

BACKGROUND PAPER

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**The Role of Rural Labor Markets in
Poverty Reduction: Evidence from
Asia and East Africa**

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Abstract

By using long-term panel data sets of rural households in the Philippines, Thailand, Bangladesh, and India and cross-sectional data sets in Kenya, Uganda, and Ethiopia, we examine the roles of labor markets in long-term poverty reduction in Asia in comparison with the current situation in East Africa. First of all, we find that the reliance on agricultural labor markets alone will not reduce poverty to a significant extent, in view of the declining share of agricultural wage income in Asia and its negligibly low level in East Africa. Second, an increased non-farm income is a decisive factor in reducing rural poverty, as it has reduced the income gaps between the land-rich and land-poor households, between the educated and uneducated workers, and between less and more favorable agricultural areas. Third, labor markets are clearly segmented in accordance with the schooling levels, which critically affect occupational choice and non-farm income of rural labor force.

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1. Introduction

Rural labor markets consist of farm and rural non-farm labor markets, which are linked with urban labor markets through inter-regional migration. The skill requirements and wages are vastly different among these labor markets. Moreover, non-farm labor markets are dynamically changing and, hence, their relative importance changes over time and differs substantially among developing countries and across regions even within a country (Haggblade, Hazell, and Reardon, 2006; Reardon et al., 2006; Lanjouw and Lanjouw, 2001). Indeed, long-term rural household data collected in selected Asian countries demonstrate the remarkable growth of non-farm labor income in recent years (Walker and Ryan, 1990; Jarayanan and Lanjouw, 1999; Hayami and Kikuchi, 1999; Estudillo and Otsuka, 1999; Quisumbing, Estudillo, and Otsuka, 2004; Lanjouw and Stern, 2004). Since the livelihood of the rural poor depends critically on labor income, how rural labor markets function and how their functions change over time are critical issues in the analysis of rural poverty.

Even in Sub-Saharan African countries, where traditionally land is considered to be relatively abundant, land is becoming a scarce resource because of the rapid population growth and slow economic transformation (Otsuka and Place, 2001; Jayne

et al., 2003). The shrinking land availability per farm population pushes working members of land-poor households into non-farm activities, especially in urban metropolises and rural towns. Thus, it appears that the role of labor markets in poverty reduction is no less important in Sub-Saharan Africa than in Asia. Although there are many studies on poverty dynamics over short periods (e.g., Dercon and Krishnan, 2000; Adato et al., 2006; Peters, 2006), a long-term strategy for moving out of poverty is not clear for households in Sub-Saharan Africa. Thus, the lessons from the poverty reductions in Asian countries would be valuable.

In this background paper, we attempt to identify (1) how the characteristics of different segments of labor markets differ in terms of skill requirements and returns to labor, (2) how returns to labor change over time, and (3) how the quality of labor changes by means of investment in human capital, which enhances the returns to labor for the next generations. Specifically we examine the following hypotheses. First, agricultural wages are comparatively low and their income share is either declining or non-significant. Second, poverty has been declining, particularly among the landless and small farmers in agriculturally marginal areas, owing to the increasing importance of non-farm labor earnings. Third, agricultural, rural non-farm, and urban labor markets are highly segmented in accordance with the skill requirements, which are

reflected in the significant differences in the schooling levels of workers engaged in the different labor markets.

In order to test these hypotheses postulated above, we use four long-term panel data sets from Southeast and South Asia and three cross-county data sets from East Africa. These data sets have been used by five studies, which will appear in a special issue of *Agricultural Economics* (Estudillo, Sawada, and Otsuka, 2006; Cherdchuchai and Otsuka, 2006; Nargis and Hossain, 2006; Kajisa and Palanichamy, 2006; and Matsumoto, Kijima, and Yamano, 2006). The four Asian studies analyze long-term changes in labor income and poverty in rural villages in the Philippines, Thailand, Bangladesh, and India. The East African study collected comparable information about labor income and poverty in Kenya, Uganda, and Ethiopia.

The next section provides more detailed information about the data sets used in this background paper. Section 3 describes the characteristics of agricultural labor markets, which have only limited roles in increasing household income in rural areas. As economies develop, non-farm labor markets expand in both urban and rural areas. Thus, in Section 4, we examine how fast non-farm labor income has increased in Southeast and South Asia over the last few decades and compares the Asian experience

with the current situations in East Africa. Section 5 discusses investment in children's education, which is necessary for them to obtain lucrative non-farm jobs when they enter labor markets. Finally, we conclude the paper with policy implications in Section 6.

2. Data

To investigate the long-term changes in rural incomes and the incidence of poverty in Southeast and South Asia, we use long-term panel data sets of rural households that cover the last two decades. Table 1 summarizes the basic information about the data sets used in this paper. In the Philippines, we use data from randomly selected 447 households in two villages each in Central Luzon and Panay Islands (Estudillo, Sawada, and Otsuka, 2006). These households were interviewed in 1985 for the first time and have been interviewed several times since then. In this paper, we use the sample survey data in 1985 and the most recently collected census data in 2004. In Thailand, 295 households in three villages each in Central Plain and North Eastern Provinces were interviewed in 1987 and 2004 (Cherdchuchai and Otsuka, 2006). Since landless households were very few in Thailand the 1980s, they were not included in the 1987 survey. In the Philippines and Thailand, the latest rounds of the surveys

have collected personal information of permanent migrant workers who have left the sample villages. Thus, they can provide accurate information about the education and income levels of migrants.¹ The Bangladesh panel data cover most parts of the country and collected information from randomly selected 1,239 households in 1988, 1,872 households in 2000, and 1,927 households in 2004 (Nargis and Hossain, 2006). The data sets from the Philippines, Thailand, and Bangladesh are basically panel data, with replacement of households whose heads passed away and left by their successors. We use the pooled cross-section data collected every year in Tamil Nadu in India in 1971-80, which are later replaced by three-year rotating panel data in 1981-2003 (Kajisa and Palanichamy, 2006). Note that the Indian data use stratified random sampling based on farm size and only include farmers who own land, excluding landless households. Thus, the income share from agricultural wage would be underestimated in this paper compared with results from other studies that include landless workers, e.g., Lanjouw and Shariff (2004).

