The Role of Labor Markets and Human Capital in Poverty Reduction: Evidence from Asia and Africa

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ABSTRACT

Using long-term panel data sets of rural households in the Philippines, Thailand, Bangladesh, and Tamil Nadu (India), a short-term panel data set in Mozambique, and cross-section data sets in Kenya, Uganda, and Ethiopia, the roles of labor markets in the long-term process of poverty reduction in Asia were examined in comparison with the current situation in Africa. There are three main findings. First, 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 Africa. Second, an increased non-farm income is a decisive factor in reducing rural poverty because it has become the major source of the rise in household income. Third, labor markets are clearly segmented in accordance with the schooling levels, where the younger and more educated children are engaged in lucrative non-farm labor employment in order to capture the high returns in schooling in this sector.

INTRODUCTION

Rural labor markets consist of farm and rural non-farm labor markets, which are linked with urban labor markets through interregional migration. The skill requirements and wages are vastly different among these labor markets. Moreover, non-farm labor markets are dynamically changing; hence, their relative importance changes over time and differs substantially among developing countries and even across regions within a country (Haggblade et al. 2007; Reardon et al. 2007; 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; Jayaraman and Lanjouw 1999;

Hayami and Kikuchi 2000; Estudillo and Otsuka 1999; Lanjouw and Stern 1998; Estudillo et al. 2008). Since the livelihood of the rural poor depends critically on labor income, how rural labor markets function and how these functions change over time are critical issues in the analysis of rural poverty.

Even in Sub-Sahara African countries, where land is traditionally considered to be relatively abundant, land is becoming a scarce resource because of 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 have been many studies on poverty dynamics over a short period of time (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 rural households in Sub-Saharan Africa. Thus, the lessons from the poverty reduction in Asian countries would be valuable.

This paper attempts to describe: (1) the characteristics of different segments of the rural labor markets, (2) how these segments differ in terms of skill requirements and returns to labor, and (3) how the quality of labor changes over time due to investment in human capital. Specifically, it examines three hypotheses. First, agricultural wages are comparatively low and their income share is either declining or has remained unchanged. Second, poverty has been declining owing to the increasing importance of non-farm labor earnings as an income source. And third, labor markets consisting of agricultural, rural non-farm, and urban labor are highly segmented, in accordance with the skill requirements, and that the younger and more educated young adults are engaged in non-farm work, where returns to schooling are bound to be higher. Studies in Asia show that income from farming is a major determinant of schooling investments in children of rural households in the early stage of development. This study used four long-term panel data sets from the Philippines, Thailand, Bangladesh, and Tamil Nadu (India); a short-term panel data set from Mozambique; and three cross-section data sets from Ethiopia, Kenya, and Uganda.[1]

Subsequent parts of this paper show the following: (1) detailed information on the data sets used, (2) description of changes in farm size and incidence of landlessness and the evolution of the labor markets, (3) documentation of changes in household income components and decline in poverty, (4) identification of the changing roles of human capital in income growth and poverty reduction, (5) exploration of the determinants of investments in children's schooling, and (6) a summary of the major findings of the paper and their policy implications.

THE DATA SETS

To investigate the long-term changes in rural incomes and the incidence of poverty in Southeast and South Asia, long-term panel data sets of rural households covering the last two decades were used. Table 1 summarizes the basic information about these data sets. For the Philippines, the study used data from randomly selected 447 households in two villages each in Central Luzon and Panay Island (Estudillo et al.

[1] These data sets have been used by a set of studies appearing in a book, Rural Poverty and Income Dynamics in Asia and Africa (Otsuka et al. 2009). While this article focuses on the role of labor markets in poverty reduction, the book addresses wider questions of the changes and differences in the determinants of rural household income over time and across countries and regions within countries.

Table 1. Description of the data sets.

