THE DYNAMICS OF WET RICE FIELD FARMING- SYSTEM ORIENTATION IN BLITAR AND TULUNGAGUNG DISTRICTS, EAST JAVA

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ABSTRAK

Pertanian yang dilakukan di lahan sawah tidaklah statis, tetapi terus berubah dan beradaptasi dalam lingkungn yang ada. Penentuan jenis komoditas yang dipilih oleh petani termasuk mengkombinasikan tanaman dan ternak dalam usahataninya terus dilakukan. Dinamika usahatani dalam upaya pemenuhan kebutuhan rumahtangga petani terus mengalami perkembangan. Pengkajian yang dilakukan di beberapa lokasi daerah sawah di dua kabupaten yaitu Blitar dan Tulungagung, Jawa Timur pada musim tanam 2000/2001 memperlihatkan beberapa hal menarik. Sektor peternakan serta perikanan telah menjadi pilihan utama bagi petani di lokasi studi dan mulai menggeser komoditas dominan seperti tanaman pangan dan hortikultura. Hal tersebut dapat dilihat dari kepemilikan asset, alokasi curahan waktu kerja dan struktur sumber pendapatan rumahtangga yang menunjukkan peran subsektor peternakan cukup dominan. Perubahan orientasi dan dinamika usahatani yang terjadi memperlihatkan adanya keinginan kuat dari petani untuk terus menjaga keseimbangan dan keberlanjutan usahatani mereka. Untuk kasus di Blitar dan Tulungagung perubahan tersebut dengan lebih mengandalkan subsektor peternakan di masa yang akan datang.

Kata kunci : *lahan sawah, orientasi usahatani, struktur pendapatan*

ABSTRACT

Lowland agriculture practice is dynamic and changes overtime in accordance with environmental settings. The farmers determine optimal combination of crops and livestock and it is carried out to achieve maximal households' income. The study was implemented in lowland areas of Blitar and Tulungagung districts, East Java province on planting season of 2000/2001. The farmers preferred livestock and fishery sub sectors rather than previous dominant commodities, such as food crops and horticulture. Assets ownership, labor allocation, and structure of households' income sources showed that the role of livestock sub sector was relatively dominant. Orientation changes and dynamics of farming system revealed that the farmers kept sustaining their farm business. Especially in Blitar and Tulungagung districts, changes in farming system orientation rely on livestock sub sector in the future.

Key words*: lowland field, farming system orientation, income structure*

INTRODUCTION

Wetland areas are known only for producing food crops such as rice, corn, soybean and vegetables, while the other potential uses of the land have not yet been seriously considered. In fact, wetland areas are also appropriate for other purposes such as fish and livestock production and their wastes are useful as fertilizer (Reintjes *et al*., 1999).

Rapid development of agricultural sub-sectors is parallel with rapid growth of population leads to increasing pressure on land resources, and in turn it results in low productivity of the land as well as land conversion (Kasryno, 1997). A research conducted by Hermanto (1996) revealed that wetland conversion in Java within the last decade increased from 13,400 to 27,600 ha per year. It is expected that land conversion in Java will continue in the coming years. Further, Rusastra and Budhi (1997) reported that the total

land conversion in Indonesia was about 1.28 million ha, whereas 79.3 percent of it was observed in Java.

According to Hayami and Otsuka (1994), agricultural diversification can be carried out in two ways, namely cultivation of new commodities in unutilized land and increasing the planting intensity as well as change in current intercropping pattern. Integration between crops and animals in certain farming-system should not be regarded only as a random collection of genetic resources (Reintjes *et al*., 1999). Each activity should be selected as appropriate for the specific biophysical, social and economic environments of the farming-system to ensure economic environmental viability.

In a farming-system, activities or varieties are selected to meet the farmers' subsistence needs, sold or used for other purposes of the households (Hutabarat, 1999). Selection of crops or livestock will be dependent on what can be produced by the households or what can be taken from the market considering the quantity, quality and market price of the product as well as services and supply availability (Sadikin, 1982).

Closer investigation of the farmers' environment shows that agricultural practices are not static, instead, they change from generation to generation and adapt to the changes and challenges that the farmers encounter. Rapid changes within the last decade have resulted partly from rapid developments through agricultural research and partly from the increasing demand for food and employment. The recent changes are not only a response to external pressures but also an expression of local community creativity.

