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The authors accept full responsibility for the views expressed in this report. The contents do not necessarily reflect the official position of USAID or Government of Bangladesh.

WP01

**A LITERATURE REVIEW OF PUBLIC FOOD
DISTRIBUTION IN BANGLADESH**

Jeffrey Alwang

Working papers on Food Policy in Bangladesh, No.1

International Food Policy Research Institute
Washington, D.C.

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**A LITERATURE REVIEW OF PUBLIC FOOD
DISTRIBUTION IN BANGLADESH**

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**A LITERATURE REVIEW OF PUBLIC FOOD
DISTRIBUTION IN BANGLADESH**

WP01

EXECUTIVE SUMMARY

Bangladesh is an extremely poor country with high rates of malnutrition and a vast population living below the poverty line. Many programs have been designed to alleviate malnutrition, and some of the largest are part of the Public Food Distribution System (PFDS). Given the large quantities of grain moving through the PFDS, its effectiveness is an important concern. The monitoring of PFDS impact is one of the major project objectives under the mandate of IFPRI-Bangladesh Food Policy Project.

This paper proposes a plan of work for measuring the effects of various PFDS programs on consumption and nutrition of the rural poor. Chapter 2 of the paper describes various PFDS delivery programs while chapter 3 reviews a number of past studies on PFDS effectiveness and nutritional status in Bangladesh. An outline of the plan of work for the IFPRI consumption/ nutrition team is presented in Chapter 4. A major component of that plan is a field study to measure the impact of the PFDS. Chapter 5 provides details on the design of the field study.

The major conclusions, presented in Chapter 6, are summarized as follows: Nutritional status is generally very poor, especially in rural Bangladesh. The PFDS has been viewed as an important means of addressing problems of malnutrition linked with poverty and inadequate consumption of food. However, several PFDS programs introduced to improve nutritional status were studied in detail and found to be poorly administered with very high rate of leakage. Further, no study has conclusively found a link between program participation and improved nutritional status.

The paper advocates intensive household data collection. It concludes that the alternative approach of monitoring economic variables for which data are readily available in Dhaka could have only limited success in monitoring PFDS impact and nutritional status.

**THE RELATION BETWEEN RICE PRICES AND
WAGE RATES IN BANGLADESH**

**R. Thamarajakshi
and
Martin Ravallion**

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**THE RELATION BETWEEN RICE PRICES AND
WAGE RATES IN BANGLADESH**

WP02

EXECUTIVE SUMMARY

The wage rate and rice price are of critical concern to the ultrapoor in Bangladesh who earn their income from wages and spend about 60 percent of it on foodgrains. Hence, the relationship between rice prices and wages has practical relevance to food policy debates in Bangladesh.

Two essays included in this paper sought to find a reliable answer to the question of long and short run implications of the relationship between wages and price of staples.

The essay by R. Thamarajakshi describes the behavior of foodgrain supply, prices, wage rate and employment over time, while the second essay by M. Ravallion makes an analytical effort to measure the magnitude and direction of the relations between rice prices and wage rates in Bangladesh. The major conclusions of Ravallion's essay may be summarized as follows:

1. In the short run, the rural rich are likely to gain and the rural poor to lose from an increase in the relative price of food.

2. Contrary to earlier studies based on partial analyses, Ravallion's analysis shows that the welfare of a typical poor household is more likely to be neutral to the change in the price of rice in the long run. However, the most interesting aspect of this analysis is that the long run welfare effect varies among the poor. This is contrary to intuitions based on partial equilibrium analysis, which ignores the wage response.

3. Finally, the study shows that it would typically take three or four years before price increase ceased to have an adverse effect on welfare of the rural poor. In looking at the short and long-run effects of higher prices of food staples, one must consider ways to counter some of the adverse effects of rising foodgrain prices in the short run to attain the growth and equity objective, which are not inconsistent in the long run.

**A DISAGGREGATED MODEL FOR
STABILIZATION OF RICE PRICES IN BANGLADESH**

Quazi Shahabuddin

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EXECUTIVE SUMMARY

This report presents the outcome of work to develop a disaggregated model for rice price stabilization in Bangladesh. The objectives of this effort are as follows: (a) application of the price stabilization model already developed by Ahmed and Bernard (1989) and solving the reduced form of the model with a view to deriving the basis of fixation of floor and ceiling prices of rice for the next fiscal year, and (b) further development of this model taking into account more disaggregated data to reflect the seasonal factors influencing the procurement and distribution operations.

This report addresses point (b), as a report covering point (a) was submitted earlier (Shahabuddin 1989). It also presents an integrated framework, based on the results of both aggregate and disaggregated models, for rice price stabilization in Bangladesh. Since both domestic procurement and open market sales of foodgrain are essentially seasonal operations influenced by seasonal factors such as seasonal demand, market arrivals, traders' expectations of prices, and stocking decisions, a more disaggregated approach using seasonal data is required to estimate the quantities of rice to be procured or sold to achieve price targets. Such a consistent derivation of quantity targets would not only contribute to the preparation of more realistic food budgets but would also assist in better targeting of the policy instruments for price stabilization.

Two further considerations guided the development of the multi-season model for the stabilization of the price of rice presented here: it should afford reasonably strong predictive power and be easy for professionals at the Government's Food Planning and Monitoring Unit to operate.

Bangladesh has been using several public policy instruments - such as imports of foodgrain, maintenance of stocks, open market sales of grains, and domestic procurement of rice - to achieve the objectives of the PFDS. This study contributes to the development of a consistent framework for stabilizing prices in Bangladesh.

Finally, it should be emphasized that although the fixing of target prices and projection of quantities through a modeling exercise introduces some realism and rationality into food policy planning, erratic behavior by factors that are difficult to identify do influence seasonal prices. Some degree of flexibility in both the procurement and open market sales programs is necessary to counter these erratic factors.

**OPTIMAL STOCK FOR THE PUBLIC FOODGRAIN
DISTRIBUTION SYSTEM IN BANGLADESH**

**Francesco Goletti
Raisuddin Ahmed
Nuimuddin Chowdhury**

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OPTIMAL STOCK FOR THE PUBLIC FOODGRAIN DISTRIBUTION SYSTEM IN BANGLADESH

WP04

EXECUTIVE SUMMARY

The search for an estimate of the optimal stock of public foodgrain has been a constant and intense demand from donors and policymakers in Bangladesh. The meaning of optimality has, however, remained different to different persons. A general perception in these debates is that there may be a precise figure that represents the optimal level of public stock. Optimality implies minimization of cost or maximization of net gains in achieving an objective. In the context of the present exercise (that is, estimation of an optimal foodgrain stock for the government), the optimal level of public foodgrain stock is defined as the level of stock that ensures a number of objectives such as a certain degree of price stabilization and a certain amount of foodgrain supply through the rationing system and for the food-for-work operations, vulnerable group development, and other relief programs at minimum cost. The definition of optimality is somewhat limited in the sense that the benefits from these public interventions are not questioned and incorporated into the analysis. However, sensitivity to changes in various types of interventions and their implications for the estimates of optimal stock are shown in this paper. As a result, it is possible to point out the optimal level of public stock for the present degree of public interventions and the stock levels for reduced degrees of public interventions or changes in policies. This procedure gives a range of estimates of optimal stocks and the corresponding types and degrees of public interventions, providing a space for gradual reform in policies and management of interventions.

