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THE IMPACT OF THE CRISIS ON JAVANESE IRRIGATED RICE FARMERS

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CASER/CSIS/CIES/ANU
joint research project on

Policy analysis of linkages between Indonesia's agricultural production, trade and environment

Rapid economic growth in Indonesia has been accompanied by significant structural changes, including for its agricultural sector and its unique natural environment. Recently questions have been raised about the impact of Indonesia's agricultural, industrial, trade and environmental policies on sustainable rural development. The nature of interactions between the economic activities of different sectors and the environment are such that an intersectoral, system-wide perspective is essential for assessing them. An international perspective also is needed to assess the impact on Indonesia of major shocks abroad, such as the implementation of the Uruguay Round agreements, APEC initiatives, or reforms in former centrally planned economies. There is increasing pressure on supporters of liberal trade to demonstrate that trade reforms at home or abroad affecting countries such as Indonesia will not add to global environmental problems (e.g., deforestation, reduced biodiversity). Again, this requires system-wide quantitative models of the economy and ecology, because typically there are both positive and negative effects at work, so the sign of the net effects ultimately has to be determined empirically.

To begin to address these issues, the Australian Centre for International Agricultural Research (ACIAR) has generously provided funds for a collaborative 3-year project (to mid-1999) involving the University of Adelaide's Centre for International Economic Studies (CIES) as the lead institution, Bogor's Centre for Agro-Socioeconomic Research (CASER) which is affiliated with the Ministry of Agriculture, Jakarta's independent Centre for Strategic and International Studies (CSIS), and the Economics Division of the Research School of Pacific and Asian Studies (RSPAS) at the Australian National University in Canberra. Being based on Indonesia with its rich diversity of environmental resources (and on which there are relatively good data) and its rapid economic growth, the project could also serve as a prototype for similar studies of other developing countries in Southeast Asia and elsewhere.

The key objective of the project is to assess the production, consumption, trade, income distributional, regional, environmental, and welfare effects of structural and policy changes at home and abroad particularly as they will or could affect Indonesia's agricultural sector over the next 5-10 years. Among other things, the analysis will focus both on the effects of economic changes on the environment, and on the impacts on Indonesia's agricultural production and trade of resource and environmental policy changes. The implications of regional and multilateral trade liberalization initiatives and Indonesia's ongoing unilateral trade reforms will be analysed, along with other potential domestic policy changes and significant external shocks such as the entry of China and Taiwan into the World Trade Organization. The analysis will draw on and adapt computable general equilibrium (CGE) models such as the national INDOGEM Model (built as part of an earlier ACIAR project) and the global GTAP Model.

The project is being undertaken in close collaboration with the Indonesian Ministry of Agriculture and ministries involved in trade, planning, and the environment. A Research Advisory Committee has been established to encourage close collaboration of representatives from those and other ministries.

ACIAR INDONESIA RESEARCH PROJECT

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Introduction

This paper aims at identifying how farmers' income in the Javanese irrigated rice lowlands has been affected in the context of the Indonesian economic crisis. It stresses out the importance of land tenure systems, the size of cultivated land and the household size as critical factors. Basic information on farmers' practices derives from a survey conducted for a World Bank IPM Impact Methodology Indicators Pilot study in September/October 1998. Thanks to World Bank and CIRAD kind authorization, survey data were made available for this paper. 399 irrigated rice growing farmers were interviewed in 48 villages in the two provinces of West Java (namely the Pantura area, including the districts of Karawang, Indramayu, Subang, and Cirebon, located on the north cost of the province, east to Jakarta) and East Java (districts of Kediri, Ngawi, Bojonegoro and Lamongan).

Indonesia climatic and monetary crisis

The monetary crisis started visibly in Southeast Asia with the devaluation of the Thailand Baht, in July 1997. Indonesia was hit later in August 1997, when the Rupiah came under pressure. It rapidly depreciated in the following months. The depreciation was accompanied by inflation. Big increases in prices occur, particularly in food prices and imported goods prices. The cutting of credit lines for trade and investment from foreign banks to Indonesian banks and companies further reduced the possibility to import the necessary inputs for production. Despite an US$ 43 billions agreement in foreign loans and loan guarantees, from IMF and other international organizations, conditioned by implementation of reforms, the rupiah did not stabilize and further plunged later in the end of 1997. It was traded at 2500 for one US$ in July 1997, around 12000 in December 1997 and 8000 in April 1998. Massive workers layoff increased the level of unemployment to about 6-7 million people as a lower estimate.

