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Growth and Distribution of Rural Income in Bangladesh

Analysis Based on Panel Survey Data

This article highlights aspects of growth and distribution of incomes in rural Bangladesh by focusing on a set of households in the period between 1987-1995. It reports findings on changes in distribution of landholdings, education and occupation of rural workers, structure and distribution of incomes, and income and non-income dimensions of poverty. The article concludes with the view that policies based on the view that policies based on providing better access to capital and education for the poor would make a greater impact on poverty reduction than policies based on interventions in the operation of land and labour markets.

MAHABUB HOSSAIN, BINAYAK SEN, HOSSAIN ZILLUR RAHMAN

I
Introduction

Although the household expenditure surveys (HES) carried out by the Bangladesh Bureau of Statistics (BBS) represent a major source for analysing trends in income distribution and poverty, the results have generated controversies, as they seemed incongruent with macroeconomic trends. Considerable controversies persisted – at least until recently – on the nature of the rural growth process, on the directionality of attendant changes in income inequality and poverty, and on possible factors that underlined such changes [Rahman and Haque 1988; Khan and Hossain 1989; Osmani 1989; Khan 1990]. Consultation with a third source of primary data, such as the present study, can help clear up factual controversies that cloud thinking on policies. Similarly. the need for going beyond the conventional analysis of cross-sectional data to shed light on what is going on 'behind the scenes' can hardly be exaggerated. This paper highlights the dynamic aspects of the growth and distribution of rural incomes by focusing on the changing fortunes of the same set of households over time. Broadening the scope of conventional poverty analysis is an important step, given the increasing emphasis in the literature on policies beyond economic growth.

The focus of the paper is restricted to the analysis of factors contributing to the dynamics of rural income growth and its distribution. The paper is structured as follows. Section II describes the methodology used for selecting the sample. Sec-

tion III reports the findings of the survey on changes in the asset base, occupation structure, and technological progress in agriculture. The structure and the growth of household incomes and their determinants are reported in Section IV. The section also gives a brief review of the aggregate trend and the sources of income inequality. An estimate of the income-poverty level for each of the survey points is presented in Section V. The section also focuses on trends in non-income dimensions of poverty with special focus on health and education. It also presents the households own perceptions of the changes in well-being, to provide a check on the trends derived on the basis of objective assessment. Section VI provides a summary of the findings and draws implications for policy.

II
Data and Methods

Survey Methodology

The sample for the study was drawn in 1987 using a multistage random sampling method for the study of the Differential Impact of Modern Rice Technology conducted by the Bangladesh Institute of Development Studies (BIDS) in collaboration with the International Rice Research Institute (IRRI) [See Hossain et al 1994; David and Otsuka 1994 for the findings of the study]. In the first stage, 64 unions (to cover one union each from 64 districts in Bangladesh) were selected from the list of all unions (the lowest level local government unit) using a random number table. In the second stage, information on land area, total population, and literacy rates

were obtained for all villages of the selected unions from the district reports of the 1981 Population Census. Two villages were selected purposively for each union such that the population pressure and the literacy rate for the selected villages were similar to those for the selected union. Thus, 124 villages were selected, with the first choice in each pair in the village being the most representative of the union. A census of all households in the first choice village was undertaken to collect information on the ownership of land, adoption of modern rice varieties, and the major source of household incomes. Where the village community was found non-cooperative for conducting the study, the household survey was conducted in the second choice village. Two unions were dropped at this stage because of the problem of logistics for conducting the survey. The sample thus consisted of 62 villages from 57 districts.

The census of the selected villages enumerated totalled 9,874 households or 159 households per village. These households were used as the sample frame for the final draw of the sample for data generation on the operation of the household economy. The households were classified into four landownership categories: (a) functionally landless (with less than 0.2 hectare of land), (b) small landowner (0.2 to 1.0 ha), (c) medium landowner (1.0-2.0 ha) and (d) large landowner (over 2.0 ha). Each of the landownership groups was further classified into two subgroups according to whether the household was engaged in tenancy cultivation or not. Twenty households were then selected from each village using the pro-

portionate random sampling method so that each of the eight (4x2) strata was represented according to its weight. In a few villages the sample size was 21 because of rounding error. The total sample for the 1987 survey thus consisted of 1,245 households.

The selected households were interviewed with a structured questionnaire for generating data on demographic characteristics of all household members, utilisation of all landowned and operated by the household, costs and returns of cultivation of different crops, ownership of non-land assets, employment of working members and earnings from non-farm activities, and perceptions of the households regarding their economic standing in the village and changes in their economic conditions. The same households were re-surveyed by BIDS in 1990 [see Rahman and Hossain 1995 for the findings] and in 1995 for the project entitled 'Analysis of Poverty Trends' supported by the Like Minded Group of donors. The sample size was larger in the later surveys as many households were subdivided due to demographic pressures. All subdivided households were covered by the later surveys. There was also some attrition due to migration of some households from the village. This paper is based on the data from the 1988 and 1995 surveys.

