DETERMINANTS OF HOUSEHOLD OFF-FARM LABOR ACTIVITY: THE CASE OF SIX VILLAGES IN CIMANUK RIVER BASIN, WEST JAVA, INDONESIA[1)]

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Abstrak

Didalam pemikiran penganut teori modernisasi, negara-negara berkembang yang sedang dalam proses "memodernisasikan" diri, akan ditandai oleh pergeseran kegiatan ekonomi dari sektor pertanian kesektor non-pertanian, baik dari segi penyerapan tenaga kerja maupun dari segi sumber pendapatan. Studi ini berhubungan dengan pernyataan tersebut diatas; tekanan perhatian ditujukan pada upaya mengidentifikasi apakah perubahan itu nyata terjadi di tingkat desa. Intensitas Kegiatan Kerja Luar Usahatani (Household off-farm labor Intensity-HOFFLI) digunakan sebagai indikator transisi kegiatan pertanian menuju kegiatan non-pertanian. Hasil studi menunjukkan bahwa di tingkat desa, HOFFLI masih didominasi oleh kegiatan-kegiatan di sektor pertanian, sementara pekerjaan utama keluarga masih juga di bidang pertanian. Faktor-faktor yang mempengaruhi HOFFLI secara nyata adalah umur Kepala Keluarga, jumlah anggota rumah tangga, rasio ketergantungan luas penguasaan lahan, penelitian asset produktif, pengeluaran untuk makanan, serta variabel-variabel boneka desa, jenis kelamin kepada keluarga, dan varietas padi yang ditanam. Lepas daripada sektor apa kegiatan luar usahatani dilakukan, ditemukan bahwa kegiatan itu sangat diperlukan adanya. Kegiatan dapat dilakukan didalam desa sendiri, maupun di luar desa dimana petani berada.

Abstract

According to modernization theorists, modernizing countries are characterized by the movement from agriculture to non-agricultural sectors, either in terms of labor absorbtion or income generation. This study deals with that issue, especially to show whether the movement is also found in village level. Household off-farm labor intensity (HOFFLI) is used as indicator of the transition from agriculture to non-agricultural sectors. The findings show that HOFFLI was still dominated by off-farm labor activities in agriculture, while household's main occupation was also still dominated by agricultural. Factors that significantly influence HOFFLI were household head's age, family size, dependency ratio, landholding, productive assets, expenditure for food and dummy variables of village, household head's gender, and variety of rice grown. Regardless of the source of activities, the findings indicate that off-farm labor activities are really needed, either those in the villages themselves, or in the nearby town such as the capital of the sub-district where the villages are located.

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INTRODUCTION

Development and developing countries are the two sides of the same coin for most development theorists; all developing countries are always seeking the best way to develop themselves, either through a specific pattern of development created by their own development agents or by following the patterns that have been implemented by other countries. While Hamilton (1987) analyzes whether the rest of Asia can emulate the Asian newly industrialized countries (Taiwan, South Korea, Singapore and Hong Kong) in developing their economy, Wiarda (1983: 439) asserts the use of "indigenous Third World Development models" as the bases of development in Third World countries, while Daniel Ortega (Time, 2-6-1989: 46) recently stated that he will turn to Scandinavian countries as Nicaragua's model of development. Development in the agricultural sector has also been analysized by different scholars with different approaches. Wallerstein (1976) for example, stated that agricultural development analysis can not be separated from the World-system analysis, especially in relation with the nature of the 'dependency' relationship between the 'core' and the 'periphery'. In the view of modernization theorists, on the other hand, modernization of the agricultural sector should be based on a 'replication' of Western agricultural development. An experience that should be followed is the transfer of labor from the agricultural sector to non-agricultural sectors (industry and services) (Lewis, 1954; Ranis and Fei, 1961; Hwa, 1983). A transition period that deals with the process of labor transfer become an important development phase that needs to be identified carefully. This is especially related with the 'readiness' of the people that are engaged in agricultural activities to change their way of life.

In the case of Indonesia, by mentioning a sizeable proportion of Java's rural households that have little or no access to agricultural land, Birowo and Hansen (1981) stated that many peasant families must seek employment in a diverse range of income producing activities; some involving agricultural wage labor, but a large proportion of their labor involving off-farm activities in small trade, construction, animal husbandry, handicrafts, fishing and other related activites. As observed by White (1981), this "occupational multiplicity" (the necessity for individuals or households to combine several economic activities in order to subsist) becomes a survival strategy for these households; a portion of the household's members has to be farm labor and/or involved in off-farm activites in order to fulfill the household's needs. In this context, and in relation to the notion of landlessness or near-landlesness in developing countries, Sinha (1984) indicates that, given the pressure of population on land, there is a need for creating alternative job opportunities in addition to those in agricultural sphere.