Country	Survey year	Sample area	Number of households[a,b]	Author
Asia				
Philippines	Panel: 1985, 1993, 1997, 2001, and 2004	Central Luzon and Panay Island	447	Estudillo, Sawada, and Otsuka (2008)
Thailand	Panel: 1987 and 2004	Central Plain and North East	295	Cherdchuchai, Otsuka and Estudillo (2008)
Bangladesh	Panel: 1988, 2000, and 2004	National	1,240	Hossain, Rahman, and Estudillo (2008)
Tamil Nadu (India)	Random: 1971-1980; Panel: 1981-2003	Tamil Nadu State	400 (1971-1980), 600 (1981-2003)	Kajisa and Palanichamy (2008)
Africa				
Ethiopia	Cross section: 2004	Central and South	420	Matsumoto, Kijima, and Yamano (2008)
Kenya	Cross section: 2004	Central and West	934	Matsumoto, Kijima, and Yamano (2008)
Uganda	Cross section: 2003	National	940	Matsumoto, Kijima, and Yamano (2008)
Mozambique	Panel: 2002 and 2005	Zambézia and Sofala	928	Cunguara and Kajisa (2008)

[a]Initial sample sizes.
[b]The sample sizes in subsequent surveys have changed because of attrition and splitting of households.
Source: Authors' compilation.

2008). These households were first interviewed in 1985 and several times thereafter. For this paper, the sample survey data in 1985 and the most recently collected village census data in 2004 were used. For Thailand, 295 households in three villages each in Central Plain and North Eastern Provinces were interviewed in 1987 and 2004 (Cherdchuchai et al. 2008). Since landless households were very few in Thailand in the 1980s, they were not included in the 1987 survey. The Bangladesh panel data cover most parts of the country and collected information from randomly selected 1,240 households in 1988, 1,880 households in 2000, and 1,927 households in 2004 (Hossain et al. 2008). The data sets from the Philippines, Thailand, and Bangladesh are basically panel data, with the replacement of households whose heads passed away and are left with their successors.

The study also used the pooled cross-section data collected every year in Tamil Nadu (India) from 1971 to 1980, and later three-year rotating panel data from 1981 to 2003, which replaced the annual cross-section data (Kajisa and Palanichamy 2008). The Tamil Nadu survey used stratified random sampling based on farm size; thus, it included the farmer households only and excluded the landless ones. As such, the income share from agricultural wage would be underestimated in the Tamil Nadu paper compared with results from other studies that included landless workers (e.g., Lanjouw and Shariff 2004).

Three rural household surveys from Ethiopia, Kenya, and Uganda were conducted as part of the same research project, i.e., Research on Poverty, Environment, and Agricultural Technology (RePEAT) (Matsumoto et al. 2008). The Ethiopian data cover 42 peasant associations and 420 households in the central to south regions; the Uganda data cover 94 Local Counsel 1s (LC1s)[2] and 940 households in most parts of the country except the northern regions because of security concerns; and the Kenyan data cover 99 sub-locations[3] and 934 households in central and western regions. Stratified random samplings of communities were used in target regions, and about 10 households per selected community were randomly selected.

The Mozambique data were extracted from the national agricultural surveys locally known as Trabalho de Inquérito Agrícola (TIA) conducted in 2002 (i.e., TIA02) and 2005 (i.e., TIA05) for two rice-growing provinces, Zambézia and Sofala (Cunguara and Kajisa 2008). The data include a sample of 1,140 households in TIA02 and 928 households in TIA05, of which 928 households were included in both survey years. There were 620 panel households in Zambézia and 308 in Sofala.

CHANGES IN FARM SIZE AND CHARACTERIZATION OF LABOR MARKETS

Changes in farm size

The panel data from Asia show large reductions in farm size of farm households (excluding the landless) and increases in the proportion of landless households (Table 2). For instance, in the Philippines, the average farm size decreased from 1.0 ha in 1985 to 0.76 ha in 2004. During the same period, the proportion of the landless households increased from 22 to 44 percent. The changes are more drastic in Thailand, with the proportion of landless housing rising from zero to 30 percent. Similar but more modest changes are observed in Bangladesh. Because the Indian data used

[2] Local Council 1 is the lowest level among administrative units in Uganda.
[3] Sub-location is an administrative unit that may include a few villages in Kenya.

