0	0	0	14
No Collateral	2	0	0	13	3	0	1	0	0	0	0	0	0	1	0	20
Na	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	3
Total	9	1	1	28	9	1	3	1	0	9	1	1	0	3	1	68

Note: Business License e.g., SIUP (Surat Ijin Usaha Perdagangan).
Petok D is a notice of asset tax payment that is regarded as the certificate of asset, mainly land ownership.

Table 7.21 Number of traders reporting collateral requirement: credit for investment.

	BB	1BB +PC	IPP	2T	3PG	4HL	4PG +HL	5PB	5PB +HL	6PB +HL	7PB +TH	7PB +TK	8PB +E	91PBR +TH	92PBR +TP	total
Land	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0	4
Land+mac Car, Siup, House	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	4
Car/Truck	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Petok D	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
No Collateral	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Na	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	2	2	2	0	0	5	0	0	1	2	0	14

The longer and larger the credit for investment, the more valuable the collateral in terms of land, machines, house or vehicles required by banks. Ten out of 14 cases required

some valuable asset as collateral (Table 7.21). Even if they have entrepreneurial capability. small traders cannot access investment credit of the institutional lenders.

As shown in the previous tables, 68 traders borrowed working capital. On the other hand, the number borrowing investment capital was only 14. Long term investment credit is still only given to certain people. This constraint reduces the incentive of local traders who wish to invest in their business. It appears that there is credit rationing in the rural areas. In this circumstance, local traders tend to run their business opportunistically based on short term perspectives. There is less incentive for local traders to devote themselves towards development of the rural economy.

Credibility and access are attached to large urban traders. Conversely, traders in the producing areas have a disadvantage. It is difficult to change their attitudes and mobilize them towards innovation in the rural economy if there is no reduction in credit rationing or improvement in access to long term investment funds.

7.5 Credit tie among traders: a manner of coping with the incompleteness of markets

7.5.1 Credit tie in vertically segmented market

Ten large urban traders in Kediri were intensively interviewed in our market survey Almost all of them do business in collaboration with collectors in Pace. They provide procurement funds to the large local collectors/brokers. The large traders in Kediri accept orders from large feed companies, obtain money from bank branches and provide this to large local collectors/ brokers in the producing areas for the procurement of maize.

After receiving money (payment in advance) for the procurement, the large local collectors/brokers procure the required quantity of maize within several days. The largest local broker in Pace gathers materials from approximately 20 village collectors, five of whom continuously trade with the large broker. He loans money to the village collectors or *peneba,* for several days without interest or collateral, the village collectors are obliged to deliver the materials to the large broker. Most large local collectors who own rice mills *(huller),* also use this lending practice. As described previously, the large urban traders send trailer trucks *(gandengan:* loading capacity of 18 ton per truck) to the large local collectors/brokers and sometimes directly deliver the maize to the large feed companies.

The modality of cash tie between the large local collectors/brokers and small traders. including *bakul (IBB), penebas (2T)* and village collectors (3PG), is almost the same as the tie between large urban traders and large local collectors/brokers. However, the amount of loan per trader in the latter tie is approximately ten times or more compared to the former tie. Cash from several million to more than ten million rupiah was provided to the large local collectors/brokers by the large urban traders.

Borrowing from traders is mostly without tangible interest; especially working capital did not require interest payment. Thirty-six traders out of 68 did not pay interest (Table 7.18) This, however, does not necessarily mean that they really do not pay any costs. Most of them are obliged to collect crops and sell to the lenders. Such credit tie (or cash tie) involves a certain norm among village collectors or *penebas* and large local collectors/brokers in tile producing areas. This is also the case among large local collectors/brokers and large urban traders. Buyers who provide procurement capital require sellers to sell quality maize or other well regulated crops to the buyers.

Regarding the condition of borrowing money, 21 traders stated that they were required to sell their crops to their lenders (Table 7.22). All of them are small traders such as *bakul* (1BB), *penebas* (2T) and village collectors (3PG). The lenders are traders and village cooperative (KUD). The village cooperative provided loans to the collectors in the producing area to ensure rice procurement for the Food Logistics Agency (BULOG or its regional office DOLOG).

The newly emerging maize market in East Java is stratified between the collection/ distribution center and the producing area (Figure 7.1). As described by the credit ties, at least two stratified principal agent relations among traders have been formed. The first principal agent relation is between large urban traders and large local collectors/brokers. The other relation has been formed between the large local collectors/brokers and small collectors within the producing area. The large local collectors/brokers act as an important channel between large urban traders and small traders in the producing area. They get money from the large urban traders and provide it to the small traders. They collect harvested crops from such small traders and sell them to the large urban traders. The large urban traders sell the collected crops to feed companies or to traders in consuming areas such as Surabaya and Jakarta

Table 7.22 Credit tie among traders.

Trader	No of Traders Sourcing		
	Trader	KUD	Total
IBB	5	0	5
2T	10	1	11
3PG	4	1	5
Total	19	2	21

7.5.2 Function of credit tie

The large urban traders can get credit for business funds from government or private banks such as *Bank Central Asia* (see Tables 7.7 and 7.8). Their assets, above all, land and warehouses, are the collateral for borrowing from the banks. They borrow money for both investment and working capital. During the harvesting season of rice and maize, they increase borrowing from the banks.

The large local collectors/brokers also have access to bank loans, but not enough for their business of procuring commodities. Whenever they need money, they can obtain cash (or payment in advance) from the large urban traders without interest or any expensive transaction cost. Hence, the large local collectors/brokers can easily give cash for procurement to small traders.

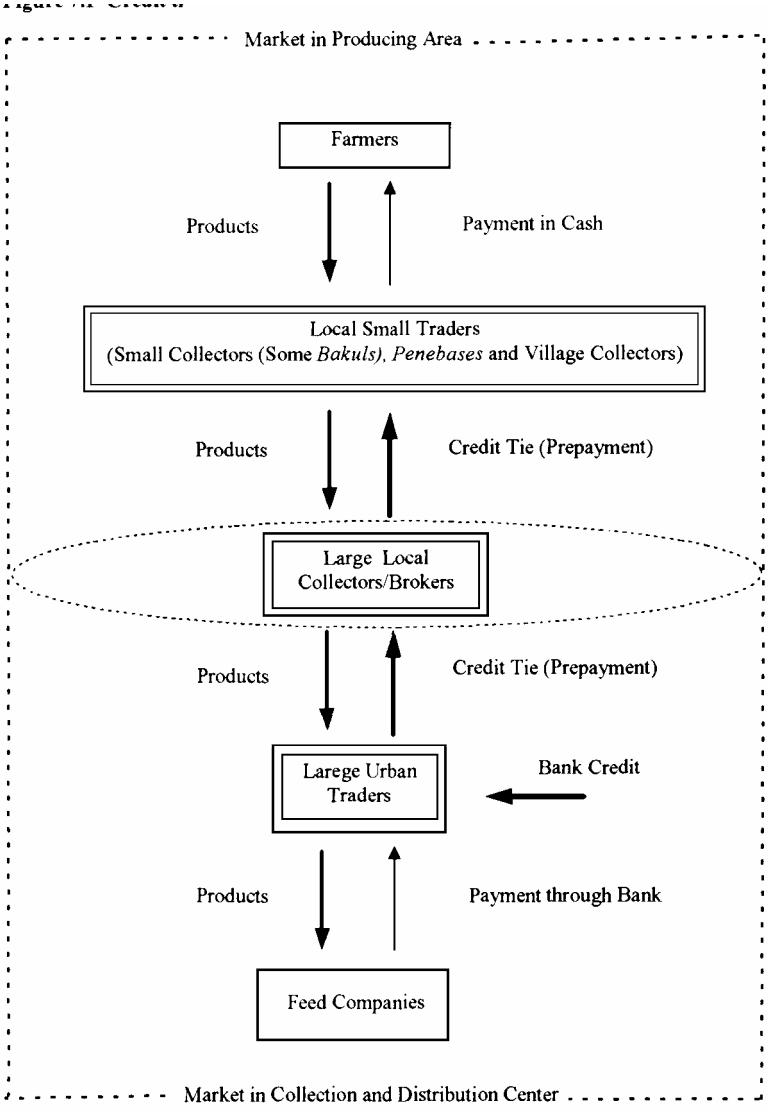
Cash ties among traders in the vertically stratified market are essential from at least the following three points:

- Feed companies and large urban traders can be assured of procuring quality crops that are well regulated;
- Large local collectors/brokers can get working capital to procure crops from small or village collectors in producing areas; and
- Buyers can get information on regulating quality and stock at each level of the vertically stratified market.

