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**PUBLIC RURAL WORKS FOR  
RELIEF AND DEVELOPMENT:  
A REVIEW OF THE  
BANGLADESH EXPERIENCE**

MAHABUB HOSSAIN  
M. MOKADDEM AKASH

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by

Mahabub Hossain  
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International Food Policy Research Institute  
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## FOREWORD

Research on labor market policies and employment programs that alleviate food insecurity in the short run and encourage development and growth in the long run is an important component of IFPRI's research portfolio. There is growing recognition that understanding the labor market in an increasingly diversified economy is as important for food and nutrition policy design as understanding the food market. Labor-intensive public works programs simultaneously address problems of food insecurity, unemployment, and inadequate infrastructure and other public goods.

This review of Bangladesh's experience with labor-intensive public works programs is part of a broader IFPRI research effort to understand more clearly the link between employment and food security, and to learn from the Asian experience with such programs. A review of experience with public works programs in Africa has already been published (*Labor-Intensive Public Works for Food Security: Experience in Africa*, Working Paper on Food Subsidies 6), and research on this issue is in progress in Niger, Botswana, Ethiopia, China, and other countries.

This report reviews the rich and long-standing experience that Bangladesh has had with food-for-work programs, and evaluates their impact on economic development, infrastructure construction, and food security. Lessons are drawn from the Bangladesh experience for Bangladesh as well as for other countries.

This study builds on earlier research on food-for-work programs in Bangladesh that was jointly conducted by IFPRI and the Bangladesh Institute of Development Studies in the early 1980s, and on fruitful collaboration between IFPRI and the World Food Programme.

Joachim von Braun  
Director  
Food Consumption and Nutrition Division

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Much of the work reviewed in this report was done by a research team composed of colleagues from the International Food Policy Research Institute (IFPRI) and the Bangladesh Institute of Development Studies (BIDS), who carried out a comprehensive evaluation of the Food for Work Program during 1981-83 for the World Food Programme (WFP). We would like to acknowledge the contributions of this research team to the understanding of the operation of public rural works in Bangladesh, as well as the institutional support provided by IFPRI, BIDS, and WFP to the study.

We would also like to thank Raisuddin Ahmed, Shubh Kumar, and Akhter Ahmed for many constructive comments on the manuscript. Research and editorial assistance provided by Shamsun Nahar, Ashabul Haque, and Rajul Pandya-Lorch are highly appreciated.

## 1. INTRODUCTION

Bangladesh is a country of over 110 million people crowded onto 144,000 square kilometers of land. This overpopulation — relative to availability of natural resources, frequent natural disasters, and the absence of a vibrant manufacturing sector — has created some of the worst problems of underemployment, poverty, and malnutrition observed in the developing world. According to the latest official estimates (GOB 1990, BBS 1991b), one-third of the available labor force is underemployed, and poverty afflicts 48 and 44 percent of the rural and urban population, respectively.

With manufacturing accounting for less than 10 percent of the gross domestic product (GDP), population increasing at a rate of 2 percent per year, and three-fourths of the population being illiterate, the agriculture and informal services sectors have to absorb the growing population and labor force. Urban areas are already overburdened in providing basic services and cannot accommodate any more people. Nearly 80 percent of Bangladesh's population lives in rural areas, attempting to get food and employment from 22 million acres of cultivable land and from agriculture-based nonfarm activities. Farm households generally tend to share work among family members. The landless, facing a shortage of jobs in the market, try to generate self-employment around low productivity activities by transforming surplus labor into commodities and selling them at low prices. Natural disasters such as floods, droughts, and cyclones are frequent in Bangladesh and can push a large proportion of the population below the subsistence level. If such calamities strike consecutively for a number of years, this population can be exposed to famine.

A development strategy for such an economy must focus on programs that increase employment and labor productivity. Technological change in food production has been the key for increasing both land and labor productivity, but because of limited land resources, it has failed to generate adequate employment. However, diffusion of new technology and profitability of its adoption depend on investment in economic and physical infrastructure, which are still underdeveloped. The construction and maintenance of such infrastructure through mobilization of labor can simultaneously promote diffusion of new technology, increase labor productivity, and provide relief to people without assets by generating much-needed employment (Ahmed and Hossain 1990).

Public works programs are public programs that provide employment and, typically, generate public goods such as physical and social infrastructure through labor-intensive techniques (von Braun, Teklu, and Webb 1991). The present public rural works program is an attempt to promote rural development by converting surplus labor into capital,

raising the level of nutrition of the landless and unemployed, and providing basic rural facilities for raising the productivity of agricultural labor and stabilizing crop yield through protection against natural disasters

Bangladesh has a long history of involvement with public works programs. During British rule, large landowners (*zamindars*) used to organize peasants to develop and maintain rural infrastructures, such as farm-to-market roads, drainage and irrigation channels, flood-protection embankments, schools, and community meeting places. The peasants provided free labor and the *zamindars* supplied the required capital. The migration of Hindu *zamindars* to India after the partition of the subcontinent in 1947 and the abolition of the *zamindari* system in 1950 adversely affected the organization of such works through community participation and deprived rural areas of the leadership and capital for maintaining existing facilities. At the same time, a number of consecutive disastrous floods during the 1950s forced the government to organize relief programs for the poor.

The idea that the twin objectives of providing short-term income support to the poor and promoting long-term growth of the economy could be simultaneously pursued around development of economic and physical infrastructure was tested by the Comilla Rural Development Academy and was later adopted by the government in the early 1960s (Alamgir 1983). In the next three decades, Bangladesh experimented with a number of public works programs, differentiated by objective, focus, and management practice.

The aim of this report is to review the rich experience that Bangladesh has had with public works, and to evaluate the impact of these public works on economic development, infrastructure construction, and food security. In the course of this review, several questions will be addressed:

- What evidence is there that public works reach the poor?
- What is the development impact of public works?
- What is the scope for expansion of public works in Bangladesh?
- What lessons can be drawn from the Bangladesh experience that are pertinent to Bangladesh and to other countries contemplating such programs?

In order to highlight the role of public works, Chapter 2 gives a brief overview of the poverty and unemployment situation in Bangladesh and analyzes the employment-generation capacity of the economy through normal market mechanisms. Chapter 3 traces the evolution of the two largest public works programs in Bangladesh—the Rural Works Program and the Food for Work Program. Management practices, allocation of resources, types of activities financed under these programs, and physical achievements of these programs are also reviewed in this chapter. The effectiveness of the public works programs in achieving their stated objectives is evaluated in Chapter 4. Conclusions are presented in Chapter 5.

## 2 POVERTY AND UNEMPLOYMENT

### INCIDENCE OF POVERTY AND FOOD INSECURITY

The head-count ratios of poverty in Bangladesh estimated by various recent studies are presented in Table 1 (columns 1-6) <sup>1</sup> While the estimates vary substantially, they generally indicate a trend of improvement in the poverty situation in the 1980s compared with the 1970s. Variations in poverty estimates are attributable to differences in underlying assumptions related to minimum calorie requirements for physical survival, items included in a minimum diet, prices used for costing the minimum diet, and so forth. The set of prices used for costing the minimum diet is the major source of discrepancies among the various head-count estimates <sup>2</sup>

Given the limitations just noted of the previous estimates of rural poverty and the difficulties in forming a clear idea about the trend in the past two decades, Hossain and Sen (1992) developed an alternative estimate based on prices they derived from the Household Expenditure Survey by using data on quantity and value of different food items. The study computes the poverty line by costing the normative food consumption bundle recommended for the average Bangladeshi person—which gives a per capita daily intake of 2,112 calories—and adding to it a 30 percent allowance for nonfood basic needs. The poverty line for rural areas was estimated at Tk 4,340 (US\$135) per capita per year for 1988/89. Applying this poverty line to the distribution of population in the household expenditure scale, the study estimated the head-count incidence of poverty to be 43 percent in 1988/89 (Table 1, column 7). The head-count incidence of poverty increased from 60.3 percent in 1973/74 to 77.4 percent in 1977/78 because of the destruction of productive capacity during the War of Liberation, dislocation of the economy due to large-scale migration and resettlement of people, and

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<sup>1</sup> The Household Expenditure Survey periodically carried out by the Bangladesh Bureau of Statistics is the main source of information for most of the studies on rural poverty in Bangladesh. Diversity in the method of imputation, lack of panel data at the household level, lack of uniform methods for recording data flow, and unreliability of memory recall data are some of the limitations of the surveys.

<sup>2</sup> The studies used prices from market surveys in selected towns which are published regularly by the Bangladesh Bureau of Statistics. The problem originates from the issue of which commodities to use to represent generic items such as vegetables, pulses, fruits, meat, and fish. The costing of vegetables, for example, is carried out by using the price of potatoes, of fruits by using the price of bananas, of pulses by using the price of lentils, and of fish by using the price of carp. All of these are relatively high-quality commodities. The aggregate effect is an upward bias in the estimate of the poverty-line expenditure and hence in the magnitude of poverty.

**Table 1—Rural poverty measures in Bangladesh a survey of estimates from different studies**

Year	Bangladesh Bureau of Statistics Official Estimate (1991)	Ahmed and Hossain (1984)	Islam and Khan (1986)	Muqtada (1986)	Rahman and Haque (1988)	Hossain (1989)	Hossain and Sen (1992)
	(percent of rural poor population)						
1973/74	82.9	55.7	47.7	55.9	65.3	77.3	60.3
1976/77		61.1	62.3	68.2			78.9
1977/78		67.9					77.4
1978/79				68.7			65.8
1981/82	73.8				79.1	77.8	55.3
1983/84	57.0				49.8	52.1	46.3
1985/86	51.0				47.1	49.9	37.3
1988/89	48.0						43.4

Sources Based on data from Q. K. Ahmed and M. Hossain An Evaluation of Selected Policies and Programmes for Alleviation of Rural Poverty in Bangladesh (Dhaka: Bangladesh Institute of Development Studies, 1984); I. Islam and H. Khan Income Inequality, Poverty and Socioeconomic Development in Bangladesh: An Empirical Investigation Bangladesh Development Studies 14 (1986); M. Muqtada Poverty and Inequality: Trends and Causes in Bangladesh--Selected Issues in Employment and Development ed. R. Islam and M. Muqtada (New Delhi: ILO-ARTEP, 1986); A. Rahman and T. Haque Poverty and Inequality in Bangladesh in the Eighties: An Analysis of Some Recent Evidence Research Report 91 (Dhaka: Bangladesh Institute of Development Studies, 1988); M. Hossain Recent Development Trends in the Rural Economy of Bangladesh Bangladesh Unnayan Samikkha 6 (1989); M. Hossain and B. Sen Rural Poverty in Bangladesh: Trends and Determinants Asian Development Review 10 (1992): 1-34; Bangladesh Bureau of Statistics Statistical Yearbook of Bangladesh 1991 (Dhaka: Ministry of Planning, 1991).

natural disasters. The poverty situation steadily improved during 1978-86 but then deteriorated over 1986-89 (Table 1, column 7). In 1988/89, the latest year for which Household Expenditure Survey data are available, the official estimate shows that 48 percent of rural households had incomes below the poverty line (Table 1, column 1).

Microlevel household surveys, however, show a higher incidence of rural poverty. Two recent large-scale micro surveys carried out by the Bangladesh Institute of Development Studies (BIDS) on a nationally representative sample selected from 62 villages estimated the rural head-count moderate poverty incidence to be 61 percent in 1987/88 and 55

percent in 1989/90 (Rahman and Hossain 1992) <sup>3</sup> While moderate poverty decreased during 1987-90, the head-count ratio for hard-core poverty increased from 26 percent to 28 percent <sup>4</sup> This study showed that nearly 53 percent of the hard-core poor were concentrated in households having no cultivated land, and nearly 90 percent were in households owning less than 1.5 acres of land. The incidence of poverty was also substantially higher for households dependent on manual labor, such as agricultural wage laborers and transport and communications workers, than for owner-cultivators, traders, and people engaged in various service occupations. Another socioeconomic characteristic of the poor is their lack of formal schooling, 55 percent of the poor had no formal schooling. Incidence of poverty was high among female-headed households, while only 8 percent of male-headed households were hard-core poor, 33 percent of female-headed households fell into this category.

Incidence of malnutrition is an important indicator of poverty. Anthropometric surveys of children show that incidence of mild malnutrition increased between 1975/76 and 1981/82, while that of moderate and severe malnutrition declined (Table 2). Between 1981/82 and 1989/90, the incidence of mild and moderate malnutrition remained unchanged, but

**Table 2—Estimates from anthropometric studies of nutritional status of rural children in Bangladesh**

Degree of Malnutrition <sup>a</sup>	1975/76	1981/82	1985/86	1989/90
	(percent of total sample)			
Mild malnutrition	17.7	28.8	33.1	38.8
Moderate malnutrition	53.0	46.1	52.0	47.9
Severe malnutrition	25.8	15.1	9.6	7.4

Sources: Data for 1975/76 and 1981/82 are from nutrition surveys carried out by the Institute of Nutritional and Food Science, Dhaka University. 1985/86 and 1989/90 data are from the Report of the Child Nutrition Status Survey carried out by the Bangladesh Bureau of Statistics as part of the Household Expenditure Survey.

<sup>a</sup> Mild malnutrition is at least 75 percent but less than 90 percent of National Center for Health Statistics reference median weight-for-age. Moderate malnutrition is at least 60 percent but less than 75 percent of reference median weight-for-age. Severe malnutrition is defined as less than 60 percent of reference median weight-for-age.

<sup>3</sup> The poverty line stood at Tk 4,790 per person per year in 1989/90 which provided for an intake of 2,112 calories per capita per day plus 30 percent additional expenditure for nonfood basic items.

<sup>4</sup> The poverty line stood at Tk 2,810 per capita per year in 1989/90 which provided for 1,740 calories per capita per day, 82 percent of the requirement for moderate poverty.

that of severe malnutrition sharply declined. This tends to support the earlier finding that the poverty situation improved in the 1980s. However, differences in sample sizes and methodologies between the 1975/76 and 1981/82 nutrition surveys, on the one hand, and the 1985/86 survey carried out by the Bangladesh Bureau of Statistics, on the other hand, raise questions concerning the comparability of these measurements over time. Nevertheless, the observation that the incidence of poverty and malnutrition was very high as recently as 1989 remains unquestionable.

The major factors behind the pervasive poverty and low levels of human development in Bangladesh are the large-scale unemployment and underemployment of the labor force and the low wages. The most formidable challenges to Bangladesh's policymakers are how to clear this backlog of unemployment and underemployment and how to create enough jobs for new entrants to the labor force, estimated at more than 1 million every year.

#### LABOR FORCE AND UNEMPLOYMENT

According to the Labor Force Survey of 1985-86 carried out by the Bangladesh Bureau of Statistics, the civilian labor force comprises an estimated 30.9 million persons, about 30.4 percent of the working-age population.<sup>5</sup> However, the size of the labor force is underestimated because the method used to define members of the labor force—the gainful-worker approach, which relies on the current status of involvement of people in income-earning activities—usually discounts labor employed in expenditure-saving activities. This leads to the exclusion of a large section of the working-age population, particularly women who would not normally classify themselves as gainfully employed but who are nevertheless engaged in economic activities within the household.

Females account for only 10 percent of all workers. Official estimates include only those women in the labor force who devote the major portion of their working hours to income-earning activities. The share of women participating in the labor force has increased significantly in recent years, from about 5 percent in the 1960s and early 1970s to 10.4 percent in 1985/86. Many more women participate in economic activities than indicated by these statistics.

The urban labor force has also increased rapidly. Whereas only 6 percent of the total labor force was located in municipal towns according to the 1961 census, by 1981 this share had increased to 13 percent. The 1985/86 Labor Force Survey estimated the urban labor force to be 19.4 percent—15.2 percent in municipal areas and 4.2 percent in nonmunicipal *thana* (subdistrict) centers.