In the panel data from Asia, we find large reductions in farm size of farm households, excluding the landless, and increases in the proportion of landless

¹ In the Philippines, Kajisa (2007) investigates determinants of migration by surveying migrants who left their home villages and shows that personal networks help villagers to find jobs in certain non-farm sectors and to increase their wages.

households (Table 2). For instance, in the Philippines, the average farm size was 1.0 ha in 1985 but decreased to 0.76 ha in 2004. During the same period, the proportion of the landless households has increased from 22 to 44 percent. The changes are more drastic in Thailand, whereas similar but more modest changes are also found in Bangladesh. Because the Indian data use stratified random sampling based on farm size and exclude landless households, as explained before, we present the data on the average farm size and proportions of landless households using the census data in Table 2. The census data show a small reduction in the average farm size from 1.0 to 0.95 ha. In the following analyses, we examine what happened to labor markets, income, and poverty incidence against the background of such unfavorable changes as the shrinking farm size and increasing landlessness in rural areas of Asia.

To examine whether the structural differences existed and persisted among rural labor markets under different agricultural environments, we compare the data between the least and most favorable villages or regions (or marginal and high-potential areas) based on the agricultural environments at the earlier round of the panel data in each country.² Typically, the marginal areas are characterized by unfavorable rainfed conditions (the Philippines, Thailand, Bangladesh, and India) in

² Although we do not show the data in tables, we pay attention to the analytical results of whole areas carried out by case studies in our summary analysis.

base year, whereas the high-potential areas are mostly irrigated areas with gravity irrigation systems. We keep the two groups fixed even if there have been changes in irrigated areas over time. This was particularly the case in Bangladesh, where many irrigation pumps were installed in rainfed areas.

The three rural household surveys from Ethiopia, Kenya, and Uganda were conducted as part of the same research project, the Research on Poverty, Environment, and Agricultural Technology (RePEAT) project (Matsumoto, Yamano, and Kijima 2006). The Ethiopian data cover 42 Peasant Associations and 420 households in the central to south regions, the Uganda data cover 94 Local Council 1s (LC1s)³ and 940 households in most of the country except the northern regions because of security concerns, and the Kenyan data cover 99 sub-locations⁴ and 934 households in central and western regions. The questionnaires used in these three countries are almost identical, especially core components including income and expenditure modules, to make accurate comparisons across countries possible. Stratified random samplings of communities were used in target regions, and about 10 households per a selected community were randomly selected. Unlike in Asia, irrigation is lacking in the majority of the villages in East Africa. Thus, marginal and high-potential areas

³ Local Council 1 is the lowest level of administrative unit in Uganda.

⁴ Sublocation is an administrative unit that may include a few villages in Kenya.

pertain to relatively remote and non-remote areas measured from the capital city.

Definitions of the areas are described at the bottom of Table 3.⁵

3. Characterization of Agricultural Labor Markets

Incentives to work for farm laborers under wage contracts are inherently low and the cost of monitoring the work efforts of such laborers in spatially dispersed and ecologically diverse farm environments is exceedingly high (Hayami and Otsuka, 1993). Therefore, agricultural wage laborers are employed only for simple tasks amenable to easy supervision, such as grazing draft animals, weeding, planting, harvesting, and threshing, but not for care-intensive activities, such as plowing, water and pest management, and fertilizer application. These simple tasks do not require much skill or experience and the labor demand for such tasks is subject to the seasonality of agricultural production. Therefore, agricultural wage rates are generally low and the demand for agricultural labor is not only uncertain but also limited. Furthermore, in contrast to its dramatic impacts on grain yields, the Green Revolution in Asia had only modest impacts on the demand for agricultural labor (David and Otsuka, 1994).

⁵ Since the data on labor use was not collected in Ethiopia, regional classification is not explained in footnote of Table 3. In this country, we define the high potential area as lowland areas surrounding Addis Ababa and marginal areas as highland areas in Central and Southern regions.

The first task of this section, therefore, is to demonstrate the low returns to hired agricultural labor, which is supplied primarily by the landless poor and the near-landless small farmers. Table 3 provides the data on labor use per hectare per season in the production of major staple crops, i.e., rice in Asia and maize in Africa. To capture the difference in labor demand across different agro-ecological systems, the data are stratified into the high-potential and marginal agricultural areas.

As economies develop, we expect that the opportunity costs of farm labor increase and, hence, the labor use in crop production declines. In Table 3, we find such a decline in the Philippines: In the high-potential areas, the labor use in rice production was 81 person-days per hectare in the wet season of 1985, but it declined to 51 person-days in 2004. A similar but smaller decline was also found in the marginal areas during the same period. These changes were achieved primarily through the wider adoption of the direct-seeding method, tractors, and threshers. In other Asian countries, however, we do not find similar declines in farm labor use in rice production. In Thailand, direct seeding and mechanization were already adopted in 1987, which is reflected in the relatively low labor use per hectare in 1987. Labor use is much higher in the two South Asian countries, presumably because of the lower levels of agricultural wages in these countries (see Table 4). Labor use in Bangladesh declined

substantially because of the complete adoption of tractors and widespread use of threshers.

Both the labor use and the proportion of hired labor tend to be higher in more favorable areas, which can be explained primarily by higher farming intensity associated with the adoption of modern rice varieties (MVs) under irrigated conditions. An exception is India, where total labor use is lower in more favorable areas, which can be explained by the replacement of hired labor, particularly permanent labor taking care of draft animals, by tractors. Over time the proportions of hired labor have either declined or remained stagnant. Since total labor use per hectare either decreased or stagnated, the total demand for hired labor per hectare would have declined in many areas and stagnated at best. Since hired labor is engaged in simple tasks, it can be easily replaced by agricultural machines. It is therefore unlikely that agricultural labor markets make significant contribution to income growth and poverty reduction in rural areas.