Table 2. Changes in farm size and percentages of landless households.

Country	Average farm size (ha)		Percentage of landless households	
	1980s	2000s	1980s	2000s
Asia				
Philippines	1.00	0.76	22	44
Thailand	4.24	2.42	0	30
Bangladesh	0.87	0.59	34	39
Tamil Nadu (India) [a]	1.01	0.95	na[b]	na
Africa				
Ethiopia	na	1.8	na	1
Kenya	na	1.9	na	0
Uganda	na	2.3	na	0
Mozambique	na	1.7	na	0

[a]Data were from the agricultural censuses in 1985/86 and 1995/96 (Government of Tamil Nadu, Economic Appraisal, Chennai, Government of Tamil Nadu).
[b]Not available.
Source: Authors' compilation.

stratified random sampling based on farm size and excluded landless households, as explained before, the data on average farm size and proportions of landless households used the census data in Table 2. The census data in Tamil Nadu show a small reduction, from 1.0 to 0.95 ha, in average farm size.

Farm size is much smaller in Asia (except Thailand) than in Africa, while the proportion of landless agricultural workers is much higher in the former but negligibly small in the latter. What happened to labor markets, income, and poverty incidence will now be examined against the background of such unfavorable changes as shrinking farm size and increasing landlessness in rural Asia.

Characterization of Labor Markets

Labor markets in developing countries can be classified into: (1) agricultural, (2) casual rural non-farm, (3) regular rural non-farm, and (4) urban. To examine whether or not the structural differences existed and persisted among rural labor markets under different agricultural environments, data were compared 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 collection in each country. Typically, the marginal areas are characterized by unfavorable rainfed conditions (the Philippines, Thailand, Bangladesh, and India) in the base year; the high-potential areas are mostly irrigated areas with gravity irrigation systems. The two groups were stratified based on the initial conditions; the stratification was maintained even if there had been changes in irrigated areas over time. This was particularly the case in Bangladesh, where many irrigation pumps were installed in formerly rainfed areas. Unlike in Asia, irrigation is lacking in the

majority of villages in Africa. Thus, marginal and high-potential areas pertain to remote and non-remote areas, respectively, relative to the capital city.

Agricultural labor market

Incentives for farm laborers to work 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. The 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.

Data were collected on labor use per hectare per season in the production of major staple crops (i.e., rice in Asia and maize in Africa) in high-potential and marginal agricultural areas. In the high-potential areas in the Philippines, the labor use in rice production was 81 person-days/ha in the wet season of 1985; it declined to 51 person-days/ha in 2004. A similar but smaller decline was found in the marginal areas during the same period. These changes primarily resulted from the wider adoption of direct-seeding method, tractors, and threshers. 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 was much higher in 2003/04 in Bangladesh (124 person-days/ha per season in high-potential areas) and Tamil Nadu (India) (141 person-days in high-potential areas) presumably because of the lower levels of agricultural wages in these countries. Labor use in Bangladesh declined substantially (from 178 to 124 person-days/ha per season from 1988 to 2004 in high-potential agricultural areas and from 150 to 101 person-days in marginal agricultural areas) because of the widespread use of tractors and 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 use of tractors in lieu of hired labor, particularly permanent labor taking care of draft animals. 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. Being engaged in simple tasks, hired labor 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.

Higher labor use, which is mostly family labor, is found in maize production in Kenya and Uganda (around 170 person-days/ha per season in 2004) than in rice production in Asia. There are two possible reasons for such observation. First, the costs of labor, which are reflected in agricultural wage rates for hired labor, are still low in Kenya and Uganda than in their Asian counterparts. Second, unlike rice production that does not require much weeding labor since paddy fields are covered with water and often herbicides are used, rainfed maize production requires constant weeding throughout the growing season. The proportions of hired labor are low in 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.