The total civilian labor force grew at an annual rate of 2.1

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<sup>5</sup> The Bangladesh Bureau of Statistics has recently published the results of the 1988/89 Labor Force Survey. The data, however, cannot be compared with those from earlier surveys because of a change in the definition of female labor force.

percent during 1960-73. The annual growth rate accelerated to 3.0 percent during 1973-86. The main source of the rapid growth in the labor force is a phenomenal increase in female participation, the number of female workers in the labor force increased at a rate of 12 percent per year during 1974-86. Growing landlessness and poverty, rapid rural-urban migration, and increasing incidence of broken families were among the main forces driving the increasing female participation in the labor force.

It is difficult to arrive at a reliable estimate of the magnitude and trend of unemployment in the country because of a very weak statistical base and differences in definition. A wide range of estimates exists regarding the extent of unemployment in Bangladesh. According to the Labor Force Survey, the unemployed make up less than 2 percent of the labor force, whereas, according to the Planning Commission (GOB 1990), about 37 percent of the estimated labor force, or 8 million persons, was unemployed at the beginning of the First Five-Year Plan (1973-78). Nevertheless, regardless of the exact share of unemployed persons in the labor force, their numbers increased over time as the number of jobs created was less than the number of new entrants. Targets (for both the public and private sectors) were fixed to generate more employment than the number of new entrants into the labor force in three successive five-year plans, but in none of the three plan periods were these targets realized (Table 3).

"Open unemployment" appears to be very low in Bangladesh.<sup>6</sup> According to the Labor Force Survey, open unemployment in 1985/86 was reportedly less than 2 percent of the work force, a figure that would put many developed countries to shame. But this definition does not

**Table 3—Employment targets and achievements in Bangladesh's five-year plans**

Plan Period	New Entrants to Labor Force  (millions)	Employment Generation		Addition to Unemployment
		Plan Target	Achievement	
First Plan (1973-78)	3.5	5.4	3.0	0.5
Second Plan (1980-85)	4.0	3.7	3.2	0.8
Third Plan (1985-90)	4.7	5.1	3.9	0.8

Source: Government of Bangladesh, Bangladesh Planning Commission, Five-Year Plan documents (Dhaka: Ministry of Planning, various years).

<sup>6</sup> In defining open unemployment, the Bangladesh Bureau of Statistics follows the usual procedure of taking a one-week reference period and classifying as unemployed only those persons who were actively seeking work but did not find work at all during the reference week.

capture those who are forced into low-productivity self-employment in family enterprises due to lack of employment in the formal sector. Since the poor cannot afford to remain unemployed, they engage in some activity regardless of its productivity and return, and, hence, escape this definition. It is presumably the educated unemployed who are captured by this concept, but they are a very small proportion of the total labor force.<sup>7</sup>

More meaningful in this context is the concept of underemployment, which measures the duration of time for which workers cannot find work. The Labor Force Survey does not suggest that there is a high degree of underemployment in Bangladesh. If 40 working hours per week is taken as the full employment norm, about 92 percent of the male workers and 81 percent of the female workers were fully employed in 1984/85. The corresponding figures estimated by the 1983/84 Labor Force Survey were 80 and 59 percent, respectively (Table 4). On average, male workers worked 52 hours per week, a very high figure by any standard.

Thus, by the time criterion, there is hardly any unemployment or underemployment to be found in Bangladesh. In fact, the economically disadvantaged groups put in more hours of labor than the better-off groups in the society. The main problems at this stage of the country's development are the very low productivity of labor and the low wage rate in the labor market. Since the wage rate is so low that it cannot provide subsistence income even at full employment (by the time criterion), the poor have no choice but to engage in self-employment in whatever activities they can find, hence sacrificing their leisure time.

**Table 4—Estimates of the extent of underemployment in Bangladesh from labor force surveys**

Number of Hours Worked per Week	Manpower Survey 1979	Labor Force Survey			
		1983/84		1984/85	
		Male	Female	Male	Female
		(percent)			
Below 20	4.4	2.0	8.7	0.5	1.0
20-39	16.4	18.4	32.7	7.4	17.2
40 or more	69.2	79.6	58.6	92.1	81.1
Average weekly working hours	n a	52.4	44.7	52.8	48.9

Source: Bangladesh Bureau of Statistics, Labor Force Survey (Dhaka: Ministry of Planning, various years).

Note: n a means not available.

<sup>7</sup> The 1984/85 Labor Force Survey estimated open unemployment at more than 6 percent for workers having secondary school certificates or higher degrees, compared with 1.3 percent for illiterates.

Failure to generate enough employment in agriculture and industry increases the number of workers who are pushed to the informal service sectors and to low-productivity self-employment in both rural and urban areas. This depresses the productivity of labor and income in those activities. In 1985/86, nearly one-fourth of the total labor force was employed in trade, transport, construction, and domestic services, which are very low productivity jobs. Industry employed only 10 percent and agriculture about 57 percent of the labor force. During 1974-86, most of the incremental labor force was absorbed in nonagricultural activities, and agriculture's share of employment declined from 79 percent to 57 percent (Table 5)

#### RURAL EMPLOYMENT SITUATION

Employment in rural Bangladesh consists mainly of self-employment. Most agricultural workers are hired on a daily basis. Since workers change jobs from one day to another, shift between self-employment and wage employment, and move between agriculture and other sectors, accurate information on employment can be obtained only through a large number of regular surveys covering a short period of time, so that respondents can recall what they did during this period. The national Labor Force Surveys collect information only for the week preceding the interview date and, hence, shed very little light on the employment situation in rural areas. Instead, the main findings of a survey conducted jointly by the Bangladesh Institute of Development Studies (BIDS) and the International Food Policy Research Institute (IFPRI) on 16 villages over eight weeks during 1982 are highlighted here (Hossain 1985, 1988b, Ahmed and Hossain 1990)

**Table 5—Employment in agriculture and nonagriculture, 1961-86**

Year	Agriculture	Nonagriculture	Total	Agriculture's Share of Total
				(million persons)
1961	14.2	2.6	16.8	84.5
1974	16.8	4.6	21.4	78.5
1981	15.4	9.9	25.3	60.9
1983/84	16.5	11.5	28.0	58.9
1984/85	16.7	12.3	29.0	57.6
1985/86	17.5	13.1	30.6	57.2

Sources: Bangladesh Bureau of Statistics, Population Census and Labor Force Survey (Dhaka Ministry of Planning various years)

The labor force participation rate was estimated at 29.7 percent of the rural population. This rate is low, partly because the proportion of young people in the population is large, but mainly because of the virtual absence of women who engage in income-earning activities.<sup>8</sup> About 35 percent of the population was less than 10 years of age, and only 8 percent of the female population participated in income-earning activities. The size of landholdings and the level of education of workers were inversely related to the participation rate. Labor force participation was higher in technologically backward villages than in advanced villages. Female labor force participation was higher among landless and marginal landowning households than among larger landholding groups. These characteristics of labor force participation suggest that intensity of work effort is driven by poverty.

The average duration of employment estimated from the survey was about 39 hours per week, or about 253 standard eight-hour days during the year of the survey. About 62 percent of the employment was generated in agricultural activities, 33 percent in cultivating own farms, 14 percent in wage labor on other farms, and 10 percent in noncrop agricultural activities. Self-employment accounted for two-thirds of total employment—three-fourths in agricultural activities and one-fourth in nonagricultural activities.

Duration of employment was inversely related to size of land owned, reflecting that at higher levels of income, people substitute leisure for labor. Workers belonging to landless households worked, on average, about 42.4 hours a week, compared with 38.2 hours for workers belonging to households owning 5 or more acres of land. Substitution of leisure for labor was more pronounced for arduous agricultural activities. Labor supply in agriculture was positively related to the amount of land owned by households, because of greater opportunities for self-employment on larger farms. In technologically progressive villages where incomes were higher, workers in farm households put in less labor than did their counterparts in technologically backward villages. In contrast, workers belonging to landless households supplied substantially more (80 percent more) labor in technologically progressive villages than in the backward villages, as more job opportunities became available. More employment opportunities were available to landless people for two major reasons: modern crop varieties are more labor-intensive, and with higher incomes, medium- and large-scale farmers substituted leisure for labor.

Since landless persons did not get enough employment on the land, they engaged in more nonfarm rural activities than did farming households. However, constrained by illiteracy and lack of access to capital, the poor engaged to a greater extent in those nonfarm activities that required more manual labor than physical or human capital.

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<sup>8</sup> Women who devoted more than 50 percent of their labor to income-earning activities were regarded as participants in the labor force. As their contribution to expenditure-saving economic activities was not taken into account, the survey also underestimated women's participation in the labor force.

Such activities included transport and construction rather than trade and services. With technological progress and increases in income, larger landowning households withdrew their labor from low-productivity nonagricultural activities, thereby creating more employment opportunities for the landless.

Most of the agricultural labor in the market was supplied by landless and marginal landowning groups. Nearly three-fourths of the total labor supplied by households that owned less than 0.5 acres was marketed, compared with only 3 percent for households that owned 5.0 or more acres. Participation in the nonagricultural market was also inversely related to size of land owned. The wage rate was higher for nonagricultural labor than for agricultural and higher for male workers than for females. Women received wages that were 40 percent lower than those of men. The agricultural wage rate was 22 percent lower than the wage for nonagricultural activities.

Respondent workers in the survey reported that they were available for work 345 days a year. On this basis, the rate of underemployment was estimated at about 27 percent. However, if six days of work per week is taken as the full-employment norm, the rate of underemployment according to the time criterion would be 19 percent.

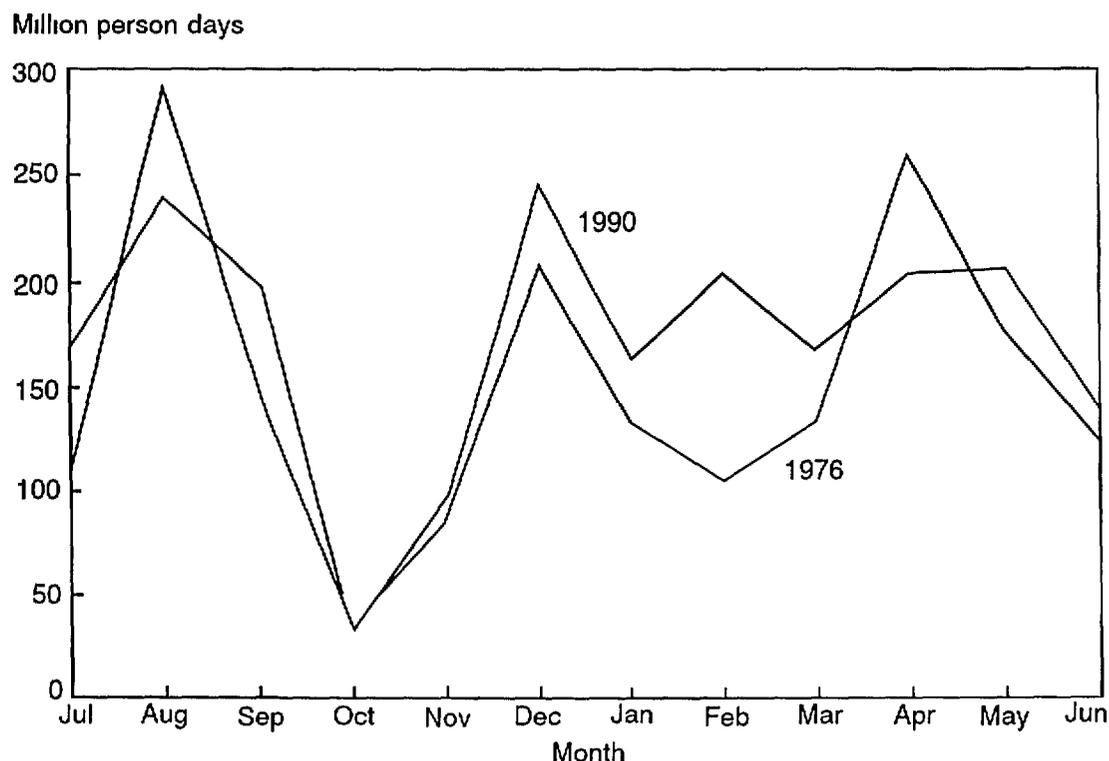
#### Seasonality of Rural Employment

With 70 percent of the land cropped under rainfed conditions, agricultural activities depend largely on nature. Since principal activities such as transplanting and weeding depend on timing of the rains, which are erratic and seasonally concentrated, crop production is characterized by a marked seasonal pattern in the demand for labor. This seasonality constrains maximum use of labor because at certain times of the year a worker may remain idle, while at other times the labor requirement becomes so great that a household may have to hire labor to assist family workers or be satisfied with less than optimum use of their labor. The mode of hiring labor on a daily basis is partly a result of the seasonal pattern of demand.

Since the BIDS/IFPRI employment survey was carried out in eight rounds throughout the year, it permitted some measure of the seasonality of employment. The survey found that February-April and September-November were slack periods for agricultural employment, while December, January, and May were peak months.

Seasonality of employment in a particular area depends on the cropping pattern of the area. Aman is the principal paddy (rice) crop, so the peak period of employment falls in July and August when aman paddy is transplanted and the premonsoon aus paddy is harvested. There is another peak period of employment in December and January when aman paddy is harvested and the irrigated dry season boro paddy is transplanted. Figure 1 shows the estimated employment generated in crop-production activity per month under certain assumptions of crop-calendar and operation-specific labor use for various crops. With the spread of

Figure 1— Seasonal pattern of employment in crop-production activity, 1976 and 1990



Source Authors estimates based on crop calendar and allocation of land under different crops as published by the Bangladesh Bureau of Statistics

irrigation facilities, boro has become an important paddy crop. This may have accentuated the December-January peak, and may have introduced a new peak in March-May when the boro is harvested and the aus crop is planted and weeded.

During slack seasons for agricultural activities, rural households look for employment in noncrop agricultural and nonagricultural activities. The seasonality of employment in the three types of rural activities—crop production, noncrop agriculture, and nonagriculture—observed in the BIDS/IFPRI survey can be seen in Table 6. The coefficient of variation in weekly employment was 18.7 percent for crop-production activities, 16.5 percent for noncrop agricultural activities, and 10.7 percent for nonagricultural activities. An inverse relationship was observed between employment in noncrop agricultural and nonagricultural activities and employment in crop production across the seasons. For eight observations, the correlation coefficient of employment in crop-production activities with noncrop agricultural activities is estimated at  $-0.57$ , and with nonagricultural activities it

**Table 6 — Seasonality of employment in crop and noncrop rural activities, 1982**

Season	Crop Production	Noncrop Agriculture	Nonagriculture	Total
	(hours of labor/week)			
Early January	23.9	3.7	13.3	40.9
Late February	18.9	3.2	16.5	38.6
Early April	19.0	3.8	15.8	38.6
Late May	25.6	3.7	12.9	42.2
Late July	21.4	4.9	12.2	38.5
Late August	19.7	4.8	14.8	39.3
Late October	13.4	4.8	14.1	32.3
Early December	26.0	3.4	12.3	41.7
Mean	21.0	4.0	14.0	39.0
Coefficient of variation (percent)	(18.7)	(16.5)	(10.7)	(7.4)

Source Based on data from M. Hossain, Labor Market and Employment Effects in Development Impact of the Food-for-Work Program in Bangladesh, a report prepared for the World Food Programme (Washington, D.C.: Bangladesh Institute of Development Studies/International Food Policy Research Institute, 1985).

is estimated at -0.49. Thus, the peak periods of employment in noncrop agricultural and nonagricultural activities generally coincided with the slack seasons of agricultural employment, which helped to smooth fluctuations in overall rural employment. The slack in the September-November period, however, still remained quite pronounced.