According to the regression analyses of the determinants of agricultural wage income in the Philippines and India (Estudillo, Sawada, and Otsuka, 2006; Kajisa and Palanichamy, 2006), agricultural wage income is significantly lower for farmers with

better access to land, irrigation, and MVs and more educated members. In Thailand (Cherdchuchai and Otsuka, 2006), young and uneducated workers tend to engage in agricultural wage work. These results reinforce our argument that agricultural labor market will not play a major role in the poverty reduction.

We find much higher labor use in maize production in Kenya and Uganda than in rice production in Asia. There are two possible reasons for such observations. First, the costs of labor, which will be reflected in agricultural wage rates for hired labor, are still low in Kenya and Uganda compared with their Asian counterparts, as we describe next in Table 4. Second, while rice production does not require much weeding labor as paddy fields are covered by water and often herbicides are used, rainfed maize production requires constant weeding throughout the growing season. The proportions of hired labor are also low in East Africa, partly because there are few landless agricultural households and more importantly because peak labor demands are determined by weather under rainfed upland farming, so that the same activities are undertaken simultaneously by almost all the households in the locality, leaving little room for labor exchange.⁶ In other words, agricultural labor markets are unlikely to

⁶ The same seasonality explains why animal rental markets are inactive not only in rainfed areas of Asia but also in Sub-Saharan Africa, but active in rice farming areas of Asia where dates of plowing are staggered.

work in rainfed agriculture in Sub-Saharan Africa.

In Table 4, we present the real daily wage for hired farm labor, which is defined as the daily earnings of a typical harvesting worker under a piece-rate contract.⁷ To make comparisons across time and regions possible, we have converted the daily wages into the purchasing power parity of the 2004 US dollar. (Hereafter, all the monetary values are expressed in the PPP 2004 US dollar.) In the Philippines, we find large increases in the agricultural wage rates over time, consistent with the large declines in labor use over the same period as we find in Table 3. In South Asia, farm wages were low but on the increase over time. In the African countries, the agricultural wage rates are very low, even compared with the agricultural wage rates in the Asian countries during the mid-1980s. Therefore, in East Africa too, the importance of farm labor markets for rural labor force is likely to be low.

4. Changing Structures of Rural Labor Markets

The relative importance of income from agricultural labor employment, farm income, and non-farm income, including remittances, has changed dramatically over time in Asia (Estudillo, Sawada, and Otsuka, 2006; Cherdchuchai and Otsuka, 2006; Nargis

⁷ In practice, daily wage contract is uncommon, so that daily wage data are seldom available. Note that cautions are needed for a comparison of wages across countries, as the conversion by the purchasing power parity may not be always accurate.

and Hossain, 2006; Kajisa and Palanichamy, 2006). In addition, farming systems have changed from the dominance of grain production to diversified systems with the production of high-value cash crops as well as livestock. Reflecting such changes, agricultural labor income accounts for a minuscule portion of farm income even among the landless and near landless households in recent years in Asia. In contrast, labor earnings from non-farm sources have been increasing dramatically.

In Table 5, we provide data on daily wage rates for non-farm activities by type in 2003-04. In Asian countries, daily wage earnings of a casual non-farm worker are comparable to or slightly higher than daily agricultural wage earnings (cf. Table 4). Even if the daily wage earnings are the same between farm employment and rural casual non-farm jobs, we must recognize the fact that farm jobs are available primarily during the peak seasons, whereas casual non-farm jobs are less subject to seasonality. Compared with farm and casual wages, the wage rates in regular rural non-farm and urban labor markets are significantly higher. The regular rural non-farm jobs include teachers and office workers, and the uneducated farm population in general cannot obtain such jobs. Urban workers earn the highest daily earnings, reflecting not only the higher living cost in urban areas but also the higher skill requirements of urban jobs.

In Kenya and Uganda, non-farm workers earn as much daily wages as their Asian counterparts. The difference, however, is that the number of non-farm workers who can earn such high wages is very small in these countries. Thus, the non-farm income share is still low in these countries as will be shown later in Table 7.

Non-farm wage rates are significantly lower in Ethiopia, where the development of non-farm sectors has lagged behind. In Ethiopia, regular non-farm wages are lower than those in casual jobs, presumably because of the suppressed salaries of government officials in this country.

As is clearly demonstrated in Table 6, in Southeast Asia the share of agricultural wage income in the total household income is either low (see the high-potential areas in the Philippines and Thailand) or declining (see the marginal areas in these countries). Also declining sharply was rice income; this was mainly due to declining rice prices coupled with a modest increase in rice yield since the mid-1980s. In contrast, the non-farm income share in the Philippines and Thailand has increased dramatically, as their per capita incomes have risen significantly. In the high-potential village in the Philippines, the per capita income more than doubled, while the non-farm income share has increased from 45 to 70 percent. Thus, there seems to be no doubt that the non-farm income has contributed to the increased overall

income. Similar or even more rapid changes are found in the marginal areas of the Philippines: Because agricultural production is not as promising as in the high-potential areas, the households in the marginal areas have expanded their non-farm activities more actively to increase their income. As a result, the regional income gap has significantly declined.

A more dramatic example of such structural changes in the composition of rural household income can be found in the marginal area of the northeast Thailand. The non-farm income share has increased from 21 to 74 percent in the period from 1987 to 2004. Since the households reside in unfavorable areas for agricultural production, it is understandable that they raised their income by increasing their non-farm income share. Such a change, however, was made possible by the increased availability of non-farm jobs in the local city (Khon Kaen) and Bangkok, as farmers in this region used to migrate to western regions to engage in the low-wage employment of sugar-cane cutting. Thus, high-wage non-farm job has been substituted for low-wage farm jobs in unfavorable areas. In contrast, the non-farm income share in the high-potential areas increased more modestly from 10 to 47 percent in the same period.