The above description reveals the importance of the role of off-farm as well as on-farm activities in understanding Javanese agriculture, especially in the rice-based agricultural regions. The study will then explore the determinants of household off-farm labor intensity in a region in Java, with more attention paid to sociological analysis of the subject. At the same time, the role of the agricultural sector in Indonesia's development process will be assessed and compared to the model from Modernization theory.

HOUSEHOLD OFF-FARM LABOR INTENSITY: THEORETICAL FRAMEWORK

As described in the introductory section, farmers and their household members might engage in labor activities in order to gain additional income for their household. This labor activities might involve off-farm activities by becoming wage earners working for other farmers, or in off-farm activities outside the agricultural sector; examples of these activities involve small-scale trade, handicrafts, labor in construction activity, or many different forms of 'informal sector' activities. In this study, household off-farm labor intensity (HOFFLI) then refers to the proportion of the household's members that are involved in such an activity.

The description above might be relevant with agricultural economists' models to provide the description of the behavior of agricultural households. The models, Agricultural Household Models, offer a thorough coverage of the behavior, especially in economic terms (Singh *et al.*, 1986). In those models, three basic factors are included: agricultural staples, market purchased goods, and leisure. The utility of those three factors are trying to be maximized, subject to three different constraints faced by the households: cash constraint, time constraint, and production/technological constraint. HOFFLI is closely related to the cash and time constraints, in terms of the effort of the households to overcome their cash inadequacy by taking advantage of their available time. This might be achieved, however, through the expense of less leisure, the member of the household can enjoy. Less family cohesion might be the expense too.

Given the fact that most developing countries' economies are still dependent on agriculture, the development strategy should then focus on agricultural development which will enable national economic growth to take place on a wide front (Arnon, 1981). Surprisingly, according to Gerrard (1983), successful agricultural development will reduce the proportion of the population engaged in agricultural production. Technical progress will enable those remaining to produce larger and larger surpluses, thereby releasing labor for other occupational pursuits. There are two kinds of results of government programs related to agricultural development. If

progress benefits primarily the large landowners, causes a decline in agricultural wages, and forces landless laborers to move to the cities, then the development should be reevaluated. On the contrary, the process of agricultural development would appear to be working when the individual who gained benefit has done so because of his own enterprise and his own capacities once certain constraits to self-realization were overcome, not because he was privileged and he used his privileges to further enhance his position.

The other indicator of success is when the displaced person finds other occupational pursuits, perhaps in an urban area, more suited to his skills and more rewarding than his previous occupation. Cairncross (1980), however, asserts that it is more essential to plan for alternative sources of rural employment such as industry and services in rural centers, which could absorb much of the increase in rural population and at the same time reduce the distance between industries and the source of raw materials. In Taiwan, for example, there is a policy to promote industrialization in the rural area on the one hand, and the expansion of highways and public transportation on the other (Speare, 1988). These two policies simultaneously provide better opportunity for rural people to have off-farm activity without leaving their rural residence. In line with Cairncross, by incorporating the notion of rural development, poverty, population problems and industrial development into the discussion of agricultural development, White (1981: p. 131) concludes that in the case of Java, given the already serious problems of overcrowding and unemployment in Java's rapidly growing urban populations, while there is no clear indication about adequate labor absorption of recent industrial development, the rural population "cannot be viewed as a potential reserve of labor for urban industrial development". Solutions to rural poverty must therefore be sought primarily in the rural economy itself, by activities that are able to generate opportunities for the productive absorption of a growing rural labor force. The success of agricultural development in Japan and Taiwan was characterized by rapid growth of employment opportunities *within* and *outside* the agricultural sector, inside and outside the rural settings (Mukhoti, 1985).

At the household level, employment opportunities within and outside the agricultural sector can be compared to linkages between household's characteristics and their environment. Khandker (1988), for example, found that education, size of farming, family size, distance to market centers, and agricultural wage level are among those variables that influence occupational choice and farmer's input and output decisions in Bangladesh. In the case of rural Java, Rietveld (1986) found that agricultural income and agricultural density (the number of persons per ha. of agricultural land) were two variables that significantly influenced the pattern of non-agriclutural employment. Following Duncan's (1964) formulation of population, organization, environment and technology (POET) in elaborating the notion

of Human Ecology, farm households can be seen as a portion of the community that, together with the other part of the community, make adaptation to the existing organization of the division of labor and the environment, while the adaptation process is conditioned by the level of technology present in the community.

It is shown in the above explanation that HOFFLI is related to many different problem settings. In this study, HOFFLI is proposed to be related to three principal concepts: household social status, control of resources, and achivement motivation. By applying these three concepts, the 'fusion' of the ideas proposed by Modernization theory and dependency theory can then be incorporated in the analysis; the notion of social class or social stratification, for example, is an integral part of the study. Previous studies regarding migration as a form of off-farm activities underlined the importance of this stratified social relation and the imbalance or inequalities in the access to various productive resources (Connel *et al.*, 1976; Mazur, 1984; Julka and Roni, 1988). The model of analysis that will be used in the study is presented in Figure 1.