The estimation of the optimal public stock obviously requires a comprehensive model that integrates a dynamic foodgrain sector with chosen policy regimes and well-defined objective and cost functions. Further, the mechanisms of simulation and sensitivity analysis are required for examination of results with varying assumptions. These analytical elements are developed in the paper. The dynamic foodgrain sector model captures the inherent seasonality of foodgrain prices, the effects of private storage decisions, and government activities involving procurement and offtake from public godowns. In defining the objective function of the government the main concerns of price stability, minimal fiscal costs, and food security through targeted distribution (rations, food-for-work, vulnerable group development, and relief programs) were taken into consideration.

Because results of the analysis vary with the types of policies, it is necessary to understand the policies well before reaching the estimates of stocks. Estimates of optimal stock relate to six types of policies specified in this paper. These are price band policy, optimal price stabilization policy, import policy approach to price stabilization, cost minimization policy, price stabilization cum cost minimization (also called the benchmark policy in this paper), and approximation to optimal price stabilization. An estimate with a no-rationing policy is also added at the end. The specific contents of each of these policies can be gauged from the presentations in the main text. A baseline picture is developed in order to show how each policy simulation compares with the baseline.

The estimated stock requirements and costs for the specified policies are shown in the followings table.

<u>Policy</u>	<u>Average Total foodgrain Stock</u> (1,000 MT)	<u>Total Cost</u> (Tk.million)
Baseline	1,075	17,045
Price band	1,452	19,632
Optimal price stabilization	1,128	8,392
Import policy	847	14,716
Cost minimization	686	6,046
Benchmark: price stabilization cum cost minimization	724	5,137
Approximation to optimal price stabilization	876	8,473
No ration distribution	690	2,741

The baseline in the table is obtained by simulating the foodgrain model for the period July 1985-June 1988. The price band is defined by a plus or minus 4 percent margin around the target price. The optimal price stabilization policy uses open market operations to minimize the variance of rice prices around the target. The import policy uses imports to minimize variance of rice prices around the target. The cost minimization policy uses open market operations to minimize the total cost of food operations. The benchmark refers to cost minimization cum price stabilization, which uses open market operations and imports to minimize the total cost of food operations subject to price stabilization and foreign reserves constraints. The approximation to optimal price stabilization was computed through stochastic simulations of production shocks and ordinary least squares over rice production, wheat production, and a lagged term. No ration distribution refers to the benchmark when monetary offtake is eliminated. Total cost equals procurement cost plus import cost minus ration sales minus open market sales.

The estimates in the table show that the optimal stock varies from the level of 686,000 metric tons for the cost minimization policy to 1,452,000 tons for the effective price band policy. Cost minimization implies allowing prices to go up in the peak price season in order to make a profit by public sale or to go down sharply in order to buy grains at cheap prices. Price stabilization is of no concern. Such a strategy forsakes the prime objective (that is, price stabilization) of the public system. Therefore, it may not be acceptable to policymakers. Their policy of price stabilization cum cost minimization appears to be one of the best options and can be further improved by elimination of rationing if evaluation of the rationing scheme justifies such elimination.

One interesting piece of evidence that emerges from this exercise is that the cost and level of stock are higher for the price band policy than for other policies. This result originates from the maintained rigidity of a price band policy. When this assumption of a rigid price band is abandoned, the policy becomes similar to the approximation to optimal price stabilization, in which case both the stock level and cost are substantially reduced.

For the sake of simplicity, the policies are specified discretely and with somewhat narrower domain than would be dictated by the exigencies of actual application. In actual application, some of these policies would be combined to achieve multiple goals. But discrete analysis provides a sense of direction of change in levels of stock and costs due to these combinations. For example, some flexible price band, import, open market operations, and cost minimization goals would be implicit in an ideal price stabilization mechanism. In the present context it is important that these policies, if applied in a balanced and effective manner, would not require a stock level above about 750,000 tons and would also cost much less than historically experienced.

For low-cost operation of price stabilization, the analysis indicates that use of three policy instruments, that is, import policy, open market purchase, and open market sale (purchase and sale are defined as open market operations) have to be very judicious. In the past, import of foodgrain has not been based on rational analysis. Open market operations have also remained very timid. Moreover, management of these operations (not specifically analyzed here) is known to have caused inefficiency and high cost. The analysis here shows that private trade is very sensitive in price speculation and stocking behaviors to the public stock situation and operation. Therefore, erratic behavior in the public sector will compound the adverse effects throughout the foodgrain market.

This paper assumes that the public sector will continue in the Bangladesh foodgrain market and analyzes how the objectives of this sector can best be achieved with optimal stock and lower cost. There is of course a larger issue, which the paper does not address: Is the public sector necessary at all? Inefficiency in the public sector may generate the momentum for a comprehensive look at this larger issue.

**OPERATIONAL PERFORMANCE OF THE RURAL RATIONING
PROGRAM IN BANGLADESH**

Akhter U. Ahmed

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OPERATIONAL PERFORMANCE OF THE RURAL RATIONING PROGRAM IN BANGLADESH

WP05

EXECUTIVE SUMMARY

In Bangladesh, the majority of the people suffer from a lack of food security. As a short-run solution to the problem, a targeted intervention of transferring income can be an efficient way of increasing the real incomes of the poor. Distributing rationed food to a target group at subsidized prices is a well-known way to transfer income. This report evaluates the operational performance of the Palli (rural) Rationing (PR) program in Bangladesh, which is a targeted intervention to provide food security to the rural poor.

The Public Food Distribution System (PFDS) provides about 13 percent of all foodgrains consumed in the country. Foodgrain distribution through the PFDS to achieve poverty alleviation objectives is receiving increasing attention from the government and the donor agencies. The targeted PR program was added to the PFDS in 1989. However, the government suspended the operation of the PR program in December 1991 in order to reform the program.

Foodgrains distributed under the PR program were priced at 25 percent less than the statutory ration (SR) price. Except for the six SR areas, the PR program operated all over the country, covering about 6 percent of the non-SR population according to the 1991 population census. In terms of total offtake, the PR program was the largest among the monetized channels and second largest among all PFDS distribution channels, accounting for 19.5 percent of total PFDS foodgrain offtake in 1990/91.

This study estimates that, from the inception of the PR program in April 1989 till its suspension in December 1991, the government incurred a fiscal subsidy of Tk. 5.54 billion (US\$158.95 million). The average rate of subsidy during the period was 39.9 percent. In 1990/91, government subsidy for the PR program stood at Tk. 2.15 billion (US\$60.21 million).