Data were collected on real daily wage of a typical harvesting worker under a piece-rate contract.[4] In the Philippines, despite substantial reduction in the labor demand, the agricultural wage rates were found to increase over time (US$15 to US$17 in 2004 purchasing power parity from 1985 to 2004). This is because the supply curve of hired agricultural labor shifted leftward faster than the leftward shift of the demand curve due to increasing employment opportunities in the non-farm sector. In South Asia, farm wages were low but also increasing over time. They rose from US$4.5 to US$6 in 2004 PPP in Bangladesh from 1988 to 2004 and from US$4 to US$8.5 in Tamil Nadu from 1986 to 2003. In the African countries, the agricultural wage rates were very low (ranging from US$2 to US$5 in 2004 PPP in Kenya and Uganda) even when compared with the agricultural wages in the Asian countries during the mid-1980s. Therefore, in Africa, the importance of farm labor markets to the rural labor force is also likely to be low.

Rural non-farm and urban labor markets

The nonagricultural labor market consists of casual and regular rural non-farm and urban job markets. Casual non-farm jobs include those in informal trade and commerce, rural transport, domestic services, and traditional manufacturing industry. Regular rural employment is commonly found in the government sector such as teachers, office workers, and rural health workers, who belong to the more educated segment of the rural population. Urban jobs are obtained by household members who migrate to major cities and other urban areas.

Data were collected on daily wage rates of agricultural, rural casual, regular non-farm, and urban workers. In Asian countries, the daily wage earnings of a casual non-farm worker are comparable with or slightly higher than the daily agricultural wage earnings. Even if the daily wage earnings are the same between farm employment and rural casual non-farm jobs, the fact is 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, reflecting higher skill requirements.

In Kenya and Uganda, non-farm workers earn as much daily wages as their Asian counterparts. However, the number of non-farm workers who can earn such high wages in these countries is very small so that the non-farm income share remains low. Non-farm wage rates are significantly lower in Ethiopia, where the development of non-farm sectors has lagged behind. In this country, regular non-farm wages are lower than those in casual jobs, presumably because of the suppressed salaries of government officials.

CHANGING HOUSEHOLD INCOME SOURCES AND POVERTY REDUCTION

Income sources in Asia and Africa

With the agricultural labor market becoming thinner in Asia and remaining inactive in Sub-Saharan Africa, the importance of agricultural wage as a source of household income was

[4] In practice, a daily wage contract is uncommon, so that daily wage data are seldom available.

expected to decline. This is clearly demonstrated in Table 3, which shows a decline in the share of agricultural wage income in the total household income in Southeast Asia. Likewise, the rice income share has declined sharply because of declining rice prices coupled with only 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, along with the significant rise in per capita incomes. In the high-potential areas in the Philippines, 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 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

Table 3. Changes and differences in real rural household income per capita (PPP US$) and its composition (%) in selected areas of Asia.

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2000s	1980s	2000s
Philippines				
Per capita income (PPP$)	1,065	2,364	386	1,119
Agricultural wage (%)	13	11	30	7
Rice (%)	37	12	20	9
Non-rice farm income (%)	5	7	13	24
Non-farm (%)	45	70	36	60
(Remittances (%))	(15)	(22)	(13)	(20)
Thailand				
Per capita income (PPP$)	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
Bangladesh				
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

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 Thailand in 1987.
3. Bangladesh: High potential agricultural areas are irrigated villages and marginal areas are drought-prone rainfed villages in 1988.
4. Tamil Nadu (India): High potential agricultural areas are canal or well irrigated districts and marginal areas are rainfed/tank irrigated districts in 1986-87.

Source: Authors' compilation.

agricultural production in the marginal areas is not as promising as in the high-potential areas, the households have actively expanded their non-farm activities to increase their income. As a result, the regional income gap has significantly declined. It must be pointed out that remittances, which are primarily sent by overseas migrants, account for nearly one-half of the non-farm income in the Philippines, underscoring the utmost importance of overseas migrants in supporting the income of rural households in this country.