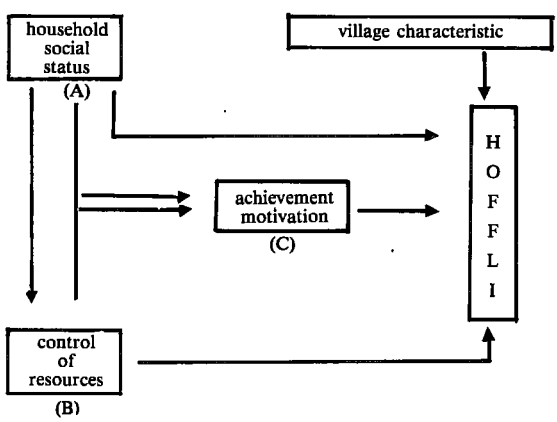


Figure 1. Model of analysis

Note:

(A)	(B)	(C)
1. age	1. assets	1. membership in intensification prog.
2. gender	2. land holding	2. seed cultivated
3. family type	3. expenditure	3. perception on wage and employment
4. literacy	- food	4. expenditure
5. marital status	- energy	- education
6. family size		
7. dependency ratio		
8. main occupt.		

METHODOLOGY

Data Sources

The study will use part of the results of a survey undertaken in 1983 in the Rural Dynamic Study, Agro Economic Survey Foundation, Bogor, Indonesia. The survey covered six villages in Cimanuk river-basin, West Java, Indonesia. The unit of analysis in the study is the household. The Number of households selected for the sample of the study is 312.

Method of Analysis

The dependent variable of the study is household off- farm labor intensity (HOFFLI). The variable is defined as the proportion of household members in the working age (15 – 64 years) that work as farm laborers and/or are involved in other productive off-farm activities, over the number of household members in the working age. The term 'off-farm' will be not suitable for households with main occupation in non-agriculture. It should be noted, therefore, that 'off-farm activities' for those households should be translated into 'secondary occupations' or 'activities other than their main occupation'. The term 'off-farm' will still be used for two reasons. First, the main idea of using this dependent variable is to see the the tendency of the labor movement from agriculture to non-agriculture. Second, it is assumed that agriculture is the main occupation of most of the sample of households so that using the term 'off-farm' is assumed to be relevant with the rural situation.

Each household member was asked to list any kind of work done last year, on-farm and off-farm. In addition, household members were asked to rank the activities according to the length of time they spent on each activity, up to five levels of rank. The activity in the first rank is considered to be the main occupation. The rests are considered as their off-farm activities. The year was divided into seven periods of time, based on the stages of rice cultivation. The periods are: (1) the period of land preparation in the rainy season, (2) the period between land preparation in the rainy sea son and the rainy-season harvesting time, (3) during the rainy-season harvesting time, (4) the period of land preparation in the dry season, (5) the period between land preparation in the dry season the dry-season harvesting time, (6) during the dry-season harvesting time, and (7) the period between the dry-season harvesting time and the rainy-season land preparation. With this periodization, there is a chance that a household member had more than one main occupation and more than one off-farm labor activities.

There are 18 independent variables employed in this study:

1. FAMTYPE – family type

2. HHAGE – household head's age
3. MSTATUS – marital status of household head
4. GENDER – gender of household head
5. HHMNO – family size
6. DEPEND – dependency ratio
7. LITRATE – literacy rate
8. MOCCP – main occupation
9. LAND – landholding
10. PROASSET – % productive asset
11. ENRG – % expenditure for energy
12. FOOD – % expenditure for food
13. EXPEDUC – % expenditure for education
14. WAGE – perception about wage outside the village
15. EMPLOY – perception abouy employment outside the village
16. SEED – rice seeds cultivated
17. INTENS – membership of rice intencification program
18. VILLAG – village dummy.

Concept definitions are presented in the Appendix.

Analysis strategy

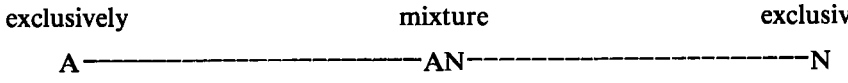
To provide an complete model of analysis, multiple regression analysis will be used as the analysis procedures. The partial as well the overall contribution of independent variables can then be determined.
determined.

Sampling technique

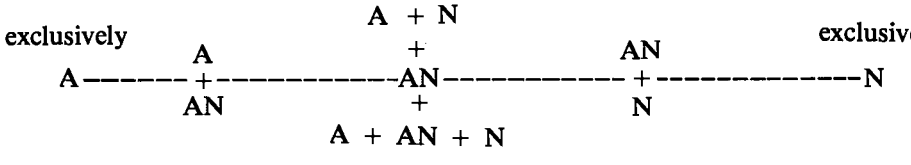
The location of the survey is characterized by dominant rice farms, with relatively a good supply of water and almost similar agroclimate environment. Farm households were drawn from six villages by multi stage stratified random sampling from the upper level sub districts. The sampling is conducted so that the selected villages come from six different ub districts. Those sub districts are in five regencies along the Cimanuk river basin area. An average of 52 households, with a range of 49 – 55, are selected from each villages. They were drawn from four strata based on the hectareage of their own operated land. The strata are less than 0.25 ha, 0.25 – 0.50 ha, 0.50 – 1.00 ha, and more than 1 ha; the number of households in each stratum was attempted to be equal.