The analysis of performance of the PR program is based on data drawn from two field surveys conducted by the Bangladesh Food Policy Project of the International Food Policy Research Institute (IFPRI). The survey results showed a high degree of participation in the program by the beneficiaries. Although the quantity of the ration was too small for their needs, the demand for rationed rice was high. The beneficiaries regularly purchased the ration if they had enough cash, and if a supply was available.

The officials of the Directorate of Food concluded that the procedure of selection of PR dealers by Members of Parliament during Ershad's regime resulted in the appointment of inexperienced and dishonest persons as dealers, which was seen to be largely responsible for the unsatisfactory performance of the PR program. The other major reason for the poor performance of the program was the low rate of commission paid to ration dealers. The inadequate commission forced the dealers to adopt malpractices, the officials reported.

During the survey, detailed cost information was collected from the dealers to estimate their cost of operation. The dealer's purchase price of rice from the government food godown was Tk. 734.00 per quintal (100 kilograms), and the official sale price to beneficiaries was Tk. 750.00 per quintal of rice. Thus, a dealer was permitted to earn a commission of Tk. 16.00 per quintal of rice for distribution, irrespective of the distance of the ration outlet from the government food godown, the Local Supply Depot (LSD). The cost analysis suggests that the dealer's commission rate should consist of two components: (1) a fixed commission, and (2) a transport bonus. Allowing for a normal profit, the fixed commission is estimated at Tk. 38.98 per quintal of foodgrain. The transport bonus is estimated at Tk. 1.39 per quintal per mile, which should be paid to the dealers in addition to the fixed commission.

For an effective operation of a PR-type intervention in rural areas, it is necessary to provide a fair commission to dealers. If an adequate commission is not permitted, then leakage of resources from the program should be accepted, simply because a private dealer will not operate at a loss. Of course, the provision of an appropriate commission will not guarantee that the dealers will stop malpractices. Strict supervision of the program, such as on the spot physical checking of stock at the ration shops, must be enforced for its success.

Leakage of resources from the PR program is estimated in this study. Leakage is defined here as the reallocation of program resources intended for the target group to the nontarget population. The estimates suggest that the total leakage of rice from the PR program was 69.4 percent. Thus the program was only 30.6 percent effective in reaching the target group.

The results of the cost-effectiveness analysis indicate that, adjusted for leakage, the total estimated benefit from the PR program, in terms of income transfer, was Tk. 328 million (US\$9.19 million) in 1990/91. The estimated fiscal or budgetary cost of subsidy for the program was Tk. 2,149 million (US\$60.21 million) in the same year, as mentioned above. Therefore, it costs the government Tk. 6.55 to

transfer one taka of income to an eligible beneficiary of the program. If the program were 100 percent effective in reaching the target population, then the government could provide one taka of income to a beneficiary at a cost of Tk. 1.73. The total benefit of the program in 1990/91 would have been Tk.1,244 million (US\$34.85 million) had the program performed exactly as designed.

It is recognized that targeted food ration programs are generally difficult to manage in rural areas where the population is more sparsely settled than in urban areas and many areas are inaccessible due to undeveloped infrastructure. In the PR program, these general problems have been accentuated by a lack of supervision of the program by government food officials, appointment of many inexperienced ration dealers, and an inadequate commission paid to dealers for ration distribution. The system also provided ample scope and incentive for rent seeking. The combination of all these factors affected the PR program so that its performance was far from satisfactory.

The PR program provided only meager coverage of the needy in relation to the number of poor remaining in extreme poverty. Moreover, the effects of the program in increasing the real income of an eligible beneficiary was insignificant. For such minimal effects, however, the government incurred a substantial cost. If resources are drawn away from more productive activities in order to continue the PR program in its present form, then it might adversely affect economic growth. This in turn, may deteriorate rather than ameliorate long-term food security in Bangladesh.

Of course, this study does not rule out the potential for government intervention to improve the conditions of the poor. On the contrary, the implicit cost of nonintervention would probably be very high. A malnourished population contributes less effectively to economic development than a properly fed, physically strong, and active population. It is likely that Bangladesh is paying a very high price in economic growth due to low productivity of her labor force as a result of widespread malnutrition. Overwhelming poverty persists in Bangladesh, and the problem of food deprivation is the most severe consequence of poverty. While the country is on the verge of attaining "self-sufficiency" in foodgrain production, millions of her population lack access to enough food due to their inadequate purchasing power and thus remain seriously underfed.

This study suggests that reforms should be made to strengthen the effectiveness of the PFDS in reaching the poor and to bring the food distribution more in line with nutritional objectives. A well-managed and appropriately targeted intervention program can minimize leakage and increase the real income and the nutritional status of the

poor in a cost-effective way. However, it is beyond the scope of this study to recommend the appropriate method of intervention. A study of the nutritional effectiveness of the PFDS by the IFPRI Bangladesh Food Policy Project is under way. This report, comparing the effects of the existing food distribution programs for the poor, will examine ways of improving the targeting of a rural food subsidy program and will suggest policies to achieve the desired goal of food security.

**DETERMINATION OF PROCUREMENT PRICE
OF RICE IN BANGLADESH**

**Raisuddin Ahmed
Nuimuddin Chowdhury
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Working Papers on Food Policy in Bangladesh, No. 6

International Food Policy Research Institute
Washington, D.C.

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EXECUTIVE SUMMARY

This report attempts to develop a consistent approach to determining the procurement price of rice and improving the operational effectiveness of the procurement program in order to support farm-level prices of rice at harvest seasons. The report was prepared at the request of the government in connection with the decision on a procurement price for the 1991/92 crop season. Even though the 1991/92 procurement price was the immediate concern, the framework for deriving estimates of procurement prices will remain valid for general application in other years if the price support program continues in Bangladesh.

The paper does not examine the economic justification for the procurement program. It (1) clarifies the objective of the procurement program, (2) develops criteria for determining the procurement price, (3) applies these criteria to derive the procurement price for the 1991/92 crop season, (4) examines factors determining the effectiveness of the program, and (5) outlines the main ingredients for a competitive mode of procurement through open tenders.

The paper argues that the main objective of procurement should be to support prices for farm-level incentives. It is counterproductive to include other objectives, such as public stocks and distributional considerations; such a diffusion of purpose serves no individual objective adequately. Achieving multiple objectives requires multiple instruments, and the procurement program is a single policy instrument that cannot be used to mitigate all problems. The objective of price support through public procurement is explained as a part of a fuller scheme for price stabilization in which open market sale is the other blade of the stabilization scissor.

Three criteria are considered in determining procurement price: (1) cost of production as a check on the rate of return to land and farm entrepreneurship, (2) world price as a check for ensuring that domestic prices are not greatly different from the prices that would allow the government to use opportunities presented by the world market, and (3) domestic market prices that will ensure feasible and efficient price stabilization. This paper discusses the pros and cons of each of these criteria and the procedures involved in applying them. It is argued that the market price should be the main criterion, with the other two serving only as bases for marginal adjustment when emerging changes warrant such adjustments.