Estimation of Income

The concept of income used in the study is comprehensive, including income received in kind and in cash. A money value was imputed to receipts in kind at prices prevailing in the survey village. Household consumption of self-produced crops and their by-products, and livestock, fishery, and forestry products are considered as incomes. The income from crop production activities is estimated as the value of the main product and by-products net of the costs on account of seeds, fertilisers, pesticides, irrigation charge, payment to hired labour, and draft and machine power. The income thus includes the imputed value of the utilisation of resources owned by the household, such as land, family workers, and draft animals. Due to lack of information, no allowance could be made for depreciation of fixed assets and the owner-occupied housing. Receipts from disinvestment of assets and borrowings are not included in incomes. Implicit transfers on account of non-market access to public services such as education and health care should ideally be included in income accounting. The survey lacked information on this aspect.

Measures of Income Inequality and Poverty

The degree of inequality in the distribution of income was measured by the Gini coefficient, as proposed by Sen (1973). The concentration coefficient was estimated by ranking households in the scale of per capita incomes. A Gini decomposition analysis was conducted to identify the factors contributing to overall income inequality by following the procedure suggested by Fei et al (1978), Pyatt et al (1980) and Shorrocks (1983). The changes in the poverty situation was assessed by measuring a class of indices – the head count ratio, the poverty gap ratio, and the squared poverty gap ratio – using the method proposed by Foster, Greer and Thorbeck (1984).

III
Changes in Asset Base and Livelihood Systems

The findings show that the number of rural households increased by only 0.8 per cent and the population by 0.3 per cent per year during 1987-95 period, compared to a 2.1 per cent annual growth in national population during the 1980s, as estimated by the 1991 population census. Rural-urban migration contributed to a large extent to the reduction in rural population growth. The number of households who migrated during the 1988-95 period constituted 14 per cent of households enumerated in 1988. Nearly 55 per cent of the migrants belonged to the landless households, and 20 per

cent to households with less than 0.2 ha. The incidence of migration was low among the land-rich households although many experienced migration of educated members.

The changes in the age composition of the population indicated a substantial decline in the natural rate of population growth. The size of the 0-10 age group declined substantially during the 1998-95 period, while the number in the age group 10 and above increased at a rate of 2.3 per cent per year, similar to that estimated by the 1981 Population Census for the 1973-81 period. The ratio of young children (0-4 age group) to women in the reproductive age (16 to 50) is a good indicator of the current fertility in the population. The child-woman ratio among the survey population declined from 77 per cent in 1988 to 50 per cent by 1995 indicating substantial reduction in the fertility rate. These demographic changes were reflected in the reduction in household size from 6.16 in 1988 to 5.95 in 1995, a rate of decline of 0.5 per cent per year.

The progress in population control was not yet reflected in the availability of family labour. The average number of family workers (earning members) increased from 1.61 to 1.79 during the 1998-95 period. The labour force participation rate among adult (16+) male members in fact declined marginally from 85 to 82 per cent due to higher school participation rate among young adults. The increase in the number of family workers was due to higher female participation in economic activities

Table 1: Educational Attainment of Adult (16+) Population [a], 1988-95

Educational Attainment	Male Population		Female Population		Total Population	
	1988	1995	1988	1995	1988	1995
No formal schooling	42.0	34.4	69.8	55.2	55.0	44.1
Attended primary school	24.1	26.6	18.4	25.6	21.4	26.1
Attended secondary school	16.5	21.4	8.4	14.1	12.7	18.0
High school graduate	9.6	8.2	2.5	3.2	6.3	5.9
Attended college/university	7.8	9.5	0.9	1.8	4.5	5.9

Note: a Figures in per cent of population in the group.

Table 2: Changes in the Livelihood System for the Earning Members
Figures in per cent of total earning members

Source of Livelihood	Primary Occupation		Primary or Secondary Occupation	
	1988	1995	1988	1995
Agriculture	65.5	55.3	93.9	79.2
Crop cultivation	42.9	37.0	62.0	52.3
Agriculture wage labour	21.9	16.8	29.3	23.8
Non-crop agriculture	0.7	1.5	2.5	3.2
Non-agriculture	34.5	44.7	50.3	54.7
Business and trade	9.2	11.7	15.8	17.0
Services	16.7	21.0	19.5	23.4
Non-agricultural labour (industry, transport and construction)	8.6	12.0	15.0	14.3
Total	100.0	100.0	144.2	133.9

outside the homestead, which increased from 7 to 11 per cent over the period.

The quality of human capital seems to have improved (Table 1). The proportion of adult population without any formal schooling declined from 55 to 44 per cent, while those who attended secondary schools increased from 23 to 30 per cent. Those who had completed high school or attended college were only 12 per cent of the adult population in 1995 and their proportion hardly changed over the 1988-95 period. There was a high rate of rural-urban migration from this category.