Somewhat unexpectedly, per capita income in high potential areas is lower than in marginal areas in Bangladesh, particularly in 1988, even though rice income is higher in the former than the latter owing to the availability of irrigation. It is remarkable to observe that non-farm income accounts for much larger share of total income in marginal areas in 1988, suggesting the decisive importance of the access to non-farm labor markets in determining the total income of rural households. Another important observation is a rapidly declining share of rice income, particularly in the marginal areas over time. In the high-potential areas, the total income has caught up with the marginal areas by increasing the non-farm income share. As in Southeast Asia, the share of agricultural wage income has been very low and declining.

In India, the per capita income was \$520 and \$228 in the high-potential and marginal areas, respectively, in the mid-1980s. Thus, the per capita income in the marginal areas was less than half of the income in the high-potential areas. However, somewhat similar to the experience in the marginal areas of the Philippines and Thailand, the households in the marginal areas of India have increased their non-farm income share from 7 to 27 percent. In addition, the share of non-rice farm income, which consists of the income from the production of high-value crops, such as sugar-cane and milk, increased in the marginal areas of Tamil Nadu. As a result, the

per capita income in the marginal areas has increased from \$228 to \$623, thus reducing the income gap with the high-potential areas. Therefore, as far as Asian countries are concerned, the development of non-farm labor markets appears to be pro-poor.

From our household data collected in a limited number of villages, it is difficult to identify the impacts of the proximity to cities and infrastructure on the household income. As far as Thai villages are concerned, the non-farm income share is higher in Northeast, which is far away from Bangkok, than Central Plain, and within each region the non-farm income share is the highest in the most remote, from the Bangkok or Kohn Kaen city, and the most unfavorable village. Although we cannot draw a definite conclusion, it seems to us that the remoteness has been overcome by the good road systems in this country and the desire of poor farmers in unfavorable agricultural areas to find non-farm jobs. It is also interesting to report that the Bangladesh study (Nargis and Hossain, 2006) and the ongoing study in the Philippines using the provincial data commonly find positive and significant impacts of electrification on non-farm income, but not farm income. If the electrification is a reasonable proxy for the general infrastructure development, which is likely to be the case, these findings strongly suggest the importance of infrastructure in improving the access of farm population to non-farm jobs.

Turning to the income in the three African countries shown in Table 7, a glance establishes that agricultural wage income is negligibly small, which strongly indicates that the agricultural labor market plays an insignificant role in household income in East Africa. Cereal income accounts for more than 50 percent of total farm income in both Uganda and Ethiopia, whereas non-cereal farm income, which includes income from the production of high-value crops and livestock products, occupies a large share in Kenya, as well as Ethiopia. It can also be seen that in Kenya, the non-farm income share is about 30 percent, which is comparable with Southeast Asia a few decades ago or contemporary South Asia. The non-farm income share is much lower in Uganda and even less so in Ethiopia. Correspondingly, the per capita income in Kenya, especially in high-potential areas, is much higher than in Uganda and Ethiopia. If agricultural growth potential is limited in Uganda and Ethiopia under the current agricultural technologies, farmers may have to rely on non-farm income as in the marginal areas in Asia.

Indeed, the regression results on the participation in non-farm activities and migration indicate that household members from land poor households have a higher probability of participating in non-farm activities and migration (Matsumoto et al., 2006). Education has positive impacts on the participation also. Interestingly, the

number of local languages that one can communicate in has strong positive impacts on the participation in the non-farm activities and migration, especially in Uganda and Ethiopia where there are no dominant local languages, such as Swahili in Kenya. On community variables, we find that the average community land productivity has negative impacts on the participation in the non-farm activity and migration in all three countries, suggesting that non-farm activities and migration offer employment opportunities to people from low-potential agricultural areas. The distance to the nearest market has a significant negative impact on the participation in the non-farm activities in Kenya but not in Uganda and Ethiopia. The result from Kenya indicates that individuals who are living 10 km away from the nearest market are 3 percent less likely to participate in local non-farm activities.

Judging from the declining income gap between initially low and high income regions in Asia in the face of increasing share of non-farm incomes, the development of non-farm labor markets seems to favor poor regions. To examine further if such changes in the non-farm income share are in favor of the landless and marginal farmers, we stratify the sample into four land size classes: landless, 0 – 1 ha, 1 – 2 ha, and over 2 ha (Table 8). Then we compare the per capita incomes and the non-farm income shares across the land size categories in the 1980s and 2003/04. As far as Asian

countries are concerned, there is a clear tendency that the smaller farm size is negatively associated with larger share of non-farm income, with a few exceptions. Similar to marginal areas, the landless and the near landless cannot earn much income from farming and, hence, they depend on non-farm income jobs. A remarkable observation is that the differences in per capita income among the landless, marginal farmers (0-1 ha), and small farmers (1-2 ha) are generally small. The income of the large farmers (2 ha and above) is in general much higher, partly because this category includes distinctly large farmers and partly because these wealthy farmers receive large amount of remittances from their well educated children. Indeed, in the case of the Philippines in 2004, a half of the non-farm income of the largest farm categories is accounted for by the remittance income. Overall, it seems clear that the development of non-farm sector favors land-poor households, which would, otherwise, would have been much poorer.

Such conclusion is supported by the regression analyses of non-farm income in which the number of working household members are explanatory variables; after controlling for the impact of education, the effects of the “quantity of workers” on non-farm income is positive and generally significant in the four Asian studies (Estudillo, Sawada, Otsuka, 2006; Cherdchuchai and Otsuka, 2006; Nargis and

Hossain, 2006; Kajisa and Planichamy, 2006). These results strongly indicate that the non-farm sectors provide ample employment opportunities to unskilled rural workers.