HOUSEHOLD OFF-FARM LABOR ACTIVITIES

There are basically three categories of household off-farm labor activities: agriculture (A), non-agriculture (N), and mix between agriculture and non-agriculture (AN). In a continuum line, the three categories can be identified as:



For households with more than 1 household member, there might be some combination of off-farm labor activities. For example, household member 1 is in A, household member 2 is in A, and household member 3 is in AN. For another household, household member 1 is in AN, household member 2 is in N, household member 3 is in AN, and household member 4 is in N. Based on these possibilities, the above three categories can be extended into 5 categories: A, A + AN, AN + N, N, and others (AN, A + AN + N, and A + N). A and A + AN can be grouped as households dominated by off-farm labor in agriculture (I), AN + N and N can be called households dominated by off-farm labor in non-agriculture (III), while AN, A + N and A + AN + N are households in 'gray area' and can be categorized as households with mixed off-farm labor activities (II). There is also the possibility that the household has no off-farm labor activity. The continuum line becomes as follow:



It is also important to include the household's main occupation into the analysis. The household's main occupation can be categorized as being in Agriculture (A) and in non-agriculture (N). Based on the nature of the activities in non-agriculture, those household in non-agriculture are divided into two groups: those engaged in 'non-modern' activities (NN) and those involved in 'modern' activities (NM). Examples of the first category are 'becak' (tricycle) operator and those looking for natural goods (sand, stone, fire wood, leaves, etc.), while examples for the second are minibus driver, construction worker and trader/merchandiser. Again, there exists possibilities of the mixture between the three categories. Households found in this mixture category are A-NN (n = 1), A-NM (n = 28), and NM-NN (n = 1).

The distribution of the households based on their main occupations and their off-farm activities is presented in Table 1. Due to its small number (n = 1), household in A-NN category is combined with those in A category, while household in NM-NN category (n = 1) is combined with household in NM category. Table 1 shows that household in N category of main occupation can be combined with those

Table 1. Distribution of households (%) based on main occupation and off-farm activities (n = 312)

main occ. / off-farm	N	A + (A − NN)	AM	M + (NM − NN)	total
I (A)	0	43	7	0	34
II (AN)	40	22	32	14	22
III (N)	40	21	54	75	30
IV (no off-farm)	20	14	7	11	14
T o t a l	100	100	100	100	100
	(5)	(242)	(28)	(37)	(312)

Note: A – agriculture
N – non-agriculture
NN – "non-modern" activities
NM – "modern" activities.

in A category, while M + (NM-NN) can be merged with AM category. The main occupation can then distinguish those in with main occupation in agriculture and those in non-agriculture, as shown in Table 2.

Table 2. Distribution of households based on combined main occupation and off-farm activities (n = 312)

off-farm / main occ.	I (A)	II (AN)	III (N)	IV (no off-farm)	total
A	98	80	55	86	79
N	2	20	45	14	21
T o t a l	100	100	100	100	100
	(106)	(69)	(95)	(42)	(312)

Note: a) A – agriculture
N – non-agriculture
NN – "non-modern" activities
NM – "modern" activities.

b) As it had been mentioned in the Methodology section, the term 'off-farm' for those with main occupation in non-agriculture should be considered as the 'secondary' or 'other' occupations.

HOUSEHOLD OFF-FARM LABOR INTENSITY

As stated before, household off-farm labor intensity (HOFFLI) is defined as the proportion of household members in the working ages that work as farm laborers and/or are involved in other productive off-farm activities. Household members in the the working ages are those in the age of 15 – 64. The HOFFLI for each village is presented in Table 3.

It is shown that most households in each village were involved in off-farm labor activities with the intensity between 51 – 100%. It was also found that there were household members with the age less than 15 years and/or more than 64 years that involved in off-farm labor activities. This might be related to the idea of 'demand for children' and the 'instrumental benefit' of having more and more children for families in rural areas (Darroch *et al.*, 1981). It also indicates that the uneed for additional income from occupations other than the main occupation of the households in the village studied is quite high.

RELATIONSHIP BETWEEN HOFFLI AND OTHER SOCIO-ECONOMIC VARIABLES

Multiple regression analysis was employed to provide overall analysis on the relationship between HOFFLI and all independent variables simultaneously. When binary regression analysis is done by ignoring the role of the other independent

Table 3. HOFFLI for the six villages studied

Village	HOFFLI				N
	0 – 25	26 – 50	51 – 100	total	
	..... %				
Wargabinangun	11	21	68	100	53
Lanjan	8	13	79	100	52
Gunungwangi	22	10	68	100	50
Malausma	13	4	83	100	55
Sukaambit	37	14	49	100	49
Ciwangi	25	34	41	100	53
T o t a l	19	16	65	100	312

variables in explaining dependent variable, multiple regression analysis is considering those other variables, and keeps them as constants when the role of an independent variable is to be identified (Agresti and Agresti, 1981).