A more dramatic example of such structural changes in the composition of rural household income can be found in the marginal areas of the northeast Thailand, where non-farm income share has increased from 21 percent in 1987 to 74 percent in 2004. Since the areas are unfavorable for agricultural production, households have raised their income by increasing the non-farm income share. This was made possible by the increased availability of non-farm jobs in the cities of Khon Kaen and Bangkok; farmers in this region used to migrate to the western regions to engage in low-wage employment such as sugarcane cutting. Thus, high-wage non-farm jobs have 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 (due to availability of irrigation) than the latter. It is remarkable that non-farm income accounts for a much larger share of total income in the marginal areas in 1988, suggesting the decisive importance of access to non-farm labor markets in determining the total income of rural households. The rapidly declining share of rice income, particularly in the marginal areas, was also observed. In the high-potential areas, the total income has caught up with that in 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, per capita income in the marginal areas was less than half of that in the high-potential areas in the mid-1980s. However, somewhat similar to the experience in the marginal areas in the Philippines and Thailand, the households in the marginal areas have increased their non-farm income share from 7 to 27 percent. In addition, the share of non-rice farm income, which consists of income from the production of high-value products such as sugar cane and milk, increased in the marginal areas of Tamil Nadu. As a result, per capita income in the marginal areas increased from US$228 to US$623, 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 increase the income of rural households, particularly in areas less favorable to agricultural production.

Agricultural wage income is negligibly small in Africa with the exception of Mozambique (Table 4), strongly indicating that the agricultural labor market plays an insignificant role in household income in 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 high-value crops and livestock products, occupies a large share in Kenya and Ethiopia. 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. Mozambique shows a higher proportion of income coming from non-cereals and non-farm earnings, indicating a potential to increase income through diversification to high-value crops and non-farm work.

Table 4. Differences in rural household income per capita (PPP US$) and its composition (%) in selected areas of Africa.

	High-Potential Agricultural Areas	Marginal Agricultural Areas
Ethiopia		
Per capita income (PPP$)	652	628
Agricultural wage (%)	0	0
Cereal income (%)	52	47
Non-cereal farm income (%)	37	38
Non-farm (%)	3	6
Kenya		
Per capita income (PPP$)	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$)	673	594
Agricultural wage (%)	3	2
Cereal income (%)	58	61
Non-cereal farm income (%)	10	13
Non-farm (%)	12	9
Mozambique		
Per capita income (PPP$)	661	451
Agricultural wage (%)	11	7
Cereal income (%)	9	18
Non-cereal farm income (%)	50	51
Non-farm (%)	30	24

Notes:
1. Kenya: High potential agricultural areas are Central and Rift Valley provinces and marginal areas are western regions.
2. Uganda: High potential agricultural areas are Local Counsel 1s (LC1s) with good market access, and marginal areas are LC1s with poor market access.
3. Ethiopia: High potential agricultural areas are Oromiya (excluding Jimma Zone) and Amhara Region while the marginal areas are SNNP Region and Jimma Zone.
4. Mozambique: High potential agricultural areas are the coastal districts in the provinces of Zambézia and Sofala while the marginal areas are the inland districts.
Source: Authors' compilation.

Income sources and farm size

Judging from the declining income gap between the initially low and high income regions in Asia in the face of the increasing share of non-farm incomes, the development of non-farm labor markets seems to favor poor regions. To examine if such changes in the non-farm income share are in favor of the landless and marginal farmers, income sources of sample households were examined by land size classes: landless, 0 – 1 ha, 1 – 2 ha, and over 2 ha (Table 5). As far as Asian countries are concerned, there is a negative correlation between land size

Table 5. Changes and differences in real rural household income per capita (PPP US$) and its composition (%) in selected areas of Asia.