#### ALTERNATIVES TO RURAL WORKS ECONOMIC GROWTH AND CREDIT PROGRAMS

What is the prospect of solving the employment problem through normal market mechanisms? To address this issue, the Task Force on Poverty Alleviation for the Ministry of Planning made a simple projection of the labor-absorption capacity of various sectors of the economy in the 1990s, using available information about technological changes and the nature of demand for various goods and services (Hossain 1991). The projections were made on the basis of two scenarios for income growth: a "business as usual" case, which assumed a rate of growth of national income of 3.8 percent per year, a historic rate achieved during 1976-90, and an "optimistic case," which assumed a rate of growth of

national income of 5.0 percent per year, as targeted in the Fourth Five-Year Plan. For crop-production activities, the constraint on growth was assumed to be the rate of expansion of irrigation, drainage, and flood control facilities. Expansion of noncrop sectors was assumed to be dependent on the income elasticity of demand for their products and the expected growth of income and population.

The exercise found that in 1989/90 there were probably about 10.1 million person-years of employment of a very low productivity type, which could be categorized as residual employment (it was almost equivalent to the Planning Commission's estimate of unemployment) (Table 7). Residual employment is employment of last resort, taken by workers when they fail to get a remunerative job in the market. Under the business as usual scenario, it is projected that residual employment will, in fact, increase to 11.4 million person-years, or about 25 percent of available labor supply by the year 2000. Even if the government succeeds in accelerating economic growth to 5 percent per year, residual employment will still remain sizable at about 15 percent of the labor force. Thus, the "trickle down" effects of the normal growth process are not expected to create enough jobs for the underemployed and new entrants to the labor force in the medium term. This

Table 7 — Projections of labor absorption in various sectors in the 1990s

Variable	1989/90 (Benchmark)	1991-2000	
		Business- as-Usual Scenario	Optimistic Scenario
Supply of labor (million persons)			
Total	34.50	45.60	45.60
Rural	25.50	29.60	29.60
Demand for labor (million person-years)			
Crop production	7.54	8.62	8.96
Noncrop activities	6.12	8.19	10.18
Manufacturing	3.58	6.51	7.02
Trading	2.75	3.94	4.38
Transport	1.55	2.30	2.63
Construction	0.79	1.32	1.63
Financial services	0.35	0.56	0.68
Personal and social services	1.74	2.80	3.36
Residual employment (million person-years)	10.08	11.36	6.76
Residual employment share of labor force (percent)	29.20	24.90	14.80

Source: Based on data from M. Hossain (convener), Report of the Task Force on Poverty Alleviation in Report of the Task Force on Bangladesh Development Strategies for the 1990s, vol. 1 (Dhaka: University Press Limited, 1991).

exercise suggests a need for providing "safety nets" to create additional jobs through targeted employment-generation programs, for increasing wage income for the landless, and for raising the productivity of residual employment through credit, training, and extension support

A major component of the strategy for rural development in postindependence Bangladesh has been the generation of self-employment for the functionally landless group through provision of access to capital, training for skill development, and extension of improved technology for nonfarm activities. Initially adopted by nongovernmental organizations (NGOs), such programs have been spread throughout the country by government organizations. Women are a special target group of these programs.

Such programs are economically justified in a country at a low level of development because poor households may undertake certain economic activities that capitalist entrepreneurs would not—because of a thin market, underdeveloped infrastructure facilities, and institutionally fixed wages—provided that these poor households have access to capital (Hossain 1988a). In conditions of widespread poverty and underemployment, the opportunity cost of employing family labor may be considerably less than the wage rate. Because of institutional norms, hired laborers work for a specified period of the day. But a household that attaches high costs to leisure because of its poverty status can extend working hours by employing family workers beyond normal hours in such home-based activities as livestock and poultry raising and cottage industries. In calculating economic gains, a poor household does not count labor as a cost, while a capitalist enterprise must deduct wages paid to hired workers when evaluating the viability of the enterprise.

This hypothesis has been substantiated by the Grameen Bank, a target-group-oriented credit institution set up to provide loans to rural households that own less than 0.5 acres of land. The members are organized in groups and associations that meet every week and identify viable economic activities for financing by the bank (Hossain 1988a). They are trained in credit disciplines by bank workers who attend these meetings. Loans are advanced at an interest rate of 16 percent per year,<sup>9</sup> and are collected in weekly installments so that repayment does not become a burden for borrowers. The Grameen Bank's record has been commendable by several criteria: coverage of the target group, timely and convenient delivery mechanisms, noninsistence on collateral security, a high rate of recovery of loans when due (more than 95 percent), expanding coverage of women, and inculcation of savings habits and promotion of thrift. Appropriate training and orientation of the field staff and their commitment to serve the suffering humanity have been crucial elements of the Grameen Bank's success (Hossain 1988a). By August 1991, the Grameen Bank had extended its operations to one-third

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<sup>9</sup> The effective rate of interest is around 30 percent since 5 percent of the loan is kept aside as a contribution to a group fund and 25 percent of the interest on the loan is claimed as a contribution to an emergency fund. The borrower has no personal claim on his deposit to these funds (Hossain 1988a).

of the villages in the country, through nearly 900 branches. One million households have received credit support from the bank. Nearly 92 percent of the borrowers have been women. Savings accumulated in a number of funds amount to nearly 62 percent of the loans outstanding with the borrowers.

Encouraged by the Grameen Bank's success, a number of other NGOs and government agencies have undertaken similar programs to generate productive self-employment. The Bangladesh Rural Advancement Committee, which initially focused on the rural poor and on improvement of health and education, recently expanded its credit programs to generate self-employment and provide income support to its members. It focuses on training for extension of improved technology in order to increase productivity of labor in self-employment activities.

The Bangladesh Rural Development Board is the major government channel through which credit is extended to landless people. The board assists the rural poor to organize themselves into special cooperatives for nonfarm activities and for extension of population control programs. However, loan size is very small, loan application procedures are complicated, and innovations are not encouraged. These and other credit-based self-employment programs now cover nearly one-third of the estimated 8.5 million functionally landless households, which is their target group. A recent evaluation of selected programs shows that the proportion of beneficiary households who could cross the poverty line varies between 33 and 60 percent (BIDS 1990).

A major constraint to large-scale employment generation through credit support is the small size of the market for nonfarm goods and services financed with the loans. With expansion of programs, competition among nonfarm operators increases and borrowers need to count much more on local markets, which lowers relative prices for their products and services and reduces profitability. So a simultaneous increase in agricultural production is needed to expand the size of the market (through increased demand for nonfarm goods).

Another limitation of the programs for self-employment generation is that although they are targeted to all functionally landless households, the relatively better-off among them—those with some entrepreneurial skills—take advantage of the opportunities. An evaluation of the Grameen Bank found that its borrowers are those who have had experience in similar lines of business and have had some formal schooling (Hossain 1984). There are few agricultural wage laborers, who are the poorest of the poor in the rural population, among the Grameen Bank's borrowers. They are shy about coming forward because of the risks involved in most self-employment businesses and their limited capacity to undertake that risk. Thus, people in extreme poverty are bypassed.

#### NEED FOR RURAL WORKS

Programs for generating additional wage employment around infra-

structure-building can reach those poor people who are bypassed by programs that generate self-employment. Infrastructure-building programs self-target agricultural wage laborers, as those people who are not used to providing manual labor for others do not like to take advantage of such programs. These programs could be undertaken during slack seasons for agricultural activities so that labor does not have to be withdrawn from other economic activities. By supporting development of infrastructure facilities, such programs could help increase productivity and profitability of agriculture and other nonfarm production activities, which in turn would attract private-sector investment in these activities.

### 3. PUBLIC RURAL WORKS PROGRAMS IN BANGLADESH

#### RURAL WORKS PROGRAM

The Rural Works Program was initiated in Bangladesh in the early 1960s. The Second Five-Year Plan of Pakistan (1960-65) declared

The central idea of the Works Programme is to put the under-utilized manpower of Pakistan to work on nation-building projects by the liberal provision of basic wage-goods (i.e., surplus agricultural commodities available under PL-480). The main sectors benefitting from the programme will be coastal embankments, low lift pump and small irrigation schemes, low-cost housing, feeder roads, school construction, water supply and drainages and reclamation (Cited in Alamgir 1983)

It was stipulated that although the major part of the program during the initial stage would have to be mounted by the government at the central and provincial levels, the ultimate objective was to decentralize administrative responsibility to the district and sub-district levels in order to strengthen local-level institutions and to facilitate mobilization of local resources for infrastructure development.

The Rural Works Program in East Pakistan was institutionalized through Government Circular No. 60, issued in Dhaka on July 15, 1965. It stated that the main objectives of the program were to (1) create general public enthusiasm for development work, (2) induce farmers to invest more in crop cultivation, (3) provide large-scale employment during seasons when employment opportunities are few, (4) train local leaders to consider long-term programs on a planned basis, and (5) stimulate local self-government units to more effectively serve the people and work in partnership with them. Thus, initially, the focus of the program was on promoting economic growth through improving infrastructure to raise the productivity of resources. A relief or poverty-alleviation aspect was not explicitly stated, although it was implicit in the program content.

From the outset, the Rural Works Program was completely financed with foreign assistance — surplus agricultural commodities, mainly wheat, donated by the United States under the PL 480 program. The Rural Works Program's first projects were initiated by the Comilla Academy as an action research project in rural development under the leadership of Akhtar Hamid Khan (Thomas 1971). The mode of planning, organizing, and implementing the program was later developed through this action research project, with only marginal changes since then. The government

decided to extend the program throughout East Pakistan after a disastrous flood hit the province in September 1962. Instructions were issued to all local councils, setting forth the procedures (see below) under which the program would operate. In November 1962, official sanction was given to the program with a cash allocation of US\$21 million. Local councils received their allocation in cash for implementing their plan.

The standard procedures for planning and implementing the Rural Works Program are as follows. Planning begins at the lowest local level, known as a ward, which consists of up to three villages, depending on their size. The ward committee, which consists of three elected representatives who are also members of the union council (the lowest-level local government unit) and an equal number of representatives of farmers and landless laborers, is responsible for planning program projects. This committee proposes projects for local development but accepts them only after consulting with the general public at an open meeting that determines the priority of the accepted projects. The ward-level priority list of projects is sent to the union council for incorporation into the Union Five-Year Plan. The plan is approved by the union council in a meeting with other local leaders. The union plans are then sent to the upper tier of local government, the *thana* (*upazila* after 1984) council for its approval. The *thana* council (*upazila parishad*) prepares a *thana* plan that includes, together with approved projects from the union plans, the *thana's* own projects that cannot be undertaken by an individual union. The *thana* plans are then sent to the district level for scrutiny by the district council, the top layer of the local government, which prepares a district plan. The district council plan is approved by the Ministry of Local Government, Rural Development, and Cooperatives, which channels government funds to local bodies for Rural Works Program activities.

Projects under the approved union plans are implemented by a ward-level project implementation committee consisting of the elected members of the union council from the ward and representatives of local school teachers, model farmers, cooperative managers, village defense parties, social workers, and landless laborers. The committee is responsible for hiring labor at the prescribed rate of pay. The committee is also responsible for preparing the time schedule for project implementation, a recording and accounting system, and a method for checking estimates of the volume of work. These become the basis for auditing by higher authorities and inspection teams from district and division levels.

Projects that extend beyond one ward are implemented by union project committees that consist of 9 to 13 members drawn from associated ward committees. The union project committee is headed by the union council chairman, and the secretary is appointed from among the members who are not elected union council members.

Both the ward and the union project committees must be approved by the chairman of the *thana* council, who is the chief executive of the subdivision (district commissioner since 1984). The chairmen and secretaries of the respective committees are to report regularly on

progress of projects and on financial accounts to the chief executive of the *thana*, who is responsible for supervising the fieldwork and disbursing funds

The government allocates funds for the Rural Works Program directly to various local bodies. The allocation is made in cash in a number of installments. Each installment is released after a satisfactory report of utilization of the previous installment is received. The trend in allocation of resources to the program can be seen in Table 8. During the 1960s, the allocation fluctuated between 7 and 9 percent of the total development expenditure, which is a substantial share when it is considered that about 30 percent of the development expenditure was allocated to agriculture and rural development. However, allocation of resources to the Rural Works Program declined by over 50 percent during the last two years of the 1960s. This declining trend has continued since independence and has never been reversed. During the late 1980s, only about 1.5 to 2.0 percent of the total development expenditure was allocated to the program.

The implementation of the project is coordinated at the *thana* and district levels, respectively, by development and coordination committees.<sup>10</sup>

**Table 8—Resource allocation to Rural Works Program, 1962/63-1989/90**

Year	Allocation for Rural Works Program (million Tk at current prices)	Allocation as Share of	
		Total Development Expenditure	Gross Domestic Product
		(percent)	
1962/63	100	7.8	0.50
1967/68	216	9.2	0.70
1969/70	115	3.7	0.30
1975/76	270	2.8	0.20
1985/86	373	1.1	0.08
1986/87	795	2.1	0.15
1987/88	765	1.9	0.13
1988/89	662	1.4	0.10
1989/90	824	1.6	0.11

Sources: Up to 1975/76: M. Alamgir, A Review of the Public Rural Works Programme of Bangladesh 1960-78, *Bangladesh Development Studies* 11 (1 & 2, 1983), 23; recent figures: Bangladesh Bureau of Statistics, *Statistical Yearbook of Bangladesh 1991* (Dhaka: Ministry of Planning, 1991).

<sup>10</sup> Implementation of projects involving one or more unions in a *thana* is coordinated at the *thana* level while for large projects involving more than one *thana* the implementation is coordinated at the district level.

Table 9 shows the different levels in the administrative hierarchy and their responsibilities in implementation of the Rural Works Program

Activities financed under the Rural Works Program can be classified in three categories

- Economic infrastructure that directly increases the productivity of resources. Such infrastructure can include irrigation and drainage canals, flood-protection embankments, coastal embankments for protection of land from saline-water intrusion, land reclamation, excavation of tanks for fisheries or irrigation, and tree plantations
- Physical infrastructure that increases financial returns by facilitating improved marketing of production and inputs, thus reducing the trading margin and transportation costs. Construction and repair of roads, bridges, and culverts as well as development and maintenance of market places are included in this category
- Social infrastructure, such as schools, community buildings, health clinics, sanitation facilities, and safe drinking-water facilities, that improves the quality of human resources

Over time, there has been a shift in emphasis from physical infrastructure to economic infrastructure (Tables 10 and 11). In general,

**Table 9 — Administrative setup of the Rural Works Program**

Level	Agency	Role
National	Local Government Rural Development and Cooperatives Division (Ministry)	Financial and administrative control; allocate funds; issue government circulars about management of work
Division	Office of the Commissioner	Convey circulars and directives; monitor progress in the division; participate in inspection team
District	Office of the Deputy Commissioner/District Council/Municipality Authority	Convey directives; disburse funds; coordinate and supervise project implementation at the district level; implement large-scale projects covering more than one <u>thana</u> or requiring high-level technical supervision
<u>Thana</u>	Circle Officer (Development)/ <u>Upazila Nirbahi Officer</u> since 1984; <u>Thana Council/Upazila Parishad</u> since 1984	Pass on directives; disburse funds to union councils; coordinate and supervise project implementation at <u>thana</u> and union levels; prepare projects involving more than one union; audit the accounts of union council
Union	Union Council	Disburse funds to project committees; implement projects at the union and ward levels

**Table 10 — Physical achievements of the Rural Works Program, 1962-77**

Infrastructure	Total for 1962-67		Total for 1973-77	
	New	Repair	New	Repair
Metal roads (miles)	647	1 835	67	29
Dirt roads (miles)	17 830	80 706	1 514	1 604
Embankments (miles)	2 883	6 675	92	31
Drainage and irrigation canals (miles)	3 182	7 944	290	5 935
Bridges and culverts (number)	22 670 <sup>a</sup>		14 360	
Community buildings (number)	6 389		n a	

Sources Figures for 1962-67 are from the Basic Demographics and Local Government Department Government of East Pakistan quoted in J W Thomas The Rural Public Works Program in East Pakistan in Development Policy II — The Pakistan Experience ed W P Falcon and G F Papanek (Cambridge Mass U S A Harvard University Press 1971) 198 figures for 1973-77 are from M Alamgir A Review of the Public Rural Works Programme of Bangladesh 1960-78 Banqladesh Development Studies 11 (1 & 2 1983) table 3

Note n a means not available

<sup>a</sup> The figure is for 1965-70 as quoted in Alamgir 1983 p 29

**Table 11 — Physical achievements of the Food for Work Program, 1975/76-1986/87**

Infrastructure	1975-80	1980-85	1985/86	1986/87
	(averages)			
River/canal excavation (miles)	155	2 127	3 000	2 300
Coastal and flood protection embankments (miles)	1 435	3 003	552	657
Dirt roads (miles)	1 320	9 133	20 850	19 742
Bridge and culverts (number)	900	5 568	1 425	2 697
Tanks (number)	183	23		

Source Bangladesh Bureau of Statistics Statistical Pocketbook of Bangladesh (Dhaka Ministry of Planning various years)

social infrastructure projects have received very little attention, presumably because of the high material-resources component of the work, which cannot be financed by allocation in the form of wheat. Official records show that some resources were utilized for the maintenance of community meeting places in the 1960s but that no such work was undertaken after independence. However, the reality is that some government officials did sell the wheat for the works program in the market, or allowed local authorities to do so, in order to undertake repair and maintenance of schools and sanitation facilities.