An important issue for the large urban traders is the quick withdrawal of money, since they use high interest rate bank loans, mostly 2% or more per month (Table 7.18), as working capital. They wish to deal without delay in collecting bills. They also need to turn over the

capital as many times as possible so as to get revenue to cover the financial cost. Almost all of the large traders in Kediri deliver maize to large agribusinesses such as Charoen Pokphand and Comfeed in Sidoarjo and Cipendawa in Jakarta, which are the largest feed companies or chicken farmers in Indonesia. Generally speaking, the companies promptly pay the price after receiving materials, to ensure the next procurement of maize.

Figure 7.1 Credit tie in vertically stratified market



As mentioned in the previous chapter, the procurement of quality material is the critical issue for agribusiness, especially for feed companies or poultry farmers. The urban traders' collaboration, therefore, is essential for the companies. The urban traders meet the conditions of the standard tables prepared by the companies which define the buying price by rating moisture content and impurities. It is very helpful for the companies that the large urban traders can prepare working capital by themselves from banks. It is also very favorable for the

feed companies that the large urban traders can take advantage of credit ties with large local collectors/brokers in order to ensure the procurement and meet quality standards.

Thus, it can be concluded that the principal agei.t relations autonomously formed among traders have contributed to agricultural development in contemporary Indonesia, which is characterized by the industrial linkage promoted by agribusiness.

7.5.3 Incompleteness of the rural financial market

Poor access to institutional lenders, no investment credits, and no standardization of financial commodities are main factors of incompleteness of the rural financial market in our study area.

Bank credits are rarely used by villagers. In the producing area, bank credit users are, in general, limited to large local collectors/brokers or rural industries. Access to institutional lenders has not improved yet, in general. Thus, the rural financial market in producing areas like Pace still retains incompleteness. To alleviate this condition, credit ties among traders have been established. Large local collectors/brokers connect the producing area and the collection and distribution center. They connect not only in terms of commodity but in terms of capital for procuring crops. These credit ties among traders in the stratified market reflect an incompleteness of the rural financial market in the producing area.

The lack of capital for investment causes under-development in controlling and regulating maize quality. Traders in producing areas cannot get sufficient funds to buy vehicles for transportation or to build drying facilities. The lack of investment activities in these fields means that they cannot get sufficient information and skill in drying technologies or on the quality standards and pricing methods defined by feed companies. Then, standardization and upgrading of quality do not yet proceed favourably in the producing areas in general.

The lack of standardization of financial commodities is also critical. The most popular credit in the producing area was the short term loan of credit cooperatives, for a maximum of four months. The interest rate was 5% per month, and various administrative costs were charged to borrowers. These costs themselves obscured the rate of interest. Moreover, the method of repayment was equal repayment with interest added. This made it hard to calculate the interest rate for local traders. The average amount of a loan outstanding during its term becomes approximately half of the amount of principal. Then, the actual interest rate could become about twice the nominal interest rate. According to our calculation, a loan with 5% interest per month could in fact become 12.6%. Local traders usually do not compare the interest rates of loan programs supplied by institutional or non-institutional lenders in the producing areas, they just count the capability of repayment. Their criterion for making decisions is based on the extent of their daily or weeklv income that can be allocated for repayment. The lack of symmetric standardization of financial commodities causes an element of incompleteness in the rural financial market.

The principal agent relation built up by credit ties complements the incompleteness of the product market and the rural financial market. The emergence of the credit tie among traders in the stratified market has complemented the incompleteness in ways summarized as follows.

First, regarding the incompleteness of standardization of commodities, maize quality does not vet completely satisfy the standard requested by feed companies. There is uncertainty regarding quality and pricing among traders in buying and selling as clarified in the previous chapter. Thus, it is better for traders do business with reliable partners who are regular customers and who know each other.

Second, traders need cash to ensure the procurement, but sufficient working capital is not supplied by institutional lenders in the producing area. Hence, small traders get money from large local collectors/brokers. The latter get money from the large urban traders. The ties work like business insurance, and have guaranteed the mutual reliability of traders and lead to a principal agent relation.

Third, the lack of information on traders causes credit rationing by institutional lenders against small traders in the producing areas where bank branches are not located. Bank branches in the urban center require higher valued collateral because of lack of information on the clients to assess credibility. The bank, indeed, cannot identify some traders, whether they are rich in entrepreneurship or whether they have potential to carry out their business. The banks lend only to the traders who have sufficient business assets and have less necessity of borrowing money. This incompleteness of the rural financial market is substituted or complemented by the ties among traders regarding capital.

8. Conclusions

This study investigates an economic system which is mainly based on CGPRT crops. The ultimate objective of the study is to draw policy implications for increasing employment opportunities and income of CGPRT farmers in the areas undergoing a diversification process. Diversification has been the principal development strategy of South-east Asian agriculture since at least the 1980s.

There are at least three ways to improve income levels and employment opportunities of farmers:

- by increasing productivity per hectare; this is the conventional way which was successful in rice production.
- by processing of harvested crops by farmers or villagers themselves; villagers can get higher added value by processing materials into food or feed. Good examples in Java are *tempe* and *tahu* made from soybean and *kerupuk* made from cassava.
- by promoting industrial linkage; the development of end uses of CGPRT commodities, particularly maize in our study, would directly (or indirectly) help farmers to extend their employment opportunities and to increase their income.

Increase of productivity on farm is still very important. This target, however, should be considered from the wider context of the development process. Our study focuses on the third point. CGPRT crops are closely related to industries such as food, feed and chemical industries. Low quality of harvested crops, particularly in maize, has been a serious bottleneck slowing further development of the industrial linkage. The study identifies the required improvements or innovation in processing, marketing, and transportation of CGPRT products. The way the market works was clarified by undertaking a case study in a diversified and commercialized area in East Java.

8.1 Farming system and its sustainability

At the farm level, labor and land are efficiently utilized year round. Farmers plant three or four times a year and there is no idle season. This type of farming is widely established in advanced areas of diversification, such as Pace. Rice, maize and soybean are widely cultivated. Their stems and leaves are utilized as livestock feed and mixed with manure for compost. There is a lot of livestock in the study village, including cattle, goats and poultry, which have an important role in the village economy. This farming system maintains the fertility of the land, which is put under pressure by the high cropping intensity. This system which supports sustainable agriculture in the area, however, is very fragile. If labor is in short supply, the supply of manure could become insufficient because of a decline in the livestock sector. Since this could damage the sustainability of agriculture in the area, special attention must be paid to this possibility.