The changes in the livelihood system for the earning members can be seen from Table 2. In 1988 nearly two-thirds of the family workers were engaged in agriculture as the principal occupation; 43 per cent in farming activities for the household, and 23 per cent selling labour services for others' farms. The dependence on agriculture for livelihood however declined substantially over the period with increasing importance of rural non-farm activities. In 1995, 45 per cent of the workers were engaged in non-agricultural activities including various salaried and personal services, petty trade, shop-keeping and business, providing labour in agro-processing activities, transport operation and road and house construction. The number of cultivators remained almost the same, while agricultural labourers declined by 1.7 per cent per year and non-agricultural workers increased by 6 per cent per year. The mobility of the labour force from agriculture to non-farm activities was facilitated by the improvement in rural infrastructure and human capital, and the technological progress in agriculture (see below) that generated employment opportunities in rural trade and transport sectors. The incidence of multiple occupations declined with greater importance of non-farm employment as the source of livelihood.

The surveys found a high degree of inequality in the access to land resources. The change in the pattern of distribution of landownership can be seen from Table 3. The top 6 per cent of the households who owned more than 2.0 ha of land controlled nearly 40 per cent of the total land, while the bottom 50 per cent of the households who owned less than 0.2 ha of land controlled only 6 per cent of the total land. While the relatively large landowners could maintain their number, the proportion of the landless and marginal landowners continued to increase under demographic pressures. The concentration coefficient in landownership, which was already high at 0.67 in 1988 further deteriorated to 0.69

by 1995. The average size of landownership declined from 0.61 to 0.58 ha during the period.

Nearly 30 per cent of the households did not utilise any land in 1995 and another 50 per cent operated holdings in sizes of less than 1 ha. Households operating land in sizes of more than 2.0 ha constituted only 6.1 per cent of all rural households, and they controlled 34 per cent of the total operated land. The average size of cultivated holding declined from 0.94 to 0.87 ha during the 1988-95 period. Sixty-four per cent of the farms were owner operated, 13 per cent operated by pure tenants and the remaining 23 per cent by households who owned some land and rented-in some for higher capacity utilisation of the farm establishment. The area cultivated under different tenancy arrangements was 22 per cent of the operated land. Both owner and tenant farmers grew in importance while the proportion of mixed tenant farmers declined.

Since land is extremely scarce, the households look for options to augment household incomes. Investment in irrigation has been the most important means of increasing the intensity of cropping and the productivity of land. The coverage of irrigation expanded very fast from 21 to 42 per cent of the cultivated land during the period. Most of the expansion of irrigation came from privately owned shallow tube wells and low-lift pumps. With the expansion of irrigation, the adoption of modern varieties increased from 30 to 65 per cent of the rice cropped area during the 1988-95 period. Although total cropping intensity increased only marginally during the period, the rice cropping intensity increased from 122 to 139 per cent of the cultivated land. In 1995 two modern varieties were grown on the same parcel for 41 per cent of the irrigated land compared to only 12 per cent for the rain-fed land. The adoption of modern rice varieties contributed to an increase in rice yield from 2.44 t/ha in 1987 to 3.22 t/ha in 1995.

The change in the availability and allocation of land and labour resources for

farm and non-farm activities, and the difference in the productivity of resources can be reviewed from Table 4. The numbers indicate that the inter-sector transfer of the rural labour was partly induced by the productivity differential between these sectors. In 1988, annual income per worker was about one-third higher for non-agriculture than for agriculture. The difference has however narrowed considerably over the period with faster growth in labour productivity in agriculture induced by technological progress. The marginal increase in productivity in non-agriculture was mainly due to expansion of employment for activities that are at the lower end in the scale of labour productivity. In the trade sector, for example, there was faster expansion of informal petty trade than that of formal large-scale business. Similarly, there was a large increase in employment for the landless and marginal landowners in rickshaw and van transport, which is not highly productive, although the operator earned more in these jobs than in the alternative agricultural labour market. So with the expansion of non-farm employment the average productivity declined. However, in 1995 the average labour productivity for non-agriculture was still

Table 4: Changes in Resource Endowment and Productivity in the Rural Economy, 1987-94

Variable	Rate of Growth (Per Cent/Year)		
	1994-95	1987-98	1987-94
Landowned (ha)	0.58	0.61	-1.0
No of family workers:	1.79	1.61	1.5
Agriculture	1.00	1.11	-1.5
Non-agriculture	0.79	0.50	6.8
Land productivity (Tk/ha)	49,372	41,133	2.7
Agricultural income per head of agricultural worker (Tk)	28,636	22,605	3.4
Non-agricultural income per head of non-agricultural worker (Tk)	30,545	29,604	0.5
Household income per worker (Tk)	29,478	24,778	2.5

Note: The estimates of income for 1987-88 are at constant 1995 prices.

Table 3: Changes in the Pattern of Distribution of Landownership, 1988 to 1995

Size of Landowned (ha)	Per Cent of Households		Per Cent Share of Land	
	1988	1995	1988	1995
Up to 0.2	46.0	49.6	4.0	4.2
0.2 to 1.0	34.4	32.9	29.0	29.5
1.0 to 2.0	11.4	11.3	26.0	27.0
2.0 to 3.0	4.9	2.7	18.8	11.9
3.0 and more	3.3	3.5	22.2	27.4
Total	100.0	100.0	100.0	100.0

Note: The average size of landownership was 0.61 ha in 1988 and 0.58 in 1995.