Development of physical infrastructure, particularly roads, bridges, and culverts, was a major activity of the Rural Works Program during the 1960s, but its importance dwindled during the 1970s. Since the early 1980s, road projects have once again been taken up by the Food for Work Program. The work has concentrated on the construction and maintenance of dirt roads, as these activities have the potential to mobilize maximum labor at low cost. In 1980/81 the wage bill accounted for only 21 percent of the total cost of paved roads, compared with 96 percent in the case of dirt roads (Table 12). Moreover, the unit cost of employment generation was about six times higher in the former than in the latter activity (Table 12). Consequently, there has been unplanned development of dirt roads, often without the necessary appurtenant structures. This has led to use of scarce land and to drainage congestion during floods. The government has recognized the problem and now allows a portion of the allotted wheat for the project to be converted into cash for construction and repair of appurtenant structures for roads.

**Table 12—Estimates of labor intensity and unit cost of generating employment, by type of project**

Type of Project	Wage Bill Share of Total Cost	Unit Cost per Day of Employment Generated
	(percent)	(Tk at 1980/81 prices)
Paved roads	21.1	104.43
Bridges and culverts	54.4	42.10
Dirt roads	96.2	17.32
Canals and embankments	84.9	25.08
Derelict tanks	96.7	18.91
Community building	22.5	57.76

Source: Based on data from M. Hossain and M. Asaduzzaman, "An Evaluation of the Special Public Works Programme in Bangladesh," *Bangladesh Development Studies* 11 (1 & 2, 1983), 200-203.

Directly productive projects are increasingly popular with the works program authorities because not only do they help to mobilize unskilled labor at low cost, but they also have a visible impact on agricultural production and they help to create a continuous flow of employment in the postconstruction phase

Another notable characteristic of the works program is that resources are used mostly for repair and maintenance work rather than for new construction. During 1979-84, for instance, about 82 percent of the wheat allocated under the Food for Work Program was for repair and maintenance, and only 18 percent was for new projects (Table 13). Since foreign aid is not normally available for the repair and maintenance of projects that have been constructed with foreign assistance, the wheat available for the public works program is often utilized for this purpose.

Since 1968, the Rural Works Program has diminished severely in scope and importance, but it has nevertheless continued under the aegis of various local governments. Following independence, a stagnant economy and frequent natural disasters that led to famine in 1974 caused relief to become more important, pushing the development objectives of the program to the sidelines. Consequently, the Rural Works Program changed its character, and a number of programs came into existence with different foci, depending on donor perceptions of the problems to be tackled. Six such programs have been in operation at one time or another.

**Table 13—Utilization of Food for Work wheat, by type of project, yearly averages for 1979-84**

Type of Project	New Projects	Repair and Maintenance	Total Allocation	Share of Project Type
	(1 000 metric tons)			(percent)
Dirt road	3.2	29.3	32.5	21.3
Flood-protection embankment	15.7	20.6	36.3	23.8
Coastal embankment	5.3	13.5	18.8	12.3
River/canal excavation/embankment	0.8	50.3	51.1	33.4
Road	1.1	5.2	6.3	4.1
Irrigation/drainage channel	1.7	6.1	7.8	5.1
Total	27.8	125.0	152.8	100.0

Source: Based on data from M. Asaduzzaman and B. Huddleston, "An Evaluation of Management of Food for Work Programme," Bangladesh Development Studies 11 (1 & 2, 1983), 46.

- The normal Rural Works Program that is a continuation of the program of the 1960s,
- The Special Public Works Program implemented in four districts using Swiss aid,
- The Intensive Rural Works Program conducted in extremely poverty-stricken *thanas* with Swedish aid,
- The Early Implementation Program, which executes earthwork under the small-scale flood control and drainage projects undertaken by the Bangladesh Water Development Board, with external assistance from the Netherlands,
- The Food for Work Program that is run with food aid from a consortium of donors and is coordinated by the World Food Programme, and
- The Zilla road maintenance program financed with external assistance and technical support from the United States Agency for International Development (USAID)

The most important of these programs, in terms of resources and geographical coverage, is the Food for Work Program, which has dominated the rural works program in post-independence Bangladesh. Except for the Food for Work Program, workers in all programs are paid wages in cash.

#### SPECIAL PUBLIC WORKS PROGRAM

The Special Public Works Program began as a three-year project in 1979, supported by the International Labour Organisation (ILO) and the Danish International Development Agency (DANIDA), in the Ministry of Local Government, Rural Development, and Cooperatives. The program aimed to strengthen planning and implementation capacities at district and *thana* levels. It financed technical training for Rural Works Program staff and acquisition of machinery and equipment for improving efficiency of implementation of public works programs in 4 out of the 21 greater districts in Bangladesh. The program was basically a mechanism for getting additional support to implement normal public works programs and to finance projects that need more raw materials and technical support than labor. An evaluation of the program noted that paved roads, bridges and culverts, and community training centers accounted for nearly two-thirds of the projects initiated under the Special Public Works Program (Hossain and Asaduzzaman 1983). The program was discontinued in 1985.

#### INTENSIVE RURAL WORKS PROGRAM

The focus of the Intensive Rural Works Program was on better planning of rural works programs and identification of priority projects. Instead of thinly spreading limited resources throughout the country, the program first identified a limited number of economically

depressed *upazilas* from available famine maps in order to have a significant effect on alleviation of poverty at the local level. It then carried out detailed technical studies on identification of infrastructure-development projects in selected *thanas*, preparation of projects with detailed technical design and costing, identification of beneficiaries among different socioeconomic groups, estimation of social cost-benefit ratios, and allocation of priorities to projects included in a *thana* planning report. However, the Intensive Rural Works Program lacked resources to implement the plans, and only a few projects could be executed. The second phase of the program placed more emphasis on direct income-generating activities for the poor than on infrastructure development. The title was also changed to Rural Sector Employment Program. This contains a small component on infrastructure development under which small-scale irrigation schemes identified as priority projects during the planning phase are taken up for implementation.

#### EARLY IMPLEMENTATION PROJECT

This project finances earthwork components of the Water Development Board's small-scale drainage, flood control, and irrigation projects. The emphasis is on more effectively reaching the target group, defined here as households dependent on selling manual labor for their livelihood. A special target group of this project is distressed women from landless or female-headed households. Particular attention is paid to project selection. Priority is given to projects located in areas where the pattern of land distribution is less skewed, and where the majority of the beneficiaries are marginal and small farmers. In order to minimize leakages and to reduce the proportion of benefits going to intermediary groups during project implementation, laborers are mobilized through labor-contracting societies. Together with NGOs, these societies organize training to improve the skills of the workers in engineering techniques and to expand their social awareness so that they can protect themselves from the system of exploitation characterized by rural social structures. Special efforts are made to mobilize distressed women around the earthwork projects to improve their economic conditions and raise social awareness. A considerable amount of expatriate technical assistance is provided for increasing the efficiency of project implementation.

#### FOOD FOR WORK PROGRAM

The Food for Work Program was initiated in the aftermath of the 1974 famine. As an immediate response to the famine, the government opened gruel kitchens for feeding destitute people all over the country. This action was financed mostly with food aid. When the famine was over, the government decided to meet relief needs on a more regular basis through rural public works programs. To meet this objective, the

government received assistance from the World Food Programme, which initiated a Quick Action Procedure, "Bangladesh 2197Q Relief Works Program for Land and Water Development". Wheat is the officially sanctioned food against which work is done, although in some years when the government has comfortable stocks of paddy from its internal food procurement program, paddy is given to workers in lieu of wheat. The projects are administered by the World Food Programme and CARE. The World Food Programme acts as both a conduit and an administrator for multilateral and bilateral food aid for the program. Major donors include Canada, Australia, and the European Community. CARE operates on behalf of USAID to administer projects implemented by wheat supplied by the United States.

Projects administered by the World Food Programme are implemented by two government agencies: the Water Development Board and the Ministry of Relief and Rehabilitation. Water Development Board projects are often large projects such as coastal embankments, flood protection embankments along major rivers, and reexcavation of canals under large-scale irrigation projects. These projects are drawn from its own long-term water resource development plans. The ministry projects are often construction and repair of interior earth roads, and digging and reexcavation of small irrigation channels. Dirt roads dominate projects supervised by CARE.

A description of the prescribed procedures for selection, approval, and implementation of Food for Work projects, drawn from Asaduzzaman and Huddleston (1983), follows. The Water Development Board selects new projects from its annual development plan. For repair and maintenance projects, the executive engineer, with the assistance of the subdivisional engineer and the sectional officer, selects the projects and prepares pro formas that are forwarded to the head office of the board through the district agricultural development committee. Ultimately, they are sent for approval to the Ministry of Relief and Rehabilitation, which coordinates the entire Food for Work Program. Members of parliament are sometimes unofficially consulted, and their views taken into account before project proposals are forwarded to the ministry.

Ministry of Relief and Rehabilitation projects are called local initiative schemes. They are selected from the updated and approved *thana* council plans that were described earlier. The projects that are taken up for implementation under the Food for Work Program are chosen in a joint meeting of the *thana* council, *thana* development committee, and *thana* Food for Work committee, with the deputy commissioner of the district as the convener. The number of proposed projects depends on the quantity of wheat allocated to the *thana*, which is determined by population size and by some indicator of economic conditions. Once selected, the local initiative schemes are sent to the project implementation officer for preparation of project pro formas. These pro formas are scrutinized by the subdivisional engineer of the Water Development Board. Project selection is done by the Food for Work subdivisional committee that forwards the projects to the ministry in Dhaka.

After approval by the Ministry of Relief and Rehabilitation, the

World Food Programme scrutinizes the proposals for final selection of the list of projects to be implemented during the year. If the information supplied is insufficient, the World Food Programme requests additional information before the final selection is made. The list of selected projects is then passed to the ministry, which issues government orders to the district-level executive engineers in the case of Water Development Board projects and to deputy commissioners in the case of Ministry of Relief and Rehabilitation projects.

After the government orders are received, the executive engineer (for the Water Development Board) and the chief executive of the *thana* (for the ministry) constitute project implementation committees for each project after consultation with the union *parishad* chairmen, local influential people, and concerned government officials. Each committee is composed of elected union *parishad* members, local social workers, members of village defense parties, and representatives for women. The chairman of the union *parishad* in which the project is located is usually the chairman of the committee. If the project encompasses more than one union, there may be one committee for each union. Also, there can be more than one project implementation committee in a union if the amount of earthwork involved is very large (when the amount of wheat allocated for the union exceeds about 190 metric tons).<sup>11</sup> The committee collects wheat from the government stores, supervises earthwork, measures the work done by workers, and distributes the wage payment.

Land required for the right-of-way for the project, or the right to dig up and deposit earth being moved, is acquisitioned by the local authority. Compensation is paid by the project authority at the average prevailing market rate for the last three years. Land that is required for lifting and depositing of earth is also accessed by the project authority, but no compensation is paid on the premise that the owner retains the right to the land after the project is completed.

Workers selected for the work are mobilized by gang leaders (*sardars*) and supervisors. They work in groups or gangs. The government circular provides that each gang should consist of 20-30 workers who would be headed by a *sardar* and that there should be a supervisor for five gangs.

The wage rate stipulated for Water Development Board projects is 40 kilograms of wheat per 1,000 cubic feet of earthwork, plus a variable allowance that takes into account such factors as the distance over which the earth has to be transported and raised. In Ministry of Relief and Rehabilitation projects, payments for allied factors are consolidated with the wage for the basic earthwork. The wage rate varies according to the type of project and the sex of the worker. For road and embankment projects, the wage rate is 47 kilograms of wheat for 1,000 cubic feet of earth for men, and 65 kilograms for women. For canal excavation projects, an additional wage of 4.65 kilograms per 1,000 cubic feet is paid. *Sardars* are paid 2.33 kilograms and supervi-

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<sup>11</sup> All tons in this report are metric tons.

sors are paid 0.47 kilograms per 1,000 cubic feet of earthwork done under their jurisdiction, provided that each is supervising the specified number of workers or gangs.

In order to make the project transparent to the locality, each project site must have a signboard that gives the name of the project, the resource allocation for the project, the volume of work to be done, and the wage rates to be provided to various categories of workers and supervisory personnel. Projects without a signboard are technically ineligible to receive the wheat. Three types of records are to be kept by the project implementation committee: a muster roll for workers, an attendance register, and a measurement book for supervision and monitoring by higher authorities.

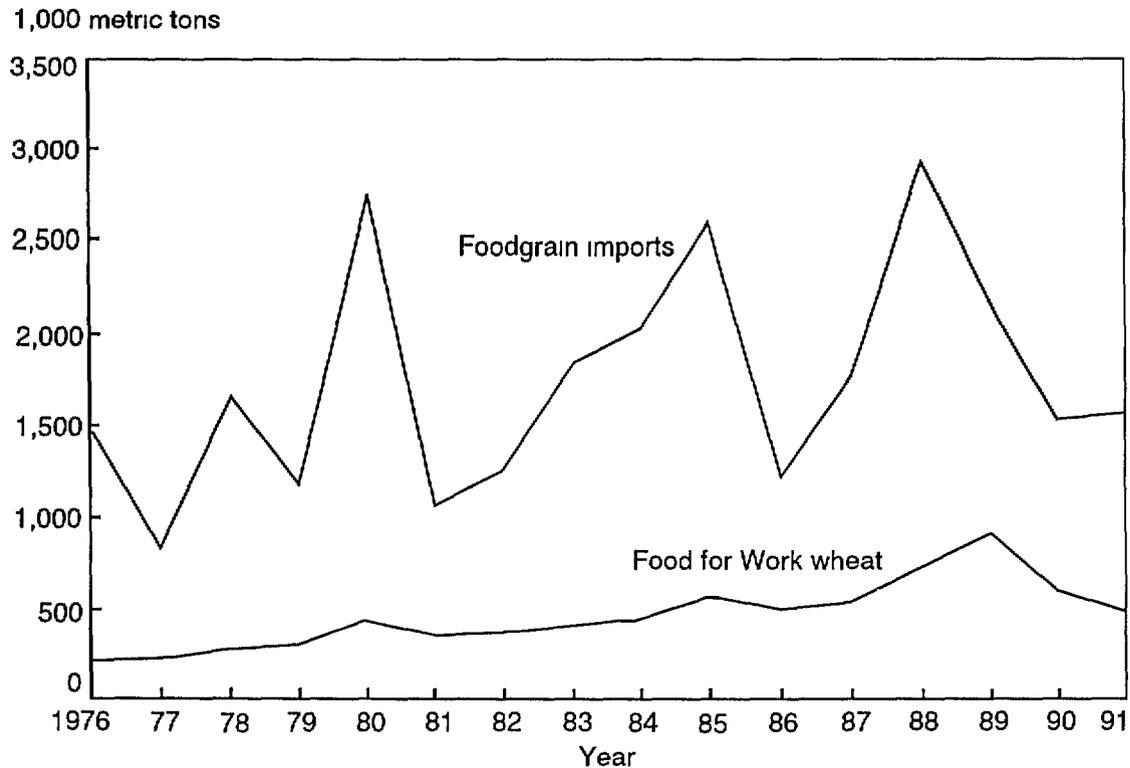
Coordination of all Food for Work Program activities is done by a number of committees: the National Coordination Committee, the district steering committee, and the *thana* Food for Work committee. The last two committees are intimately involved with the day-to-day problems at the project site. The national committee decides upon various policies regarding the program and reviews progress. No specific provision is made for supervision of work quality, other than by the project implementation committee and the labor supervisors hired to direct the project. However, the project implementation committee (for the Ministry of Relief and Rehabilitation) and the sectional officer (for the Water Development Board) are required to verify the quantity of work completed each time a request is made by the committee for delivery of wheat. World Food Programme field officers and government inspection teams visit project sites from time to time.