8.2 Change of harvesting institution

During the harvesting season, labour supply becomes short in the area. Harvesting usually overlaps with land preparing, seeding and transplanting of the next crop. Farmers immediately start the next crop and do not have enough time to spend drying the harvested crops. Collective farming activities are not found in the study village. *Sambatan* (mutual labour exchange) is not undertaken except among a relatives. *Gotong royong* is limited to house building and night security. These are the reasons why farmers use the *tebasan* system, selling their crops to harvesting contractors *(penebas)* just before harvest time.

Communal ties in the Javanese village have been symbolized by the harvesting practice known as *derapan* (or *bawon).* This traditional institution has been maintained during commercialization of agriculture. A study on disposition of harvested crops shows that a certain percentage of harvested rice is allocated for harvesting workers by the *derapan* system (Table 3.4). *Derapan* has not been applied to other crops such as maize and soybean, but the traditional institution still survives in rice harvesting. Landless or poor farmers are still guaranteed food by this communal institution (cf. Geertz 1963).

8.3 Development of agribusiness: its impact on producing areas and problems confronted

Improving the quality of harvested maize as well as stabilizing procurement of the commodity are critical and urgent issues of feed companies. Contamination by foreign materials and fungi that produce aflatoxin has become a constraint to the development of the feed industry and the poultry farming business.

Seeds, especially hybrid maize seeds, are produced by farmers under contract with seed agribusiness companies. Maize production has been integrated by large poultry farmers as an agribusiness. These endeavours are far more capital intensive compared to annual food and industrial use crop farming. The quality requirement of maize for this business is so strict that the marketing system and farm production need to be improved.

In the downstream maize market, feed industries have developed, This corresponds to the development of broiler farming that was introduced to Indonesia in the early 1980s. There are several large feed companies in East Java, with very strict requirements on quality.

Quality materials are in demand by this industry. How to cope with this new demand has been a most important development issue. How can farmers and traders in a rural area meet the request from the downstream industries? One counter measure is to quickly dry and process the harvested maize. One necessary innovation is to build a cheap drying facility within the village that would permit drying the maize immediately after harvesting. Using mould inhibitors in sacks with maize might also be a possible innovation for farmers and small traders in producing areas. Appropriate technologies must be introduced into the producing areas. In addition, it is essential for traders and other villagers to receive incentives for investment from financial institutions.

Individual farmers lack knowledge, techniques, information, and capital. Small traders, instead of extension workers, already provide villagers with information on price and new technologies such as new varieties of seeds or pesticide. The government must not neglect their role, which could accelerate agricultural development in rural areas.

New uses, such as feed for livestock, ingredients or processed food, have developed rapidly after investment deregulation's, which accompanied self sufficiency of rice in the mid 1980s. Feed for poultry, starch, alcohol, corn oil, ketchup and other ingredients are expected to become large industries in Indonesia. The feed industry has been stimulated by the growth of the poultry industry since the latter half of the 1980s. This change is likely to be the beginning of a long term trend affecting agriculture.

8.4 Necessary technological and institutional innovation

For inducing innovation, it is essential to give investment incentives to farmers and traders in rural areas and to improve their access to institutional lenders. Our study determined that access to investment capital is limited primarily to working capital. Long term credit requires collateral and the procedure is too complicated for rural people. In addition, credit for investment is provided at the bank branch in the district capital, which is far from the village.

Regarding the development of the demand side of the maize economy, two standards are critical. One is standardization in the maize product markets. Lack of standardization of products induces uncertainty in market transactions. Buyers do not know the real quality of the material and sellers cannot understand the basis of price fixing by buyers. Standardization of marketed crops established within producing areas would improve the maize, at least, from the following three points of view:

- The uncertainty that mars the efficiency of the economy would be erased or reduced. It would make it easy td distinguish quality material from low quality commodity which would substantially improve the way of pricing;
- Quality commodities would reduce the marketing cost. Intermediate traders could reduce the frequency of loading and unloading work devoted to controlling the quality of the commodities. It would also facilitate bulk transport;
- Work for drying and improving quality at the earlier stage of marketing can create more employment opportunities in rural producing areas.

The other standardization where improvement is necessary is that of financial commodities. One of the reasons that rural people rarely access credit or loans supplied by institutional lenders is the lack of standardization that enables comparison of interest rates among financial products. Then, the most important factor for villagers to make decisions is not the interest rate but simply the capability of repayment. The actual interest rate borne by villagers is usually far higher than the nominal rate stated by lenders such as the credit cooperative.

Feed companies need detailed information on production, stock, quality and price to ensure stable procurement for factory operation. Feed companies have tried to organize urban traders to some extent to ensure procurement and to collect information about production, stock, quality, local price and loyalty of traders. The large urban traders create a definite tie in trading with large local collectors/brokers by providing working capital. The latter create a certain tie with collectors or harvesting contractors in the producing areas by providing working capital that originates from the large urban traders. Thus, a principal agent relation has been established among traders, induced by incompleteness of the product market and the rural financial market. Thus, there is an linkage between the two markets.

On the other hand, traders in rural areas generally lack experience that is critical to work as traders. Javanese traders' experience is much shorter than that of Chinese traders. It is rare that Javanese traders succeed with businesses inherited from their parents. They lack trade

connections, know-how and information, which might be caused by their socio-cultural background. It is necessary to facilitate upgrading of trading skills of traders in rural areas.

8.5 Policy implications

Policy needs to involve traders and the private sector. The policy programs must be simple and inexpensive. Particular attention, however, must be paid to maintaining the fertility of soil and the sustainability of agriculture.

This study has identified the many constraints to the activities of farmers and traders. Policy alone may not be able to eliminate or reduce these constraints. It is very important to give investment incentives to traders in the producing area. Such investment would reduce the traders' opportunistic attitude, because they would need a longer duration to recover the investment cost. It is essential for traders to maintain favourable relations with farmers and other people concerned. Such investment would also lead to more efficient transfer of information on quality demands in the downstream maize market.

Policy implications for the further development of the CGPRT crop based economy can be summarized as follows:

- Mutual linkage of farmers, traders and agribusiness is essential for future development of the CGPRT crop based economy.
- For sustainability, it is essential that villagers maintain the fertility of land and also avoid the destruction of favourable social ties in rural areas.
- Development of skills, information and technological change regarding quality control and pricing of commodities, would enable traders and farmers to take more advantage of the shifts in quality demanded for CGPRT crops. The farmers and traders in producing areas have been generally disadvantaged in getting such skills, information and technology.
- Standardization of quality characteristics and measuring technology of marketed crops in the collection and harvesting stage would enable reduction of uncertainty in selling and buying and would increase employment opportunities in producing areas. At the same time, this can promote industrial linkage with agribusiness or agro-industry.
- Standardization of financial commodities and improved access to institutional lenders would enable villagers to invest. Such investment could reduce opportunistic attitudes of traders and commit them to the local economy over a longer term.