For the 1991/92 procurement season, the cost of production criterion yields an estimate of Tk. 301 per maund of rice; the world price criterion generates an estimate of Tk. 308, and the market price criterion gives an estimate of Tk. 346. Although the task of making a choice is made difficult by the use of three criteria, the criteria do indicate the direction in which the procurement price needs to change. The estimates of production costs provide evidence that the absolute degree of profitability in the production of rice is quite high. This estimate incorporates a profit of 50 percent even after the costs of land rent and family labour are included. The estimate based on the world price criterion is not significantly different from the estimate based on cost of production. However, the estimate based on the market price criterion is substantially higher than either of the other two estimates. This situation warrants a downward adjustment in domestic prices, which is likely to happen under free trade. The current procurement price is Tk. 362 (Tk. 240 for paddy). Keeping in view the political and administrative difficulties in immediate deregulation of trade, this report recommends a procurement price of Tk. 345 per maund of rice and Tk. 230 per maund of paddy for the 1991/92 crop year.

The derivation of a procurement price from the market price criterion involves a price stabilization framework. This is explained fully in the text. In this framework, rice is procured at market prices at or below the support price. This support price is derived as the reference procurement price instead of following the current usage in government documents of calling it the procurement price. The approach adopted to determine the support price ensures a normal profit margin for traders so that the government's role (that is, public rather than private procurement) is largely limited to above-normal production years and regions.

Most farmers sell their rice in the market, and procurement contributes to producers' incentives through its impact on market prices. However, the way in which procurement is implemented is critically important in producing an impact on market prices. The current procedure of millgate contracts for procuring rice involves almost a bilateral negotiation between an officer of the Food Department and a miller. It has many flaws. There appears to be widespread abuse of public resources through collusion among millers and public officials. The current system of procurement therefore does not affect market prices as much as it could.

The mode of procurement should be transparent and competitive enough to create expectations among traders that a fall in prices would be prevented. Procurement through open tenders involving competitive bidding is a time-honored mode that can serve this purpose. This paper briefly outlines an open-tender procedure that, in effect, transfers

the transportation and packaging functions to the private sector. In addition to its impact on market prices, its cost savings would be substantial because most of the grains are procured in one region but consumed in other regions.

MANUSCRIPTS

22a

**FOODRAINS IN BANGLADESH:
PAST TRENDS AND PROJECTIONS TO YEAR 2000**

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International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

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EXECUTIVE SUMMARY

The structure of the Bangladesh economy is changing, with the share of agricultural GDP declining and that of industry and services increasing. Yet agricultural growth is still sluggish, even in comparison with other low income countries in Asia.

The distribution of income is showing a deteriorating trend in rural areas. At the same time the nutritional standards, even if quite low, are improving. Also improving is the value of rural wages in terms of rice.

Foodgrain production has been characterized by higher growth in the 80's than in the 70's. This higher growth has also been accompanied by higher stability. Growth of production has been achieved through the use of high yielding varieties, expansion of irrigated land, fertilizer use and infrastructure improvement. Most of the expansion of modern technologies has taken place in the winter crops, namely boro rice and wheat. There is still room for improvement in aman and aus rice. The process of productivity growth has not created a growing disparity of rice yields among regions, indicating that the diffusion of modern technologies has not been uneven.

Foodgrain imports have shown a slight tendency to disentangle from food aid, as the capacity of Bangladesh to service its imports has improved.

Prices of foodgrains have shown an increased stability in the 80's as a result of changed pattern of seasonality and better management of stock policy than in the 70's.

The projection of foodgrain gap between nutritional standards and domestic production in year 2000, indicate a maximum gap of 3.3 million metric tons (mmt). Most of the gap, 2.2 mmt, is due to wheat (see Table 40 and 41). The "medium" projection indicates a negligible surplus of foodgrains of 0.199 mmt, with an associated rice surplus of 1.9 mmt.

The projection of excess demand in year 2000 is 2.9 mmt (see Table 48). The middle projection is 1.3 mmt. If the processes of urban and rural income growth are taken into account, the projections of foodgrain deficit are altered considerably. The maximum deficit for year 2000 becomes 1.2 mmt, and the middle case exhibits a surplus of 0.236 mmt (see Table 49). This discrepancy with the aggregate projections without taking into account urban growth is due

mainly to the fact that urban growth is accompanied by a changing diet pattern characterized by relatively less emphasis on foodgrain. If the foodgrain demand disaggregation is carried further to incorporate both rural and urban areas and both rice and wheat, the resulting situation for year 2000 appears as basically characterized by overall self-sufficiency in foodgrains (see Table 56 and 57). The overall self-sufficiency hides the asymmetry between large rice surpluses and wheat deficit.

It has also been found that taking into account age disaggregation would not alter the above projections for year 2000 considerably.

M02

**A REVIEW OF THE RAY HOOKER REPORT
AND
AN OUTLINE FOR DETERMINING PROCUREMENT PRICE OF
FOODGRAINS IN BANGLADESH**

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

May 1990

**A REVIEW OF THE RAY HOOKER REPORT AND
AS OUTLINE FOR DETERMINING PROCUREMENT
IN BANGLADESH**

M02

EXECUTIVE SUMMARY

The Ray Hooker Report reviewed the foodgrain prices in Bangladesh for 1987. In April, 1987 certain GOB measures deviated from the Agreement which stipulates that the OMS price is to be set at approximately 15% above the procurement price in non-SR areas and 20% in SR areas (henceforth this differential is mentioned as band). GOB officials suggested that some of the PFDS price ratios specified in the agreement were no longer appropriate. They argued for lowering the band, to 10-15%, on the grounds that the prevailing import price was low enough not to increase total cost of PFDS subsidy. The Report weighed viable options in this context.

Hooker's study considered four alternatives:

- i. No change in the band as stipulated in the Agreement;
- ii. Narrowing the band as proposed by GOB;
- iii. Linking OMS price with shadow Procurement Price for CY1987 only;
- iv. Combining (i) and (iii)

Three Observations from Post Hooker Report Scenario:

Table 1. Spread Between OMS price and Procurement Price (%)

Sl.	Period	Rice	Wheat
1	Pre-April 87	15.09	8.95
2	Apr 87-Jul 87	-1.00	3.5
3	Aug 87-Dec 87	0.65	6.5
4	Jan 88-May 88	8.44	9.5
5	Jun 88-Oct 88	8.44	9.5
6	Nov 88- Jun 89	3.41	4.8
7	Jul 89-Oct 89	10.22	10.0

1) Table 1 shows that the band as stipulated by the Agreement was abandoned; (2) During the same period (Table 1), the Ration Price also followed the same trend and moved up as a share of OMS price; (3) Procurement Price was static in nominal terms, but all other prices went up which meant a decline in the real Procurement Price.

Primarily this paper examined the mechanism of determining Procurement Price, OMS price and Ration Price. The

Agreement stipulated a mechanism with objectives of: (1) providing incentives to producers and security to consumers through fixing a base Procurement Price and a sale price; (2) reducing subsidy on food account; (3) ensuring public distribution does not reduce private trade. To understand the likely impact of reducing of price band on the objectives, it is required to grasp the logic of the price stabilization mechanism. Its two important aspects are: (1) the basis of the band and implication of change of band; (2) the basis of determining Procurement Price. The latter plays a key role since it is the price used to derive OMS price and Ration Price.