7 per cent higher than that for agriculture. Overall, the land productivity in agriculture increased at 2.7 per cent per year, and the labour productivity in all rural activities increased at 2.5 per cent per year, indicating a respectable increase in total factor productivity.

The distribution of benefits from agricultural growth depends on the differential access to irrigation and adoption of modern technology. In the early literature on the green revolution, it was argued that modern technology would bypass the small and marginal farmers [Griffin 1974; Pears 1980]. Most of the empirical studies carried out for Bangladesh found contrary evidence [Hossain 1977, 1988; Mandal 1980; Hossain et al 1994; Asaduzzaman 1979]. The present study further confirms that irrigation development and technology adoption have remained scale neutral in Bangladesh (Table 5). The 1988 survey did not find any systematic difference in the intensity of irrigation across farm size groups, while the rate of adoption of modern rice varieties was in fact higher on smaller farms. With large-scale expansion of irrigation and fast diffusion of modern varieties this pattern hardly changed. The findings show that the benefits of the expansion of irrigation and the technological progress have been fairly equally distributed in Bangladesh.

IV
Structure and Distribution of Household Incomes

Definition of Income Sources

Total income has been decomposed by sector of origin, (i e, agriculture and non-agriculture) and by economic activity. The agricultural income has been divided into three sources:
– Crops. The income includes expenditures saved from household consumption of own-account production of crops, vegetables and fruits, sale of the crops, and the imputed value of crop by-products. The incomes are calculated taking the net of the expenditures on material inputs, hired labour, and rental payments for hired draft power and farm machinery.
– Non-crop agriculture. It refers to net income from livestock, fisheries, and forestry products, which includes household consumption of own-account production. The 1994 survey did not collect information on income from renting out of draft power and sale of by-products such as animal skins and dung. Based on data from the 1988 survey, it was assumed

that such income accounts for 10 per cent of the value of livestock products.
– Agricultural wages. It includes income earned from hiring out of labour services in crop production activities on others' farms.
The non-agricultural sources of income are classified by the relative importance of physical capital, human capital, and labour as components of income. They are divided into three groups:.
– Trade. Financial capital is the dominant factor of production for this activity. It includes incomes from shop-keeping, peddling, petty trade, business, and various kinds of market intermediation (such as contractors in public sector road construction activities, and moneylenders).
– Services. It requires education at different levels, depending on the activity and hence prior investment in human capital formation. It includes incomes from self-services and various types of salaried services. The incomes from services may not necessarily be derived from activities conducted within the village boundary. Due to improvement in transport infrastructure, many members of the households are found employed in the services and commercial activities in local towns and cities while retaining the household in the village. The incomes from remittances from members permanently residing outside the household are also included as service incomes.
– Other non-agricultural activities. This component includes earnings from manual

labour employed in rural processing and industrial activities, transport operations, and housing and road constructions.

Composition and Growth of Incomes

Table 6 reports the findings of the survey on household incomes in rural Bangladesh and its sources. The average rural household income estimated from the survey was Tk 52,767 for 1994-95 crop year. With an average household size of 5.94 persons, the per capita income was Tk 8,803, or US$ 220 at the prevailing exchange rate.

In computing the rate of growth of income from different components during the survey period, we converted the estimates of income for 1987 at constant 1995 prices by using the cost of living index for rural areas. Since price changes may not have been uniform for different sources, this method will introduce some bias in the estimates of growth for different income components, but the estimate of growth for total household income should not be affected. It can be noted from Table 6 that the income from agriculture increased at only 1.9 per cent per year during the 1987-88 to 1994-95 period. The household income, however, increased at a respectable 4.1 per cent per year, mainly due to faster growth (7.2 per cent per year) of income from rural non-farm activities.

Several aspects are noteworthy with respect to the structure of rural household income as of the mid-90s. First, land-ownership was no longer the predominant source of household incomes in rural

Table 5: Intensity of Irrigation and Adoption of Modern Varieties, by Size of Farm, 1987 and 1994

Size of Farm (ha)	Per Cent of Cultivated Area Irrigated		Per Cent of Rice Area under Modern Varieties	
	1987	1994	1987	1994
Up to 0.40	39.6	62.4	44.0	69.6
0.40 to 1.0	30.2	57.7	34.5	65.4
1.0 to 2.0	30.6	58.8	29.4	63.4
2.0 to 3.0	32.1	62.2	33.0	66.0
3.0 and over	31.6	53.3	20.1	69.7

Table 6: Structure and Growth of Rural Household Incomes, 1987-95

Source of Income	Income at Constant 1995 Prices (Tk/household)		Share of Total Household Income (Per Cent)		Annual Growth of Income (Per Cent)
	1994-95	1987-88[a]	1994-95	1987-88	1987-95
Agriculture	28,636	25,091	54.3	62.9	1.9
Crop production	18,124	14,565	34.3	36.5	3.1
Non-crop agriculture	7,606	5,695	14.4	14.3	4.2
Agricultural labour	2,902	4,831	5.5	12.1	-7.0
Non-agriculture	24,131	14,802	45.7	37.1	7.2
Trade and business	8,489	6,583	16.1	16.5	3.7
Services	11,751	5,595	22.3	13.1	11.2
Non-agricultural labour[b]	3,891	2,624	7.4	7.5	5.8
Total income	52,767	39,893	100.0	100.0	4.0

Notes: a The incomes in current prices for 1987-88 were converted into constant 1994-95 prices using the change in the cost of living index for rural areas.
b Includes earnings from labour in agro-processing, transport operation and construction activities.