In all three African countries, we find that the non-farm income share is slightly higher among the smaller land size groups (Table 8). Thus, households with small land sizes compensate their low farm income with non-farm income. Although this finding is consistent with the results from Asian data in the same table as well as previous African studies (Reardon et al., 2006; Jayne et al., 2003), the levels of non-income shares are, in general, much lower than Asian countries. A major exception is Kenya, where the non-farm income shares in 2004 are comparable to those in Southeast Asia in the 1980s. It seems that in East Africa too, the increased availability of non-farm jobs favors land-poor households, which are generally poor.

Indeed, the regression results on determinants of local non-farm activities indicate that household members from land-poor households have a higher probability of participating in local non-farm activities in Kenya and Uganda (Matsumoto, Kijima, and Yamano, 2006). In Kenya, the regression results also find that the community average land productivity, measured by the average value of output per ha, has a negative effect on participations in the local non-farm activities. Combined, these

results suggest that local non-farm activities provide employment opportunities for individuals from land-poor households in low-potential agricultural areas in Kenya.⁸

As a result of these changes and differences in per capita income and income shares, the head count ratios of poverty have declined over time but at different paces among the locations (Table 9). In this paper, we use income, instead of expenditure, to estimate the head count ratios of poverty. Because income is generally considered to include more errors and fluctuate more than expenditure, we need to be cautious about the accuracy of the poverty estimates. What is important in this paper, however, are changes in the poverty estimates over time within panel data in Asia, and we consider them comparable across survey rounds because they are from mostly the same samples and income calculations are conducted by the same researchers.

In the Philippines, the proportion of poor households has declined from 40 to 23 percent in the high-potential areas and from 66 to 42 percent in the marginal areas.

In Thailand, the rate of decline is much more drastic: it has declined from 51 to 12 percent in the high-potential areas and from 70 to 21 percent in the marginal areas.

Reflecting slower growth of the non-farm economy in Bangladesh, the rate of

⁸ A recent study from Ethiopia also suggests that entry barriers into non-farm activities are low and poor households have access to non-farm activities (van den Berg and Kumbi, 2006). The Gini decomposition analyses suggest that non-farm income reduces income inequality in Oromiya region of Ethiopia.

reduction in the incidence of poverty is less impressive. It is noteworthy that in India, the incidence of poverty has drastically declined especially in the high-potential areas, despite the modest increase in non-farm income. Further investigations suggest that the income distribution has become quite equitable in the high-potential areas in India, as labor intensive high-value crops were introduced (Kajisa and Palanichamy, 2006).

In African countries, except the high-potential areas of Kenya, the proportion of poor households is high, ranging from 42 to 57 percent.⁹ In the high-potential areas of Kenya, it is as low as 29 percent, which is comparable to that of the Asian countries. This finding indicates that the increased availability of non-farm jobs is one of the keys to successful poverty reduction in Sub-Saharan Africa.

5. Human Capital and Poverty Reduction

It is commonly found through the regression analyses that human capital measured by schooling has either a non-significant impact on farm income, as in Southeast Asia (Estudillo, Sawada, and Otsuka, 2006; Cherdchuchai and Otsuka, 2006), or modest impacts, as in Bangladesh and India (Nargis and Hossain, 2006; Kajisa and

⁹ Matsumoto, Kijima, and Yamano (2006) used both income and expenditure to estimate poverty. They find that the per capita income in each country is about 13 percent less than the per capita expenditure, resulting in high head count ratios of poverty if income is used instead of expenditure. Thus, the head count ratios of poverty in this paper could be overestimated.

Palanichamy, 2006). In contrast, schooling is a critically important determinant of choice of non-farm jobs and the non-farm income throughout Asian countries, particularly in more recent years. In other words, there is overwhelmingly clear evidence that the better education enables rural workers to find “good non-farm jobs,” whereas the lack of education tends to force them to be engaged in agricultural labor employment at worst and “bad non-farm jobs” at best. Since the members of large wealthy farm households tend to be more educated than those of the landless and near-landless, the development of non-farm labor markets confers larger benefits to the non-poor. This does not imply, however, that the development of the non-farm sector is not pro-poor: Although wage rates are lower, the development of the non-farm sector offers enhanced employment opportunities for unskilled and semi-skilled jobs, such as employment in light industries associated with rural industrialization, which do not require higher education. As a result, the income gap between the educated and uneducated has been reduced. In other words, according to the case studies in Asia, the development of non-farm labor markets is clearly pro-poor.

The regression results from the three East African countries also indicate that schooling is an important determinant to participate in local non-farm activities and migration in Kenya and Uganda (Matsumoto, Kijima, and Yamano, 2006). In

addition, as consistent with the results from Asian studies, the schooling level of household members increase non-farm income but not farm income. Thus, increasing the schooling level of poor would help them to increase their income. In this context, recent introductions of free primary education programs in both countries help poor households to invest in their children's schooling so that they can obtain high-return non-farm jobs in the future. Indeed, a recent study that uses the same Uganda data used in this paper shows large impacts of the introduction of the free primary education program, introduced in 1997, on completion rates of 4th and 5th grades of children from poor households, especially girls (Nishimura, Yamano, and Sasaoka, 2007).

According to the Philippine study (Estudillo, Sawada, and Otsuka, 2006), women received significantly larger amount of non-farm income and significantly lower agricultural wage income than men, indicating that non-farm job markets in this country do not discriminate against women. Although the evidence on the non-farm earnings is less clear, female workers contribute to the total household income as much as male workers in 2004 in Thailand (Cherdchuchai and Otsuka, 2006). As far as Southeast Asia is concerned, women seem to have comparative advantage in non-farm jobs.¹⁰

¹⁰ Unfortunately the gender issues are not analyzed in the South Asian studies.

Quisumbing, Estudillo, and Otsuka (2004) and Takahashi (2006) find that rural households invest a major portion of their additional income in the schooling of children, who later engage in rural non-farm jobs or migrate to cities to seek more lucrative employment opportunities. A main source of the additional household income in the earlier years was found to be improved farm technology, e.g., the adoption of high-yielding modern varieties of rice. It is therefore reasonable to hypothesize that productivity growth in agriculture contributes to overall economic development by stimulating investments in the schooling of children in rural areas and subsequently supplying an educated labor force to non-farm sectors.