It seems the need to change will increase as the economic, technological and demographic conditions change at the farmer level. Product marketing and promotion along with financial constraints have encouraged farmers to seek alternative sources of income beyond their current farming practices (off farm). Furthermore, some farmers are dependent on the other activities beyond agriculture to fulfill their households' needs as well as to sustain their farming activities.

The purpose of this research was to obtain information about the dynamics in farming system practices, especially integration between crops and livestock, in East Java irrigated lands (represented by Blitar and Tulungagung) in terms of farming patterns, production, technological level and source of agricultural information in order to improve their incomes.

METHODOLOGY

The following analysis was conducted in Blitar and Tulungagung districts in order to identify the changes in farming-system activities adopted by wetland rice farmers. These two districts are expected to have the spatial similarities in East Java. The selection of Blitar and Tulungagung in this study is based on the fact that those two regions represent most of the main agro-ecological zones in East Java.

A semi-structured questionnaire survey method was used in this analysis on the field during the last one year (planting season on June 2001). As many as 150 wetland rice farmers in Blitar and Tulungagung were selected to participate in the survey. In Blitar, this survey was carried out in Srengat, Nglegok, Talun, Gandusari and Ponggok sub districts, represented by 30 respondents, while in Tulungagung it was carried out in Gondang and Rejotangan sub districts and was represented by 75 respondents. Secondary information was obtained from annual reports provided by local agricultural services, as well as statistics and previous research publications.

RESULTS AND DISCUSSION

Land Holding and Ownership

In general, land is the most important capital resource in agricultural activities

Table 1. Average Area of Farmers' Owned and Rented Land (ha) in Blitar and Tulungagung, 2001

Land Type	Regency						Total Average		
	Blitar			Tulungagung					
	Owned	Rent, etc.	Total	Owned	Rent, etc.	Total	Owned	Rent, etc.	Total
Irrigated rice field	0.41	0.48	0.89	0.80	0.37	1.17	0.60	0.42	1.03
Rain fed rice field	0.24	0.33	0.57	0.12	0.13	0.25	0.18	0.23	0.41
Unirrigated field	0.40	0.01	0.41	0.27	0.07	0.34	0.34	0.04	0.38
Home yard	1.21	0.16	1.36	0.06	0.00	0.06	0.63	0.08	0.71
Fishpond	0.15	0.03	0.18	0.04	0.00	0.04	0.10	0.02	0.11
Others	0.05	0.04	0.09	0.06	0.00	0.06	0.05	0.02	0.07
Total	2.46	1.04	3.50	1.35	0.57	1.92	1.90	0.80	2.71

(Myers, 1995). Area of land ownership is a good indicator of an activity's scale, production ability and current type of farming (Webster and Wilson, 1980). The survey showed besides existing vast land areas, land holding obtained from rented was almost one half of total land areas managed by farmers (total farmer's owned land was 1.90 ha on average and rented land was 0.80 ha on average). This finding may indicate that owned land is no longer sufficient to fulfill the households' needs or it may suggest that farmers are becoming rich or many have already left the agricultural sector and extra land is available.

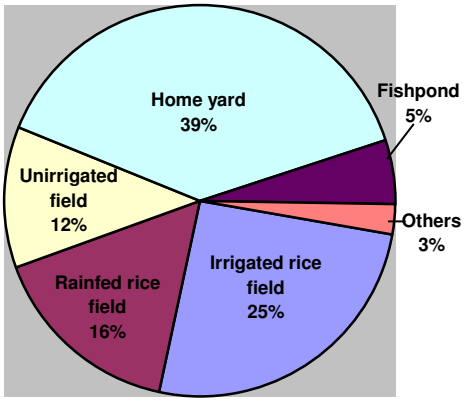


Figure 1. Composition of Land Ownership of Respondents in Blitar, 2001 (%)

Table 1, Figures 1 and 2 show the composition of agricultural land managed by the respondents. Another interesting finding is that average area of fishponds owned by the farmers in Blitar and Tulungagung is 0.18 and 0.04 ha, respectively. Fishponds are found throughout the study in Srengat and Ponggok. In Talun sub district, average fishpond area ownership is 0.35 ha. The comparative value of fishery in these areas is significant and important for the local farmers.