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10. Appendices

Appendix 10.1 Households in the study village (KA hamlet)_

No HH	Main Job Code	Farming Code	Number of HH Members Male	Female	Total	Main Job	Gogol mem-ber	Tenure Status Land Owner in/out	Rent	Farm Oper-ation	Employment HH Head	Ag Hired HH Member	Emp-loyed Total	Farmer Group Member	Water Pump Owner	Motor cycle Owner
1001	7	7	1	1	2	Gov. employee	0	1	1	0	0	0	1	1	0	0
1002	4	4	2	2	4	Hired laborer	0	0	0	0	1	0	2	1	0	0
1003	1	1	2	3	5	Farmer	0	1	0	1	1	0	3	1	0	0
1014	5	5	1	2	3	Ice trader	0	0	0	0	0	0	1	0	0	0
1005	5	5	2	4	6	Coffee shop	0	0	0	0	0	0	2	1	1	0
1006	1	1	2	3	5	Farmer	0	1	0	1	1	2	3	1	0	0
1007	4	4	3	2	5	Hired laborer	0	0	0	0	1	2	3	1	0	0
1008	8	8	5	1	6	No job Decrepit	0	0	0	0	0	2	4	1	0	0
1009	1	1	5	4	9	Farmer	1	1	0	1	0	0	8	1	0	0
1010	4	4	1	1	2	Hired laborer	0	0	0	0	1	1	2	0	0	0
1011	1	1	4	3	7	Farmer	1	1	2	1	1	2	3	1	0	0
1012	4	4	2	4	6	Hired laborer	0	0	0	0	1	2	3	1	0	0
1013	5	5	2	3	5	Small trader (Bakul-Pd+Mz)	0	0	0	0	0	0	1	1	0	0
1014	1	1	1	1	2	Farmer	1	1	0	1	1	0	1	0	0	0
1015	7	3	1	2	3	Guard	0	0	3	1	0	0	2	1	0	0
1016	1	1	1	1	2	Farmer	I	1	0	1	0	0	2	1	0	0
1017	5	5	1	2	3	Small trader (rice)	0	0	0	0	0	0	1	1	0	0
1018	4	4	3	1	4	Hired laborer	0	0	0	0	1	1	2	1	0	0
1019	1	1	1	3	4	Farmer	0	1	2	1	0	0	2	1	0	0
1020	5	5	4	1	5	Small trader (Pd)	1	0	0	0	0	0	1	1	0	0
1021	1	1	5	4	9	Farmer	2	1	0	1	0	0	1	1	1	0
1022	5	5	3	2	5	Small trader (Pd)	0	0	0	0	0	0	1	1	0	0
1023	1	1	3	2	5	Farmer	0	1	0	1	1	0	2	1	0	0
1024	4	4	4	4	8	Hired laborer	0	0	0	0	1	1	2	1	0	0
1025	4	4	2	1	3	Hired laborer	0	1	1	0	1	1	2	1	0	0
1026	5	5	1	3	4	Coffee shop	I	I	1	0	0	0	1	0	0	0
1027	1	1	2	2	4	Farmer	1	1	2	1	0	0	1	0	0	0
1028	7	2	1	4	5	Teacher	0	1	2+3	1	0	0	3	1	1	1
1029	4	4	1	1	2	Hired laborer	0	0	0	0	1	1	2	1	0	0
1030	5	1	1	4		Ice trader/farmer	0	1	0	1	0	0	1	1	0	0
1031	2	2	1	1	2	Farmer	0	1	3	1	0	0	2	1	0	0
1032	3	3	3	3	6	Farmer	0	0	3	1	1	0	1	1	0	1
1033	3	3	2	3	5	Farmer	0	0	3	1	1	1	2	1	0	0
1034	5	3	1	2	3	Small trader (Gn)	0	0	3	1	0	0	1	1	1	0
1035	2	2	4	3	7	Farmer	1	1	3	1	0	0	4	1	0	1
1036	1	1	4	2	6	Farmer	1	1	0	1	1	1	1	1	0	0
1037	1	1	0	1	1	Farmer	1	1	0	1	0	0	1	1	0	0

Appendix 10.1 (continued)

No. HH	Main Job Code	Farming Code	Number of HH Members Male	Female	Total	Main Job	Gogol mem-ber	Tenure Status Land Rent Owner	in/out	Farm Oper-ation	Employment Ag.Hired Laborer HH Head	HH Member	Emp-loyed Total	Farmer Group Member	Water Pump Owner	Motor cycle Owner
1038	3	3	1	3	4	Farmer	I	0	3	1	1	0	2	1	0	0
1039	3	3	0	1	1	Farmer	0	0	3	1	0	0	1	1	0	0
1040	4	4	1	1	2	Hired laborer	0	0	0	0	1	1	2	1	0	0
1041	4	4	0	2	2	Hired laborer	0	0	0	0	1	0	I	1	0	0
1042	1	1	1	1	2	Farmer	0	1	0	1	1	0	1	0	0	0
1043	1	1	2	3	5	Farmer	0	1	2	1	0	0	1	1	1	0
1044	3	3	4	2	6	Farmer	0	0	3	1	1	2	3	1	0	0
1045	2	2	2	2	4	Farmer	0	1	3	1	1	0	1	1	0	0
1046	3	3	2	2	4	Farmer	0	0	3	1	0	0	2	1	0	0
1047	1	I	2	5	7	Farmer	1	1	0	1	0	1	3	1	0	0
1048	1	1	2	2	4	Farmer	1	1	2	1	1	1	2	1	0	0
1049	3	3	2	4	6	Farmer	0	0	3	1	1	2	3	I	0	0
1050	1	1	3	2	5	Farmer	0	1	2	1	0	0	3	1	1	1
1051	I	1	6	2	8	Fanner	I	1	0	1	1	5	6	1	0	0
1052	4	4	1	2	3	Hired laborer	0	0	0	0	1	1	2	1	0	0
1053	8	8	2	3	5	No job/farmer	1	1	I	0	0	0	1	1	0	0
1054	5	1	2	3	5	Small trader/shepherd	1	1	0	1	0	0	2	1	0	0
1055	7	7	1	2	3	Clerk of butcher	0	0	0	0	0	0	1	0	0	1
1056	8	8	0	2	2	No job	0	0	0	0	0	0	0	1	0	0
1057	7	2	3	4	7	Teacher (El Sch)	0	1	3	1	0	0	3	1	1	0
1058	5	3	6	2	8	Penebas/small trader	0	0	3	1	0	0	6	1	0	0
1059	6	6	2	1	3	Artisan (bamboo wall)	0	0	0	0	0	0	3	1	0	0
1060	5	5	3	2	5	Coffee shop	0	0	0	0	0	0	1	1	0	0
1061	I	1	2	I	3	Farmer	0	1	0	1	0	0	3	1	0	0
1062	5	5	2	3	5	Bakso trader	0	0	0	0	0	0	4	1	0	0
1063	5	5	2	2	4	Ice trader	0	0	0	0	0	0	0	1	0	0

Codes Main job code: I owner farmer, 2 owner farmer partly rent in, 3 tenant farmer, 4 landless worker; 5 trader, 6 craftman, carpenter etc., 7 officials, teacher, clerk, and other employed worker, 8 unemployed or other.

Fanning code. I owner farmer, 2 owner farmer partly rent in, 3 tenant farmer, 4 landless worker; 5 trader, 6 craftman, carpenter etc., 7 officials, teacher, clerk, and other employed worker; 8 unemployed or other.

Crogol member 0 non member, I one plot owner, 2 two plot owner. Hired labor; HH head: 0 no; I yes.

Land ownership 0 landless; I landowner

Land tenure_ 0 no rent out/in ; I rent our entirely; 2 rent our partially, 3 lease in, 4 sharecropping.

Farm operation: 0 no operation, I self operation.

Farm group member. 0 no. I yes.

Water pump owner. 0 no; I yes.

Motorcycle owner 0 no; I yes.