In Table 10, we present the average schooling years of adult workers in four different labor markets based on the main occupation: permanent urban migrant workers, rural non-farm workers, farmers, and agricultural workers. The results indicate that the urban migrants have much higher education levels than those who stay in rural areas. Since schooling is not critically important in farming, farmers tend to be less educated than rural non-farm workers. The least educated are the agricultural workers, who are engaged in simple farm tasks. Although Table 10 provides only descriptive information, the regression analyses confirm the significant and decisive impacts of schooling on high-wage urban and rural non-farm occupations in the

Philippines and Thailand (Takahashi, 2006; Cherdchuchai, 2006). In other Asian countries, too, there are clear differences in education levels among rural non-farm workers, farmers, and agricultural workers (Lanjouw and Shariff, 2004; Kurosaki and Khan, 2006).

In general, education levels are lower in the marginal areas than in the high-potential areas. This is because lower household income in the earlier years resulted in lower schooling investment in the poor areas. Such difference in schooling between the favorable and unfavorable agricultural areas explains why both rural and urban non-farm daily wage earnings tend to be higher in high-potential areas than in marginal areas in the Philippines and Thailand (see Table 5). The education levels of farmers in the high-potential areas are higher than those of farmers in the marginal areas, which may suggest that wealthy farmers in the high-potential areas either could afford to invest in schooling of children or found high returns from the farming of high-value crops, or both.

Reflecting the differences in the education levels, the returns from these different labor markets are remarkably different. Table 11 compares the average annual income of permanent migrant urban workers with full-time rural non-farm

workers in the Philippines, Thailand and Bangladesh (Takahashi, 2006; Cherdchuchai, 2006; Nargis and Hossain, 2006). The data from the Philippines and Thailand clearly show that the migrants earn much higher income. This is particularly the case for migrants from the high-potential areas, who are more educated than those from the marginal areas – an observation consistent with our earlier argument on the effect of schooling on non-farm wage earnings. Such regional difference is not observed in Bangladesh, where the regional income gap has been much smaller.

In sum, labor markets are highly segmented in accordance with the schooling level. It must also be pointed out that schooling levels tend to be higher in more favorable than less favorable areas, which results in a regional income gap. In all likelihood, such differences have been created initially by the differences in agricultural income, when agriculture was the dominant source of rural livelihood.

6. Conclusion

By using four long-term panel data sets in Southeast and South Asia and three cross-sectional data sets in East Africa, this paper examined the roles of labor markets in long-term poverty reduction in Asia and compared the Asian experience with the current situation in East Africa. The following three major conclusions emerged.

First, the reliance on agricultural labor markets alone will not reduce poverty to a significant extent. The share of agricultural wage income has been decreasing in Asia, even though it remains relatively high in Tamil Nadu. Moreover, the employment of agricultural labor is confined to simple tasks, so that the daily earnings of agricultural workers are necessarily low. Furthermore, hired labor engaged in such simple tasks can be easily replaced by agricultural machines and the availability of such employment opportunity is limited to peak seasons. In East Africa, the agricultural labor market is totally inactive.

Second, increased non-farm income is a decisive factor in reducing rural poverty. The non-farm income share has increased significantly in Asian countries over the last two decades and is inversely and closely related with the incidence of poverty. Although educated workers earn higher income in non-farm sectors, uneducated workers can also find unskilled jobs in non-farm sectors. Also the landless and near-landless can reallocate a larger amount of their time from low-paying agricultural jobs to high-paying non-farm jobs. According to the case studies conducted by the case studies in Asia, the income gaps between the land-rich and land-poor households, between the educated and uneducated workers, and between less and more favorable areas have significantly declined as non-farm employment

opportunities have expanded. Similar relationships are found in cross-sectional data from East African countries, suggesting that the development of non-farm labor markets is indispensable for massive poverty reduction in Sub-Saharan Africa.

Third, labor markets are clearly segmented in accordance with the schooling levels. In Asia, educated workers tend to find lucrative non-farm jobs, whereas uneducated workers tend to work in relatively low-paying jobs including hired labor employment in agriculture. It is also important to note that according to the long-term panel studies in Asia, increased agricultural income, mostly generated from the Green Revolution, was a major source of funds to invest in children's schooling in the early years, which later led to the choice of lucrative non-farm occupations by children. The last finding raises questions about the sources of investment in children's schooling in Sub-Saharan Africa. In practice, many African farm households lack the financial resources to send their children beyond primary school. The Asian experience strongly suggests that it is the Green Revolution that must be realized to initiate the structural changes towards increasing investment in human capital and greater participation in non-farm activities in Sub-Saharan Africa. Indeed, without increasing crop income and improving food security in Sub-Saharan Africa, farmers will not be able to afford to send their children to schools and allocate more

time to non-farm activities.

Thus, realizing a Green Revolution in Africa is a major policy challenge not only to improve production efficiency and food security in the short run but also increase farmers' incomes in the long run by stimulating the schooling investments in children of rural population. Another policy implication of this paper is to develop non-farm sectors so as to provide ample employment opportunities for the poor. How to develop industries, in general, and rural industries, in particular, is an area that requires the urgent attention of development economists. Although it is often argued that the development of agriculture stimulates the development of rural non-farm sectors through consumption and production linkages (Haggblade, Hazell, and Dorosh, 2006), the empirical evidence is scanty. On the other hand, Otsuka (1998) and Sonobe and Otsuka (2006) argue that successful rural industrialization requires the transfer of advanced production and management knowledge from urban to rural areas, which suggests that only rural areas with favorable access to large urban markets have the potential to develop industries. Although industrialization is a critically important issue in poverty reduction, our current knowledge on this issue is far from adequate.