THE BASIS AND IMPLICATION OF THE PRICE BAND:

What happens if the band is squeezed from 15% to 10%? The likely consequences are: (a) reducing the scope of private trade because private traders will be able to benefit less by trading spatially between peak and troughs; a crowding out of able speculators will be observed; (b) increasing the extent of subsidy as a result of keeping (local or foreign) Procurement Price constant while lessening the sale price by 5%; (c) increasing consumer surplus - this benefit must be examined whether it can outweigh the cost aspects of above. The stabilization protected consumers only against abnormal price rises, i.e., the price band was set as to allow for normal profit to traders and to protect consumers against abnormal price rises.

Rationale of band specification in PL-480 Title-III Agreement:

A 15-20% band was stipulated on the basis of existing information on normal profit margin in foodgrain trading as well as the normal stock levels to support ceiling price and budgetary capacity of the govt. Any reduction of the band without regard to these factors are likely to make the system ineffective. Even if the normal margin were lower it may not be a basis for recommending a reduction of price band if reduction in subsidy were to be held high in govt priority.

Recommendation made by the Report:

Implementation of alternative (iii) is recommended for CY 1987 with reversion to the Agreement provisions from Cy 1988 onward.

**BASELINE DATA COLLECTION FOR NUTRITION
SURVEY AND ANALYSIS**

Melony International

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

September 1990

EXECUTIVE SUMMARY

This study collected baseline data for a national survey on malnutrition to be carried out by IFPRI's Bangladesh Food Policy Project. It focused on sub-regional units, including both distressed and non-distressed districts.

First, the available data, for each district in the country were gathered to provide a baseline from which to evaluate the impact of Rural Rationing (RR) on nutrition. Later, the study selected survey areas on the basis of a variety of criteria. Data sources included BBS, FPMU, R&H, WFP, UNDP, BARC, Bangladesh Bank (BB), Winrock International.

The categories of data to be collected were:

- i) Progress in implementing the Rural Rationing program;
- ii) Number of RR card holders and number of household covered including the number of female card holders (latest three months);
- iii) Percent of targeted number reached (latest 3 months);
- iv) Release and off-take of grain under RR by commodity and by months;
- v) Food grains released by districts for latest three months for each of the other food based programs e.g. FFW, VGD, OMA, etc.
- vi) District level indicators of high level food insecurity;
- vii) District level indicators or infrastructure (physical and management) that influences movement, marketing and access of food.

Additional data were also collected on following:

- i) Agro-ecological zones (AEZ);
- ii) Areas liable to famine;
- iii) District level daily wages;
- iv) District level GDP.

Districts excluded from final analysis:

Chittagong H. Tracts (CHT) districts, Patiya and Dhaka were considered to be excluded from study for:

- i) Government gives special emphasis for development activities of the CHT districts.
- ii) Regarding Patiya, there were missing data;
- iii) Chittagong and Cox's Bazaar showed identical matrix value and are neighboring districts, so Cox's Bazaar was excluded for selection of the study area.
- iv) Dhaka was not incorporated in the analysis because of its metropolitan effect may bias the selection of the survey.

The report recommended a total of twenty new districts were as study area. It includes a large number of statistical tables.

**EVALUATING THE GAINS FROM TRADE:
Exporting Rice and Importing Wheat in Bangladesh**

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

June 1990

EXECUTIVE SUMMARY

At the beginning of the Bangladesh Food Policy Project, the then Secretary of Food emphasized that the economics of exporting rice and importing wheat in Bangladesh should be examined. To meet that request, the present report presents the analysis of the economics of exporting rice and importing wheat in Bangladesh.

1. Export of rice will initially reduce domestic supply of rice by the amount of export. But this fall in supply will raise prices that will increase domestic supply. Therefore, net reduction in domestic supply will be less than the quantity of export. Import of wheat will directly increase domestic supply by the amount of import but will also reduce domestic wheat price and hence domestic wheat production. All these short run changes will be determined by supply and demand elasticities. A framework for simultaneous solutions of all these effects is developed and used in the analysis. The effects are estimated on the assumption that 100,000 tons of rice is exported and all foreign exchange from this earning is used in purchase of whatever quantity of wheat is available.
2. The results of the analysis indicates that this trade policy of exporting rice and importing wheat will increase domestic supply of foodgrains (rice and wheat) by about 75 to 132 thousand tons depending on assumptions about supply and demand elasticities. This is undoubtedly the most desirable aspect of the policy. This conclusion also reinforces the obvious argument often made, that the government should not import any rice as it is doing under current policy. Instead of importing rice, the government can import a larger quantity of wheat with the same amount of foreign exchange.
3. However, although the total supply of foodgrains will increase due to a switch to the proposed policy, this is not without some additional cost. This is entirely the taka cost reflecting the difference of purchase value of 100,000 tons of rice and the sale value of imported wheat. Because of fluctuation of relative prices of rice and wheat, there will be financial profits in some years and losses on other years. A simulation exercise indicates that the number of years with losses will be about four times the number of years with profit. On average, the cost per

additional tons of wheat imported will be equivalent to about 64 percent of the price of wheat at domestic market. This is also an underestimation because trading cost is not included. Including trading cost, the cost may go up to about 80 percent of the domestic price of wheat. Therefore, the consideration of financial cost, particularly when the trade will be done by government, does not make the proposition attractive.

4. Keeping the foodgrain trade open, i.e. allowing private traders to export and import, may provide a better test of comparative gain through export of rice and import of wheat. Because private trade may adopt ingenious measures of efficiency in trading, their capability may belie the calculation made here. Moreover, the prospect of exporting very fine quality rice (eg. kalijura, kataribhog, chinigura, etc) has not been examined here. These varieties compare well in prices with Basmati in U.S. and European markets. A back-of-the-envelope calculation indicates that Bangladesh may be able to expand the export of these very fine qualities rice in many parts of the world. This will require withdrawal of restriction of foreign trade in these commodities.
5. If the experience of 1989-90 in rapid increase in production of rice is sustained for a long enough period, Bangladesh may face a problem of surplus, at least of a temporary nature. This will force the country to explore foreign markets for export of rice. Export of rice from Bangladesh will become a problem and import of wheat will turn out to be an irrelevant proposition under that situation.

COST OF PUBLIC FOOD DISTRIBUTION IN BANGLADESH

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July 1991

EXECUTIVE SUMMARYOBJECTIVES

This study has two objectives:

- (a) to evaluate budgetary cost of the Public Foodgrain Distribution System (PFDS); and
- (b) to evaluate the true economic costs of the PFDS.

METHODS:

This study evaluates costs in both budgetary and economic terms. While budgetary costs do not account for aided or grant imports, economic costs do.