There are three different analysis done for this purpose. First, the multiple regression between HOFFLI and all independent variables, except variables perception on wage and employment outside the village. This was due to the small number of respondents responded to the question related to those two variables (65 out of 312 respondents). The results of the analysis were presented in Table 5. Second, the regression between HOFFLI and all independent variables. In this case, the number of observation was only 65. The results, however, will not be considered important, because of the limited number of observation that can be included. Table 6. presented the results of this analysis. Finally, the regression between HOFFLI and all independent variables other than perception on wage and employment, plus interaction between some selected variables. The interactions were between variable main occupation and all other independent variables other than perception on wage and employment, and among continous independent variables. This is done especially to test whether the household main occupation interacts with other variables. The results are presented in Table 7.

Table 5. The results of multiple regression analysis

$R^2 = 0.3572$

variables	b or direction
VILLAG	2>4>3>1>6>5*
MOCCP	non-ag. > ag.
MSTATUS	widowed > married
FAMTYPE	nuclear > extended
GENDER	male > female***
SEED	trad. > HYVs***
INTENS	non memb. > memb.
HHAGE	−0.66*
HHMNO	−3.30**
LAND	−17.49*
LITRATE	0.07
PROASSET	0.21*
FOOD	0.46**
EXPEDUC	−0.17
ENRG	0.10
DEPEND	12.41*

*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.10 level

Table 6. Results of regression analysis with variables perception on wage and employment

$R^2 = 0.6682$

Variables	b or direction
VILLAG	4>2>3>1>5
MOCCP	non ag. > ag.**
MSTATUS	married > widowed
FAMTYPE	nuclear > extended
GENDER	female > male
SEED	HYVs > trad.***
INTENS	non member > member
WAGE	H > S > L
EMPLOY	S > L > H**
HHAGE	−0.18
HHMNO	−8.58*
LAND	−9.67
LITRATE	−0.03
PROASSET	−0.11
FOOD	0.02
EXPEDUC	−0.14
ENRG	−0.18
DEPEND	11.07

*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.10 level

The results of the multiple regression analysis show that village variable was significant. Among household social status variables, gender of household head, household head's age, the number of household members, and household dependency ratio were significantly related to HOFFLI. The other variables in this category were not significant. Among control of resources variables, landholding, the percentage of productive assets, and expenditure for food were significantly related to HOFFLI. With regard to variables in achievement motivation category, only variable rice varieties planted that was significantly related to HOFFLI.

In terms of interaction among variables, interaction between the household main occupation and the other variables were not significant, except its interaction with household head's age. Because variable household head's age was significant in explaining HOFFLI in the multiple regression without interaction, the interaction between both variables can then be ignored. This indicates that the multiple regression analysis without inter action is adequate to describe the relationship between HOFFLI and the proposed independent variables.

Table 7. The results of multiple regression analysis with interaction

R^2 = 0.3707

Variables	b or direction
VILLAG	4 > 2 > 3 > 6 > 1 > 5
MOCCP	non ag. > ag.
MSTATUS	widowed > married
FAMTYPE	nuclear > extended
GENDER	female > male*
SEED	HYVs > trad.*
INTENS	non member > member
HHAGE	−4.44***
HHMNO	−1.97**
LAND	−2.58**
LITRATE	−0.14
PROASSET	−2.66***
FOOD	1.54
EXPEDUC	−1.33
ENRG	−0.31
DEPEND	3.02***
HHAGE*MOCCP	2.17**
HHMNO*MOCCP	−0.11
LAND*MOCCP	0.44
LITRATE*MOCCP	−0.09
PROASSET*MOCCP	−0.87
FOOD*MOCCP	0.73
EXPEDUC*MOCCP	0.43
ENRG*MOCCP	0.14
DEPEND*MOCCP	0.00

*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.10 level

The result of the multiple regression analysis including variables perception on wage and employment shows that perception on employment influenced HOFFLI significantly at 0.05 level, while perception on wage was not significant. This might be seen as an indication of the presence of "disquised unemployment" in village level, where wage is not the major consideration in choosing off-farm activities. There were also some major changes in the other variables, compared with regression analysis without those two variables. Because of the problem of unadequate observation, the two results should be considered uncomparable.

Based on the above discussion about the results of the study, some limitation of the study that should be mentioned are: (1) there were no detail description about the village economic activities. Employment opportunities available in the village an in the regions next to the village were then not be able to be identified; (2) the analysis was based on if on one-year employment situation. The influence of seasonality aspects was, to some extent, ignored; and (3) no further information on man-land ratio in each village. This is important to identify whether there is still opportunity to extend agricultural activities in the village.