The May 1998 political crisis, with mass protest and riots in every big cities in Indonesia, lead to President Suharto's resignation. At the same time, the rupiah's loss of value widened. It was traded at 14000 in June-July 1998. More political stability, further negotiation with donors, some signs of reform implementation and possibly a counter reaction from the financial markets helped the rupiah progressively recover strength to trade at 10000 in September 1998 and at 8000 a month later. November 1998 demonstrations and military intervention did not affect its value, still between 7000 and 8000, but have contributed to maintain uncertainty about this new stability. While Government officials attributed the relative stability of the rupiah to the economic reform program, other analysts estimate that variations of interest rates in USA and continuous

intervention of the Indonesian Central Bank, selling dollars in a very thin currency market, helped to maintain the rupiah at its current level. Between September 1997 and September 1998, inflation rate based on consumer prices was estimated at around 80% (82.4% in The Economist, No 8092, p126; 81.15% according to data from Indikador Ekonomi, the monthly statistical bulletin from BPS, Dec. 1997 and Sept. 1998).

El Niño and the related drought have affected yields because of water shortage and control problems and have induced delays in the rice-planting seasons, making crops more prone to pests attacks. In the irrigated rice fields of Java, these effects were less important due to the presence of irrigation schemes. Estimation of losses for 1998 are around 10 to 15% (FAO, 1998) though more serious damages were estimated through satellite imagery, but real figures are yet to come.

Impact of the crisis on irrigated rice farmers' income

In order to analyze the impact of the crisis on farmers, who are growing rice in irrigated fields, we proceed with a two step methodology. In the first step, the importance of the land tenure system (LTS) will be analyzed. On one hand, the current crisis has resulted in higher prices for imported products and, through inflation, has caused an increase in domestic prices, in particular food prices. On the other hand, costs and income share vary at farmers' level according to the LTS. It is thus particularly relevant to understand rice farming under different LTS has been affected by the crisis. This analysis will be conducted on the basis of a LTS typology.

However, further analysis is required to understand the differential impact of the crisis on different types of farmers, in particular in order to take into account real inputs use and outputs. Thus, a farmer typology will be used combining several criteria including LTS, land size, and household size. It will help show how much different types of farmers are winning and loosing because of the crisis.

Finally, implications for the future of irrigated rice production in Java will be analyzed, in the light of recent economic and agricultural policy decisions.

How land tenure systems affect farmers' situation in a time of crisis

We established the following typology of the main land tenure systems in irrigated-rice Javanese lowlands from observed land tenure practices and former research (Susilowati, 1997). Six "basic" land tenure systems (LTS) have been identified, including the important categories of land-less rice workers.

The six land tenure systems typology are:

P1.**Ownership of land and hired labor force.** Labor force is hired to handle all activities from planting to drying harvested rice. This case is found among farmers owning bigger rice fields (up to 4/5 hectares and more). These farmers are likely to be found, for instance, in the north part of West Java province, especially in the districts of Karawang, Subang, and Indramayu (Pantura). In this system, owner farmers pay for all expenses (inputs, labors, taxes) and get the entire harvest. Hired workers may be either land-less wage workers, sharecroppers or tenant farmers who seek additional income by selling their labor force.

P2.**Ownership of land, rented out to a sharecropper**. The sharecropper handles all agricultural activities for the owner. In this case, owner farmers usually own less land than in the first case. They are more likely to be outside agriculture and/or they have a main activity (trade, industry, service). They usually pay for half of the inputs costs, excluding labor force. They get their income from sharing the harvest, usually on a "paroh" basis - 50% of the harvest -, (CASER 1993).

P3.**Ownership of land, rented out to a tenant.** The land is rented to another farmer against a lump sum payment, in cash or in rice. Practices vary from place to place and according to the type of land. An estimate cost of three to four quintals of non husked rice (GKP[1]) per ha per year is common. This represents about 40% of the expected yearly output of a normal cropping year (CASER, 1993). The owner does not share any cost except some taxes. Payments are commonly made after the harvests.

R4.**Sharecropping.** This type of LTS is associated with the P2 type. Sharecroppers share the harvest on a "paroh" basis with owner farmers from the P2 LTS. According to surveys, former studies (Fujimoto, 1985) and research results (CASER, 1993), sharecroppers generally pay for half of the inputs cost (seeds, fertilizers, pesticides). They assume up to the whole cost of labor (depending on the land area) except for harvest, either through family labor, hiring wage workers or using mutual help systems.