	Land Size			
	Landless	0 – 1 ha	1 – 2 ha	>2 ha
Philippines				
1985 PC Income (PPP $)[a]	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 $)	na[b]	359	481	799
2004 PC income (PPP $)	3,156	2,677	2,882	4,690
1987 Non-farm Share (%)	na	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 $)	na	511	682	1,529
2004 PC income (PPP $)	na	602	826	1,610
1981 Non-farm Share (%)	na	2	3	6
2004 Non-farm Share (%)	na	21	17	8
Ethiopia				
2004 PC income (PPP $)	na	565	558	816
2004 Non-farm Share (%)	na	7	4	1
Kenya				
2004 PC income (PPP $)	na	698	814	1,091
2004 Non-farm Share (%)	na	32	29	25
Uganda				
2003 PC income (PPP$)	na	458	557	903
2003 Non-farm Share (%)	na	11	11	10
Mozambique				
2005 PC income (PPP$)	na	347	540	557
2005 Non-farm Share (%)	na	25	24	24

[a]Per capita.
[b]Not available.
Source: Authors' compilation.

and non-farm income share. Similar to marginal areas, the landless and the near landless cannot earn much income from farming, hence, they depend on non-farm jobs. Remarkably, except for the large farmers (>2 ha), the differences in per capita income among the landless, marginal farmers (0-1 ha), and small farmers (1-2 ha) are generally small. Overall, the development of the non-farm sector seems to favor land-poor households, which otherwise would have been much poorer.

In Ethiopia and Uganda, the non-farm income share is slightly higher among the smaller land-size groups. Thus, households with small land sizes compensate for their low farm income with non-farm income. Although this finding is consistent with the Asian data as well as the results of previous African studies (Reardon et al. 2007; Jayne et al. 2003), the levels of non-income shares are generally much lower than those in Asian countries. A major exception is Kenya, where the non-farm income share in 2004 was comparable with Southeast Asia's in the 1980s. In Kenya, small farmers have a higher non-farm income share than large farmers. Thus, it seems that in Africa, too, the increased availability of non-farm jobs favors land-poor households, which are generally poorer.

Changes in poverty

In this paper, income, instead of expenditure, is used to estimate the head count ratios of poverty by applying the one-dollar per capita per day poverty line. Because income is generally considered to include more errors and to fluctuate more than expenditure, there is a need to be cautious about the accuracy of the poverty estimates. Nonetheless, the changes in poverty estimates over time within the panel data are considered to be comparable across survey rounds because they are mostly from the same set of sample households. In brief, the head count ratios of poverty were found to have declined over time but at different paces among the locations (Table 6).

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. Thailand had a more drastic rate of decline: from 51 to 12 percent in the high-potential areas and from 70 to 21 percent in the marginal areas. Bangladesh's rate of poverty reduction is less impressive, reflecting the slower growth of the country's non-farm economy. Notably also, India's poverty incidence has drastically declined especially in the high-potential areas, where the increase of non-farm income has been modest. Further investigations suggest that the income distribution has become quite equitable in the high-potential areas in India, with the introduction of labor intensive high-value crops, such as groundnut, sorghum, and cantor (Kajisa and Palanichamy 2008).

In African countries, except in the high-potential areas of Kenya, the proportion of poor households is high, ranging from 42 to 57 percent.[5] In the high-potential areas of Kenya, it is as low as 29 percent, which is comparable with that of the Asian countries. This finding indicates that the increased availability of non-farm jobs is a key factor to a successful poverty reduction in Sub-Saharan Africa.

[5] Matsumoto et al. (2008) 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.

Table 6. Changes in the incidence of poverty hHead-count ratio using the US$1/capita per day poverty line) in selected areas of Asia and Africa (%).