Appendix 10.1 (continued)

No HH	Main Job Code	Fanning Code	Number of HH Members Male	Female	Total	Main Job	Gogol member	Tenure Status Land Owner	Rent in/out	Farm Operation	Employment Ag.Hired Laborer HH Head	HH Member	Employed Total	Farmer Group Member	Water Pump Owner	Motor cycle Owner
1064	8	8	2	1	3	No job	1	0	0	0	0	1	1	1	0	0
1065	5	5	1	1	2	Ice trader	0	0	0	0	0	0	1	1	0	0
1066	1	1	3	1	4	Farmer/ice trader	0	1	2	1	0	0	2	1	0	1
1067	5	5	6	3	9	Fire wood trader	0	0	0	0	1	3	5	1	0	0
1068	4	4	10	4	14	Hired laborer	0	0	0	0	1	7	8	1	0	0
1069	4	4	7	4	11	Hired laborer	0	0	0	0	1	5	7	1	0	0
1070	3	3	3	2	5	Farmer	0	0	3	1	0	0	3	1	0	0
1071	8	8	1	1	2	No job	0	0	0	0	0	0	0	0	0	0
1072	4	4	2	4	6	Hired laborer	0	0	0	0	1	4	4	1	0	0
1073	3	3	3	4	7	Farmer	0	0	4	1	0	0	4	1	0	0
1074	5	5	3	2	5	Candy trader	0	0	0	0	0	0	1	1	0	0
1075	2	2	1	3	4	Farmer	0	1	3	1	0	0	1	1	1	1
1076	7	3	3	4	7	Clerk of butcher	0	0	3	1	0	1	4	1	0	0
1077	11	5	4	2	6	Iron scrap trader	0	0	0	0	0	0	2	1	0	0
1078	1	1	3	5	8	Farmer	I	1	0	1	0	0	3	1	0	2
1079	1	1	2	1	3	Farmer	0	1	0	1	0	0	3	1	1	1
1080	4	4	4	1	5	Hired laborer	0	0	0	0	1	1	2	1	0	0
1081	2	2	1	1	6	Farmer	0	1	3	1	0	0	6	1	1	0
Total			199	189	388		20	35		44	31	52	189	73	10	11

Codes Main job code: I owner farmer 2 owner farmer partly rent in, 3 tenant farmer, 4 landless worker; 5 trader, 6 craftman, carpenter etc.; 7 officials, teacher, clerk, and other employed worker, 8 unemployed or other.

Farming code: I owner farmer, 2 owner farmer partly rent in; 3 tenant farmer; 4 landless worker, 5 trader,6 craftman, carpenter etc ; 7 officials, teacher, clerk, and other employed worker, 8 unemployed or other.

Gogol member: 0 non member; I one plot owner, 2 two plot owner. I tired labor; HH head: 0 no, I yes.

Land ownership. 0 landless; I landowner.

Land tenure: 0 no rent out/in, I rent our entirely, 2 rent our partially; 3 lease in. 4 sharecropping.

Farm operation: 0 no operation; I self operation.

Farm group member. 0 no; I yes.

Water pump owner 0 no; 1 yes.

Motorcycle owner 0 no, I yes

Appendix 10.1 household in the study village (continued)

No. HH	Cropping Pattern 1975-1980	1980-1985	1990
1001	0	0	0
1002	0	0	0
1003	Pd-(Pd+Sy)-Mz	Pd-Sy-Mz	Pd-Sy-Mz
1004	0	0	0
1005	Pd-Sy-Mz	Pd-Sy-Mz	0
1006	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-Mz
1007	0	0	0
1008	0	0	0
1009	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-Mz-Mz
1010	0	0	0
1011	Pd-Sy-Mz-Mz	Pd-Sy-Mz-Mz	Pd-Pd-Mz-Mz
1012	0	0	0
1013	0	0	0
1014	#na	#na	Pd-Sy-[(Mz-Mz)+Ch)]
1015	Pd-Sy-Mz	Pd-Sy-Mz	Ch-Mz-Ch
1016	Pd-Pd-Mz	Pd-Pd-Mz	Pd-(Pd+Sy)-Mz-Mz
1017	0	0	0
1018	0	Pd-Sy-Mz-Mz	0
1019	0	0	Pd-Mz-Mz-(Mz+Pn)
1020	0	0	0
1021	Pd-Sy-(Ch+Mz)	(Sc)+[pd-Sy-(Ch+Mz)]	[Pd-Sy-(Ch+Mz)-Pn]+[Sc]
1022	0	0	0
1023	0	Pd-Sy-Mz	Pd-Sy-(Ch+Mz)
1024	Pd-Sy-Mz	0	0
1025	0	0	0
1026	0	0	0
1027	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-Mz-Mz
1028	0	Pd-Pd-Mz	Pd-Pd-[(Mz-Mz)+Ch]+[Ch-Mz-Mz]
1029	0	0	0
1030	0	0	Pd-Sy-Ch-Mz
1031	Pd-Mz-Mz	Pd-Sy-Mz	Pd-(Sv+blz)-Mz
1032	Pd-Sy-Mz	Pd-Sy-Mz	{Pd-Mz-Ch}+{Pn-[(w1z-Mz)+(Cv)]}
1033	Pd-Sy-Mz	Pd-Sy-Mz	Pd-'viz-Mz-Mz
1034	Pd-S_y-Mz	Pd-Sy-Mz	Pd-Sy-Ch-Pn
1035	0	0	Pd-Sy-Mz
1036	Pd-Sv-Mz	Pd-Pd-Mz-Mz	Pd-Pd-(Mz+Ch)
1037	Pd-Pd-Mz	Pd-Pd-Mz	Pd-Mz-Mz
1038	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-[(Mz-Mz)+Ch]
1039	Pd-Sv-Mz-Mz -Mz-Mz	Pd-Sy-Mz-Mz	Pd-Sy-Mz
1040	0	0	0
1041	0	0	0
1042	0	0	Pd-Sy-Mz-Mz
1043	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-[(Mz-Pn)+Ch]
1044	0	Pd-Sy-Mz	Pd-Sy-Mz-Mz
1045	Pd-Sy-Mz	Pd-Sy-'.viz	Pd-Sy-Mz-#na
1046	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Mz-Mz
1047	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Mz-Mz

Code of cropping pattern:

Pd paddy,	SN soybean,	Mz maize
Cv cassava	Ch chili	Sc sugarcane
Gn groundnut	Mb Mungbean	(+) alternatives for one season

O+( ) crops within the same type of brackets connected by + are alternatives

0 not cultivated or not harvested

Appendix 10.1 Households in the study village (Continued).

No. HH	Cropping Pattern 1975-1980	1980-1985	1990
1048	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-D4z
1049	0	Pd-Sy-Mz-Mz	Pd-Sy-(Ch+Pn)
1050	Pd-Sy-Mz	Orange(84)	Orange
1051	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-(Mz+pn)
1052	0	0	0
1053	Pd-Sy-Mz-Mz	Pd-Sy-Mz	0
1054	Pd-Sy-Mz	Pd-Sy-D4z	Pd-Sy-Mz
1055	0	0	0
1056	0	0	0
1057	0	0	Pd-(Mz+Sy)-Mz
1058	0	0	Pd-Sy-Mz-Mz
1059	0	0	0
1060	0	0	0
1061	Pd-Sy-Mz	Pd-Sy-Mz	Pd-(Pd+Sy)-Mz-Mz
1062	0	0	0
1063	0	0	0
1064	0	0	0
1065	0	0	0
1066	0	0	(Pd-Pd-Mz-Mz)+(Pd-Mz-Mz)
1067	0	0	0
1068	0	0	0
1069	0	0	0
1070	0	0	Pd-Sy-Mz-Pn
1071	0	0	0
1072	0	0	0
1073	Pd-Sy-Mz	Pd-Sy-Mz	Pd-Sy-Mz-Mz
1074	0	0	0
1075	0	0	Pd-Sy-(Mz+Ch)-Mz
1076	0	0	00-00-Mz
1077	0	0	0
1078	Pd-Sy-Mz-Mz	Pd-Sy.Mz-Mz	(Pd-Pd-Mz-Pn)+(Pd-Sy-Ch)
1079	Pd-Sy-Mz	Pd-Sy-Mz	Pd-(Pd+Sy)-Mz-(Mz+Ch+pn+Mb)
1080	0	Pd-Sy-Mz	0
1081	0	0	Pd-Sy-Mz