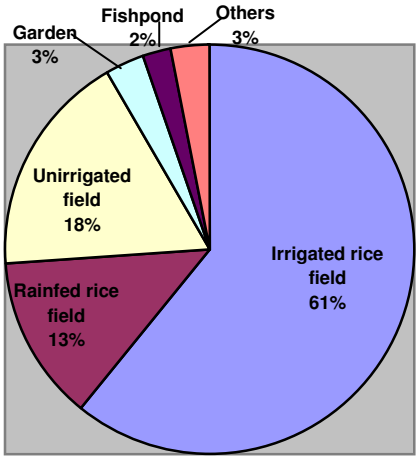


Figure 2. Composition of Land Ownership of Respondents in Tulungagung, 2001 (%)

Livestock development

In Indonesia, livestock sub sector contributes about a quarter of the gross value of agricultural output (Knipscheer *et al*., 1994). Livestock ownership is very common among farmers because livestock and crop cultivation are complimentary. However, the role of livestock in farmers' household income structure is often neglected (Webster and Wilson, 1980). Most of respondents in the two study areas own livestock, namely both large and small ruminants and also poultry as shown in Table 2.

Table 2 shows that the majority of farmers (respondents) in the study areas raise livestock. The dominant livestock types are native chicken, goats and beef cattle, i.e., 85, 55.7, and 44.3 percent, respectively. Sheep (25%) and dairy cattle (21.7%) are also significant. However, the variation of livestock holding in all sub districts both in Blitar and Tulungagung districts is relatively high, possibly due to different natural, social and economic resources as well as different levels of access to marketing and information.

Labor Allocation

Labor requirements and availability are important determinants in farm activities (Flinn *et al.*, 1982). In this survey, information about work-man-day (HOK) needed for cropping and livestock rearing for one year was collected and presented in Table 3.

Total time allocated for livestock production in some sub districts such as in Talun and Ponggok (Blitar district) and Rejotangan (Tulungagung district) is higher than that for cropping. Moreover, the average labor allocation within district, either Blitar or Tulungagung, shows that labor allocation for livestock production is higher than that for cropping (228.4 HOK to 207 HOK in Blitar and 324 HOK to 188.5 HOK in Tulungagung).

Table 2. Average Livestock Holding of Respondents in Blitar and Tulungagung, 2001

Type of livestock	Blitar (heads)	Tulungagung (heads)	Average
Beef	0.6	0.6	0.6
cattle	1.7	0.1	0.9
Dairy	1.0	1.1	1.1
cattle	1.1	0.1	0.6
Goat	3.8	50.0	26.9
Sheep	143.2	0.0	71.6
Layer	22.1	93.9	58.0
Broiler	0.0	1.1	0.5
Native chicken	1.0	1.4	1.2
Local duck			
Manila duck			

Table 3. Labor Allocation for Livestock and Crop Farms for One Year in Blitar and Tulungagung, 2001

Type of activities	Blitar (work-man-days)					Ave-rage	Tulungagung (work-man-days)		Ave-rage
	Srengat	Nglegok	Talun	Ponggok	Gandusari		Godang	Rejotangan	
Agriculture	218	238	142	201	238	207.4	224	153	188.5
Livestock	133	170	247	442	150	228.4	195	454	324.5
Total	351	408	389	643	388	435.8	419	607	513

Table 4. Household Income Structure in Blitar and Tulungagung, 2001

Source of income	Blitar (%)						Tulungagung (%)			Average
	Srengat	Nglegok	Talun	Ponggok	Gandusari	Rata-rata	Gondang	Rejotangan	Rata-rata	
I. Agriculture										
A. Farming-system										
Food crops	15.9	13.3	20.8	3.6	6.2	12.0	17.0	11.1	14.0	13
Horticulture	23.4	4.0	4.5	18.1	3.1	10.6	14.0	4.1	9.1	9.9
Large ruminant	2.0	8.3	5.8	37.7	19.9	14.7	14.1	5.3	9.7	12.2
Small ruminant	2.8	3.6	0.0	0.0	5.5	2.4	2.7	2.4	2.5	2.5
Poultry	3.1	4.6	10.7	4.3	0.3	4.6	1.2	28.1	14.6	9.6
Fishery	0.0	5.1	8.1	0.0	9.0	4.5	0.0	8.6	4.3	4.4
Estate crops	0.3	7.7	5.8	8.3	1.8	4.8	1.0	1.0	1.0	2.9
B. Off Farm										
Labor	8.5	1.6	8.2	10.3	0.9	5.9	25.7	6.1	15.9	10.9
Asset rental	0.8	2.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.3
Others	0.0	1.9	0.0	0.0	2.6	0.9	3.7	12.0	7.9	4.4
II. Non Agriculture										
Trade	0.0	2.2	7.3	8.2	5.2	4.6	10.4	2.5	6.5	5.6
Transportation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Service	0.0	12.5	0.0	3.8	6.0	4.5	1.8	4.2	3.0	3.8
Industrial	0.0	4.8	0.0	5.5	0.0	2.1	4.6	1.9	3.3	2.7
Labor	0.0	5.1	0.0	0.0	4.2	1.8	0.0	0.3	0.2	1
Overseas employment	0.0	23.5	0.0	0.0	32.9	11.3	0.0	7.2	3.6	7.5
Others	43.2	0.0	28.7	0.0	2.3	14.8	3.8	5.2	4.5	9.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100

Therefore, it shows that livestock raising is overtaking cropping as a source of reliable income for farmers in the study areas.