R5.**Tenant farming**. This type of LTS is associated with the P3 type. The tenant pays a lump sum for the use of the land. He pays for all production cost and pay back the rent after the harvest. The risk is much higher since payments are not based on the real harvest but on a pre-defined amount. Any climatic (drought, flood), biological (pests) or economic (input price) crisis will affect severely the welfare of these farmers. On the other hand, good conditions may lead to accrued income.

[1] GKP is the Indonesian acronym for the unhusked and humid harvested rice

L6.**Land-less rice workers**. Wageworkers rent their labor force during the cropping season. According to surveys, this category of households remains the most numerous in the irrigated rice Javanese lowlands (CASER 1993).

The "gadai" system, where land is given to be cultivated as interest payment for a specified amount of credit, is not separately analyzed. Farmers who benefit gadai land are in a similar situation with ownership (they own the usufruct of the land) and may adopt one of the three P type practices. Similarly, "bengkok" land -belonging to the village government- is assimilated to one of the three former P or R category according to how rice is grown.

Basic data

In order to assess the impact of changes in relative inputs and outputs prices for different LTS, we use a common cost structure for one hectare of irrigated rice and two cropping seasons. The data have been compiled from surveys and interviews in several villages in different districts of West and East Java. They have been integrated to get a basic production scheme representing the usual way farmers grow rice, from land preparation to drying of the harvested product before selling. The resulting cost structure is indicated in Table 1 below. In this table, the variations observed through field surveys are also indicated. With this cost structure, we conduct a "ceteris paribus" comparison. This means that we fix almost all production cost parameters for all categories, so that the only parameters directly linked to the LTS become the elements of change. Accordingly, it is not the absolute value that is important here, but the relative changes observed from one category to another.

The basic data come from the survey of farmers mentioned earlier. 399 farmers were interviewed. In this sample survey, there is a bias towards including more owners and better-off farmers. This is due to the fact that for this survey a high proportion of IPM farmers has been purposively interviewed. Since one of the IPM program selection criteria was ownership, the survey entails logically a higher proportion of owners. Similarly, a higher proportion of educated farmers is found. Taking this in account, we can state that, in a not-biased sample, the number of smaller farmers would increase as well as the number of sharecroppers and/or renters.

The data we use do not reflect exactly a before-and-after-crisis situation. Though reference situation is January 1997 before the crisis hit the farmers, calculations include data collected in October 1998 for the cropping season 1997-1998. For the current cropping season 1998/1999, data was collected during group discussions at village level and with experts at the survey time. Data are shown in Table 1 and Table 2.

Regional yield differences exist. In East Java, in some villages, farmers have higher yields while using almost no pesticides, and little fertilizers. The yields in the second cropping season have decreased from 4850 to 3000 kg GKP/ha. This decrease is likely due to a combined effect of input price increase and less favorable climatic conditions in relation with El Niño effect on late planting.

Pantura farmers' use of Urea, SP 36 and KCl is very similar to what had be found earlier (Hadniana et al., 1990). But in both provinces many farmers do not use KCl at all. The average of 30 kgs of KCl is thus not very representative of the real situation, since some apply 70 up to 100 kg KCl per ha, and other nothing. About two thirds of the farmers do apply chemicals for pest control, among them carbamate, systematically applied at planting and buprofezine or fipronil applied three times.

Hand labor needs are quite similar to what has been found elsewhere for lowland paddy (Suryana and Kariyasa, 1997; Naylor, 1992) except for hand tractor substituting for hand land preparation. Note that wages vary according to the task, from Rp. 2000 for half-day work and 4000 Rp for a full-day work. Including meals, coffee and cigarettes they are estimated at 3500 and 5500 Rp. One year later they reach respectively 7000 and 12000 in West Java (Pantura) and 6000 and 10000 in East Java, all extra cost included. This conversion to include all side costs is based on local meal prices and farmers estimates. The number of working days for each activity, indicated in Table 1, derives from the survey. For R4 and R5 categories, labor for dyke preparation and maintenance and fertilizing comes from the family, with no related cash expenses.

The raise in agricultural wages is likely due to the in-kind payment system for harvesting. Since harvesters receive a share of the harvest as wages, and given that rice price increased significantly, harvesters are automatically getting higher pay. This in turn has been reflected in other cropping activities in order to maintain consistent daily wages. The 1/10th share for this in-kind harvesting cost (bawon) is the most common observed practice and concerns the harvest only.