Allocation of resources to the Food for Work Program shows an increasing trend, particularly since the late 1970s (Figure 2). In the 1970s, resource allocation varied between 200,000 and 300,000 tons of wheat, the value of which amounted to between 4 and 5 percent of the total development expenditure (Table 14). The peak allocation was 917,000 tons in 1988/89, which amounted to 11 percent of total development expenditures. The increase in allocation in the late 1980s was partly in response to natural disasters such as the devastating floods of 1985, 1987, and 1988. Resource allocation was reduced to between 500,000 and 600,000 tons during 1989-91, which were normal production years. The value of wheat allocated came to about 6.0 percent of total development expenditures and about 0.5 percent of the national income. In recent years, the Food for Work Program has utilized nearly one-third of the imported grains (Figure 2).

Thus, the initiation of the Food for Work Program compensated for the decline in allocation to the normal Rural Works Program. In recent years, the two programs have together received about 7-8 percent of total development expenditures, with the share rising to about 10-12 percent during years of natural calamities.

Figure 3 shows the seasonal pattern of utilization of resources in the Food for Work Program. During normal years, nearly 85 percent of the resources are utilized during January-May, which used to be the traditional slack season for agricultural activities and was therefore

Figure 2—Trends in foodgrain imports and allocation of wheat to Food for Work Program, 1976-91



Sources Estimated from World Food Programme Bangladesh Foodgrain Forecast (Dhaka World Food Programme September 1991) and Bangladesh Bureau of Statistics Statistical Yearbook of Bangladesh (Dhaka Ministry of Planning various issues)

perceived by policymakers to be a period when employment and income support were needed by the poor. These are also months of little rain, thus they are convenient for undertaking earthworks. During years of natural calamities, resource utilization during September-November is substantially higher than in normal years despite the difficulty of carrying out work during the rains. The peak period for utilization of resources shifted from March-June in the late 1970s to January-March in the late 1980s, partly in response to the rapid expansion of cultivation of irrigated boro paddy, which has made the April-June period a relatively busy time for agricultural activities (Figure 1) <sup>12</sup>

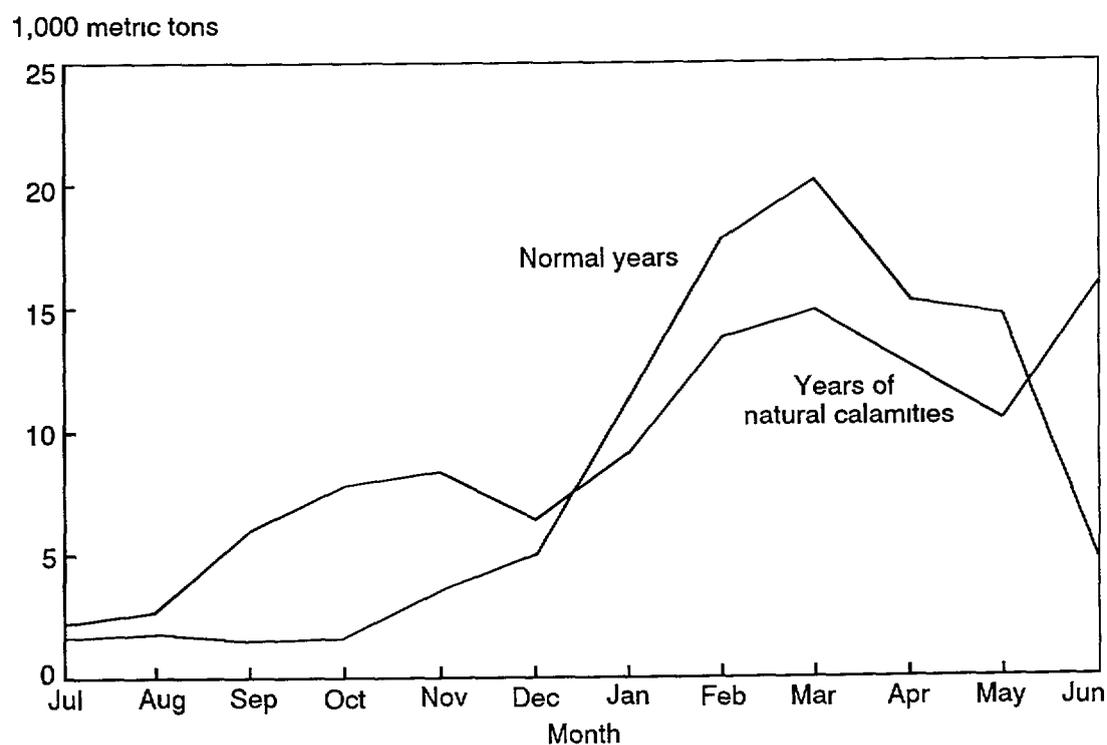
<sup>12</sup> The BIDS/IFPRI evaluation of the Food for Work Program recommended earlier initiation of projects so that they could be completed before the peak agricultural season in May-June. The follow-up of the recommendation by the government of Bangladesh resulted in improved matching of the program with the pattern of seasonal underemployment.

**Table 14 – Resource allocation to Food for Work Program, 1975/76-1990/91**

Year	Allocation of Wheat (1 000 metric tons)	Value at Current Prices (million Tk)	Value as Share of	
			Development Expenditure	Gross Domestic Product
(percent)				
1975/76	209	430	4.5	0.4
1980/81	355	1 051	4.4	0.5
1985/86	500	2 365	7.0	0.5
1986/87	534	2 825	7.4	0.5
1987/88	743	4 064	10.0	0.7
1988/89	917	5 227	11.3	0.8
1989/90	599	3 570	6.7	0.5
1990/91	489	3 237	5.7	0.4

Sources: Estimated from World Food Programme Bangladesh Foodgrain Forecast (Dhaka: World Food Programme, September 1991) and Bangladesh Bureau of Statistics Statistical Yearbook of Bangladesh (Dhaka: Ministry of Planning, various issues).

**Figure 3 – Seasonal pattern of utilization of Food for Work wheat**



It was mentioned earlier that one of the objectives of public works programs was to vitalize local government institutions and to train local political leaders to plan and execute development projects. Table 15 provides information on utilization of works program funds by different layers of local government. The union council, which is the lowest layer of local government and which implements projects at the village level, had a small share of the works program funds, and the share has become negligible in recent years. The district council, which plans and implements projects covering more than one union, has also received relatively small amounts of funds, nearly one-quarter of the share before independence, and about 5 to 6 percent in recent years. The municipalities, which plan and implement projects in district towns, received nearly one-tenth of the share of the works program funds before independence, but in recent years they have claimed nearly two-fifths of the resources. The *thana* council used almost one-half of the funds before independence and has managed to maintain its share.

The decline in the share of the union councils and district councils may have been compensated for by allocation of resources under the Food for Work Program for projects initiated by these agencies. Data on utilization of Food for Work Program resources by local government agencies is not available, but information compiled by Asaduzzaman and Huddleston (1983) sheds some light. The World Food Programme shared the administrative responsibility for supervising its program almost equally with CARE. As mentioned earlier, the projects supervised by the World Food Programme are implemented by the Water Development Board for construction and maintenance of relatively large-scale water resource development projects that may cut across more than one *thana* under the jurisdiction of district councils, and by the Ministry of Relief and Rehabilitation for locally initiated schemes, where most projects are located within a union. This is reflected in the average size of projects. Water Development Board projects were, on average, about 11 times larger than the ministry projects.

**Table 15—Utilization of Rural Works Program funds by local government agencies**

Agency	1962-70	1986-90
	(percent of total funds)	
Municipalities	10.3	41.8
District councils	24.8	5.6
<u>Thana</u> councils	47.7	45.5
Union councils	17.1	7.2

Sources: Based on data from M. Alamgir, "A Review of the Public Rural Works Programme of Bangladesh 1960-78," Bangladesh Development Studies 11 (1 & 2, 1983) and Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh (Dhaka: Ministry of Planning, various years).

The CARE-supervised program consists mostly of relatively large road reconstruction projects that may cover several villages and be under the jurisdiction of the *thana* council or the district council. About 10 percent of the wheat was utilized by Ministry of Relief and Rehabilitation projects, which are implemented by the union council. Under the Food for Work Program, resources are available in the form of wheat. This discourages the undertaking of projects that require investment in material resources (such as bricks and cement), machinery, and equipment. Hence there was a tendency for local government agencies to finance such projects as repairs and maintenance of paved roads or bridges and culverts with resources from the normal Rural Works Program, while utilizing the resources under the Food for Work Program for projects involving mostly earthwork. This may be why in the post-independence period, a large share of the Rural Works Program funds went to municipalities that needed more material resources to maintain the infrastructures in district towns. Wheat received under the Food for Work Program was allocated to projects initiated by the district and union councils.

## 4. EVALUATION OF PUBLIC WORKS PROGRAMS

This chapter presents a review of the findings of major evaluations of the public works programs conducted so far by independent observers. The first section deals with the experience of the Rural Works Program in East Pakistan in the 1960s, while the second section provides an overview of the evaluation of the first phase of the Food for Work Program conducted by the International Food Policy Research Institute in collaboration with the Bangladesh Institute of Development Studies during 1981-83.

### RURAL WORKS PROGRAM

#### Management Aspects

Inadequate attention was given to the planning of the Rural Works Program at both the local and national levels.<sup>13</sup> Union and *thana* plans were rarely based on adequate data and analysis of local needs, and in most cases they were highly ambitious, as the availability of resources required to implement them was not considered. Prioritizing projects for implementation when resources became available was based more on political pressure than on a careful review of expected benefits in relation to costs. The plans were basically a compilation of projects submitted by local elites to promote the interests of their political clients. In many cases the projects had faulty technical designs due to shortage of engineering skills at local levels.

Irregularity in payment of installments in the project budget affected continuity of work. Many projects remained unfinished because of difficulties in procuring additional funds to cover cost escalations due to unforeseen factors or underestimation of costs when projects were prepared. Sometimes, without prior indication, the government reduced actual disbursement of funds from the amount originally approved. Many projects were not completed before the onset of the monsoons, when heavy rains would wash away large parts of the earthwork done. Unfinished projects would then be submitted afresh the following financial year for

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<sup>13</sup> This section on the Rural Works Program is based mainly on Sobhan 1968, Thomas 1971, and Khan 1977. Sobhan carried out a household survey in four purposively selected areas to investigate the management aspects of the program and to assess its impact on the workings of the local and national political systems. Thomas attempted to estimate the development benefits of the different components of the works program and carried out a cost-benefit exercise with data obtained through a detailed study of 8 of East Pakistan's 413 *thanas*. Khan provides valuable insights into the planning and management of the works program and its impact on the rural power structure.

approval and fund allocation. Thus, considerable wastage occurred in implementing the Rural Works Program.

Another common complaint was of leakages in resource utilization through manipulation of records on the number of workers employed and amount of earthwork done. Nearly half of the respondents of a survey reported in Sobhan (1968) noted that funds were misappropriated by project committees or local government officials. The majority of the respondents also reported anomalies in the selection and implementation of projects, which inhibited full exploitation of the development potential of the program.

### Development Effects

Nearly three-fourths of the Rural Works Program's funds were used for construction and repair of roads (Thomas 1971). Although most of the roads built had dirt surfaces that could accommodate only bicycles, rickshaws, and light animal-cart traffic, this investment laid the foundation for an adequate network of rural roads. The sample survey of eight *thanas* reported in Thomas (1971) showed that in 1963 there were, on average, 8.2 miles of usable roads per *thana*, by 1967, this had increased to 60.5 miles. Within this five-year period, the number of vehicles using the road increased 46 percent for animal-driven carts, 88 percent for bicycles, and 3.5 times for rickshaws. Few of the roads were suitable for trucks and buses, the number of trucks using the roads in the *thanas* surveyed increased from 10 to 65 and the number of buses from 15 to 90.

Roads encouraged farmers to invest in animal-driven carts and to sell their produce at primary union council markets as well as at secondary *thana* council markets instead of to itinerant traders (*farriahs*). The unit cost of transport (all modes) in the eight *thanas* declined by 40 percent. The value of land adjacent to roads built through the RWP increased by 154 percent, compared with 44 percent for land remote from those roads.

Thomas (1971) also indicated that there was a substantial increase in the size of the primary and secondary markets as well as an increasing move away from subsistence to commercial farming and from marketing of agricultural produce through itinerant traders to direct sales in markets. A survey of 158 markets showed that the average number of traders increased by 97 percent and the daily rental fee of shops increased by 90 percent. Table 16 highlights changes in the commercialization of production and marketing revealed by a survey of 123 farmers.

The dual-purpose drainage and irrigation canals utilized 5 percent of the Rural Works Program funds. Applying the estimates of area benefited per mile of drainage canals from the eight-*thana* study to the total length of canals built under the Rural Works Program in East Pakistan, Thomas (1971) estimated that 2.8 percent of cultivated land was saved from drainage congestion. Assuming 200 percent cropping intensity and a savings of one-third of the potential loss of yields due

**Table 16—Changes in commercialization of production and marketing patterns for 123 farmers, 1962-67**

Crop	Farmers Growing for Sales		Sales Primarily in the Market	
	1962	1967	1962	1967
	(percent)			
Rice	37	57	36	82
Jute	100	100	33	69
Vegetables	11	41	38	96
Sugarcane	100	100	62	76
Minor crops	12	29	27	83

Source Based on data from J. W. Thomas, *The Rural Public Works Program in East Pakistan*, in *Development Policy II—The Pakistan Experience*, ed. W. P. Falcon and G. F. Papanek (Cambridge, Mass., U.S.A.: Harvard University Press, 1971), 210.

to improved drainage, Thomas further estimated that this component of the project might have increased agricultural production by about 3.5 percent. The flood-control embankments, which utilized another 5 percent of the program funds, benefited 6.2 percent of cultivated area and might have increased agricultural production by another 1.4 percent.

Thomas (1971) estimated the net annual benefits from all components of the Rural Works Program at 3.4 times the cost, which was considered highly favorable in comparison with alternative investment opportunities. Given the management problems cited earlier, critics argue that Thomas' estimate of the development impact could have been biased upward (Abdullah 1973).

The employment effect of the Rural Works Program was, however, only marginal in relation to the needs. Thomas (1971) estimated that the program generated, on average, annual employment of 173,000 person-years during the construction phase. This was only 3.4 percent of the underemployment in the rural labor force during the late 1960s. Thomas did not, however, estimate the longer-run employment effects from the operation of the structures built under the program.

### Political Economy Aspects

Sobhan (1968) concluded from his analysis of the experience of the Rural Works Program that it was merely a means of buying political support in rural areas for the party in power. Thomas (1971) argued that this was not the case during the initial period of expansion (1963-65) when local leaders and the Local Government Department controlled

the program. At that time, the managers of the program adhered rigorously to economic priorities, enforced standards of honesty, and frequently adjusted administrative procedures to meet changing conditions. After the 1965 election, however, the provincial government sought to shape the Rural Works Program to serve the political purposes of the regime, and economic factors became less-important considerations for pushing the program forward. Identification of projects was guided by local political interests, and checks on performance and audits of local council accounts became less frequent. In many instances, misuse and even outright diversion of funds went unpunished if the local council member had the right political affiliations (Thomas 1971).