Household Income

The main objective of a productive agricultural activity is to obtain income for the family (Webster and Wilson, 1980). From the survey, income data was constructed from two sources; proportion of household income generated from asset ownership and productive activities performed by household members in both agricultural and non-agricultural sectors (Table 4, Figures 3 and 4). This information will be able to explain the importance of a particular sector or sub-sector to a household economy.

Table 4 (Figures 3 and 4) shows that the proportion of income generated from food crops, horticultures and livestock especially those of large ruminant and poultry are almost equal in the two districts. It shows that farmers in the surveyed areas are no longer relying on a single sub-sector for their households' income. In fact, there are other important sub-sectors

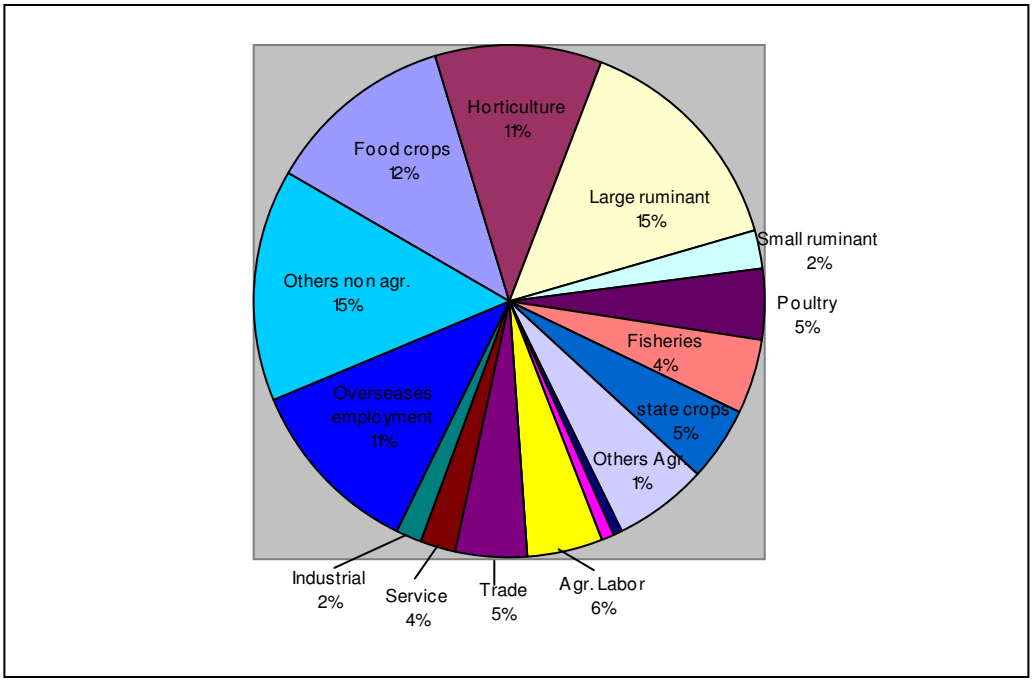


Figure 3. Household Income Structure in Blitar, 2001

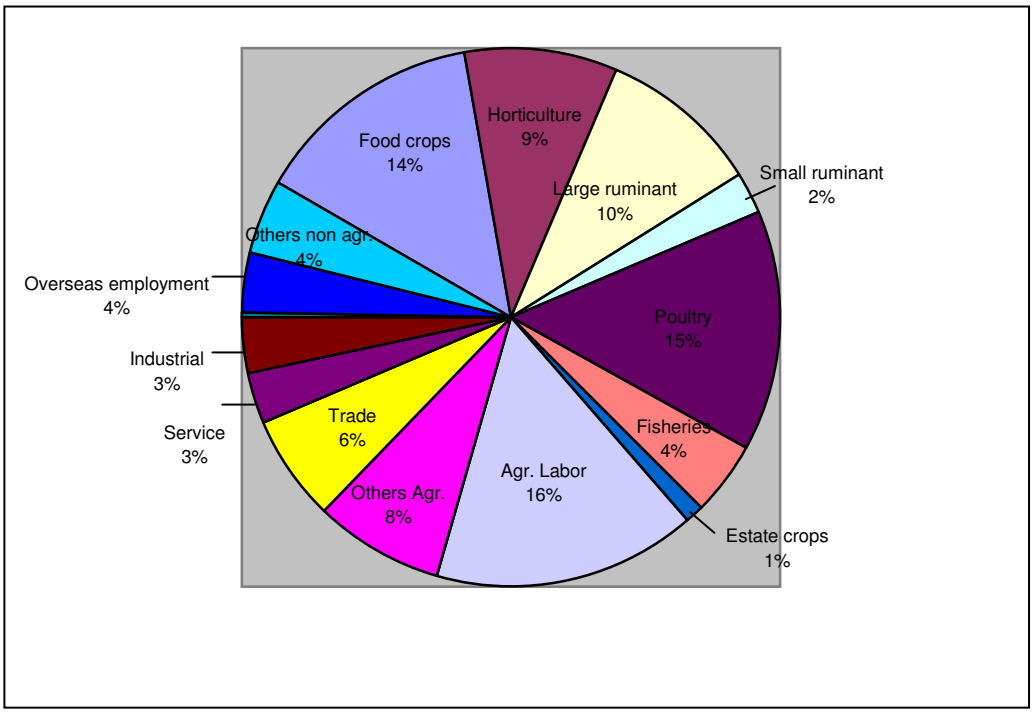


Figure 4. Household Income Structure in Tulungagung, 2001

Table 5. Farmer Perception on Farming System Practiced in Blitar and Tulungagung, 2001

Description	Number	(%)
Perception on the current farming practices:		
a. Extremely satisfied	30	10
b. Fairly satisfied	69	23
c. Less satisfied	72	24
d. Unsatisfied	129	43
Can the produce fulfill households' needs?		
a. Yes	81	27
b. No	201	67
c. Uncertain	18	6
If not, what about extra job in addition to owned production plus?		