For actualization we use the following inflation rates:

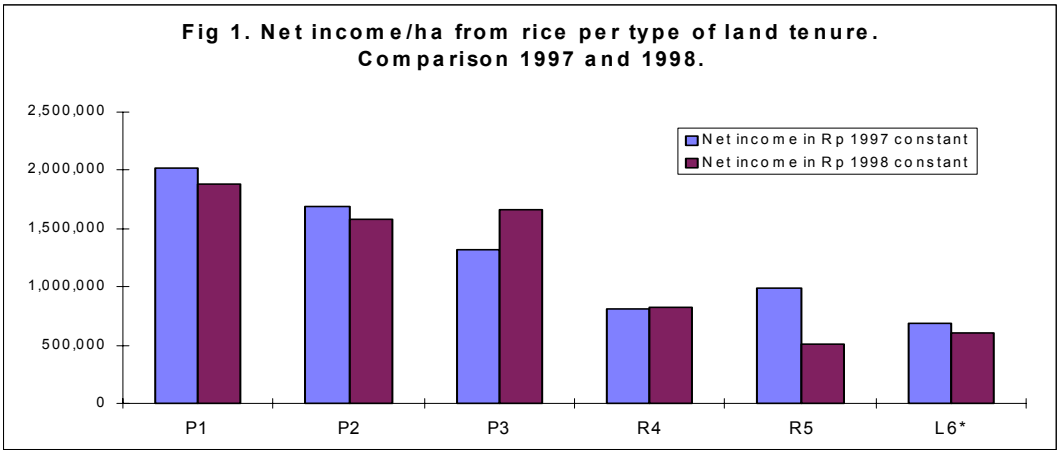
- from September 1997 to January 1997: 12%
- from January 1998 to January 1997: 30%
- from September 1998 to January 1997: 124% (100% for adjusted official rate to farmers situation from September 1998 to September 1997, + 12%)

Net income calculation is applied for one hectare of rice under the different LTS for 1997 and 1998 with reference for actualization to January 1997 prices. Figure 1 below shows the changes in income distribution per type of tenure.

Table 3. Yearly net income by land tenure system. 1997/1998.

	Net income Rp 1997	Net income Rp 1998	Net income Rp 1997 constant	Net income Rp 1998 constant	Purchasing power
P1	2,149,750	3,203,875	2,022,960	1,882,345	-7%
P2	1,790,000	2,746,188	1,687,029	1,578,860	-6%
P3	1,400,000	3,112,500	1,320,536	1,655,821	25%
R4	858,000	1,339,313	806,190	824,454	2%
R5	1,055,750	610,375	991,853	509,224	-49%
L6*	720,000	1,080,000	681,429	598,352	-12%

* For one cropping season: 72 working days. Two seasons/year.



In nominal terms, net income has increased for all LTS except for R5. In constant terms, the purchasing power associated with the cultivation of one ha irrigated rice either stagnated or slightly decreased. Tenant farming appears to be the big loser from the current crisis, while ownership associated to renting out of the land proves to be more profitable.

In 1998, prices of both inputs and outputs increased, outputs prices increasing relatively more. These changes would normally advantage, among the categories of ownership, the more risky activity such as P1 (where owners assume all costs and not sure of the yields) than P2 (sharing some costs and not sure of the yields) and than P3 (sharing almost no costs and fixed yields). Similarly, R5 should be more profitable than R4. But the results are different. They stress out the negative impact of the ecological component of the crisis (lower yields) for the more risky systems. Favorable price changes did not compensate for the decrease in second harvest yields (3000 kg/ha against 4850). This