Code of cropping pattern:
Pd paddy
Sy soybean
Mz maize
Cv cassava
Ch chili
Sc sugarcane
Gn groundnut
Mb Mungbean
(+) alternatives for one season
O+( ) crops within the same type of brackets connected by + are alternatives
0 not cultivated or not harvested

Appendix 10.2 List of traders

No	Final Trader Code	M/F	Age	Business Address Village [Sub-district] mistricD	Trading Area	Facility	Role	Trading Material	Business Licence
1001	4PG+HI,	M	31	Pacewetan	4	HL	PG+FIL	Pd+Rc+Mz	0
1002	2T	M	30	Getas [Tanjung Anom]	4	0	T	Pd+Mz+Sy	0
1003	2T	M	45	Pacewetan	2	PK	T	Pd+Mz+Gn	0
1004	2T	M	57	Pacewetan	4	0	T	Pd+Rc+Mz+Sy	0
1005	2T	M	43	Kepanjen	3	0	T	Pd+Mz	/
1006	2T	M	36	Kepanjen	4	PK	T+BB	pd+Mz+Cv	0
1007	2T	M	33	Kepanjen	4	0	T	Pd+Mz	0
1008	5PB	M	27	Kecubung	5	TK	PB	Pd+Mz+Sy	#na
1009	3PG	F	32	Joho	5	TK	PG	Pd+Mz+Sy	TRD
1010	2T	F	40	Joho	4	PK	T	Pd+Mz+Sy	0
1011	4HL	M	34	Joho	3	HL	HL	Pd	MIL
1012	IBB	M	35	KAPacewetan	4	0	BB	Pd+Rc+Mz	0
1013	IBB	F	60	KA Pacewetan	3	PK	BB	Pd+Mz+Sy	0
1014	IBB	M	36	KAPacewetan	4	0	BB	Pd+Rc+Mz	0
1015	IBB	M	40	KAPacewetan	3	PK	BB	Pd+Mz	0
1016	IBB	F	60	Pacewetan	3	PK	BB	Pd+Mz+Sy	0
1017	IBB	F	40	Pacewetan	4	PK	BB	Pd+Mz+Sy	0
1018	IBB	M	32	KAPacewetan	4	0	BB	Pd+Rc+Mz+Sy	0
1019	IBB	F	30	Pacewetan	3	0	BB	Pd+Mz+Sy	0
1020	2T	M	40	Joho	3	PK	T	Pd+Mz+Sy	0
1021	3PG	M	32	Joho	5	TK	PG	Pd+Mz+Cv(Gn)	0
1022	4Hh	M	33	Joho	3	HL	HI.	Pd+Rc	MIL (Pd)
1023	3PG	M	32	Joho	5	0	PG	Pd+Mz+Cu	TRD
1024	3PG	M	42	Joho	3	GD	BT	Pd+Mz+Sy	TRD
1025	2T	M	40	Joho	3	PK	T	Pd+Mz+Sy+Gn	0
1026	91PBR tahu	F	50	Pacewetan	2	PBR+KL	PBR tahu	Sy (Tahu)	0
1027	91PBR tahu	M	65	Pacewetan	4	PBR+l{L+IT+P	PBR tahu	Sy (Tahu)	PRC (tahu)
1028	3PG	M	25	Pacekulon	5	GD	PG	Pd+Mz+Sy	TRD
1029	2T	F	50	Pacewetan	3	PK	T	Pd+Mz+Sy	0
1030	IBB	M	35	KAPacewetan	4	PK	BB	Pd+Mz	0
1031	3PG	M	48	Bodor	3	0	PG	Pd+Mz+Sy	0
1032	4HI.	M	47	Kecubung	3	HL	HI.	Pd	MIL (Pd)
1033	4PG+HL	F	52	Babadan	5	HL+GD	PB	Pd+Mz	TRD+MIL+GD+TDP
1034	2T	M	60	Kecubung	4	PK	T	Pd+Mz+Sy	0
1035	2T	M	45	Kecubung	3	0	T	Pd+Mz	0
1036	2T	M	45	Pacekulon	3	0	T	Pd+Mz	0
1037	2T	M	40	Jatigreges		0	T	Pd+Mz	0
1038	IBB	M	45	Jatigreges	2	0	BB	Pd+Mz+Sy	0

Trading area I in same hamlet, 2 in same village; 3 inter village, 4 inter sub-district, 5 inter district, 6 inter province or overseas trading.

Facility: TK shop or warehouse; GD warehouse; HL huller/miller; PBR other industry; WR small shop, KL peddler, TA=O nothing.

Role: T harvesting contractor, PG collector, PB wholesale trader, PC groceries, PP market trader, BB small trader, BT middleman; HL huller, GR (grocier) wholesaler or distributer; LL other

Trading material: Pd *paddy*, Rc rice; Mz maize; Cv cassava; Sy soybean; Go groundnut, Ba fruits, Tr livestocks product, Sc Sugarcane; Gp Gaplek, LL other.

Business licence TRD trading, PRC processing; MIL miller, TRP transportation, TDP tanda datlar penuahaan

Appendix 10.2 List of traders (Continued)

No	Final Trader Code	M/F	Age	Business Address Village [Sub-district] mistricD	Trading Area	Facility	Role	Trading Material	Business Licence
1039	2 T	M	67	Pacekulon	3	0	T+PG	Pd+Mz+Sy	0
1040	2 T	M	33	Sanan	2	PK	T	Pd+Mz+Sy	0
1041	2 T	M	45	Jatigreges	5	PK	T	Pd+Mz+Sy	0
1042	2 T	M	42	Sanan	2	0	T	Pd+Mz+Sy	0
1043	2 T	M	35	Sanan	4	0	T	Pd+Mz	0
1044	2 T	M	47	Bodor	2	TK	T	Pd+Mz	0
1045	2 T	M	38	Batembat	4	TK	T+PG	Pd+Mz+Sy	0
1046	2 T	M	49	Batembat	4	0	T	Pd+Mz	0
1047	2 T	F	36	Babadan	4	0	T	Pd+Mz+Sy	0
1048	2 T	M	50	Batembat	2	0	T	Pd+Mz+Sy	0
1049	3 PG	M	51	Babadan	2	TK(PC)	PG	Pd+Mz+Sy	0
1050	1 BB	M	35	Banaran	4	PK	BB	Pd+Mz+Sy	0
1051	1BB+PC	M	33	Jetis	1	TK	BB+PC	Pd+Mz+Sy	0
1052	2 T	M	45	Jetis	4	PK	T+BB	Pd+Mz+Sy+Gn	0
1053	2 T	M	38	Banaran	3	0	T	Pd+Mz+Sy	0
1054	2 T	M	52	Banaran	4	0	T	Pd+Mz+Sy	0
1055	3 PG	M	52	Plosohario	4	GD	PG	Pd+Mz	TRD
1056	4 PG+HL	M	55	Jetis	5	HL	PG+HL	Pd+Mz+Sy+Gn	MIL (Pd)
1057	1 BB	F	45	Plosohario	2	0	BB	Pd+Mz	0
1058	2 T	M	28	Plosohario	4	0	T	Pd+Mz+Gn	0
1059	1 BB+PC	M	45	Gondang	3	TK(PC)	BB+PC	Pd+Mz+Sy	0
1060	91 PBR tahu	M	42	Gondang	4	PBR tahu	PBR tahu	Sy (Tahu)	PRC (tahu)
1061	91 PBR tahu	M	41	Mlandangan	4	PBR tahu	PBR tahu	Sy (Tahu)	PRC (tahu)
1062	91 PBR tahu	M	42	Mlandangan	4	PBR tahu	PBR tahu	Sy (Tahu)	PRC (tahu)
1063	1 BB	M	47	Cerme	3	PK	BB	Pd+Mz+Sy	0
1064	2 T	M	39	Cerme	1	0	T	Pd+Mz	0
1065	2 T	F	60	Mlandangan	3	TK	T	Pd+Mz	0
1066	2 T	M	41	Gondang	3	0	T	Pd+Mz	0
1067	1 PP	M	41	Cerme	3	WR	PP	Sy (Tempe)	0
1068	2 T	M	35	Gemenggeng	2	0	T	Pd+Mz+Sy	0
1069	2 T	F	35	Jampes [Pace]	4	PK	T	Pd+Mz+Sy	0
1070	1 BB	M	55	Jampes	2	PK	BB	Pd+Mz+Sy	0
1071	4 PG+HL	F	47	Gemenggeng	4	HL	PG+HL	Pd	MIL (Pd)
1072	1 BB	F	40	Jampes	3	PK	BB	Pd+Mz+Sy	0
1073	3 PG	M	27	Gemenggeng	2	0	PG	Pd+Mz	0
1074	6 PB+HL	M	65	Kedin City	6	HL+PBR	PB	Pd+Rc+Mz	MIL+TRD
1075	6 PB+HL	M	35	Kediri City	5	HL+PBR	PB	Pd+Rc+Mz	MIL(Pd+Mz)
1076	6 PB+HL	M	49	KediriCity	5	HL+PBR	PB+HL	Pd+Rc+Mz+Cv	TRD+MIL(Pd+Gp)+TRP
1077	6 PB+HL	F	42	Kediri City	6	HL	PB+HL+LL	Pd+Rc+Mz+Sy	/