Enumeration of costs is comprehensive. Distribution costs - disaggregated into administrative costs, interest charges and storage, transportation and handling costs - are evaluated on full-valuation methods. In order to avoid double counting, budgetary costs are computed net of any stock changes due to aided or grant grain. The difference between budgetary cost and receipts corresponds to budgetary subsidy. That between the economic cost and receipts amount to the economic subsidy. Because capital costs related to public distribution are omitted from subsidy estimates, they, if anything, understate.

CONCLUSIONS:

The PFDS subsidies impose a large budgetary burden, amounting to over 10 percent of public sector development expenditure.

On the whole, economic subsidy on the foodgrains publicly distributed rates at about 54 percent: 32 percent on rice and 62 percent on wheat. Overall, the rate of economic subsidy is about twice as big as for budget subsidy.

Open Market Sales (OMS) is the least subsidized, and Essential Priorities (EP), the most subsidized, among the monetized channels.

The huge costs of the PFDS do not compare well with the potential poverty payoff it might, given better targeting, have had. For example, abolishing some of the ration channels, for example the EP, and diverting the grains thus released into more cost effective channels would promote efficiency.

**DETERMINATION OF PROCUREMENT PRICE
OF RICE IN BANGLADESH**

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**DETERMINATION OF PROCUREMENT PRICE
OF RICE IN BANGLADESH**

M06

EXECUTIVE SUMMARY

(Kindly refer to Working Paper No. 6)

**MARKETED SURPLUS OF BANGLADESHI RICE
AMID GROWING TECHNICAL CHANGE:
A MICROECONOMETRIC SEASONAL STUDY**

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(USAID Contract No.: 388-0027-C-00-9026-00)

December 1991

EXECUTIVE SUMMARY

OBJECTIVES:

- (A) To estimate the changing size of Bangladesh's rice market during the decade through 1989/90;
- (b) To estimate partial and total price, and output, elasticities of the gross marketed surplus of 1989/90 aman paddy.

METHODS:

The study divides the year through November 1990 into two marketing seasons, aman and boro/aus. This study, for the most part, is based on a Farm Survey specifically-designed for the purpose. Districts were first stratified using an index which included (i) the proportion of rice area under high-yield-variety (HYV) strains, (ii) under modern irrigation, and (iii) the number of rice mills registered with the Ministry of Food. A self-weighted sample of twenty one new districts was drawn from sixty four such units in the country. Six hundred and seventy nine farm households were interviewed. An in-depth questionnaire probing the farm's opening stock, production, onfarm consumption, marketing, closing stock, prices received, expectations of future price, family age and gender composition etc. was administered by field enumerators trained specifically for the job.

CONCLUSIONS:

It is shown that the ratio of marketed surplus to production of rice has secularly risen in Bangladesh. From about one third in the late 1970s, the ratio in 1989/90 is estimated at 49%. Marketings during the aman season increase disproportionately with output. Prices have positive but quantitatively insignificant overall effect on marketing. However, the technologically forward farm and the average farmer in the surplus district both have significant degree of positive price response of supply. Marketings fall with household consumption. Set asides for future consumption or sale lower current marketings, as expected. Overall, output elasticity of marketed surplus is 1.6 while price elasticity is only 0.08. If, given the size of the harvest, average price per unit time increases by 10%, marketings increase by less than 1%. Total price elasticity is 0.29 in the short run and 0.54 in the long run. Total price elasticity of home retention is -.04 in the short run, and -.01 in the long run.

Public policy should stress yield and output enhancing policies (like farm technological change, diffusion of irrigation etc.) to stimulate marketing. The theoretical merit of output price support policy is called into question by the results.

STUDIES ON MAIZE IN BANGLADESH

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Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

March 1992

EXECUTIVE SUMMARY

This study summarizes the existing literature available on maize in Bangladesh. Additionally, it attempts to identify the existing gaps particularly in the research and promotional activities of maize and to highlight the prospects of maize in the country.

The report covers the following topics:

1. Present status of maize production in Bangladesh:
Organizations, Area, Production and yield, Regional distribution of area and production, Comparison of maize yield, Varieties grown, Economics of maize production, Constraints.
2. Consumption and marketing of maize:
Consumption, marketing and price of maize in Bangladesh.
3. Advantages and prospects of maize:
Adaptability of maize
Flexibility of maize
Potential yield of maize
Nutritional value of maize
Fodder and fuel, Maize as
Poultry feed, Maize as
Starch from maize
Oil from maize
Other uses of maize
Self-targeting crop, maize as a
Land availability for production of maize.

It concludes that for a maize introduction program to succeed, government may adopt:

- i) Inception of maize distribution through the various outlets of the country's PFDS at a cheaper price;
- ii) Phase by phase the above inception may be organized first in rural areas and later in urban areas to make the whole program workable;
- iii) Maize promotion program as above should be accompanied by intensive promotional campaigns aimed at nutritional values of maize and its cooking methods and recipes. Consumers should be convinced that maize is a nutritious food which can be taken as lunch, dinner or as items of main meal by choice.

**INLAND FISHERY IN BANGLADESH:
PROSPECTS OF POND CULTURE**

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(USAID Contract No.: 388-0027-C-00-9026-00)

March 1992

(Revised June 1993)

EXECUTIVE SUMMARY

Because of her physiography, Bangladesh has emerged as one of the top ranking countries in the world in terms of inland fisheries resources. But the yearly catch of fish has declined over the years.

The process of degradation of traditional fish breeding and feeding grounds have created adversities and it is apprehended that the catch of inland fish will be reduced by 150,000 metric tons in the coming years.

It has been estimated that by the year 2000 total demand of fish in Bangladesh, assuming no changes in relative prices or in the use of fish for fish meal, will exceed 1.5 million tons.

The average productivity of ponds in the country is 971 kg/ha against some government managed fish farms with multi-species carp culture where maximum production so far achieved is 3500 kg/ha. Evidences are there that intensive carp culture in ponds in countries like Thailand, China and some states of India have registered yield rates upto the extent of 9000/kg/ha with improved management and intensive feeding. The lack of knowledge for intensive culture through improved technology is the main constraint for low yield in Bangladesh.

The average size of the sample pond is 0.64 acre having range 0.20-1.65 acres with yearly yield (catch) 788 kg/acre. In terms of yearly catch per acre, there is an inverse relationship between yield and the size of the pond. Proper knowledge of pond composition (i.e. releasing types of species and number of fingerlings for each types of species) is lacking among pond culturists. Per acre input use is found to be higher in case of smaller ponds giving higher yield compared to larger ponds. The correlation coefficient between per acre yearly catch and total value of input use is 0.97 which is statistically significant at 1% probability level.

In the sample, 56.98% ponds are operated by single ownership followed (29.4% ponds), leased in by individuals (9.8% ponds) and leased in jointly (3.9% ponds). Among the four types of operators, the best harvest, of 1207 kg/acre, is found in the ponds where the ponds are leased by individuals. This is possibly because the lessee has the skill and entrepreneurial capability of taking risk for investing more in the input supply process than other pond operators.