A major remaining issue, which was not fully analyzed in this study, is gender

equity. In the Philippines and Thailand, women are not discriminated against in non-farm jobs, so they are able to actively participate in non-farm activities (Estudillo, Sawada, and Otsuka, 2006; Cherdchuchai and Otsuka, 2006). In South Asia, men tend to migrate to cities to work, whereas women tend to stay in rural areas to manage farms, presumably because women are discriminated against in urban jobs. It is true, however, that women's status tends to improve as they assume greater management responsibility for farming. What is not clear is under what conditions gender equity can be further improved in south Asia. Somewhat similar to the case of South Asia, men tend to work in urban areas in East Africa. Yet women also work as local traders in this region. Here too, however, how women's status is related with the development of non-farm employment has been grossly under-explored.

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Table 1. List of Village Studies Included in the Paper

Country	Survey Years	Sample Areas	Sample size1) (Households)	Authors
Asia				
The Philippines	Panel: 1985, 1989, 2000, & 2004	Luzon and Panay Island	447	Estudillo, Sawada, and Otsuka (2006)
Thailand	Panel: 1987 & 2004	Central and North East	295	Cherdchuchai and Otsuka (2006)
Bangladesh	Panel: 1988, 200, & 2004	National	1,239	Nargis and Hossain (2006)
Tamil Nadu (India)	Pool: 1971-1980; Panel: 1981-2003*	Tamil Nadu State	400 (1971-83), 600 (1984-2003)	Kajisa and Palanichamy (2006)
Africa				
Ethiopia	Cross Section, 2004	Central and South	410	Matsumoto, Kijima, and Yamano (2006)
Kenya	Cross-Section, 2004	Central and West	898	Matsumoto, Kijima, and Yamano (2006)
Uganda	Cross-Section, 2003	National	940	Matsumoto, Kijima, and Yamano (2006)

Note: 1) Initial sample sizes. The sample sizes in subsequent surveys vary because of attrition and splitting households.

Table 2. Changes in Farm Size and Percentages of Landless Households

Country	Average Farm Size (ha)		Percentage of Landless Households (%)	
	1980s	2003/04	1980s	2003/04
Asia	- ha -	- ha -	- percent -	- percent -
The Philippines	1.00	0.76	22	44
Thailand	4.24	2.42	0	30
Bangladesh	0.87	0.59	34	39
Tamil Nadu (India)	1.01 ¹⁾	0.95 ¹⁾	--	--
Africa				
Ethiopia	--	1.8	--	1
Kenya	--	1.9	--	0
Uganda	--	2.3	--	0

1) Data are taken from the agricultural census in 1985/86 and 1995/96 (Government of Tamil Nadu, *Economic Appraisal*, Chennai, Government of Tamil Nadu).

Table 3. Labor Use per Hectare per Season (Person-days) and Proportion of Hired Labor (%) in Major Staple Crop Farming in Selected Areas of Asia and East Africa

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2003/04	1980s	2003/04
Total labor use (person-days)				
Philippines ¹⁾	81	51	91	76
Thailand ²⁾	56	49	53	57
Bangladesh ³⁾	178	124	150	101
Tamil Nadu (India) ⁴⁾	149	141	164	161
Kenya ⁵⁾	--	156	--	185
Uganda ⁶⁾	--	191	--	153
Hired labor (%)				
Philippines ¹⁾	80	79	37	25
Thailand ²⁾	44	35	16	33
Bangladesh ³⁾	52	56	40	61
Tamil Nadu (India) ⁴⁾	70	71	73	70
Kenya ⁵⁾	--	31	--	24
Uganda ⁶⁾	--	13	--	13

Notes:

1) The Philippines: High potential Agricultural areas are irrigated villages and marginal areas are drought-prone rainfed villages in Iloilo Province in 1985.

2) Thailand: High potential Agricultural areas are irrigated villages in Central Plain and marginal areas are drought-prone rain-fed villages in Northeast in 1987.

3) Bangladesh: High potential agricultural areas are irrigated villages and marginal areas are drought-prone rainfed villages in 1988.

4) India: High potential agricultural areas are canal or well irrigated districts and marginal areas are rainfed/tank irrigated districts in 1986-87.

5) Kenya: High potential agricultural areas are Central and Rift Valley provinces and marginal areas are Western regions.

6) Uganda: High Potential Agricultural areas are Local Council 1s (LC1s) with good market access, and Marginal areas are LC1s with poor market access.

Table 4. Real Daily Labor Earnings in Rice and Maize Harvesting in Selected Areas of Asia and East Africa (PPP US\$)

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2003/04	1980s	2003/04
Asia	- PPP \$ -	- PPP \$ -	- PPP \$ -	- PPP \$ -
Philippines	17	20	12	13
Thailand	18	12	10	10
Bangladesh	5	6	4	6
Tamil Nadu (India)	5	9	3	8
Africa				
Kenya	--	3	--	2
Uganda	--	5	--	5
Ethiopia	--	8	--	9

Notes: Average labor earnings under piece-rate contract, assuming eight hours of work per day.

Table 5. Comparison of Real Daily Labor Earnings among Casual and Regular Rural Non-Farm Employment and Urban Employment in Selected Areas of Asia and East Africa in 2003/04 (PPP US\$)

	High-Potential Agricultural Areas			Marginal Agricultural Areas		
	Casual Labor	Regular Non- farm	Urban	Casual Labor	Regular Non- farm	Urban
	- PPP \$ -	- PPP \$ -	- PPP \$ -	- PPP \$ -	- PPP \$ -	- PPP \$ -
Asia						
Philippines	13	9	24	9	6	14
Thailand	21	25	32	13	23	22
Bangladesh	6	8	9	6	7	9
Tamil Nadu (India)	--	23	--	--	21	--
Africa						
Kenya	26	32	--	16	29	--
Uganda	--	24	--	--	15	--
Ethiopia	21	9	--	22	10	--

- 1) Include wage earnings only, while excluding self-employment.
- 2) Assume eight hours of work per day. If only monthly or annual income data are available, convert them to daily earning while assuming "standard" work days per month or per year.