	High-Potential Agricultural Areas		Marginal Agricultural Areas	
	1980s	2000s	1980s	2000s
Philippines	40	23	66	42
Thailand	51	12	70	21
Bangladesh	64	41	58	43
Tamil Nadu (India)	72	13	84	47
Ethiopia	na[a]	45	na	42
Kenya	na	29	na	50
Uganda	na	50	na	57
Mozambique	na	59	na	80

[a]Not available.
Source: Authors' compilation.

THE ROLE OF HUMAN CAPITAL IN POVERTY REDUCTION

It is commonly observed that the better educated rural workers are engaged in the more lucrative non-farm work, where schooling is critically important in job selection. Indeed, regression analyses show that schooling variables positively and significantly affect non-farm income of rural households in the Philippines (Estudillo et al. 2008) and Thailand (Cherdchuchai et al. 2008). Schooling is also an important determinant of participation in local non-farm activities and migration in Kenya and Uganda (Matsumoto et al. 2008). There is also much less of a gender discrimination in the non-farm labor market, where women can earn as much non-farm income as men, in the Philippines (Estudillo et al. 2001) and Thailand (Cherdchuchai et al. 2008). In contrast, the less educated rural workers are forced to engage in agricultural labor employment or low-income rural non-farm work, where returns to schooling are bound to be lower. Yet while wages are lower, the rural non-farm sector offers enhanced employment opportunities for the unskilled and semi-skilled workers, leading to a decline in the income gap between the educated and uneducated workers (Takahashi 2008; Cherdchuchai 2006).

Table 7 presents the average schooling years of adult workers in four different labor markets based on the main occupation of the worker: (1) permanent urban migrant workers, (2) rural non-farm workers, (3) farmers, and (4) agricultural workers. The data indicate that the urban migrants have much higher education levels than those who stay in the rural areas. Since schooling is not as important in farming as in non-farm jobs, 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. In other Asian countries, too, there are clear differences in educational attainment levels among rural non-farm workers, farmers, and agricultural workers

Table 7. Schooling of permanent migrants, rural non-farm workers, farmers, and agricultural workers in selected areas of Asia and Africa in 2004.

	Average years of schooling
Philippines	
Permanent migrants	11.8
Rural non-farm workers	9.0
Farmers	8.9
Agricultural workers	7.2
Thailand	
Permanent migrants	9.2
Rural non-farm workers	9.0
Farmers	6.3
Agricultural workers	6.2
Bangladesh	
Permanent migrants	7.2
Rural non-farm workers	5.5
Farmers	4.5
Agricultural workers	1.9
Tamil Nadu (India)	
Permanent migrantsa	10.0
Rural non-farm workersb	8.0
Farmers	5.7
Agricultural workers	2.3
Ethiopia	
Permanent migrants	4.3
Rural non-farm workers	3.1
Farmers	2.5
Kenya	
Permanent migrants	9.7
Rural non-farm workers	9.0
Farmers	8.0
Uganda	
Permanent migrants	8.9
Rural non-farm workers	6.7
Farmers	6.1
Mozambique	
Permanent migrants	na[3]
Rural non-farm workers	2.7
Farmers	1.8

[a]Refers to regular non-farm workers
[b]Refers to rural business workers.
[c]Not available.
Source: Authors' compilation

(Lanjouw and Shariff 2004; Kurosaki and Khan 2006).

On the average, the annual income of permanent migrant urban workers is higher than that of the full-time rural non-farm workers in the Philippines and Thailand. This is particularly the case for migrants from high-potential areas, who are more educated than those from marginal areas. Such regional difference is not observed in Bangladesh, where the regional income gap is much smaller. Overall, it is clear that labor markets are highly segmented in accordance with schooling level, where the more educated workers tend to find lucrative non-farm jobs and the uneducated workers tend to work in relatively low-paying jobs including hired labor employment in agriculture.