It is, however, widely recognized that the Rural Works Program contributed greatly to strengthening local self-government units, particularly *thanas*, which later became the focal point of all development activities. The program provided elected local leaders with an opportunity to think about the development problems of their locality and to participate in the preparation and implementation of local-level planning. The *Thana* Training and Development Centers that were constructed under the program became major institutions for training local leaders and progressive farmers in improved technologies and new knowledge. These centers later played a useful role in coordinating development activities undertaken by various ministries and departments.

The Rural Works Program was designed to benefit landless laborers and marginal landowners and to ensure their direct participation in the development process. The grass-roots involvement in the program constituted a first step in political participation that could lead to a bottom-up planning and development process. The potential for this important change in administration was, however, lost with the shift from an economic to a political emphasis in the program.

## FOOD FOR WORK PROGRAM

### Management Aspects

A high degree of local-level participation in the initiation, selection, and design of projects is expected under the Food for Work Program.<sup>14</sup> For large projects implemented under the Water Development Board, technical considerations dictate minimum consultations with local people. Asaduzzaman and Huddleston (1983) found that influential local people participated in the planning process in nearly half of the projects implemented by the Ministry of Relief and Rehabilitation and in

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<sup>14</sup> This section on management draws upon a critical evaluation of the management of the Food for Work Program especially its adherence to prescribed rules and procedures that was done on the basis of an in-depth survey of the management of 32 sample projects undertaken during 1982 (Asaduzzaman and Huddleston 1983). Most of the observations of this survey are still relevant today. A government-appointed task force on utilization of food aid made similar observations on the basis of its investigations during 1987-89.

nearly one-fourth of those implemented by the board. People at half of the project sites felt that another project would have been more beneficial. Engineers observed that when local people viewed a project as beneficial, this contributed to a high standard of implementation.

Delays in the project-approval process were a major problem. Projects that began late often faced difficulties in completing their work before the onset of the monsoon season, if a project is not completed during the season, a part of the work is washed away by rains and floods and has no longer-term benefit. There were two major factors that caused delays after the issuance of the government order: formation of project implementation committees, and acquisition of land for lifting and depositing earth at the project site. Political motives for satisfying local clients were mentioned as the major factor behind the delays in forming project implementation committees. In many cases, more than one committee had to be formed, even when the rules suggested formation of only one. For acquisition of land, since most projects involved reconstruction or rehabilitation of an existing structure, compensation was not authorized for land from which earth was collected. Local officials claimed that such land was given voluntarily, while local farmers complained the project damaged standing crops and soil quality, and therefore compensation was needed. Negotiations with the affected people for settling the issues take time.

Asaduzzaman and Huddleston (1983) also noted that local-level government officials could not give enough time to monitoring and supervising projects because they were overburdened with many other administrative functions. Even the project implementation officers, whose main responsibility is supervision of public works programs, were not able to visit all the projects under their jurisdiction even once a month. As a result, it was not possible to measure the quantity and quality of work done under the program, and there remained scope for malpractice and substandard work. Procedures for supervision are much more highly developed for organization of work and payment of wages than for technical quality of labor.

Another major problem encountered by the program was a substantial leakage through underpayment of workers and overreporting of work done. Workers worked longer hours and were more productive than provided for in the official estimate of the amount of earthwork that could be moved in a day. But they received, on average, less wheat per 1,000 cubic feet of earthwork moved than the officially specified rate. Workers were often not aware of the provisions for additional wage payments for allied factors (for example, for movement of earth from longer distances), as these were rarely reported on the signboards. It was found that the quantity of wheat received by workers varied from one project site to another and tended to reflect more the local market wage rate than the rate determined by the amount of work done. The rate of underpayment was estimated at 24-27 percent for Water Development Board projects and 17-20 percent for Ministry of Relief and Rehabilitation projects.

Excess claims for wheat over the actual payment to workers were sometimes made to finance project-related costs that were not covered by

the rules and regulations of the Food for Work Program. Such costs included payment of cash to workers in lieu of wheat, coverage of losses in transit, excess transport costs, storage costs at project sites, and extra payments to officials involved in management at various stages in the process. About two-thirds of the project implementation committee members complained that a proportion of the wheat for which they had taken receipt at the local storage depot did not arrive at the project site, and half of the *thana* officials reported they had received such complaints. On average, the amount of wheat reported as not arriving at the project site was estimated at 35 percent for Water Development Board projects and 18 percent for projects of the Ministry of Relief and Rehabilitation.

#### Long-Run Development Effects Economic Infrastructure and Physical Infrastructure

The development impact of the Food for Work Program depends on various factors: the nature of the projects financed under the program, the quality of the work done, which determines the life of the infrastructure as well as its impact on the productivity and profitability of resources benefiting from the infrastructure, and the pattern of distribution of ownership of resources. If the infrastructure facilitates more intensive use of the existing resources, it may also generate additional employment for the landless during the operational phase. It is a general perception that since infrastructure increases the productivity of land, the ownership of which is highly concentrated among a few, the longer-term impact would be to make the income distribution more unequal and to strengthen the existing rural power structure.

A major study conducted jointly by IFPRI and BIDS in 1981-83 attempted to estimate the impact of economic infrastructure development projects on production, employment, income, nutrition, and investment two to three years after the completion of these projects (BIDS/IFPRI 1985). The projects that were subjected to evaluation included (1) a dual-purpose canal for irrigation in the dry season and drainage in the wet season, (2) field channels for irrigation to enable farmers to get water in their fields from canals constructed under large-scale irrigation projects, (3) a coastal embankment project for protecting crops from damages caused by intrusion of salt water, (4) a river embankment for protecting crops against normal flooding, and (5) a river embankment for protecting against premonsoon flash floods that occur in areas adjacent to the hills in the eastern and northeastern part of the country. Lacking benchmark information on preproject conditions, the study estimated the benefits through "with" and "without" comparisons by selecting a control group of villages that had similar characteristics in the preproject situation. Later, when the survey data were being processed, it was found that the control villages for a number of projects had better economic conditions before the project was imple-

mented This demonstrated that the Food for Work Program is generally implemented in economically depressed areas, which is a positive aspect. However, this finding created problems in terms of evaluating the impact of the program, and simple comparisons of values in project and control villages failed to give a reliable estimate of project benefits.<sup>15</sup>

In order to overcome methodological problems, the study used multivariate analysis to separate out the effects of other variables that could influence the outcome, but that were not necessarily due to the project. A brief report of the findings of this analysis follows.

The employment effect of the project was arrived at through an analysis of variance of the total number of days of employment across households located in project and control areas. It was assumed that the number of days of employment and the nature of employment (self-employment versus wage employment, or agricultural employment versus nonagricultural employment) would be determined by the size of the landholding and the age and educational level of the worker. The difference across households should not be attributed to the project. These variables were included as covariates in the analysis of variance. It was also postulated that the employment effect of the Food for Work Program would vary with the state of development of physical infrastructure in project areas. The opportunity for employment, particularly in nonagricultural activities, would be greater in areas with better transport and communications facilities and with better access to markets and financial institutions than in areas lacking these facilities. Dummy variables were used to represent the Food for Work project variable (1 for villages located in project areas) and infrastructure variable (1 for villages with developed physical infrastructure facilities). The coefficient of the dummy variables was expressed as a percentage of the arithmetic mean of the dependent variable in order to assess the relative contributions of the project and infrastructure. The results are reported in Table 17.

Total employment from all activities was about 3 percent lower in project areas compared with control areas. The negative effect on employment in project areas was explained in terms of a preference for leisure over labor at higher levels of income. The independent contributions of the size of the landholding and the level of education of the worker to total employment were also negative, which implied the existence of a backward-bending supply curve for labor. The argument is that as Food for Work projects increase the productivity of resources and augment household incomes, households withdraw labor from low-productivity self-employment into which they have been forced by subsistence pressure. Although the work effect by the time criterion declines, the productivity of labor increases.

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<sup>15</sup> The selection of project sites was based on satisfactory completion of projects that had become operational. There were however variations in the degree of effectiveness with which the project was operating which could have been an important factor for the magnitude of effects observed.

**Table 17 — Effect of Food for Work projects and infrastructure on rural employment. estimates from analysis of variance**

Type of Employment	Difference Due to Food for Work Projects		Difference Due to Infrastructure	
	Difference as Percent of Mean	F-value	Difference as Percent of Mean	F-value
Wage employment	16.1	16.7*	19.3	11.1*
Agriculture	7.0	1.6	-3.0	9.5*
Nonagriculture	23.2	15.1*	43.4	46.3*
Crop production	4.1	2.1	4.1	2.2
Total employment	-3.3	30.2*	9.3	58.0*

Source M Hossain Labor Market and Employment Effects in Development Impact of the Food-for-Work-Program in Bangladesh a report prepared for the World Food Programme (Washington D C International Food Policy Research Institute 1985) tables 3.19 and 3.36

\* Statistically significant at the 0.95 level of probability

The impact of the program on employment for the landless and land-poor was assessed by investigating the effect on wage employment. Wage employment in the project areas was found to be higher by about 16 percent compared with the control areas. The difference was statistically highly significant. The positive effect was, however, realized through greater employment opportunities in the nonagricultural sector than in agriculture. Nonagricultural wage employment was about 23 percent higher in project households than in control households.

The state of development of physical infrastructure was also found to have a significant effect on rural employment. Total employment was about 9 percent higher in villages with developed infrastructure facilities. As in Food for Work projects, the positive effects were mostly through higher employment in nonagricultural activities than in agriculture, and through wage employment rather than self-employment. Wage employment was about 36 percent higher in project villages with developed infrastructure facilities (17 percent due to the project and 19 percent due to the infrastructure) than in control villages with less-developed physical infrastructure facilities. These findings that Food for Work projects and physical infrastructure have positive effects on wage employment rather than on self-employment imply that the longer-term effects through the labor market reach the relatively lower income groups to a greater extent.

The income effect of a project was estimated by fitting a regression equation with the household-level data, relating income to its main determinants, and incorporating Food for Work project participation as a separate explanatory variable. It was postulated that the income from

crop production ( $Y_A$ ) would depend on the amount of land owned by the household ( $L_O$ ), the amount of land rented in from others ( $L_R$ ), the number of family workers engaged in agriculture ( $W_A$ ), and the value of fixed assets other than land, that is, agricultural implements and draft power ( $K$ ). Two dummy variables were used to incorporate the effects of the economic infrastructure created by the Food for Work projects ( $P$ ) and of the state of development of physical infrastructure ( $I$ ). Two variants of the model were estimated (1) the Food for Work project and infrastructure were excluded, and (2) the Food for Work project and infrastructure were included. The estimated results are as follows:

$$Y_A = 3106 + 2511 L_O + 576 L_R + 970 W_A + 0.037 K \quad (1)$$

(14.9)      (2.1)      (3.6)      (0.76)

$$R^2 = 0.45, \text{ and}$$

$$Y_A = 1496 + 2505 L_O + 648 L_R + 1023 W_A + 0.028 K \quad (2)$$

(15.0)      (2.4)      (3.8)      (0.57)

$$+ 1912 P + 1130 I$$

(3.18)      (0.76)

$$R^2 = 0.47$$

Figures in parentheses are estimated "t" values of the regression coefficients.

The inclusion of the project and infrastructure dummies did not substantially change the value of the coefficients of other explanatory variables, only the value of the constant term was reduced. This indicates that development of economic and physical infrastructure shifts the income function upwards.

The values of the regression coefficients of  $P$  and  $I$  imply that if the endowments of all other factors were the same, households in project villages would have incomes that were higher, on average, by Tk 1,912 than those of households in control villages. Households in villages with developed physical infrastructure facilities would have incomes higher by Tk 1,130 than households in villages that lack such facilities. At mean values of the explanatory variables, the average agricultural income in the control villages with less developed infrastructure facilities was estimated at Tk 7,372. The net contribution of the Food for Work project to agricultural income was thus estimated at 26 percent, and that of infrastructure at 15 percent, of the mean incomes in control villages.

The growth in income from crop production is likely to stimulate income from noncrop rural activities such as livestock rearing, processing, trade, and services. When incomes from these sources were added to the income from crop production, the following estimates of the income model were obtained:

$$\begin{aligned}
 Y = & 1319 + 2120 P + 2761 I + 1621 L_O + 566 L_R & (3) \\
 & (2\ 87) \quad (3\ 68) \quad (8\ 39) \quad (1\ 72) \\
 & + 1967 W + 0\ 205 K + 723 E \\
 & (3\ 02) \quad (5\ 26) \quad (0\ 85)
 \end{aligned}$$

$$R^2 = 0\ 47$$

The variables K and W include capital and workers employed in nonfarm activities,  $L_O$  includes land used for homestead and other purposes, E is a dummy variable representing education (1 for household heads having more than five years of schooling), and the other variables are as defined earlier. The difference in the coefficients of W and K in equation (3) compared with those in equation (1) suggests that labor and capital in rural areas is more productive in nonfarm activities than in farm activities.

The coefficient of the project dummy P suggests that household income in the project area was higher by Tk 2,120 than in the control area. Recalling that the direct effect of the project on crop production was Tk 1,912, the study concluded from this simple analysis that the indirect impact of the project on noncrop sectors was about 11 percent of the direct effect on crop production income. The effect on nonfarm income was estimated to be greater in areas with developed physical infrastructure—Tk 1,637 per household compared with Tk 1,130 in crop-production activities. Thus, the development impact of physical infrastructure was derived more from stimulation of rural nonfarm activities.

Table 18 presents a summary of the estimates derived from the regression equations of the income effect of the development of economic and physical infrastructure. Project areas with underdeveloped physical infrastructure had 25 percent higher incomes than areas without the project. The positive income effect was about 59 percent in villages with better physical infrastructure facilities.

The Food For Work Program, however, had a less-pronounced effect on rural capital formation (Ahmed 1985). A comparison of mean values for the project and control groups showed gross investment to be 27 percent higher and net investment to be 64 percent higher in the project group than in the control group. The differences were statistically highly significant. From the multivariate analysis, it was found that the effect of the Food for Work Program on investment was mainly through its indirect but positive income effect. When the effects of other variables were controlled, the effect of the program on investment was estimated at 19 percent.

The development of physical infrastructure had a significant negative effect on rural capital formation, particularly on land development and acquisition of agricultural machinery and equipment. Land development involves employment of a substantial amount of labor. In underdeveloped villages, surplus family labor is often allocated to land development because of low opportunity costs. In project villages,

**Table 18 — Effect of Food for Work projects and infrastructure on rural household incomes estimates from regression analysis**

Area Characteristics	Income from Crop Production	Nonfarm Income	Total Household Income
		(Tk/year)	
Without Food for Work project or developed infrastructure	7 372	974	8 346
With Food for Work project but without developed infrastructure	9 284 (26)	1 181 (21)	10 465 (25)
With Food for Work project and developed infrastructure	10 414 (41)	2 819 (189)	13 233 (59)

Source Based on data from M. A. Quasem and M. Hossain, "The Effect on Agricultural Production and Income in Development Impact of the Food-for-Work Program in Bangladesh" a report prepared for the World Food Programme (Washington, D.C.: International Food Policy Research Institute, 1985), table 2.21.

Note Figures in parentheses are percent of increase in income compared with the situation without the project.

the scope of asset creation through private initiative is reduced by the government's involvement in such activities as provision of subsidized irrigation facilities and digging of irrigation channels. Thus, the Food for Work Program often substitutes investment activities that would have been undertaken with private and community initiatives had there been no prospect of government resources for such work.