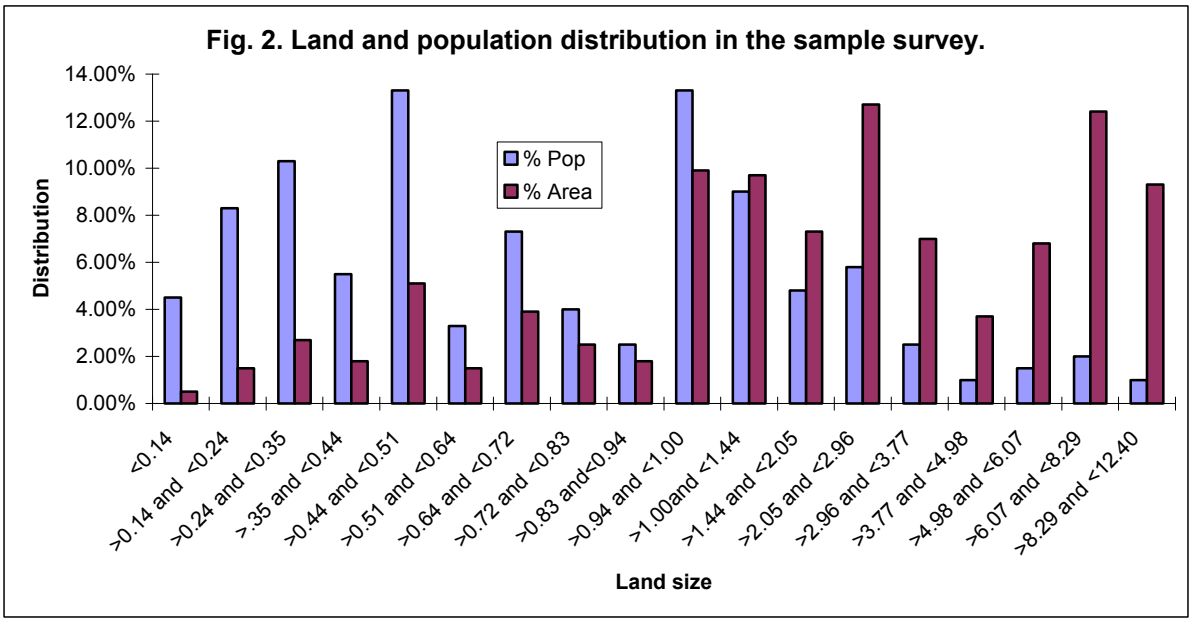
combination of positive and adverse effects explains why R5 are gaining less and P3 are gaining more. In the R5, and its corresponding P3 groups, tenants pay a fix amount for the land rent. It affects the total output: the latter remains constant in the P3 category providing a higher income compared to other P categories, and decreases in the R5, even leading to a negative income. This situation has been observed during farmers' interviews. Farmers explained that they did not harvest enough to pay for the costs and had either to sell gold, to use other sources of income or postpone the debt to the next cropping season.

A second important point is the situation of land-less people who work as wage workers. For comparison purpose, we considered the reference situation for a household with one wage worker working a total of 72 days per cropping season for a daily Rp 5000/day in 1997 and Rp 10000/day in 1998 (intermediate picture between Pantura and East Java according to survey). Wage workers' net income decreases similarly to the majority of farmers' income. This is due to the fact that their sole source of income - their labor force – experienced a lower increase than the paddy price which generate farmers income. Besides, land-less people's situation is likely to be worst. Most products they rely on for their daily consumption, in particular rice, increased more than the inflation rate. This will be discussed later.

Size and land tenure system: how the crisis affects farmers' access to rice

Until now, we used a hectare-based approach. But, in the reality farm distribution according to size is very uneven. Figure 2 shows the distribution of land size and population in the sample survey. It appear clearly on the left-hand side of the diagram, that a majority of farmers are growing rice on small plots (less than 1 ha) while the majority of land is owned by a small number of farmers, on the right-hand side.

In order to take this point into consideration we proceeded to elaborate a typology of farms based on the sample survey data. After data checking, we reduced the sample to 395 farmers (from 399). A Principal component Analysis (ACP) was conducted on the following variables: Province, Number of cropping season, Number of people staying in house, Total rice cultivated area, Wet season yield, Use of Urea, Use of KCl, Use of SP36, Share of land owned, Share of land in sharecropping, Share of land rented. With the resulting factorial coordinates, we classified all individuals into a six classes typology with a Hierarchical Ascending Classification. Ten additional variables help describe each of the six categories.



In each category, we calculated the corresponding minimum area for self-sufficiency. This calculation is based on an average consumption of 250 kg of paddy per person per year, valued at Rp 550/kg GKP in 1997 and 1100 for 1998 (see Table below).

Table 4.

Minimum area and class share for self sufficiency	Self sufficiency area for 1997 (ha)	Self sufficiency area for 1998 (ha)	Class share below area for 1997	Class share below area for 1998
Class1	0.44	1.33	33%	80%
Class2	0.15	0.24	0%	0%
Class3	0.28	0.41	18%	31%
Class4	0.66	1.21	36%	78%
Class5	0.15	0.17	3%	3%
Class6	0.22	0.24	8%	8%

We added when necessary a sub-category to take into consideration farm size when relevant.