Determinants of Schooling Investments

A critical question is whether a higher agricultural income leads to higher investments in schooling of children; and if so, to what extent? Rural households in Asia tend to invest a major portion of their income in the schooling of children, who later on are engaged in rural non-farm jobs or migrate to cities or even abroad to seek more lucrative employment opportunities. A main source of additional household income in the earlier years was modern farm technologies, notably, the adoption of high-yielding modern rice varieties under irrigated conditions. It is therefore reasonable to conclude that productivity growth in agriculture contributes to overall economic development by stimulating investments in the schooling of children in the rural areas and, subsequently, supplying an educated labor force to the non-farm sector.

The cases of Uganda, Ethiopia, and Mozambique are interesting because agriculture and related activities are the dominant sources of income. The analyses of the determinants of completion of grade 5 to 8 in Ethiopia, Kenya, and Uganda show that household income is a critical determinant for completing grades, particularly for girls in Uganda and Ethiopia (Matsumoto et al. 2008). Since farm income is a dominant source of income in these countries, these results are supportive of the hypothesis that farm income is an important determinant of investment in children's schooling in both Asia and Africa.

In Kenya, where schooling levels are much higher so that most children complete grade 8, the effect of income on children's completed schooling was not observed. In Mozambique, the schooling of the household head is the most significant factor affecting schooling of children, as measured in terms of incremental years in school and school enrollment. This may be because parents in Mozambique commonly work in the non-farm sector, where schooling is important, unlike other countries in Africa where parents are mainly engaged in farming.

Overall, the initial opportunity to increase household income, which was brought about by the Green Revolution, can lead to the virtual circle of higher income, higher schooling investments in children, higher remittance and non-farm wage incomes, and, in some cases, overseas migration. Schooling investments may be a prerequisite of migration, suggesting a sequential human capital investment process.

SUMMARY AND CONCLUSIONS

By using four long-term panel data sets in the Philippines, Thailand, Bangladesh, and Tamil Nadu (India), a short-term panel data set in Mozambique, and three cross-sectional data sets in Ethiopia, Kenya, and Uganda, the roles of labor markets in long-term poverty reduction in Asia were examined; the Asian experience was compared with the current situation in Africa. Three major conclusions have emerged.

First, the reliance on agricultural labor markets is unlikely to reduce poverty to a

significant extent. The share of agricultural wage income declined as shown in the long-term panel data in Asia, except for Tamil Nadu (India). Employment of agricultural labor is confined to simple tasks, so that daily earnings of agricultural workers are necessarily low. Furthermore, hired labor engaged in simple tasks can be easily replaced by agricultural machines, and its demand is limited to peak seasons. In Africa, the agricultural labor market remains very thin.

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. According to the case studies conducted 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 significantly declined as the non-farm income share increased. Similar relationships are found in African countries, suggesting that the development of non-farm labor markets is indispensable for poverty reduction in Sub-Saharan Africa. Furthermore, women seem to have a comparative advantage in non-farm jobs whereas men appear to have their comparative advantage in farm work in Southeast Asia (Estudillo et al. 2001; Cherdchuchai 2006).

Third, and finally, labor markets are clearly segmented in accordance with schooling levels. In Asia, permanent migrants and rural non-farm workers were found to be more educated than farmers and agricultural workers. On the whole, educated workers tend to find lucrative jobs in the non-farm sector, supporting the widely held belief that schooling is a profitable form of human capital investment.

An important question has to do with factors that affect parental decisions to invest in schooling of children. The long-term panel studies in Asia suggest that increased agricultural income, mostly generated from new agricultural technologies, was a major source of funds used to invest in children's schooling in the early years, which later led to the grown children having lucrative non-farm occupations. The Asian experience strongly suggests that it is necessary to improve farm technology in order to break the vicious cycle of poverty in Sub-Saharan Africa. Indeed, without increasing crop income and improving food security in Sub-Saharan Africa, farmers in this region will not be able to afford to send their children to school and allocate more time to non-farm activities.

As such, introducing new farm technology in Africa is a major policy challenge to improve production efficiency, strengthen food security, and increase farmers' investment in their children's schooling. Another policy implication from this paper has to do with the development of 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 and practitioners.

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