a. Enough	204	68
b. Not enough	84	28
c. Uncertain	12	4
The most reliable occupation as the source of income:		
a. Food crop	57	19
b. Horticulture	15	5
c. Livestock	93	31
d. Fishery	54	18
e. Estate crops	6	2
f. On farm labor	15	5
g. Trade	18	6
h. Off farm labor	6	2
i. Industry/services	27	9
j. Overseas employment	6	2
k. Others	3	1
Future plan to improve household welfare		
a. Improvement of farming system	63	21
b. Improvement of livestock raising	171	57
c. Activities beyond agriculture	66	22

showing large contributions to income, for example, fishery, trading, services and labor in agricultural and non-agricultural sectors. All family members in the households have to be able to allocate their resources efficiently to generate income.

Changes in Farming-System Orientation

Essentially, implementation and sustainability of farming-systems are determined by farmers' perception and activity selection (Syafa'at, 1999). Results of the survey indicated that the majority of the farmers (43%) were not satisfied with their current farming practices, while 24 percent were less satisfied. Only 10 percent of farmers were fairly satisfied and 23 percent said that they were extremely satisfied. This finding is related to the fact that 67 percent of the respondents were unable to fulfill their daily needs from their own asset, although 28 percent of them had off-farm sources of income.

Table 6. Farmers' Perception of the Sources of Information and Change in Tulungagung, 2001.