Table 6. Changes and Differences in Real Rural Household Income per Capita (PPP US\$) and its Compositions (%) in Selected Areas of Asia

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2003/04	1980s	2003/04
Philippines				
Per capita income (PPP\$)	1,065	2,364	386	1,119
Agricultural wage (%)	13	11	1	7
Rice (%)	24	12	14	9
Non-rice farm income (%)	18	7	47	24
Non-farm (%)	45	70	37	60
Thailand				
Per capita income (PPP\$)	2,014	4,617	959	2,543
Agricultural wage (%)	4	6	12	5
Rice (%)	66	26	54	7
Non-rice farm income (%)	21	22	13	14
Non-farm (%)	10	47	21	74
Bangladeshi				
Per capita income (PPP\$)	634	1,001	841	1,094
Agricultural wage (%)	14	8	11	4
Rice (%)	35	20	24	13
Non-rice farm income (%)	18	21	20	26
Non-farm (%)	33	51	55	57
Tamil Nadu (India)				
Per capita income (PPP\$)	520	697	228	623
Agricultural wage (%)	11	28	17	3
Rice (%)	62	50	39	22
Non-rice farm income (%)	19	18	40	49
Non-farm (%)	9	4	7	27

Table 7. Differences in Rural Household Income per Capita (PPP US\$) and its Compositions (%) in Selected Areas of East Africa

	High-Potential Agricultural Areas	Marginal Agricultural Areas
Kenya		
Per capita income (PPP\$)	998	576
Agricultural wage (%)	2	1
Cereal income (%)	32	39
Non-cereal farm income (%)	22	17
Non-farm (%)	30	31
Uganda		
Per capita income (PPP\$)	673	594
Agricultural wage (%)	3	2
Cereal income (%)	58	61
Non-cereal farm income (%)	10	13
Non-farm (%)		
Ethiopia		
Per capita income (PPP\$)	652	628
Agricultural wage (%)	0	0
Cereal income (%)	52	47
Non-cereal farm income (%)	37	38
Non-farm (%)	3	6

Table 8. Changes and Differences in Real Rural Household Income per Capita (PPP US\$) and its Compositions (%) in Selected Areas of Asia

	Land Size			
	Landless	0 – 1 ha	1 – 2 ha	2 ha –
Philippines				
1985 PC Income (PPP \$)	703	608	721	1,550
2004 PC income (PPP \$)	1,774	1,494	1,972	4,463
1985 Non-farm Share (%)	52	36	25	15
2004 Non-farm Share (%)	77	58	50	57
Thailand				
1987 PC Income (PPP \$)	--	359	481	799
2004 PC income (PPP \$)	3,156	2,677	2,882	4,690
1987 Non-farm Share (%)	--	30	20	11
2004 Non-farm Share (%)	69	72	68	39
Bangladesh				
1988 PC Income (PPP \$)	544	593	703	1,059
2004 PC income (PPP \$)	674	831	977	1,533
1988 Non-farm Share (%)	48	49	45	35
2004 Non-farm Share (%)	66	65	57	47
Tamil Nadu (India)				
1981 PC Income (PPP \$)	-- ¹⁾	511	682	1,529
2004 PC income (PPP \$)	--	602	826	1,610
1981 Non-farm Share (%)	--	2	3	6
2004 Non-farm Share (%)	--	21	17	8
Ethiopia				
2004 PC income (PPP \$)		565	558	816
2004 Non-farm Share (%)		7	4	1
Kenya				
2004 PC income (PPP \$)		698	814	1,091
2004 Non-farm Share (%)		32	29	25
Uganda				
2003 PC income (PPP\$)		458	557	903
2003 Non-farm Share (%)		11	11	10

1) Not available.

Table 9. Changes in the Incidence of Poverty (Head-Count Ratio) in Selected Areas of Asia and East Africa (%)

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2003/04	1980s	2003/04
	- percent -	- percent -	- percent -	- percent -
Philippines	40	23	66	42
Thailand	51	12	70	21
Bangladesh	64	41	58	43
Tamil Nadu (India)	72	13	84	47
Kenya	--	29	--	50
Uganda	--	50	--	57
Ethiopia	--	45	--	42

Table 10. Schooling of Permanent Migrants, Rural Non-Farm Workers, Farmers, and Agricultural Workers in Selected Areas of Asia in 2003/04

	High-Potential Agricultural Areas	Marginal Agricultural Areas
	- years -	- years -
Philippines in 2004		
Permanent migrants	11.3	10.4
Rural non-farm workers	9.5	8.4
Farmers	10.0	7.7
Agricultural workers	6.6	7.9
Thailand in 2004		
Permanent migrants	10.1	8.3
Rural non-farm workers	9.6	8.3
Farmers	6.6	6.0
Agricultural workers	6.7	5.8
Bangladesh in 2004		
Permanent migrants	7.4	7.1
Rural non-farm workers	4.7	6.3
Farmers	4.5	4.6
Agricultural workers	1.6	2.3
Tamil Nadu (India) in 2004		
Regular non-farm	10.8	9.1
Rural business	8.1	8.0
Farmers	6.2	5.2
Agricultural workers	--	2.3

Takashi: For India, it is better to use “non-farm” in the table, and explain its definition for India in footnote.

Table 11. Comparison of Income among Permanent Migrants and Rural Non-Farm Workers in the Philippines and Thailand in 2004

	High-Potential Agricultural Areas	Marginal Agricultural Areas
	- PPP \$ -	- PPP \$ -
Philippines in 2004		
Permanent migrants	13,503	8,001
Rural non-farm workers	5,624	4,540
Thailand in 2004		
Permanent migrants	12,809	8,543
Rural non-farm workers	5,631	6,089
Bangladesh in 2003		
Permanent migrants	1,289	1,366
Rural non-farm	1,149	1,194