Yearly actual catch per pond is estimated to 505.22 kg and average sales price Tk. 41.57 per kg. which gives gross yearly revenue Tk. 21002. The net return from average pond (pond size 0.64 acre) after deducting the fixed cost and variable costs comes around Tk. 11360.

In spite of relatively low current level of per capita domestic fish consumption, prevention of a further decline over next 15 years is a major challenge. The price of fish has been increasing at a faster rate than the prices of other basic food items. If we assume that ponds have no rental value then net return of pond comes around Tk. 21350 which is much higher than net returns arising out of any combination of crops cultivated in a plot of one acre land in Bangladesh during a calendar year. In spite of this, the practice of pond culture in the country is still at a low level.

**INPUT-OUTPUT COEFFICIENTS IN CROP
PRODUCTION ACTIVITIES IN BANGLADESH,
with results on relative
financial profitability at farm level**

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EXECUTIVE SUMMARY

As input into a broader study of the prospects for agricultural diversification (see M30), this paper reviews cost of production data for 8 rice crops and 25 non-foodgrains. It begins with a summary of data sources and an evaluation of the quality and representativeness of each. The bulk of the report centers on a direct comparison of cost estimates among the different data sources. The paper contrasts input-output coefficients across studies and notes that they vary for a variety of reasons: a) because yield varies across agroecological zones, crop varieties, farm size, water sources and from year to year, depending on the weather; b) prices of inputs likewise vary over time and across regions.

This report contains a large statistical annex with detailed crop budgets from a variety of studies.

**OPERATIONAL PERFORMANCE OF THE RURAL
RATIONING PROGRAM IN BANGLADESH**

Akhter U. Ahmed

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-01-9026-00)

April 1992

**OPERATIONAL PERFORMANCE OF THE RATIONING
RATIONING PROGRAM IN BANGLADESH**

M11

EXECUTIVE SUMMARY

(Kindly refer to Working Paper No. 5)

**A VIABLE PROCEDURE OF OPEN TENDER FOR
PUBLIC PROCUREMENT OF RICE IN BANGLADESH**

Mahfoozur Rahman

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

May 1992

EXECUTIVE SUMMARY

Background

1. Areas comprising today's Bangladesh were historically a land of surplus food grain production. But over-population and stagnation of agricultural production created deficits by 1940s. The fall of Burma and consequent collapse of British Administration caused the Great Bengal Famine with a loss of a million lives. The famine of 1974 caused a loss of over 200,000 lives. All these catastrophic events and chronic shortages exert a very powerful influence upon any Government in Bangladesh to evolve and execute a food policy to ensure supply of sufficient food for the people. Ever since its inception, the relevant Government department for execution of food policy procured paddy and rice by various means like levys, cordons and restriction on trade. But with rising production and near self sufficiency in rice production today, such policies are redundant in real life situation prevailing in Bangladesh. A change of policy is in order to adjust to rising production of rice leading to export in the near future.

2. Government Intervention and Policy Adjustments

In the present situation, the main objective of Government procurement of rice is to provide a support price to farmers. The secondary objective is to provide rice to consumers at stabilized prices which the government assumes to be 'fair'. Analysts are of the opinion that arbitrary fixation of procurement prices are creating inefficiencies and distortions which in no manner help the targeted vulnerable groups of public distribution of food. Rather, it encourages rent seeking and corruption in the food operations of the Government. If the Government could procure rice at the going market rates, a large portion of the rent element would be eliminated. Limitations of statutory and administrative codes preclude free negotiations which is the hallmark of free trade in determination of price of commodities in the market place. The nearest approximation to free negotiation to determine price is a competitive tender within the framework of Government rules and codes. For this reason, the DGF floated tenders to procure a small quantity of rice recently. The object of this paper is to generate a viable procedure to procure rice by open tender and also to provide basis for policy reforms in related sectors so that such tenders become the principal instrument of procurement within a short time.

3. Fundamental Considerations

Bangladesh has inherited many Codes and Rules which have regulated expenditure on public funds in an exemplary manner. The chief among those are Finance Regulations and Audit Codes. The principles outlined in those time honored procedures are sound, stringent and clearly opt for competitive procurement of any Govt. stores. Open competitive tender, clear contract after tender, and audit of stores and funds by independent teams are some of the provisions of these rules. These procedures are no different from those adopted by any business house in their purchase operations. These rules and procedures must then be strictly enforced with some modifications which the Rules do not prohibit.

4. Existing Purchase Procedures

As many Government departments and corporations purchase their commodities in as many different ways. Major Departments like DGDP, PWD, Dte of Supply and Inspection purchase by open tender. Corporations like BJC and Sugar Corporation buy at Govt's fixed prices and sell again at fixed rates. Both these corporations have incurred huge financial losses in recent years which have largely restricted their operations. It has been observed that, if the tenders are floated and executed efficiently, the prices thus obtained are excellent in comparison to prevailing market prices. DGDP in particular purchase fine rice at rates which are considered not only fair but a bargain by independent analysis. The long operational records of Dte of supply also point unambiguously towards efficacy of open tendering procedure for procurement of stores and stocks for the Government.

5. A Recommended Procedure

The procedures thus generated must conform to Govt's Rules and Codes with modifications in some aspects to take advantage of existing inspection and banking agencies in Bangladesh. The present specifications of rice by DGF are out dated and inadequate. The BSTI has evolved excellent standard specifications for milled rice. This standard is superior in its scientific methods than those existing in neighboring countries of S.E. Asia. It is recommended that DGF adopt one of the four grades of milled rice with standard sampling and testing methods to standardize rice trade. This will be of great assistance to eventual export trade to which Bangladesh will enter in near future. Inspection by private agencies and payment by inland letters of credit are two other recommendations to help not only the contractor but to benefit the DGF at no extra cost. The contractor will bear the nominal expenses of these services. As a starter, these procedures are kept optional at the

choice of the contractor.

6. Quantities, Times and methods of Supply

DGF should ideally purchase all rice problems by tender. The places of supply should be at the points of distribution. There should be no tender at procurement zones where floor prices are in force. The time to float tender is at the harvest time with long elapsed time allowed to take advantage of least-cost transport from surplus zones. The entire package should be tendered for ie rice, gunny bags, and transportation. This will ensure economical operation while free competition will determine the costs of all goods and services.

7. Tender Evaluation

In the last tender by DGF, small quantities of rice were offered at prices which analysis revealed to be good in comparison to present costs of procurement. But owing to procedural problems orders were placed very late, resulting in supply of a minute quantum of rice. Had the DGF been more attentive to Govt's own Finance Rules and codes, such a situation could not arise. In future tenders, attention must also be given to develop a benchmark cost for rice at different points of supply. In the absence of cost data and balance sheets, estimation of cost is very difficult. But it is almost certain that true cost to the Government is much higher than what is estimated hitherto. Future tenders should be evaluated against these bench marks. Promptness in decision taking is key to successful consumption of tender purchases of rice.