Bangladesh. This may be judged from the fact that, in 1994-95, the crop production activities accounted for only 34 per cent of the rural household income. The income from this source is dependent on the ownership and operation of agricultural land. Second, trade and services accounted for nearly 38 per cent of the household incomes, indicating that ownership of non-land physical assets and accumulation of human capital have become important sources of rural income. Third, the importance of the labour market in income intermediation was fairly low in rural Bangladesh. Self-employment of manual labour in rural non-farm enterprises and hiring of labour services in crop production activity accounted for only about 13 per cent of rural incomes. The agricultural labour market accounted for only 5.5 per cent of the total household incomes in 1994-95. Additional data shows that even for functionally landless households, agricultural wages accounted for 16 per cent, and manual labour-based non-farm activities accounted for another 16 per cent of the household incomes, while 42 per cent of their total incomes originated in trade and service activities. Income from agricultural wages in fact declined at 7.0 per cent per year during this period. Because of faster growth of non-agricultural activities, the share of the non-agricultural sector in the rural household income increased from 37 to 46 per cent over the 1987-95 period.

Determinants of Income

A multivariate regression model was estimated using household-level data to assess the relative contribution of different factors to changes in the rural household income. The income-earning capacity of the household would obviously depend on the size of landowned and operated by the household, the number of family members in the working age group, and the amount of non-land fixed assets used in productive activities. Access to irrigation would increase the quality and the productivity of land. The adoption of modern rice varieties would increase household incomes if the increase in output outweighs the increase in costs on account of fertilisers, irrigation and pesticides.

The model was estimated in linear form so that the value of the parameters would show the marginal returns from the factors of production. Two alternative variants of the model incorporated separately irrigated land and rice area under modern varieties, because of strong correlation between these two variables. The model was estimated

with data from the 1988 and 1995 surveys, and the values of the parameters were measured at constant 1995 prices using the cost of living index, to facilitate comparison. The estimates show substantial increase in the average as well as the marginal productivity of both land and labour resources during the 1987-95 period (Table 7). The increase in land productivity was mostly due to technological changes in agriculture through the diffusion of the modern seed, fertiliser, and water technology. The marginal contribution of irrigation was estimated at Tk 9,084 per ha (40 per cent higher than that for rain fed land); the return declined by 9 per cent over the 1987-95 period with large expansion of the irrigated area. The additional contribution of modern varieties of rice was estimated at Tk 9,396 per ha (44 per cent higher than that for traditional varieties). The marginal returns from modern varieties increased by 16 per cent over the 1987-95 period.

While the average income per person increased by 2.4 per cent per year over the 1987-95 period, the marginal earnings per worker increased by 12 per cent per year. This large increase in the marginal productivity of labour is a reflection of the increase in the productivity of labour in specific occupations, as well as the reallocation of labour from lower to higher productive activities. The expansion of irrigation infrastructure and the diffusion of modern varieties might have contributed to the increase in the marginal productivity of labour in agriculture.

The marginal returns to capital (excluding land), however, declined significantly during the period. This may be due to rapid expansion of rural capital formation from a very low base. The average capital-output ratio was estimated at only 0.28 for 1987; it increased substantially to 0.47 by 1994. The increase in capital intensity has contributed to the growth in land and labour productivity, but the marginal return from capital declined.

The contribution of different factors to the growth of income could be assessed from the value of their elasticity. The sum of the elasticity, as estimated from the 1995 survey data, was close to unity, indicating constant returns to scale. The value of the elasticity was 0.36 for land, 0.62 for labour and 0.07 for capital. The findings indicate that about 61 per cent of the increase in income at the margin was contributed by labour, 36 per cent by land, and only 7 per cent by capital.

Measure of Income Inequality

The sample households were ranked in the scale of per capita income and the income shares of successive decile groups were estimated to study the pattern of distribution of income in the sample (Table 8). The income distribution was fairly unequal. The bottom 40 per cent of the households owned only 16 per cent of the total income, while the top 10 per cent owned about 32 per cent. The Gini ratio for concentration of per capita income was estimated at 0.42 for the entire sample. The high degree of income inequality is related

Table 7: Determinants of Household Incomes: A Regression Estimates

Factors of Production	1987-88				1994-95			
	Equation 1		Equation 2		Equation 1		Equation 2	
Landholding (ha)	12,660	(12.10)	13,150	(12.96)	22,712	(11.63)	21,195	(11.95)
No of family workers	8245	(10.02)	8160	(9.91)	17,868	(15.55)	18,492	(16.10)
Fixed capital	46.4	(8.41)	45.0	(8.02)	14.3	(9.45)	12.8	(8.38)
Irrigated land (ha)	9996	(4.95)	9084	(3.22)				
Land under water modern varieties (ha)			8074	(4.70)			9396	(5.17)
Constant term	10,683	(7.32)	10,342	(7.09)	-2074	(-0.89)	-3105	(-1.33)
R^2	0.47		0.47		0.51		0.52	

Notes: Figures within parenthesis are estimated 't' values of the regression coefficient. The dependent variable is household income at 1995 constant prices.