CONCLUSION AND POLICY IMPLICATION

According to modernization theorists, the modernization process in developing countries will be characterized by the movement of labor and employment from agricultural to non-agricultural sectors, as it happened in the now-developed countries. The problem with this theory is whether the process should occur only at the macro level, where the state or country is the unit of analysis, or also at the micro level, where, for example, the village or household is the unit of analysis. This study is part of the effort to answer the question whether labor and employment movement in the context of modernization theory is also happened in the micro level, where the household is the unit of the analysis. In this study, household off-farm labor intensity (HOFFLI) is proposed to be a 'transition' indicator of labor movement from agricultural to nonagricultural sectors.

Village as a dummy variable was found to significantly influence HOFFLI. This indicates that locality characteristics cannot be ignored in analyzing labor-related issues. This might be related to different village environments in terms of village accessibility, village economic activities, resource availability and factors related to village population. A further analysis on village accessibility indicates that it is also influential to HOFFLI; distance to urban centers was positively related to HOFFLI, while road quality was negatively related to it.

The results of the multiple regression analysis showed that the number of household members, household dependency ratio, and expenditure for food were significantly related to HOFFLI. These three variables can be grouped into a new group called 'survival motivation' variables. In connection with HOFFLI, it can be concluded that 'survival motivation' is much more dominant than achievement motivation. A further conclusion based on these facts is that households' lives in the villages studied were still dominated by the nature of subsistence; due to their lack of resources, people mainly struggle to survive, while hoping to achieve a higher standard of living.

The household main occupation was not significant, while membership in intensification programs was not either significantly related to HOFFLI. With regard to the fact that variable rice seed cultivated was significant, a further question about the importance of rice intensification programs should be raised; the use of high yielding varieties of rice will be more likely related to fewer need for off-farm activities, regardless of the membership of the intensification programs.

All in all, the subsistence-level of the households in the study area leads to the conclusion that, in rural areas, the sectoral movement from agriculture to non-agriculture is not as clear as proposed by modernization theorists. HOFFLI, proposed as an indicator of the transition process, was still dominated by off-farm labor activities in agriculture, while the household's main occupation is also still dominated by agriculture. In responding to this situation, modernization theorists will still argue that through time, the sectoral movement will occur. On the other hand, dependency theorists argue that dependency still colors rural-urban relationships, agricultural and nonagricultural sector relationships, and other periphery-core relationships. As an alternative, the realists (if one is permitted to borrow the term from political scientists) will argue that it is the efforts of those involved in the movement process that will determine the results. The case of South Korea's industrialization process is a good example of the implementation of realists' theory.

An important implication of the study is that the efforts to increase agricultural production and productivity need to be reinforced, with special attention to the small-scale farmers; due to their lack of access to resources, their 'survival motivation' is much more dominant than their achievement motivation. The efforts should then be directed toward improving their access to resources, without widening further the gap between small farmers and larger farmers in term of that access to resources. In dealing with this effort, Rogers (1983) warned, however, that the widening gap might be unavoidable, because there is no reason to control larger farmers from moving to a better situation. Designing policies and measures that pay more attention to small farmers should then be prioritized; agricultural extension workers, for example, should spend their attention and time more on small farmers rather than devoting their efforts to just reaching the targeted objective of covering more and more farmers, regardless of their farm size. Credit policies and other efforts to enhance farmers' access to resources should also be directed toward those small farmers.

Related to the above implication is the insignificant relationship between membership in intensification programs and HOFFLI, while the use of rice seed varieties was significant. This implies that assisting small farmers is not necessarily in the form of formal institution such like those rice intensification programs; as long as access to resources and openness to information related to agricultural produc-

tion are available to them, those programs should not necessarily be enforced. It is better to convince them that using high yielding varieties will absorb more family labor and, hopefully, will provide greater income rather than to force them to be a member of one of the intensification programs.

That the number of household members and the household dependency ratio significantly related to HOFFLI implies that population policies to reduce the rate of population increase need to be introduced; this means that the household size should be getting smaller in the future.

A major handicap faced by agricultural as well as nonagricultural sectors in rural areas is accessibility; only two out of the six villages studied have asphalt roads, and only three villages have access to a minibus as public transportation facilities. The study found, however, that these factors did not prevent the households from having off-farm labor activities, inside and outside the village.

The finding indicates that off-farm labor activities are really needed. This could be a good basis to develop policies to create job opportunities, either in the villages themselves, or in the nearby towns such as the capital of the sub-district where the villages are located. Relatively intensive investments, though, are needed for this purpose, as mentioned before by Costello *et al.* (1987). This could be in the form of constructing connecting roads and other transportation facilities and developing the nonagricultural industries themselves.