The preproject nutrition situation was worse in project villages than in control villages (Kumar and Chowdhury 1985), verifying the observation that the Food for Work Program tends to reach economically depressed areas. There was a greater prevalence of stunting than wasting or stunting-cum-wasting in project villages. Water supplies were also poorer in project villages. Dietary intakes were, however, higher in project villages than in control villages for all age groups. Indicators of change in nutritional status, as suggested by anthropometric measurements, showed an equalizing trend in project sites for differences between boys and girls at various ages. The nutritional status of girls, who were significantly worse off, on the whole, in the younger age groups, improved more in project villages than in control villages. Since the baseline information was worse in project villages, a positive nutritional impact was more than indicated by the comparison.

The level of food consumption was higher in project sites than in control sites for the entire sample as well as for all income groups. The seasonal fluctuation in food intake was, however, more pronounced in project villages than in control villages. This was due to improvements in employment and income in project villages during some portions of the production cycle (February-June) but not in others (September-November).

For the landless and low-income groups, improvements in diet coincided with better harvests and with more extensive employment in nonfarm activities

The objective estimates of the development impact of the Food for Work Program obtained from the field survey data were checked with the opinions of respondents about changes in their economic conditions since the implementation of Food for Work projects. Table 19 presents the responses obtained from both project and control groups for different types of projects. For all projects, the economic condition of people in the control villages was unchanged, as one-third of the respondents reported improvement and one-third reported deterioration. In contrast, 57 percent of the respondents in the project villages reported improvement and 21 percent reported deterioration in their economic condition. The difference in response between the project villages and control villages was statistically highly significant. The largest positive gain was reported by respondents in flood-protection embankment areas, 95 percent of the respondents reported improvement in project areas and none in control areas. The majority of the respondents in areas with irrigation channels reported improved economic conditions, but the response was not statistically significant.

What is the nature of the distribution of longer-term gains from the development of rural infrastructures? Responses about changes in economic condition for different landholding groups were compiled (Table 20). In control areas, only large farmers reported improvement

**Table 19—Changes in economic conditions of respondent households after implementation of Food for Work projects**

Type of Project	Project Area		Control Area		Value of Chi-Square	Level of Significance
	Improved	Deteriorated	Improved	Deteriorated		
	(percent of total cases)					
Drainage and irrigation canal	52.5	15.0	27.8	30.6	5.32	0.07
Field channel for irrigation	57.5	17.5	50.0	32.5	2.54	0.28
Coastal embankment	25.9	44.4	25.0	50.0	0.17	0.92
Flood protection embankment						
Flash flood	65.8	23.7	30.0	25.0	10.10	0.01
Normal flood	94.7	0.0	0.0	40.0	35.30	0.00
All projects	57.3	20.7	30.1	34.6	22.19	0.00

Source: Based on data from M. A. Quasem and M. Hossain, "The Effect on Agricultural Production and Income in Development Impact of the Food-for-Work Program in Bangladesh," a report prepared for the World Food Programme (Washington, D.C.: International Food Policy Research Institute, 1985), table A.10.

**Table 20 — Changes in economic conditions of different landholding groups after implementation of Food for Work projects**

Landholding Group	Project Area		Control Area		Value of Chi-Square	Level of Significance
	Improved	Deteriorated	Improved	Deteriorated		
	(percent of cases)					
Functionally landless	37.6	35.8	22.2	29.6	7.96	0.03
Small farmer	53.8	19.2	25.7	37.1	7.14	0.03
Medium farmer	72.3	10.6	38.2	44.1	12.92	0.02
Large farmer	91.7	0.0	53.8	23.1	4.86	0.09

Source Based on data from M. A. Quasem and M. Hossain, *The Effect on Agricultural Production and Income in Development Impact of the Food-for-Work Program in Bangladesh*, a report prepared for the World Food Programme (Washington, D.C.: International Food Policy Research Institute, 1985), table A.11.

in their economic condition, while a majority of the households owning less than 0.5 acres of land reported either stagnation or deterioration in their economic condition. In contrast, the conditions of only the landless and the near landless remained unchanged in the project sites, the responses were equally divided between improvement and deterioration. However, a larger proportion of the landless in project villages reported improvement compared with control villages. The majority of the landowning groups in project areas, irrespective of their size, reported improvement in economic conditions, but the gains in comparison with control villages were higher for larger landowners. The conclusion of this analysis is that under conditions of economic stagnancy, as in the control villages, the rich become richer and the poor, poorer, but under conditions of growth as in the project area, inequality increases but the poverty situation improves as the poor gain in absolute terms.

The review of the development impact of economic infrastructure just reported noted that the impact on employment and income was higher in areas with developed physical infrastructure and that additional benefits came mainly from stimulation of nonfarm rural activities. A comprehensive study (Ahmed and Hossain 1990) on the impact of infrastructure on rural development in Bangladesh, which analyzed the same data, reached similar conclusions. Ahmed and Hossain estimated that the efficiency of agricultural production was about one-fourth higher in areas with well-developed physical infrastructure than in underdeveloped areas. This improvement was achieved mainly because diffusion of modern agricultural technology was facilitated. The positive effect of infrastructure was, however, more pronounced on income from nonagricultural activities than agricultural activities. Income gains were distributed more in favor of the landless and smaller landowners, contrary to the common belief that development of infrastructure accentuates income distribution.

Ahmed and Hossain (1990) defined physical infrastructure as including paved roads, financial institutions, and primary and secondary markets, not all of which are financed by rural public works programs. The exclusive emphasis of the works program regarding the development of physical infrastructure was on development and maintenance of dirt roads, and bridges and culverts on these roads. There are few comprehensive studies on the development impact of rural roads for Bangladesh.

Hossain and Chowdhury (1984) attempted to assess the socioeconomic impacts of rural roads by comparing land use, employment, agricultural production, marketed surplus, product and input prices, road traffic, and transport charges between an accessible and a remote *thana* in Bogra, one of the most agriculturally progressive districts in Bangladesh, as well as between Bogra and Faridpur, a district that still practices traditional agriculture. Data were collected through primary surveys of traffic on roads and markets, interviews with traders and transport operators who used the roads, and a random sample of households from 12 villages purposely selected according to their accessibility to roads and markets. The study did not find a significant relationship between cultivation intensity in the sample villages and accessibility of villages to roads. However, cropping intensity was significantly related to accessibility to roads. The intensity of modernization of agriculture was also significantly related to accessibility to roads. The area share under modern irrigation and the use of chemical fertilizers per acre of land were higher in Bogra than Faridpur, and in Bogra they were higher in the *thana* with the improved road network. A positive relationship between accessibility of the village to roads and use of fertilizer in the village was noted, but the relationship with availability of irrigation facilities was relatively weak. Yield per acre of rice was about 87 percent higher, and the gross value of agricultural production was about 25 percent higher in the most accessible villages in Bogra, compared with the most remote village in Faridpur.

Nonfarm occupations were more important in accessible villages than in remote villages. Nearly 30 percent of households in villages adjacent to a road reported nonagricultural activities as their major occupation, compared with 22 percent in moderately accessible villages and 18 percent in remote villages. The most striking difference was in dependence on cottage industries and on transport services for generation of nonfarm employment.

Variation in marketed surplus across villages was significantly higher than variation in yield or value of agricultural produce per unit of land. The amount of commodities transacted per person was 19 percent higher in the accessible *thana* than in the remote *thana* in Bogra, the difference was 17 percent in Faridpur. The volume of transactions was about 66 percent higher in Bogra than in Faridpur.

The annual volume of traffic per mile of road was estimated at 11,000 tons in the accessible *thana* and 9,000 tons in the remote *thana* in Bogra. For Faridpur, the annual volume was 8,100 and 4,500 tons per mile in the accessible and remote *thana*, respectively. Markets located

near the paved trunk roads accounted for nearly three-fourths of the volume of goods traded

The unit cost of transport per ton mile was 19 percent lower in the accessible *thana* than in the remote *thana*. Within the same *thana*, transport charges were higher during the rainy season than during the dry season, and the seasonal difference was higher for the remote *thana* than for the accessible *thana*. With existing traffic, improvement in the quality of roads in Bogra would give a user cost-saving of Tk 78,000 per mile, comparing favorably with the Tk 15,000 per year of actual investment on road improvement for the previous four years. Thus the crude estimate of the benefit-cost ratio was about 5.2, which must be regarded as very high by any standard.

Hossain and Chowdhury (1984) found that improvement in road quality led to a relatively advanced mode of transportation, that is, there was a shift from traditional modes (human porters, animal backs) to mechanized modes (rickshaws, trucks) that are faster and cheaper. The advanced modes of transport were run by pure transport operators, while the traditional modes, such as bullock carts, were run by farmers or traders who were only part-time transport operators. The former belonged relatively more to the landless and smaller landowning groups than the latter. There was a higher proportion of full-time transport operators for all modes of transport in the accessible area than in the remote area. The study concluded that investment for improvement in quality of rural roads would stimulate development of a commercial trade and transport sector, which would increase employment opportunities for the low-income group and, hence, would contribute to alleviation of rural poverty.

High rates of return on investment for construction and maintenance of rural roads and culverts were also estimated by other studies. Table 21 reports the volume and nature of traffic and the user cost of transport as estimated by Chowdhury and Hossain (1985) for different types of rural roads. The volume of traffic and savings in road user cost vary directly with road quality. The volume of traffic was nearly four to five times higher on dirt feeder roads connecting villages to the arterial road system than on interior dirt roads. On paved roads, the volume of traffic was several times higher than on dirt roads, and the additional traffic was carried mostly by mechanized transport. The road user cost was about 26 percent lower on improved dirt roads than on deteriorated ones, and 55 percent lower on paved roads. Improvement of a feeder dirt road generated a transport cost saving of Tk 180,000 on existing traffic and Tk 225,000 on generated traffic, which compares very favorably with the estimated cost of Tk 50,000 per mile per year for improvement and maintenance of such roads.

Hossain and Asaduzzaman (1983) evaluated the Special Public Works Program and estimated the benefit-cost ratio for reconstruction of dirt roads at 3.3, assuming a shadow wage rate for labor at 80 percent of the market wage rate. For construction of culverts on rural roads, the benefit-cost ratio was 5.5.

**Table 21—Volume of traffic and user cost of transport on different types of rural roads**

Road Type	Annual Volume of Traffic (1 000 metric tons/mile)	Share of Nonagricultural Commodities (percent)	Share Carried by Mechanized Transport (percent)	Cost of Transport (Tk/ton/mile)
Interior dirt road	3.8	10.1	0.0	48.4
Dirt feeder road				
Deteriorated	14.7	13.1	0.0	48.1
Improved	18.1	14.8	4.9	35.7
Brick soling road	34.5	30.6	79.4	26.4
Bituminous paved road	88.4	37.6	86.5	21.2

Source Based on data from O. H. Chowdhury and M. Hossain, Roads and Development: A Case Study of Return on Investment in Rural Roads in Bangladesh (Dhaka: Bangladesh Unnayan Parishad, 1985).

Chowdhury and Asaduzzaman (1983) made a qualitative assessment of the impact of investment for construction of dirt roads and markets under the Rural Development-1 Project implemented by the Bangladesh Rural Development Board in seven *thanas* in Bogra and Mymensingh districts. The reduction in unit transport cost as a result of investment on roads was estimated at 23 percent for Bogra and 17 percent for Mymensingh. Road users reported an average reduction in traveling time of about 38 percent in Bogra and 16 percent in Mymensingh, and an average reduction in traveling cost of 80 percent and 5 percent, respectively, for the two *thanas*.

### Technical Considerations

The substantial development impact of the Food For Work Program depends on successful completion of the projects and good quality of the work. Good-quality work requires sound conception, correct design, adequate resources for requisite appurtenant structures, and careful technical supervision during implementation. However, an excessive emphasis on achieving the relief objective, relative to the development objective, results in quality often being sacrificed for quantity. An engineering evaluation of 31 projects by Nishat and Chowdhury (1983) found that for most of the projects the structures were appropriate and the quality of design was good, but conformity of execution with design and quality of work were often unsatisfactory. In some cases, the

problem was serious enough to prevent any development impact from being realized. In the case of road and embankment projects, for instance, inappropriate technical designs of the projects would lead to drainage congestion, and during floods, local people would cut the embankments, thereby reducing the development impact.

In other cases, poor quality of execution was expected to affect the rate of deterioration and the frequency of repair and maintenance. In only about one-third of the cases was quality of construction found to be fairly good. A resurvey of project sites one year after the initial survey showed that half of the projects had remained incomplete. It was observed that motivation, especially of project implementation committee members and of local people, was closely associated with work quality.

### Impact on Short-Run Food Security

Public rural works programs should provide immediate benefits to workers by increasing the number of days of employment and providing higher incomes. This should be reflected in higher levels of consumption of the target group. By absorbing additional labor, such programs may help prevent a decline in wages during the lean agricultural season, which may indirectly benefit others in the target group who are not participating in the program.

The BIDS/IFPRI (1985) evaluation of the Food for Work Program estimated that during the early 1980s the program had the capacity to provide more than 100 million days of employment per year, which translated to at least 17 days of additional employment in the construction phase for every landless worker. During 1985-90, the program spent, on average, 658,000 tons of wheat per year. Assuming a 30 percent leakage in the program and a wage rate of 4 kilograms of wheat per day, the program may have generated about 115 million person-days of wage employment, equivalent to about 10 percent of employment generated for hired workers in crop-production activities.

A comprehensive study by Osman and Chowdhury (1983) of the short-term impact of the Food for Work Program found, however, that the employment generated by the program largely represented a shift from self-employment and, to a smaller extent, from other forms of wage employment (Table 22).<sup>16</sup> But since the daily remuneration from the program was considerably higher than from other sources, especially compared with the marginal return from self-employment, the effect measured in terms of income was highly significant. The study estimated

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<sup>16</sup> The employment and income effect was assessed by comparing values of these variables for sample households drawn from labor-selling groups in project villages (Food for Work participant) with those of control villages in five project sites. The sample consisted of 245 and 246 households respectively. The employment survey was carried out in three rounds at an interval of two weeks. In each round information on employment was collected for the preceding two weeks for each member of the household in the labor force.

**Table 22 — Employment characteristics of Food for Work participant and nonparticipant households during project implementation in 1982**

Variable	Project Group	Control Group	Statistical Significance of the Difference <sup>a</sup>
Total employment per household (hours)	450	410	S
Self-employment	76	169	S
Wage employment	373	240	S
Farm	137	153	NS
Nonfarm	61	87	S
Food for Work	175	0	S
Hours of work per day per household			
Self-employment	5.2	5.3	NS
Wage employment	8.3	8.1	S
Farm	8.0	8.1	NS
Nonfarm	8.0	8.0	NS
Food for Work	8.6		
Wage rate (Tk per hour)			
Farm	1.95	1.81	S
Nonfarm	1.46	1.31	S
Food for Work	1.95	1.69	S

Source Based on data from S. R. Osman and O. H. Chowdhury, Short Run Impacts of Food for Work Programme in Bangladesh, Bangladesh Development Studies 11 (1 & 2, 1983), 135-190.

<sup>a</sup> S = significant, NS = not significant.

that the net wage income of participant households was 55 percent higher during the six weeks of the survey period compared with what they would have earned during the same period in the absence of the program. The net income gain amounted to about 10 percent of their annual wage income and to about 7 percent of their total income in the years preceding the Food for Work season.

The study found a small indirect effect of the Food for Work Program on nonparticipating households within the target group. Nearly four-fifths of the labor-hiring households reported that wage rates went up due to the program, and 48 percent reported that they felt a labor shortage. The wage rate in farming activities was 11 percent higher in villages with Food for Work projects than in control villages during the program season. However, there was little adverse effect on agricultural production through the wage effect. Only 18 percent of the labor-hiring households had to cut down on the use of hired labor because of higher wages. Moreover, 92 percent of these labor-reducing households reported working more themselves in order to compensate for the reduced use of hired labor.