Class 1 and 1b. **Very small tenants and Tenants.** Population 14%; Land 9%.

This class is present in the Pantura and East Java. A few of these tenants may own also a smaller plot. Yields are slightly higher than the sample average (See Table 2). Most farmers plant three crops

per year on two parcels. They have one or two other agricultural activities and off farm activities. More than 4 people stay permanently in house. In 1998, 1.33 has are necessary to reach self-sufficiency in rice. 80% of the farms are below this threshold. 35% of the farms are under 0.47 ha with an average land area of 0.32 ha (Class 1). This is the farm size where 54% of the farmers cultivate between 0.47 and 2 has, with an average of 0.92.

Class 2. Pantura Big owners. Population 13%; Land 41%.

In this group, yields are 5050 and 2700 kg GKP/ha. These farmers use less Urea and SP 36 and more KCl. They plant two crops per year on at least 2 parcels. They have almost no other activity. A higher proportion of farmers owns a hand tractor. The household's size is under three people at home. All farms are bigger than 0.24 ha, the minimum size for self-sufficiency. The selected farm has an area of 4 ha. It represents the average size of the 88% of farms situated between the extreme values (0.5 and 14.1 hectares.

Class 3 and 3b. Pantura Small owners and Very small owners. Population 26%; Land 18%.

This group of owners has very low yields: 3400 and 2300 kg GKP/ha, associated with a very low use of KCl and less SP36. Other characteristics are similar to the former group though more farmers have off-farm activities. 46% of the farms are between 0.41 and 1.13 ha with an average size of 0.72 ha. In this is the farm size, 31% of the farms are under 0.41 ha with an average size of 0.26 ha. They will be included in the typology as Class 3b. Given their size, all labors except spraying are performed through family or mutual help.

Class 4 and 4b. Sharecroppers and Small sharecroppers. Population 8%; Land 7%

Pantura sharecroppers show very similar characteristics with the former category, but yields for the first season are higher. 78% of the farms are below 1.21 ha, the minimum area for self sufficiency. 54% of the farms are between 0.5 and 1.5 ha with an average size of 0.97 ha. Some 33% of the farms are under 0.5 ha. Their average land size is 0.32 ha. They will be included in the typology as Class 4b. For them, all labors except spraying are performed through family or mutual help.

Class 5. East Java Highly productive diversified owners. Population 18%; Land 12%.

These farmers grow three crops on two parcels with very high yields: 6100 and 4400 kg GKP/ha associated with the highest

consumption of KCl. Besides, they have two other agricultural activities and many have off farm activities. Four people stay in house. 86 % of the farms are between 0.24 and 1.7 ha with an average size of 0.75 ha.

Class 6 and 6b. East Java Small and Very small owners. Population 22%; Land 13%.

This numerous class is made of East Java owners. They grow rice on two parcels. They have three cropping seasons with quite high yields – 5400 and 3600 kg GKP/ha. They use no KCl but they consume more Urea and SP36. They have the highest number of people living in house (4.4). The minimum area for self sufficiency is 0.24 ha corresponding to 8% of the farms. 40 % of the farms are between 0.5 and 1.1 ha with an average size of 0.82 ha. Around 50% of the farms are under 0.5 ha. Their average land size is 0.36 ha.

Class 7. Land-less rice workers.

Wageworkers rent their labor force during the cropping season. According to surveys, this category of households remains the most numerous in the irrigated rice growing Javanese lowlands (CASER 1993). They were not interviewed in IPM survey. However, data used to calculate their economic situation derive from the IPM survey and from other field observation.

This typology confirms the importance of the three following criteria: the land tenure system, the location and the size. In particular, location is associated with quite specific farm structure. Pantura farmers are more specialized in rice than East Java farmers are. Their farms are bigger. However their yields are not as high as in East Java either because they are facing adverse conditions (less fertile soils and more pests – as reported in discussion with farmers during surveys and by enumerators), or because they use less fertilizer, in particular KCl. The 10 final categories include one R 5, dispersed in Pantura and East Java, two R4 in Pantura, and five types of owners, with size and yields as major discriminating factors.

The data obtained from the survey did not permit us to refine the P category into P1, P2 and P3. Nevertheless, this typology gives more insight on the real situation of the Javanese farmers. In the following section we will review how the economic situation of each category has evolved, according to its cost structure, and in relation with yields, size and household consumption.