Table 8: Degree of Inequality in the Distribution of Landholding and Per Capita Incomes, 1987-95

Rank with Respect to the Criterion Variable	Share (Per Cent) of Landowned		Share (Per Cent) of Per Capita Incomes	
	1995	1988	1994-95	1987-88
Bottom 40 per cent	1.9	2.1	15.7	18.7
Middle 40 per cent	27.9	29.6	35.8	39.3
Ninth decile	19.6	21.0	16.9	15.8
Top 10 per cent	50.6	47.2	31.6	26.2
Top 5 per cent	34.6	30.0	19.9	16.0
Gini concentration ratio	0.69	0.67	0.42	0.35

to the inequality in the distribution of landownership. The top 10 per cent of the rural households controlled 51 per cent of the total land, while the bottom 40 per cent owned only 2 per cent

There was a substantial deterioration of income distribution during the 1987-95 period. The income share of the bottom 40 per cent of the households declined from 19 to 16 per cent, while the share of the top 10 per cent of the households increased from 26 to 32 per cent. The value of the Gini concentration ratio increased from 0.35 to 0.42. An in-depth investigation revealed that this was due to the drastic reduction in the crop sector income in several villages because of the disastrous flood in 1987. The reduction in crop sector income was obviously higher for larger landowning households. The land-poor households gained during that year from the relief and employment support programme undertaken by the government after the flood [Hossain and Akash 1994]. The allocation of expenditure for relief and development through rural public work programmes (Food for Work and Vulnerable Group Development) had declined since then, which may have contributed to the worsening income distribution during the 1987-95 period.

Sources of Income Inequality

The distribution of total income may change because of changes in the distribution of individual components of income and/or changes in the income share of the component. If additional income is derived from a relatively equally distributed source, income distribution will improve. Conversely, if the faster growing sources of income are more unequally distributed, the inequality in the distribution of income will worsen.

The economic position of a household depends on the per capita income and not on the income from different components. So the Gini ratio of income for the component source does not have an economic meaning. Hence, we measured the concentration ratio of income from different components by maintaining the same rank of the households in the scale of per capita income. These pseudo-Gini ratios for different components of income, and the results of the Gini decomposition analysis are reported in Table 9.

As expected, the crop sector income was highly unequally distributed because of the skewed distribution of landownership. But incomes from trade and services were almost as unequally distributed. About 65 per cent of the incomes from trade and 60

per cent of the incomes from services were concentrated in the hands of the top 40 per cent of the households in the per capita income ladder. Thus, employment and income opportunities in the fast growing non-agricultural activities were also captured by the relatively high-income groups, presumably due to their better access to capital and credit and improved human capital and their capacity to invest in education of the children. The income from agricultural wages and processing and transport and construction activities were distributed in favour of the lower income groups as shown by the low and negative values of the pseudo-Gini ratios for these components of income. Nearly 70 per cent of the agricultural wage income accrued to the bottom 40 per cent of the households.

The contribution of different sources to overall income inequality is shown in the last column of Table 9. The crop production activity accounted for only 42 per cent of overall inequality in the household income (0.18 out of 0.43), services accounted for another 28 per cent, and trade, 19 per cent. As the share of income from the non-agriculture has been increasing, and the incomes from trade and services are more unequally distributed than the income from agriculture, non-agriculture will become an important force behind worsening income distribution. This finding points to the need for adopting policies that support distribution of new employment opportunities in the non-farm sector in favour of the resource-poor households.

V
Trends in Poverty

Measures of Income-Poverty

The measurement of poverty involves (a) the specification of the income level below which a person is considered poor (the so-called 'poverty line') and (b) construction of an index to measure the in-

tensity and severity of poverty suffered by those whose income is below the poverty line. The most widely used measure of poverty is the so-called 'head count' ratio, i e, the proportion of people living below the poverty line. Foster et al (1984) proposed a class of poverty measures that are additively decomposable and that satisfy all the criteria for an ideal poverty measure [Sen 1981; Kakwani 1980]. This measure is known as the FGT index. Using this method, incidence, intensity, and severity of poverty were measured.