Appendix 10.2 List of traders (Continued)

1078	6PB+HL	M	50	Kediri City	5	HL	PB	Pd+Rc+Mz	TRD+AGR(Agriculture)
1079	7PB+TK	F	42	Kediri City	6	TK	PB+PC	Mz+Sy+LL	TRD
1080	6PB+HL	M	42	Kediri City	6	HL+PBR	PB	Pd+Rc+Mz+Cv	PRC+TRD
108I	7PB+PBR tahu	M	32	Kediri City	6	PBR tahu	PB+PBR tahu	Pd+Rc+Mz+Sy	TRD+PRC (tahu)
1082	6PB+FII	M	59	Kediri City	5	}R,	PB	Pd+Rc+GI	TRD+MIL (Pd)
1083	6PB+HL	M	42	Kediri City	6	HL	PB	Pd+Rc+Sy+Cm	TRD+MIL
1084	5PB+HL	M	27	Gemenggeng	6	HL	PB	Pd+Rc+Mz+Cv+	TRD+#na
1085	5PB+HI.	M	39	Babadan	5	HL	PB	Pd+Mz+Sy+Cv	TRD (PI) (+Sc+Cattle Breeding+Contractor+TRP
1086	5PB+HL	M	68	Kecubung	6	HL	PB+HL	Pd+Mz	/
1087	6PB+}{I.	M	38	<Jombang>	6	HL	PB	Pd+Mz+SV+Cv	TRD (Pd+Pl)
1088	92PBR tapioka	M	/	[Turen]<Malang>	5	PBR	HL	Cv(Gp)	TRD+PRC
1089	6PB+III.	M	39	Malang City	6	HI.	PB	Pd+Re+Mz+Cv+S	TRD+PRC+Manpower
1090	IBB	F	45	Sukolilo [Wajak]	3	PK	BB	Pd+Mz	0
1091	IBB	/	45	Patuk Sukolilo <Wajak>	3	PK	BB	Rc+Mz	0
1092	3PG+HL	M	27	Napel Sukolilo [Wajak]	4	HL	PG	Pd	MIL Pd
1093	3pG+l[L	M	44	Napel Sukolilo [Wajak]	2	HI	HL+pG	Pd+Mz	MIL.
1094	2T	M	28	Napel Sukolilo [Wajak]	4	PK+drying yard	T	Pd+Mz+Sc	0
1095	2T	M	50	Napel Sukolilo [Wajak]	4	0	T	Pd+Mz+Sc	0
1096	3PG	M	66	Wajak [Wajak]	4	TK	PG	Pd+Mz	TRD
1097	2T	M	30	Baran Sukoanyar[Wajak]	3	PK	T	Pd+Mz+Ba	0
1098	3PG	M	32	Blayu [Wajak]	4	0	PG	Pd+Mz	TRD
1099	41 IL	M	25	Sukoanyar [Wajak]	3	IiL	Ill	Pd+Mz	MIL (Pd+Mz)
1100	4Hh	M	31	Kidangbang [Wajak]	2	HL	HL	Pd+Mz	MIL (Pd+Mz)
1101	8PB Exp. PBR	M	56	Malang City	7	PBR+HI.	PB Exp PBR	Cv(Gp)+Mz	PRC(Pd+Mz+Gp)+TRD+ Export+Ground water use+ others
1102	4PG+HL	F	62	Kidangbang [Wajak]	4	HL	PG	Pd+Mz	MIL+TRD

Trading area: 1 in same hamlet; 2 in same village, 3 inter village, 4 inter sub-district, 5 inter district, 6 inter province or overseas trading

Facility TK: shop or warehouse, GD warehouse, IR. huller/miller, PBR other industry; WR small shop, KL peddler, TA=O nothing.

Role: T harvesting contractor, PG collector; PB wholesale trader, PC groceries; PP market trader, BB small trader; BT middleman, HL huller, GR (grocier) wholesaler or distributer, LL other.

Trading material: Pd paddy, Re rice, Mz maize, Cv cassava; Sy soybean; Gn groundnut, Ba fruits; Tr livestocks product; Sc Sugarcane, Gp Gaplek, LL other.

Business license: TRD trading, PRC processing, MIL miller, TRP transportation, TDP tanda daftar perusahaan

Appendix 10.2 List of traders (Continued)