Changes in farmers' economic situation

Fig 3 and Table 5 below summarize the economic results of each class. First of all, as a confirmation of results on LTS, renters suffer most than other farmers due to the proportionally higher cost of rented land. Due to low yields in the second season, renters could not take advantage of high paddy prices.

Second, a few numbers of farmers have an income level that is much higher than the majority confirming the land and population distribution displayed in Fig 2. These wealthiest farmers represent 30 to 40% of this sample population, and around 60% of the cultivated area. However, given the bias mentioned earlier towards more owner and bigger farmers, it is likely that this proportion is lower in the reality. Given their farm size and/or high yields these farmers are likely to have stored paddy from the wet season harvest and to have sold part of it at higher prices during the second semester of 1998. In that case, their net income increases much more in constant rupiah and they gained from the crisis. This was confirmed by interviews made with big owners.

Third, regional disparities are favoring East Java districts in our sample. There, yields decreased less for the second harvest than in the Pantura area. This is also true for cross categories comparison: the highest the decrease in second harvest yields, the most farmers' purchasing power decreased. This is true for Pantura big owners: the yields decreased by 45% and their purchasing power by 26%. Furthermore, the second season low average yield reflects only partly the situation of farmers who have suffered severe losses. About 10% of farmers in the Pantura sample have harvested less than 1000 kg GKP/ha. Their situation has thus tremendously worsened.

Finally, under adverse conditions smaller owners in Pantura have been able to maintain a higher purchasing power using less hired labor.

These results show the complexity of the impact of the crisis. Without typologies such as the one presented above, it is impossible to predict what will result from the combination of factors such as land tenure system, size, yields and inputs use that are specific to each farm type. It demonstrates clearly that rice farmers in the lowlands, in their majority, did not really benefit from the crisis the way other farmers did elsewhere with other crops.

An important question is whether and how farmer's behaviour will have changed, and what are the consequences. It cannot be fully addressed here, but it deserves further investigation. In fact, the question is whether those farmers who have gained from the crisis will invest part of their additional income in productive activities, or in consumption goods as reported in the case of export crops such as cocoa or spices. Since these farmers grow rice on large areas representing a big part of

the cultivated land, there is hope that the next cropping year will be better. But for the majority of small-scale farmers, it is very unlikely that 1999 yields will rise, at least for two reasons.

Table 5.

Economic results / **Class**	**Net income** 1997 current	**Net income** 1997 constant	**Net income** 1998 current	**Net income** 1998 constant (adjusted)	**Purchasing power**
1. Small tenant	571,056	538,057	617,024	391,965	**-27%**
1b. Tenant	862,776	809,635	547,515	446,230	**-45%**
2. Big owner Pantura	11,120,500	10,397,848	12,699,350	7,665,481	**-26%**
3. Small owner Pantura	1,187,964	1,110,860	1,550,304	878,545	**-21%**
3b. Very small owner Pantura	475,579	447,988	819,832	461,860	**3%**
4. Sharecropper Pantura	686,081	644,182	826,586	557,242	**-13%**
4b. Small sharecropper Pantura	443,936	418,457	587,904	360,186	**-14%**
5. Highly productive owner East Java	2,736,131	2,571,233	4,464,084	2,446,015	**-5%**
6. Small owner East Java	2,134,604	2,014,940	3,673,026	2,032,264	**1%**
6b. Very small owner East Java	1,181,943	1,116,293	1,922,148	1,069,939	**-4%**
7. Land-less rice workers*	720,000	681,429	1,080,000	482143	**-29%**

* 72 working days/season paid Rp. 5000.- a day, meals included in 1997, Rp. 5000 then 10000. in 1998.
Total working days for two cropping seasons.

First, the decrease or stagnation of net income will induce low investment in production factors, in particular in fertilizers and pesticides at the planting time. The government decision to remove fertilizer subsidies in December leading to higher prices coincides with this fall in income, reinforcing the trend to reduce inputs in rice cultivation. As a consequence, pests outbreak will be more likely to happen in areas were smaller farms are encountered such as in parts of Central and East Java.

Then, a shift to other crops is likely to happen, as it can be observed in outer islands such as Sulawesi (cocoa) or Sumatra (shrimp

ponds, spices). But it will be limited due to the lack of capital and due to agro-ecological constraints. Small farmers may turn to vegetables and other secondary crops as a substitute for rice cropping, in particular for the second cropping season in 1999. A low price policy allowing to import white rice from abroad and inducing a pressure towards lower paddy prices would favor such a behavior. It could result in lower than expected harvests and higher imports.