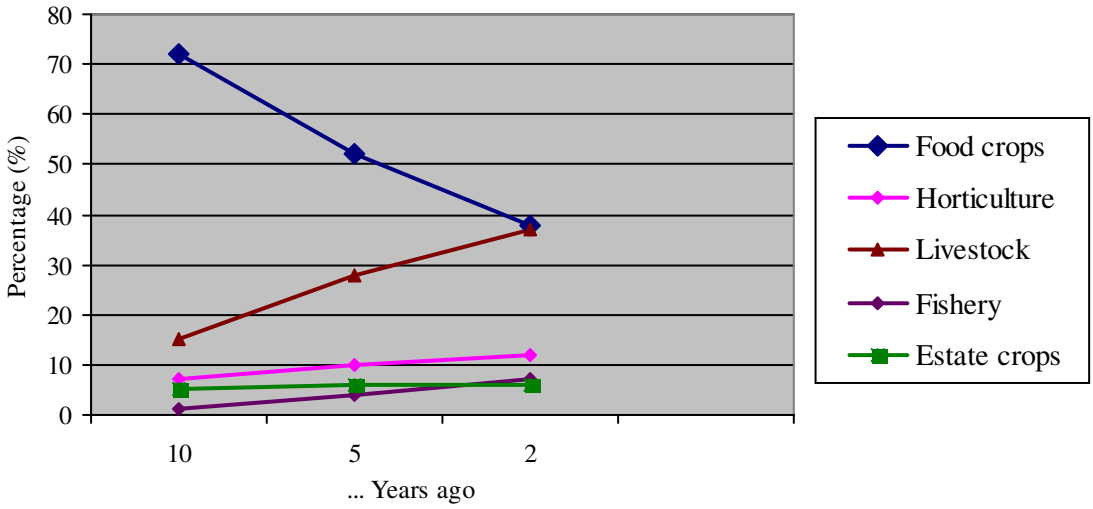
Description	Number	(%)
Source of information about current farm activities:		
a. Mass media (printed and electronic)	12	8
b. Extension agents	15	10
c. Local government officials	6	4
d. Neighboring farmers	61	41
e. Farmers' representatives	17	11
f. Agricultural shops	39	26
g. Others	-	-
Dominant source of agricultural information in the villages:		
a. Mass media (printed and electronic)	16	11
b. Extension agents	23	15
c. Local government officials	3	2
d. Neighboring farmers	53	35
e. Farmers' representatives	26	17
f. Agricultural shops	30	20
g. Others	-	-
Is the land being cultivated decreasing?		
a. Yes	32	21
b. No	118	79
If yes, by how much?		
Average (of point No. 3.a.) = 0.23 ha		

Table 7. Trend of Intensive Grown Commodities in Tulungagung, 2001

Most intensive grown commodities :	in……years ago			Δ change (%)
	10 yr (%)	5 yr (%)	2 yr (%)	
a. Food crops	72	52	38	-34
b. Horticulture	7	10	12	+5
c. Livestock	15	28	37	+22
d. Fishery	1	4	7	+6
e. Estate Crops	5	6	6	+1

Other results indicate that about 31 percent of farmers in Blitar and Tulungagung rely on livestock for their income and 18 percent on fishery. Only 19 percent of farmers still relied on food cropping for their household, while 5 percent relied on horticulture and as off farm agricultural labor 5 percent.

It is possible that in the future, livestock may become the most reliable source of income for most farmers (57%). They stated that in an effort to improve their families' welfare they would take more advantage of livestock. About 21 percent of the respondents stated that they would remain with cropping



Figures 5. Farming System Changes in Tulungagung, 2001

activities and about 22 percent stated that they would work in a non-agricultural sector.

Farming System Changes

A special interview with farmers was carried out in Tulungagung regarding their perception of the changing farming-systems. Information obtained from this interview is very important in assisting the future agricultural development in this region. Tables 6, 7 and Figure 5 present the results of the special interviews undertaken in Tulungagung.

The most important source of agricultural information received by farmers is from neighboring farmers (35%) and from agricultural shops (20%). Other important sources are agricultural extension workers and farmers' representatives ("kontak tani"). Another important observation is the sharp decline of cropping activities in the study areas, and the sharp escalation of production during the last 10 years. Therefore, it will be necessary to establish appropriate responses from all related institutions to facilitate continued agricultural development.

CONCLUSIONS

1. Land suitability, opportunities and access to market, market information, resources availability (labor, knowledge, genetic, etc.) availability of inputs (fertilizers, pesticides, chemicals, water, etc.) lead the farmers to select the income generating activities that fulfill their households' daily needs. In some cases involving in activities outside agricultural sector (especially outside the food crop sub sector) provides farmers to take advantage of excess labor.
2. The livestock sub-sector, especially large ruminants (dairy and beef cattle), poultry (native chicken, layers and broilers) and fishery become priority sources of income for the farmers. Livestock commodities replaced previous dominant commodities such as food crops, horticultural crops and estate crops as the sources of income.
3. Non-agricultural activities such as industrial activities and services including overseas employment are still important sectors especially for farmers who have

insufficient resources to satisfy family needs or those who perceive that the agricultural sector is no longer a reliable source of income.

4. Finally, the major sources of information on which farmers base their decisions to change their farming-systems are neighboring farmers (fellow farmers) and agricultural shops from where they purchase inputs. Extension workers and farmers' representatives are minor sources of information. The results indicate that creativity and self-sufficiency among farmers in the current economic environment are improving.

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