One needs to establish the poverty line income to estimate FGT indices of poverty. Setting the poverty line has been an issue of great controversy in Bangladesh. It has also been an important source of discrepancy in the level and trend in poverty estimated in various studies [see Ravallion and Sen 1996 for a review]. The popular approach used by the poverty studies in Bangladesh is the 'cost of basic needs' method [Muqtada 1986; Rahman and Haque 1988; Hossain and Sen 1992; Sen and Islam 1993; Rahman and Hossain 1995; Ravallion and Sen 1996]. This method takes a normative consumption bundle of food items recommended for the average Bangladeshi population that gives a per capita daily intake of 2,112 kilocalories and 58 g of protein needed to maintain a healthy productive life [Muqtada 1986]. The required minimum expenditure on food

Table 10: Changes in Poverty Situation, 1987-94[a]

Indicator	1987-88	1994-95
Head count ratio (per cent of households)		
Extremely poor	25.8	22.5
Moderately poor	31.7	29.2
Extremely and moderately poor	57.5	51.7
Poverty gap ratio (per cent)	21.7	19.2
Distributional-sensitive measure (FGT index)	10.9	9.6

Note: a The line of extreme poverty (Tk per person per year) for 1987 and 1994 is 2480, and 3757, respectively. The line of moderate poverty (Tk per person per year) for 1987 and 1994 is 4150, and 6287, respectively.

Table 9: Decomposition of Inequality in the Distribution of Household Incomes, Per Capita Income Scale, 1994-95

Income Component	Share of Component to Total Income	Concentration Ratio of Income from Components	Contribution to Component to Inequality in Income
Agriculture	0.543	0.393	0.213
Crop production	0.344	0.519	0.179
Non-crop activities	0.144	0.364	0.052
Wages	0.055	-0.321	-0.018
Non-agriculture	0.458	0.475	0.218
Services	0.223	0.539	0.120
Trade	0.161	0.520	0.084
Others	0.074	0.186	0.014
Total	1.000	0.431	0.431

items is estimated by using a set of prices for the reference year for the representative group of population. Earlier studies on poverty used national level retail prices for the reference year for representative food items as published in the Statistical Year-book of Bangladesh. More recent studies [Hossain and Sen 1992; Sen and Islam 1993] derived prices from the information on value and quantity for different food items published in the HES Reports. An additional 40 per cent allowance is then made for incomes needed to satisfy the non-food basic needs. This assumption is based on the finding of the HES that the expenditure group on the margin of poverty allocates 60 per cent of their consumption expenditure on food items [BBS 1989].

In this study, we basically followed the above approach to set the poverty line. In reporting results of the previous survey, official data on retail prices for Bangladesh were used. The 1995 survey, however, collected village-specific information on prices of basic necessities, which were used to measure village-specific poverty line. For non-food items, we used the change in consumer price index for the country as a whole since such information is not available for rural areas. This will introduce an upward bias in the estimate of poverty, since most rural households do not pay for such non-food items (such as house rent, electricity) and the level of expenditure on transport, recreation, education, and health is substantially lower in rural areas than in urban areas.

The measures of the severity of poverty shown by the FGT index would depict what has been happening to changes in income among the poorer of the poor. This measure is however difficult to interpret. To see what has been happening at the lower end of the poverty scale, we used a lower poverty line income needed to have at least 1,800 kilocalories per person per day and called the households below this line as extremely poor, and those with enough incomes to obtain between 1,800 and 2,112 kilocalories as moderately poor. The lines of extreme poverty are estimated at 60 per cent of the line for moderate poverty following the findings of the 1985-86 HES of the Bangladesh Bureau of Statistics [BBS 1989]. This estimate is based on the relationship between per capita income and calorie intake at the household level.

The estimates of the percentage of households living below the poverty line are reported in Table 10. The head-count measure showed considerable improvement in the poverty situation during the

1987-95 period. The proportion of households below the line of moderate poverty declined from 58 per cent in 1987-88 to about 52 per cent in 1994-95. There was also a significant improvement in economic conditions of the poorer group among the poor. The number of extremely poor declined from 26 to 23 per cent.

The intensity of poverty is measured by the average gap of the income of the poor households from the poverty line. The poverty gap ratio declined from 22 per cent in 1987-88 to 19 per cent in 1994-95, indicating an improvement in the intensity of poverty. The FGT index of poverty gives higher weights to income gains accruing to the poorer among the poor households. The FGT index declined only marginally from 10.9 to in 1989 to 9.6, indicating improvement in economic conditions at the lower end of the poverty scale also.

Non-Income Dimensions of Poverty

The survey collected other information on levels of living that are indirect indicators of extreme deprivations. One such information is the availability of warm clothes to protect themselves against low temperatures from December to February. Another is the possession of at least two sets of clothing so that the person can wear a set while the other is cleaned and dried after bathing. Deprivation of these basic clothing needs is an indication of severe economic distress. The 1990 survey found 15 per cent of the sample population having less than two sets of clothing and 22 per cent without any winter clothing. But the situation has considerably improved since then. By 1995, people with less than two sets of clothing dropped to 3.5 per cent and those without any warm clothes to 6.7 per cent.

The survey also collected information on the health status of the sample population as an indicator of the outcome of economic distress. Members of households who were reported as either chronically ill or disabled were 3.2 per cent of the total population in 1988. The number dropped

to 2.3 per cent by 1995. Members reported as occasionally ill and not fully able to participate in economic activities were 12.0 per cent of the sample in 1988; the number dropped to 9.8 per cent by 1995. The incidence of ill health was higher for the female populations. The data show an improvement in health conditions during 1988-95 for both male and female populations. The magnitude of the problem, however, remains at a level that is not socially acceptable. Twelve per cent of the people still cannot lead a healthy active life, and 2.3 per cent are entirely dependent on others for their care and livelihood.