The choice of the policy makers is whether continuing the policies of locating industries in urban industrial estate areas, with the consequence of ever increasing rural-to-urban migration, or redirecting them to be located in rural areas so that the influx of people to the already crowded urban areas can be slowed down. This might be a real dilemma for the policy makers, especially in the situation of the lack of adequate funds for development. Intermediary actions, however, can be considered to be implemented; those are in the form of small-scale rural industries, or creating rural-urban industrial linkages, for example, by locating the production of industrial components in the rural areas and using urban industries only for assembling manufacture. The success stories of Japanese and Taiwanese industrialization might be good comparisons (Speare *et al.*, 1988; Smith *et al.*, 1985).

BIBLIOGRAPHY

Agresti, Alan and Barbara F. Agresti 1979 Statistical methods for the soc ial sciences. Dellen Publishing Company. San Fransisco. Cal.

Arnon, I. 1981. Modernization of agriculture in Developing Countries: resources, potentials and problems. John Wiley & Sons. New York. N.Y.

Birowo, AT., and Gary E. Hansen, 1981. "Agricultural and rural development: a review". In GE Hansen (ed.) Agricultural and rural development in Indonesia. Boulder, CO: Westviews Press.

Cairncross, John, 1980. Population and Agriculture in Developing Countries. FAE Economic and Social Development Paper. FAO. Rome.

Connell, J., B. Dasgupta, R. Laishley, and M. Lipton, 1976. Migration from rural areas: the evidence from village studies. Delhi, India: Oxford Univ. Press.

Costello, Michael A., Thomas R. Leinbach and Richard Ulack. 1987 Mobility and employment in urban Southeast Asia: examples from Indonesia and the Philippines. Boulder, Col: Westview Press.

Darroch, R.K., P.A. Meyer, and M. Singarimbun. 1981. Two are not enough: the value of children to Javanese and Sundanese parents. Honolulu: East-West Centre.

Duncan, Otis D. 1964. "Social organization and the ecosystem." In Robert Faris (Ed.). Handbook of modern Sociology. Rand-McNally. Chicago. Ill.

Fei, J. C. H. and Gustav Ranis. 1964. Development of the labor surplus economy: theory and policy. Irwin. Homewood. Ill.

Gerrard, Christopher D. 1983. Promoting Third World Agriculture: Lessons of Recent Experience. The North-South Institute. Ottawa, Can.

Hamilton, Clive. 1987. "Can the rest of Asia emulate the NICs ?". Third World Quarterly IX/4: 1225-1256.

Hunter, Guy (Ed.). 1978. Agricultural development and the rural poor. Ottawa, Can.: Overseas Development Institute.

Hwa, Erh-Cheng. 1983. The contribution of agriculture to economic growth. The World Bank staff papers no. 619. The World Bank. Wasington. DC.

Julka, A. C. and R. N. Roni. 1988. "Inequalities of Income, landownership and associated assets among cultivating households of Punjab: an exercise in Determinant Decomposition." Indian Jo. of Agr. Economics XLIII(2):115-125.

Khandker, Shahidur R. 1988. "Input management ability, occupational patterns, and farm productivity in Bangladesh agriculture'. The Journal of Developing Studies XXIV/2: 214-231.

Lewis, W. Arthur. 1954. "Economic development with unlimited supplies of labor". Manchaster School of Economic and Social studies 22(2): 139-91.

Mazur, Robert E. 1984. "Rural out-migration and labor allocation in Mali". In C. Goldscheider. Rural migration in developing nations. Boulder, CO: Westview Press.

Mukhoti, Bela. 1985. Agriculture and Employment in Developing Countries. Westview Special Studies in Social, Political and Economic Development. Westview Press. Boulder, Col.

Rietveld, Piet. 1986. "Non-agricultural activities and income distribution in rural Java". BIES 22 (3): 106-117.

Rogers, Everret M. 1983. Diffusion of Innovations. Third Ed. New York, NY: The Free Press.

Singh, Inderjit, Lyn Squire, and John Strauss (eds.). 1986. "Agricultural household models: extensions, applications, and policy." Baltimore, Md.: The John Hopkins University Press.

Sinha, Radha. 1984. Landlessness: a growing problem. FAO Economic and Social Development Series no. 28. FAO. Rome.

Smith, Michael, Jane McLoughin, P. Large, and Rod Chapman. 1985. Asia's new industrial world. London: Methuen Co.

Speare, Alden, Paul K. C. Liu and Ching-lung Tsay. 1988. "Urbanization and development: the rural--urban transition in Taiwan". Brown University Studies in Population and Development. Boulder. Col.: Westview Press.

Time. 1989. "Sending signals-or smokes?". Feb. 6, 1989: 46.

Wallerstein, Immanuel. 1976. The modern world-system: capitalist agriculture and the origins of the European world-economy in the sixteenth century. Academic Press. London.

White, Benjamin. 1981. "Population, involution and employment in Rural Java." Pp. 130-146 in Gary Hansen (Ed.). Agricultural and rural development in Indonesia. Westview Special Studies in Social, Political and Economic Development. Westview Press. Boulder. Col.