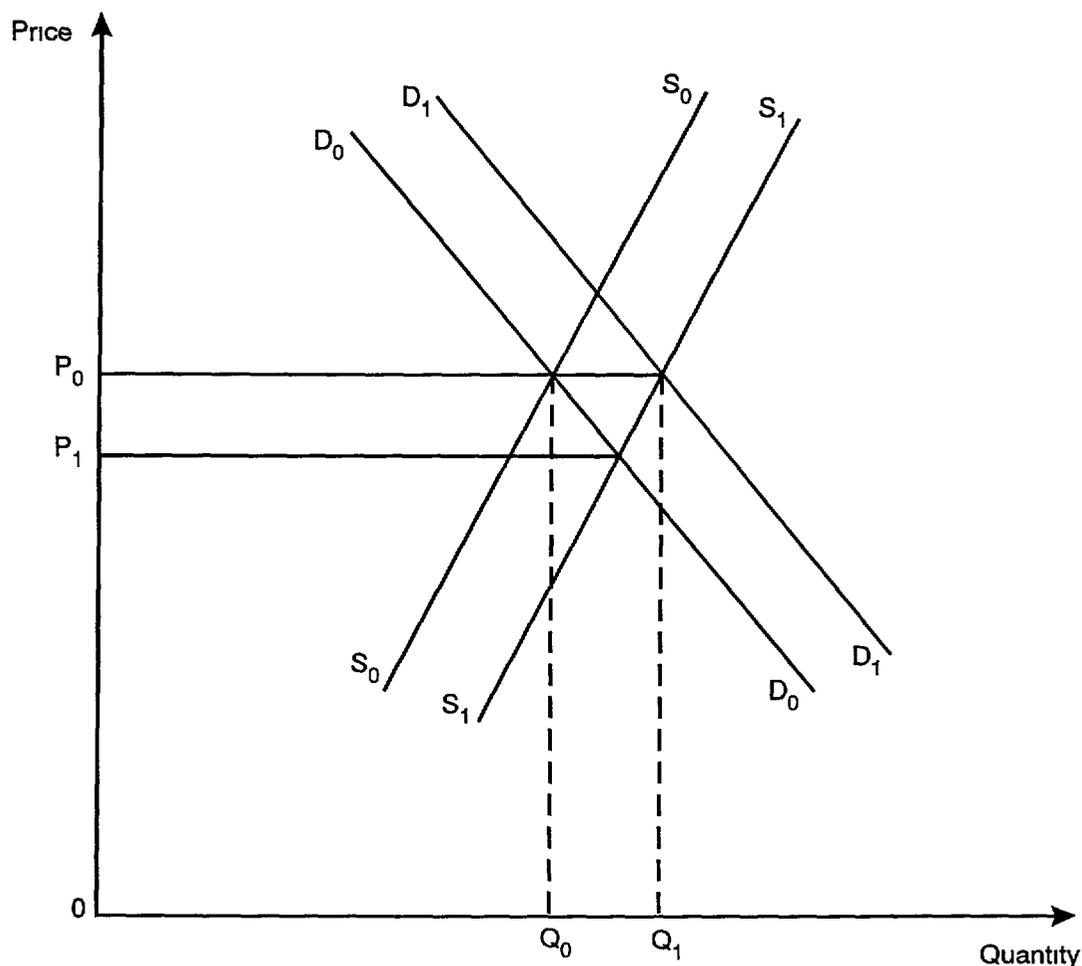
The effect of the Food for Work Program on consumption of participating households was not as pronounced as the effect on income. Only those workers heavily involved in the program (more than 50 percent of their employment was derived from the program) had marginally higher levels of foodgrain consumption than nonparticipating workers. A part of the additional income earned through the program could have been used for nonfood consumption or loan repayment. The study put forward the hypothesis of staggered consumption behavior at subsistence levels of income to explain the apparent gap between income gains and higher food intake. It was argued that at low levels of income, people try to maintain the minimum subsistence food intake even through borrowing, and defer expenditures on other nonfood basic needs such as clothing for periods when incomes are received in lump-sum fashion. Since Food for Work wages are sometimes paid at intervals of several weeks, they may be used for meeting lumpy expenditures or for repaying loans. Hence, the impact is not felt on food consumption during the period of work. Nearly 54 percent of the households receiving wheat as wages had to sell some wheat for meeting cash expenditures. The total amount of wheat sold was about 15 percent of the total receipts.

The Food for Work Program benefits did largely reach the target group (Chowdhury 1983). About 50 percent of the project workers were drawn from completely landless households, and 70 percent from those with less than 0.5 acres of land. About 85 percent of the workers were illiterate, and their average income was about half the level of the national per capita income. Since participation in the program involves arduous manual work, it appears to be self-targeted, that is, the employment opportunities are taken up only by those who are in dire need of such employment.

#### Effect on Prices and Producer Incentives

Stagnation in the domestic production of wheat since the mid-1980s, after a decade of rapid growth, is attributed by many to large imports of wheat for financing the Food for Work Program. The macro analysis of the impact of the program on prices is based on the argument that an infusion of imported wheat increases the domestic supply of foodgrains in the market, and unless demand for wheat is induced to the full extent of the increase in supply, the price of wheat will go down. To the extent that rice is a substitute for wheat, the increased supply of wheat may also bring down rice prices. The counterargument is that the supply of wheat under the Food for Work Program is expected to generate its own demand, because the target group of the program is extremely poor households with unemployed family labor and, hence, with a large unmet demand for food. The purchasing capacity generated by employment in the program is matched by the supply of wheat as wage payments in kind, hence it should not affect prices. This argument is explained in Figure 4. Import of wheat and shifts the domestic supply curve from  $S_0S_0$  to  $S_1S_1$ , and if demand remains unchanged, the price of wheat should go

Figure 4—Effect of additional supply of Food for Work wheat on prices



down from  $OP_0$  to  $OP_1$ . But if the worker who receives the wheat as wages consumes the entire amount, and the additional consumption is not at the expense of domestically produced grains, demand will increase by the same amount as supply (as shown by the upward shift of the demand curve from  $D_0D_0$  to  $D_1D_1$ ), leaving prices unchanged. The effect on prices will ultimately depend on the income effect of the Food for Work Program as well as the income elasticity of demand for wheat and the price elasticity of supply and demand. Some evidence on the strength of these factors is available from the IFPRI/BIDS evaluation of the program, which is reported below.

Osmani and Chowdhury (1983) found the additional employment effect of the Food for Work Program to be small but the income effect to be quite substantial, because earnings from program work were higher than

income foregone from self-employment activities taken up when employment opportunities in the market were limited. Evidence suggests that demand for foodgrains would increase as a result of the substantial income effect. The strength of the demand shift would largely depend on the extent to which the wages received in the form of wheat were used for raising the consumption of foodgrains. The IFPRI/BIDS survey found the foodgrain consumption effect to be rather weak (Osmani and Chowdhury 1983). Per capita wheat consumption in participant households was only 14 percent higher than that in the control group, and the top 50 percent of households in terms of employment received from the Food for Work Program had consumption levels 29 percent higher than nonparticipants. The findings indicate that a substantial portion of the additional income generated from program employment was diverted to meet nongrain consumption needs.

One important reason that Food for Work Program workers are paid in wheat is precisely to minimize the price depression effect. It is presumed that given the same level of income, a worker who receives payment in foodgrains will consume more foodgrains than one who is paid in cash. This argument is particularly valid if there is a high transaction cost in converting foodgrains to cash. The IFPRI/BIDS survey noted that in practice, however, workers frequently received payment in cash because of late arrivals of foodgrains to project sites or for other reasons. Nearly one-fifth of the workers received their wages entirely in cash, while two-fifths received cash at some time or other (Osmani and Chowdhury 1983). Payment in kind per se would not lead to greater consumption of foodgrains if the worker sells part of the wheat and uses the sale proceeds to meet nonfoodgrain needs. The IFPRI/BIDS survey found that nearly 54 percent of the households who received some of their wages in wheat during the survey period sold at least part of the wheat, the amount of wheat sold equaled 14 percent of total receipts. Only 24 percent of the respondents who sold wheat reported that the main purpose of doing so was to substitute wheat for rice in their diets, while 62 percent did so to meet urgent cash needs.

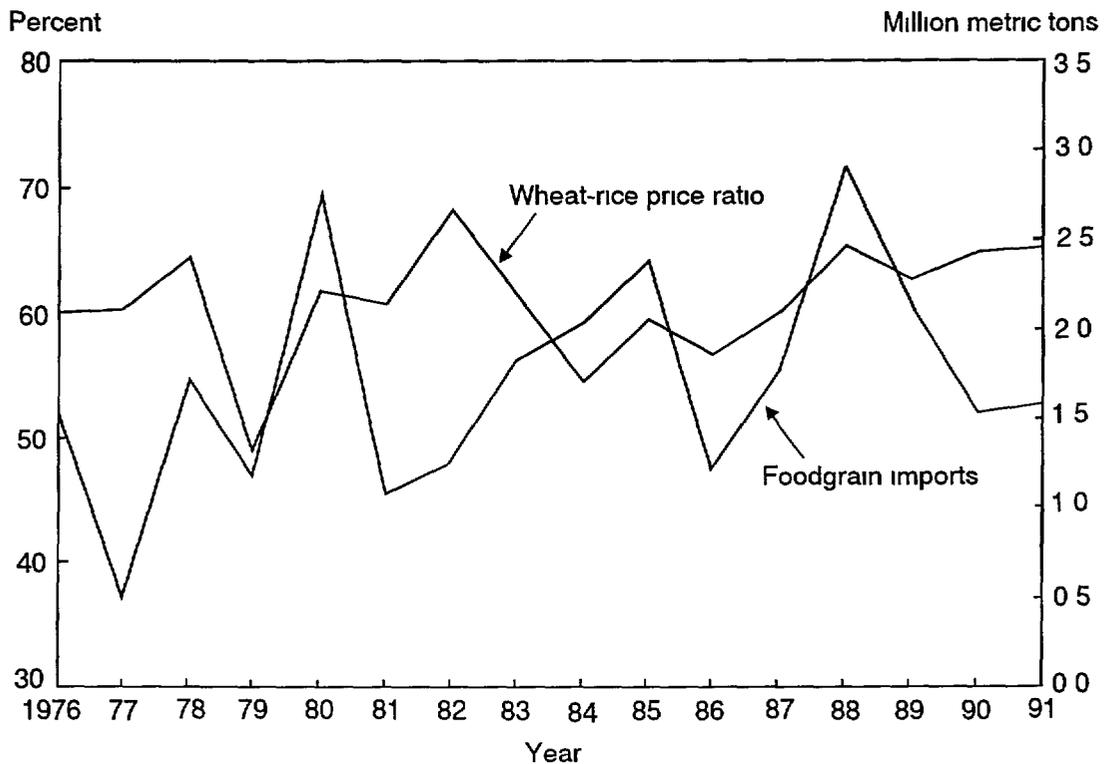
The evidence presented above suggests that due to a number of leakages, infusion of Food for Work wheat might not lead to an increase in the effective demand for wheat to the full extent. Thus, wheat prices would be expected to be somewhat lower than they would have been in the absence of the program. Even if wheat prices are depressed, it does not necessarily follow that the depressed prices lead to stagnation in wheat production in the country. During the 1980s, the price of boro rice, the competitor crop to wheat, was also on a downward trend due to rapid growth in irrigation facilities, which allowed large-scale expansion in cultivation of high-yielding boro rice.

Figure 5 presents the long-term trend in the wheat-rice price ratio<sup>17</sup> and relates it to Bangladesh's total foodgrain imports. Except

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<sup>17</sup> Both prices are averages for the postharvest period: March-May for wheat and May-July for boro rice.

Figure 5—Relationship between foodgrain imports and wheat-rice price ratio



Sources Estimated from World Food Programme Bangladesh Foodgrain Forecast (Dhaka World Food Programme September 1991) and Bangladesh Bureau of Statistics Statistical Yearbook of Bangladesh (Dhaka Ministry of Planning various issues)

during 1980-82, the negative relationship between foodgrain imports and wheat-rice price ratio was fairly weak. Also, there was no significant downward trend in the wheat-rice price ratio that would have induced farmers to reallocate land from wheat to boro rice. In fact, the price ratio fluctuated around 60 percent during 1976-87, but since then, wheat prices have increased at a faster rate than rice prices. It seems that technical factors may have played a more important role in the recent stagnation of wheat production in Bangladesh than depression in prices induced by the Food for Work Program.

## 5 CONCLUSIONS

Public works programs have the potential to serve both relief and development objectives. Development of rural roads, marketplaces, irrigation and drainage channels, flood-protection embankments, afforestation, and so forth, can create employment during slack seasons for agricultural activities and, at the same time, can promote diffusion of new agricultural technology, increase land and labor productivity, facilitate marketing, and provide better input-output prices to farmers. If economic activities are stimulated by developed infrastructure facilities, a second round of employment and income would be generated during the operational phase in both agricultural and nonagricultural activities.

Bangladesh has experimented with two types of public works programs that have been differentiated broadly by the mode of payment of wages to workers. The normal Rural Works Program that was initiated in the early 1960s was financed with cash resources, while the Food for Work Program that was initiated after the famine in 1974 is financed with allocation of wheat obtained as grants from donor countries. The primary objective of the first program was development, while the second program focused more on relief by making employment maximization during the operational phase its prime objective. Both programs have, however, aimed at developing the planning and implementation capacity of local self-government units and at promoting a participatory development process.

Both programs were financed with external resources and received nearly 8 percent of the annual development expenditures. Initially, more resources were allocated for development of physical infrastructure. With the passage of time, the emphasis shifted to economic infrastructure. Very few resources were allocated to development of social infrastructure or to projects such as paved roads that required more material resources than labor.

In the postindependence period, foreign assistance for public works was available as grants in the form of wheat. Donors preferred payment to workers in wheat. This provided an incentive to finance projects that involved mostly earthwork, which has the potential to mobilize the maximum amount of labor at the minimum cost. The work had to be organized during the dry season from January to May, which, during the 1960s and 1970s, coincided with the slack season for agricultural activities. The program has also been responsive to natural disasters. Resource allocations have been higher in years of natural calamities, and resources have been utilized for generating employment even during the rainy season.

In recent years, wage employment generated by the program has accounted for about one-tenth of the wage employment generated in the

crop-production sector. Evaluations of the immediate effect on the target group, based on household-level surveys, however, show that Food for Work employment is mainly the result of a shift from low-productivity self-employment. Since the return per day of labor is higher in the Food for Work Program than in other alternative forms of employment available to workers, the program has had a positive effect on the income of workers, estimated at about 10 percent of the wage income and 7 percent of total household income. Properly implemented, the projects have also generated longer-term development impact. Economic infrastructure generates additional employment and income to a greater extent in the crop sector, while physical infrastructure has a greater overall impact.

A major problem has been the high degree of leakage in resources during implementation of the program. This has partly been due to the payment of wages in kind. The imported wheat has to be moved to the work site, this has a high transaction cost and involves a number of layers of government officials who try to extract rents. Sometimes the problem has been due to a tendency on the part of the government to use the resources to satisfy political clients at local levels. This often leads to selection of projects that are not highly needed, inadequate supervision, and substandard work.

Lack of technical expertise at the local level and political objectives of serving the local clients of the power-holders has often led to selection of inappropriate projects, poor technical design, and low quality of implementation, all of which reduced longer-run development impact. Since the resources were available in the form of wheat, the program has mostly financed earthwork for building and repair of roads and embankments. These lacked the necessary appurtenant structures, which has aggravated drainage congestion during floods.

The works program has also dampened community initiative to undertake small-scale projects through mobilization of voluntary labor. Because of easy availability of resources, local communities now wait for the government to come forward with resources that previously were mobilized easily from within the locality. Some arrangement to provide matching funds from the central government unit to the local units is necessary to induce mobilization of local resources for projects that are conceived as beneficial to the locality. Partial funding by the locality may also ensure minimization of leakages and better quality of work.

A positive side effect of the Rural Works Program is that it has increased interactions between various layers of the local self-government units and the central bureaucracy in charge of planning and implementing rural development programs. It has promoted popular participation in rural development activities and has made people conscious of and interested in the functioning of the local government. However, this has also exposed to the public eye the process by which the dominant elite in the villages exploit the poor and the weak.

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