There has also been a significant improvement in the levels of literacy. Nearly 42 per cent of the male and 70 per cent of the female population aged six and above had no formal schooling during the 1988 survey. The number dropped to 34 and 55 per cent, respectively, at the time of the 1995 survey. There has been substantial increase in the number of those who attended primary and secondary schools, for both male and female population.

Another qualitative indicator of poverty would be the incidence of child labour. Participation in economic activities for children in the 11 to 15 age group dropped from 20 per cent in 1988 to 12 per cent in 1995. Child labour was prevalent mostly among the male population; their labour force participation rate declined from 30 to 21 per cent. The reduction in participation rate was partly due to increased school attendance rate.

The survey sought the opinion of respondents regarding the economic standing of the households and the change in economic conditions during the 1995 period. Respondents were asked to categorise the relative economic standing of the household into one of four classes-extremely poor, moderately poor, self-reliant, and solvent-in both the 1990 and 1995 surveys. The subjective judgment of the respondents themselves suggests a considerable improvement in their poverty situation. The number of those who considered themselves as poor declined from

Table 11: Mobility of Households, by Self-Categorisation of Household's Economic Position, 1989 and 1994

Self-Categorisation (1990 Survey)	Self-Categorisation (1995 Survey)					
	Extremely Poor	Poor	Self-Reliant	Solvent	Total	Per Cent
Extremely poor	146	76	38	13	273	23.4
Moderately poor	69	254	202	55	580	49.7
Self-reliant	1	28	111	60	200	17.2
Solvent	1	9	9	94	119	10.2
Total	217	367	360	222	1166	100.0
Per cent	18.6	31.5	30.9	19.0	100.0	

74 per cent in 1990 to about 50 per cent by 1995. Those who perceived themselves as extremely poor also declined from 24 to 18 per cent (Table 11).

The respondents were also asked in the 1995 resurvey to report the change in their economic conditions over the last five years and the reasons for the change. Improvement in economic conditions was reported by 39 per cent, and deterioration, by 19 per cent. Others stated that their economic condition had remained unchanged. Major factors behind improvement were reported as higher employment opportunities, adoption of a modern rice variety, more earning members, higher profits in business, fewer family members to feed, and hard work, in that order of importance. The reasons behind deterioration were mentioned as fewer earning members, lack of employment opportunities, illness of earning members, natural disasters, payment of dowry and increase in the number of family members.

VI
Conclusion

Although the growth of agricultural income decelerated in the early 1990s, total factor productivity in the overall rural economy increased at a satisfactory rate. The main contributors to growth in productivity were rapid expansion of irrigation and diffusion of modern high-yielding rice varieties. Non-crop agricultural activities, such as livestock and fisheries, also registered an impressive growth during the period. Labour productivity was substantially higher in non-farm activities than in agriculture, which provided incentives to movement of labour from agriculture to non-agricultural sector. Opportunities for non-farm employment have, however, been available to households with literate members and better access to capital.

An important factor behind the improvement in rural economic conditions has been the drastic reduction in the growth of the rural population due to rapid rural-urban migration and the reduction in the fertility rate. The success in population control had not yet made any impact on the rural labour force at the time of the 1995 survey. The rural labour force grew at 2.0 per cent per year during the 1987-95 period. The additional labour force found employment mostly in the non-agricultural activities.

The household income was fairly unequally distributed mainly because of the high concentration in the ownership of land, the most important asset in rural areas. The Gini ratio is estimated at 0.69

for landownership and 0.42 for income. An analysis of the decomposition of income inequality by sources of income revealed that nearly half of the income inequality was on account of the concentration of non-agricultural incomes. Incomes from trade, services and livestock production were distributed more in favour of the higher income groups. The concentration in total household incomes deteriorated during the period because of the increase in the share of non-agricultural incomes which was more unequally distributed than incomes from agriculture.

The growth in rural income contributed to a considerable improvement in the poverty situation during the period under study. The magnitude of poverty, with a head-count index of 51 per cent, is a matter of serious concern since natural resources are already over exploited, and the adoption of the available technology has reached fairly high levels. A much faster acceleration of growth will be needed to alleviate poverty within a socially acceptable time horizon.

The findings of the study point to the importance of new agricultural technology, physical infrastructure, and human capital in fostering higher growth and favourable income distribution in rural areas. Given the limited importance of the labour market in income intermediation, policies based on providing better access to capital and education for the poor would make a greater impact on poverty alleviation than policies based on interventions in the operation of the land and labour markets. [PW]

Note

1 Fast decline in poverty during 1976-86 and the consequent rise of poverty during 1986-96 based on official household expenditure surveys are two major moments in this debate. The debate between national accounts and household consumption survey-based estimates of the level of income (consumption) is another example. There is also considerable push vs pull debate relating to the increasing prominence of the rural non farm sector as provider of income and employment.

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