Wiarda, Howard J. 1983. "Toward a nonethnocentric theory of development: alternative conceptions from the Third World". The Journal of Developing Areas 17: 433-452.

Appendix

Family Type (FAMTYPE)

There are two family type among the households: nuclear and extended. The household are categorized as nuclear family when the family consists of parent(s) and their child(ren). A family without child(ren) is also considered to be in this category. When the family has other member(s) in addition to the parent(s) and their child(ren) then it is categorized as extended family.

Household head's age (HHAGE)

Household head's age at the time of the survey is measured in years.

Maritas status (MSTATUS)

There are two type of household head's marital status: widowed and married; no other marital status found as the sample of the study. Combined with whether there are child(ren) in the household, four categories of marital status will be used in the study: (1) widowed with no child, (2) widowed with child(ren), (3) married with no child, and (4) married with child(ren).

Household's head gender (GENDER)

Household's head gender is either male or female.

Family size (HHMNO)

Family size refers to the number of household member(s). In this case, household member is defined as the member of the household that belong to the unit of household consumption (i. e. that eat from the same kitchen). Included as household members are: (1) schooling members in town/city on the spend of the household, and (2) others that regularly take meals in the household, even though they do not sleep in the house. Members of the household that migrate on a circulation basis are also included as household members, as long as they stil eat from the same kitchen. Excluded as household members are others that stayed in the house but not took meals from the same kitchen.

Dependency ratio (DEPEND)

Dependency ratio is defined as the number of household member(s) not in the working age (0 – 14 and 65 + years) devided by the number of household members in the working age (15 – 64 years).

Literacy rate (LITRATE)

The assumption is that any household members who attended at least three years of elementary school, whether he/she finished the school or not, is literate. Literacy rate is then defined as the proportion of household member(s) aged 12+ that attended a minimum of three years in elementary school.

Main occupation (MOCCP)

The main occupation of the household is differentiated into agriculture and in non-agriculture activities. This variable is related with the *dominant* main occupation of the household member(s) that work.

For households with more than one member that work, two criteria are used: (l) the proportion of the number of household members that work according to their main occupations. For example, when there are three household members that work, two of them with agriculture as their main occupation, then the main occupation of the household is agriculture. (2) When the proportion is equal, the time spent for the occupation is used as the weight factor. This is employed, for example, for household with four members that work, two of them are in agriculture and the other two are in non-agriculture. When the time spent for those two in agriculture is longer than the time spent for the other two in non-agriculture, then the main occupation of the household is agriculture.

Landholding (LAND)

There are two types of land operated by the households, rice field (sawah) and dry land. To combine those two qualitatively different types of land into one category, the hectarage dry land is conversed to be equal to half of the hectarage of rice field.

The landholding per capita used in this study is the hectarage of land operated by the household devided by the number of household member(s) in the working age.

Productive Assets (PROASSET)

Productive assets is defined as the proportion of the total households assets that are able to be utilized in productive activities. Among these assets are livestocks (cow, sheep, duck, etc.), transportation facilities (truck, motorcycle, bicycle, etc.) and agricultural equipment (tractor, sprayer, plough, etc.).

Expenditure for energy (ENRG)

Expenditure for energy is the proportion of total expenditure spent for energy (fire wood, kerosene, gas, electricity, etc.).

Expenditure for food (FOOD)

Expenditure for food is the proportion of total expenditure spent for food (rice, meat, snack, etc).

Expenditure for education (EXPEDUC)

Expenditure for education is the proportion of total expenditure spent for educational purposes (books, tuition, transportation cost to go to school, etc.).

Perception about wage and employment outside the village (WAGE & EMPLOY)

These variables is especially designed for household member(s) that are involved in off-farm labor activities outside the village as commuter(s). They were asked about their perception on wage rate and employment opportunities outside the village, i.e. whether they are lower, similar, or higher.

Rice seeds cultivated (SEED)

There are three categories of households regarding this variables: (l) households that do not grow rice, (2) households that grow rice and use high yielding varieties (HYVs) of rice, and (3) households that grow rice but do not grow HYVs.

Membership in rice intensification program (INTENS)

There are three categories of households regarding this variables: (l) households that do not grow rice, (2) households that grow rice and participate in rice intensification programs (BIMAS, INMAS, INSUS or OPSUS), and (3) households that grow rice but do not participate in rice intensification program.

Village characteristics

Distance to urban centers

The distance to urban centers is measured in kilometer. Two urban centers are included, tha sub-district capital and the district capital. These two variables were used as proxies of the distance from household's residence to the two urban centers.

Road quality

Three different road qualities are included: dirt, gravel, and asphalt.

Major transportation facilities

Three different transportation facilities are included: on foot, 'becak' (man-operated tricycle), and minibus.

Other general village characteristics

Due to the lacks of detailed data about the other village characteristics, such as village-level industries, that might influence HOFFLI, dummy variables will be used to represent differences in village characteristics.