Implications for the future

The crisis had, until now, altogether, a negative effect on small Javanese irrigated rice farmers and land-less workers in the Pantura area and in East Java. Its effects on the wealthiest farmers who have a storing capacity were much more beneficial. Since the Pantura and East Java districts we took as reference are rather representative of the most commonly found aspects of irrigated rice cropping in Java, we can say that the crisis is likely to have accrued social differentiation in rice farming.

Table 4 shows that for the whole sample, in terms of rice self-sufficiency, renters, sharecroppers and Pantura owners with low yields have see their situation worsening. Given the relative weight of each category only 13% of the sample been affected. However, remembering the bias already mentioned it is reasonable to think that in reality at least 20% of the farmers have seen their capacity for self-sufficiency to decrease.

Input policy and low harvests

The difficulty to get fertilizers in the villages, independently to price consideration will threaten the harvest and further reinforce the probability of low yields. It is nation wide reported that fertilizers are difficult to get. It is likely that the production of fake fertilizers or pesticides became a lucrative activity and that these fake products are for sale. This will not only affect the national productivity; farmers will suffer from additional losses and their attitude towards buying inputs may be negatively affected, unless strong warranty of quality is given. Under such circumstances it is very likely to expect a considerable drop in domestic production. Furthermore, in the area where smaller plots are cultivated, such as in East Java for example, there is a higher probability to see farmers not using costly inputs such as pesticides. These area might be more prone to pests attacks, a situation quite different from last year, where the Pantura area was one of the places which most suffered.

For the poorest rice farmers and especially for small scale farmers, in particular in East Java, and in area with similar socioeconomic and agro-ecological conditions, the risk is to see farmers turning themselves towards more lucrative crops in the second rice. Thus, Indonesia's rice production could be affected in two ways: decrease in yields in the most favorable area like Pantura and decrease in the planting area in other locations such as East Java. Consequences would be the need to maintain a high level of imports from abroad and thus a heavier burden on the trade and foreign currency balance.

The lack of control over the input marketing channels is a crucial point to address. Liberalization should not lead to the absence of rules. Systematic control of marketed inputs with certification label can solve partly the fake product problem. However, the problem of reaching targeted population remains to be solved.

Price policy

The increase of paddy farm gate floor price in December from 1000 to 1500 Rp/kg was an adjustment made to the real price paid to the farmers (cf survey results) in September. Increasing paddy and therefore white rice prices will certainly ease the situation of farmers and provide incentives for rice planting. However, it will hit not only urban people but also the most vulnerable rural population of land-less wageworkers as we have seen in the preceding section. Given that international prices are low at the moment due to surpluses proceeding from Thailand and Vietnam, the situation could become very difficult for Javanese farmers. Massive imports of cheap rice could have a beneficial effect on the poorest, if the trading channels transmit price difference up to the consumer. But this would induce a pressure to drop the farm price of paddy. In that case we could see a further strengthening of the current trend were farmers gross income would decrease, but all costs remain the same.

The crucial point here again is the availability and quality of inputs. Increasing floor prices will not result if farmers cannot access to these production factors. In places, were alternative crops cannot or hardly be grown (such as in the Pantura) farmers are very vulnerable. In other places, it is likely that many of them would switch to other more lucrative crops for the second planting season as it can be observed in some East Java villages; for instance almost all farmers interviewed in the Kediri district grow soybean as second crop.

Thus, from a political economics point of view, prospects for recovering from 1998 rice shortage are not good, unless transparent public intervention is made to regulate and control the sector

temporarily. It is likely that farmers have already reduced the planted area and the yields will be low unless very good weather conditions prevail, and pests incidence will not be too strong.

Finally, not only farmers are still threatened. The land-less wage workers represent an important share of the villages' population. It has been estimated to be around 40 to 50% of the households (Susilowati, 1997, p199). Their situation facing adverse scenario such as the reduction of planted area and low yields will worsen. With less area to cultivate their work opportunities will decrease; with lower yields their income paid in paddy will also decrease. In absence of other rural job opportunities land-less workers will face difficult times unless specific emergency measures are taken to provide them with sufficient food. A close and combined monitoring of wage level, inputs cost, yields, and paddy and white rice prices will be necessary for timely intervention.

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