No	Expen-ence as Trader (year)	Education Career	Finished or Not (YIN)	Training Career as a Trader		Type of Work		Major/Side Business		Side Business (if any)	Major Business
				Employer's Job	Duration (Year)	Full/ Part 1,16,2	Yearly/ Seasonal 3,4	Trader (%)	Others (%)		
1001	3	SHS	Y	0	/	1	4	100	0	0	/
1002	17	ES	N	c	2	16	4	70	30	Farmer	/
1003	4	ES	Y	0	/	2	4	33	67	0	Farmer
1004	15	ES	N	0	/	1	4	100	0	0	/
1005	5	ES	N	#na	3	2	4	50	50	0	Farmer
1006	13	ES	N	0	/	lb	4	60	40	Farmer	/
1007	5	ES	N	0	/	2	4	50	50	0	Farmer
1008	30	ES	N	0	/	1	3	100	0	0	/
1009	21	ES	Y	0	/	1	3	/	/	Farmer	/
1010	10	ES	Y	0	/	Ib	4	75	25	Farmer	/
1011	18	SITS	Y	a	6	2	3	30	70	0	Farmer
1012	10	ES	N	a	4	1	3	100	0	0	/
1013	40	0	/	0	/	2	4	33	67	0	Farmer
1014	14	ES	Y	a	I	16	/	70	30	Cattle	/
1015	1	ES	Y	0	/	2	4	25	75	0	Farmer
1016	40	ES	N	a	4	1	3	100	0	0	/
1017	25	ES	N	a	2	Ib	4	50	50	Farmer	/
1018	3	ES	Y	a	6	lb	/	70	30	Ag. Laborer	/
1019	10	ES	Y	a	2	lb	/	70	30	Farmer	/
1020	12	ES	N	0	/	1	4	100	0	0	/
1021	1-5	UN(J)	Y	0	/	16	/	100	0	0	/
1022	3	ES	N	c	/	1	/	100	0	0	/
1023	5	SHS	Y	b	1	lb	/	100	0	0	/
1024	11	JHS	Y	0	/	1	4	/	/	0	/
1025	20	ES	Y	0	/	16	4	50	50	Farmer	/
1026	25	ES	N	a	4	1	/	70	30	Farmer	/
1027	36	ES	N	0	/	1	3	100	0	0	/
1028	2	SHS	Y	b	1	lb	/	100	0	0	/
1029	13	ES	Y	0	/	I	4	75	25	Farmer	/
1030	1	ES	Y	0	/	lb	4	50	50	Farmer	/
1031	4	ES	Y	0	/	2	/	75	25	0	Village
1032	20	JHS	Y	c	0.06	2	/	30	70	0	Farmer
1033	20	ES	N	0	/	I	3	75	25	Farmer	/
1034	I5	ES	Y	c	2	2	4	25	75	0	Farmer
1035	9	ES	Y	a	10	2	/	30	70	0	Farmer
1036	5	ES	Y	0	/	2	/	50	50	0	Farmer
1037	10	ES	N	0	/	2	4	25	75	0	Farmer
1038	10	ES	N	0	/	2	/	50	50	0	Farmer

Appendix 10.2 List of traders (Continued).

No.	Experience as Trader (year)	Education Career	Finished or Not (Y/N)	Training Career as a Trader		Type of Work		Major/Side Business		Side Business (if any)	Major Business
				Employer's Job	Duration (Year)	Full/ Part 1162	Yearly/ Seasonal 3,4	Trader (%)	Others (%)		
1039	8	ES	Y	0	l	lb	4	50	50	Farmer	/
1040	10	ES	Y	0	/	1	3	100	0	0	/
1041	3	ES	N	0	/	2	4	25	75	0	Farmer
1042	5	ES	Y	0	/	2	/	40	60	0	Farmer
1043	3	ES	N	0	/	2	4	25	75	0	Farmer
1044	5	ES	N	0	/	2	4	25	75	0	Farmer
1045	16	ES	Y	b	2	lb	/	70	30	Farmer+PC(Shop)	/
1046	10	ES	Y	0	/	2	4	50	50	0	Farmer
1047	16	ES	Y	0	/	1 b	/	60	40	Farmer	/
1048	7	ES	N	0	/	2	/	50	50	0	Farmer
1049	3	UN(J)	Y	0	/	2	4	25	75	0	Teacher/ES Principal
1050	5	ES	Y	c	1	lb	4	75	25	Farmer	/
1051	5	ES	N	0	/	lb		50	50	Farmer	
1052	12	ES	Y	0	/	2	4	40	60	0	Farmer
1053	7	JHS	N	0	/	2	4	25	75	0	Farmer
1054	20	ES	Y	0	/	2	/	50	50	0	Farmer
1055	19	ES	Y	0	/	2	4	25	75	0	Village officer+ Farmer
1056	18	ES	N	b	13	1	/	100	0	0	/
1057	10	ES	Y	0	/	lb	4	50	50	Farmer	/
1058	13	JHS	N	a	3	lb	/	55	45	Farmer	/
1059	21	ES	N	0	/	2	4	33	67	0	Farmer+PC
1060	20	ES	Y	c	2	1	/	100	0	0	/
1061	15	ES	Y	c	2	lb		50	50	Farmer	
1062	19	ES	Y	c	2	lb	3	75	25	PC	/
1063	19	ES	Y	0	/	2	4	40	60	0	Farmer
1064	10	ES	Y	0	/	2	4	25	75	0	Farmer
1065	5	0	N	0	/	2	4	25	75	0	Farmer
1066	8	JHS	Y	0	/	2	4	50	50	0	Farmer
1067	3	JHS	Y	0	/	2	/	30	70	0	Farmer
1068	10	ES	Y	b	12	lb	/	60	40	Farmer	/
1069	15	ES	Y	0	/	16	4	60	40	Farmer	/
1070	5	ES	Y	0	/	2	4	25	75	0	Farmer
1071	5	ES	Y	0	/	lb	/	70	30	Farmer	/
1072	18	ES	N	0	/	1	4	100	0	0	/
1073	1	JHS	Y	a	3	2	/	40	60	0	Employee (Warujayeng)
1074	40	JHS	N	#na	10	1	4	100	0	0	/
1075	22	SHS	Y	a	4	1	3	100	0	TRP	/

Education: ES elementary school, JI IS junior high school; SHS senior high school; UN university.
Employer's job: a parents; b family; c others
Type of work: I full time; 1 b part time; 2 side business (part time); 3 yearly work; 4 seasonal work.

Appendix 10.2 List of traders (Continued).

No	Experience as Trader (year)	Education Career	Finished or Not (Y/N)	Training Career as a Trader: Employer's Job	Training Career as a Trader: Duration (Year)	Type of Work: Full/ Part 1,16,2	Type of Work: Yearly/ Seasonal 3,4	Major/Side Business: Trader	Major/Side Business: Others	Side Business (if any)	Major Business
1076	36	SHS	N	a	13	1	/	100	0	TRP	/
1077	21	SHS	N	a	4	1	3	100	0	TRP	/
1078	15	JHS	Y	a	#na	1	/	100	0	0	/
1079	21	SHS	Y	#na	1	1	3	75	25	TRP	/
1080	15	SHS	Y	b	10	1	3	100	0	TRP	/
1081	9	SHS	Y	a+c	9	1	3	70	30	PBR Tahu	/
1082	19	SITS	Y	a	10	1	3	100	0	TRP	/
1083	16	UN(J)	Y	c	4	1	3	90	10	Car Dealer	/
1084	2	SHS	Y	b	10	1	3	50	50	TRP	/
1085	10	SITS	Y	0	/	/	2	10	90	Cattle(1701+	Contractor Sugarcane (500 ha)
1086	/	/	/	/	/	1	3	/	/	SC farmer	/
1087	5	SHS	Y	a	14	1	/	100	0	0	/
1088	3	JHS	Y	a	2	1	4	100	0	0	/
1089	II	SHS	N	0	/	1	/	100	0	0	/
1090	26	0	N	0	/	1	/	100	0	0	/
1091	IS	ES	N	0	/	1	3	/	/	0	/
1092	10	SHS	Y	b	6	1	/	100	0	0	/
1093	19	ES	Y	0	/	1 b	3	50	50	0	Farmer
1094	11	ES	Y	0	/	2	4	33	67	/	/
1095	16	ES	Y	0	/	7	/	75	25	Farmer	/
1096	30	ES	Y	0	/	16	4	70	30	Farmer	/
1097	9	ES	Y	a	2	16	3	50	50	/	Farmer
1098	12	SHS	Y	a	3	1	/	100	0	0	/
1099	4	E S	Y	a	2	1	/	100	0	0	/
1100	1	ES	Y	0	/	lb	/	50	50	Driver(Pickup)	/
1101	12	SHS	N	0	/	1	3+4	100	0	LIPPO Bank Malang Branch Director	