8. Private Sector Constraints

The present private sector in foodgrain in Bangladesh is weak, financially and organizationally. Decades of control has weakened the initiative and drive of this subsector so that it can not supply the entire quantity of rice as required by PFDS immediately. But with liberalization of restrictions, they can do the job eventually. Many steps like removal of restrictive laws, limitations on finance, and institutional developments are necessary to develop a vigorous private sector in food grain.

9. Conclusion

Presently, the revenue budget of Bangladesh faces great pressure. Revenue surpluses are essential, for many reasons, among them for providing local currency to utilize aided foreign currency for development projects. Stoppages of leakages and reducing budget deficit have therefore, assumed new dimensions now. Reducing the deficit in Governments food operations should be a priority task in

these circumstances. One of the major steps as recommended by many expert groups was to bring down the cost of procurement to match market rates of rice. Tendering for procurement is only one step in that direction. Since Bangladesh has long standing codes of conduct for Govt. purchase, any procedure must conform to them totally. To be effective, these tenders must continue regularly to give encouraging signals to the private sector. Side by side, steps like inspection and payment by letter of credit can be introduced immediately. Long term investments like silos and storage in private sector are also necessary. Development of a rice-exchange is to be seriously considered. However, the effort of tendering for rice is a step in the right direction which must not be allowed to fail owing to procedural inefficiencies.

**PUBLIC PROCUREMENT OF PADDY AND RICE IN BANGLADESH:
MILLING AND STORAGE ADJUSTMENT FOR EFFICIENCY**

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EXECUTIVE SUMMARY

1. In recent years, the growth of paddy production in Bangladesh has shown a steady upward trend. Such production gains have been most noticeable in the Boro crop where the use of modern agricultural inputs and use of power pumps for irrigation are widespread. With such trends and a self-sufficiency in rice production, public procurement may demand a colossal amount of scarce financial resources of the Government. Therefore, attempts to improve the efficiency of procurement is a vital requirement.

2. Under the present situation, the form of procurement is taking the shape of a classic buffer stock operation. The recent foodgrain balance indicates a positive rice balance which is likely to grow rapidly. With increasing surpluses, the role of the Govt. will be mainly to hold stocks for long range storage either for future shortfalls or for export.

In either case, the need for safe keeping of the precious foodgrain stock is supreme and without which the whole program is bound to get into serious difficulties. It is not only good enough to have an efficient procurement policy, it should also be implemented well so that all major objectives are achieved with least budgetary costs.

3. In the long range storage scenario, the major objectives of price support to farmers are best served by procurement of paddy and not rice as is presently practised. Paddy keeps well in storage for a longer period than rice. The climatic conditions of wet months make milling and storage very difficult. In such a climate rice spoils very quickly after a maximum shelf life of 2-3 months. This compels the Govt. to release the rice into another procurement season. The dumped rice puts downward pressure on the price, necessitating additional quantities of procurement. Here the surplus stock must be taken off the market and stored for a long period safely. Under the present state of milling and storing technology of Bangladesh, it can only be done in the form of paddy. Moderately wet paddy can be bought with a system of discounting for extra moisture. Indian and local experience indicate that such paddy can be kept safely under present storage technology.

4. Many other reforms can enhance the efficiency of procurement. They are (a) Discontinuation of Mill Gate Purchase Scheme (b) Fixation of Uniform milling ratio (c) Procurement of rice for PFDS by tender (d) Procurement of

paddy only at farmer level. If implemented, they will certainly reduce budgetary costs of procurement with better price support for farmers. But, these are ad-hoc solutions only. The real solution lie in long term development of crop-dryers, silo storage plants, modern milling industry and an export trade in rice with all the economic benefits of such a modern and efficient post harvest sector.

ZONING IN BANGLADESH

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EXECUTIVE SUMMARY

This paper defines 15 cropping pattern zones for crop agriculture in Bangladesh. After reviewing some of the existing zonal exercises in the field of agriculture, the paper presents an alternative one, based on crop-specific land allocation practices observed during 1983-84 Agriculture Census.

This exercise is motivated by a desire to circumvent the limitations of country-wide aggregation. In particular, the paper attempts to lay the groundwork for two key sets of analysis: a) identification of performance specific determinants through analysis of cross-section or panel data; and b) make more realistic projections at the aggregate level by accounting for zone-specific constraints and potentials. The paper serves as one of 8 background papers for the synthesis paper on crop diversification (M30).

A widely known classification is the Agro-Ecological Zones (AEZ) of Bangladesh Agriculture Research Council (BARC). At one level of classification, there are 30 such zones. These zones are however widely scattered over the country. A second classification includes the 60 Planning Areas identified by the Master Plan Organization (MPO). Based on thana-level data of 1983-84 Agriculture Census, MPO had generated Planning Area-specific data. Given the expenses involved, it may not be feasible to repeat this exercise on a regular basis.

The present exercise takes the (new) district-level data of the 1983-84 Census; and considers the shares of total cropped area under various crops to constitute a vector. Thus, there are 64 vectors considered. The vector distance for each pair of vectors are then measured, and those having minimum distance are grouped into one cluster. In total, 12 major clusters are found and three (new) districts are found to be outliers. Interestingly, the districts within each cluster are found to be territorially linked. Some comparisons of these newly defined zones are presented in terms of variations in crop allocations and their relation with AEZs and PAs. The findings generally suggest that the classification could be an acceptable choice. Since data on the new districts are likely to be more readily available, the classification may be used for planning and projection purposes.

SCOPE OF CROP DIVERSIFICATION IN BANGLADESH

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EXECUTIVE SUMMARY

This paper examines prospects for diversification of crop agriculture out of non-cereals. In a predominantly multiple-cropped agriculture such as Bangladesh, farmers select not simply a single crop for each parcel of land but rather a whole sequence of crops. This implies that individual crops compete not only with other crops during the same season but also, via the cropping pattern package, with crops of other seasons.

This paper attempts to identify these tradeoffs and the principal choices made by Bangladeshi farmers by examining the cropping patterns, or sequences, associated with rice and non-rice cultivation. It first defines standard cropping patterns and explores determinants such as land elevation and irrigation access. The paper then computes financial returns to different cropping patterns. It focuses in particular on cropping patterns and zones that foster diversification out of cereals.

This paper serves as one of 8 background papers for the synthesis paper on crop diversification (M30).

**COSTS AND RETURNS FOR SOME FRUITS AND
SEMI-PERENNIAL CROPS IN BANGLADESH**

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EXECUTIVE SUMMARY

This study focuses mainly on the costs and returns of some fruits and semi-perennial crops in Bangladesh. The study report is structured as follow:

1. Introduction;
2. Acreage, Production and Yield Rate of Some Fruits in Bangladesh: *Banana; Mango; Pineapple; Jackfruit; Papaya; Guava; Lime and Lemon; Litchi; Betel nut; Betel leaves; Coconut;*
3. Costs and returns of Some Fruits and Semi-perennial Crops:
Betel nut; Betel leaf; Guava; Banana; Lemon; Papaya; Mango; Jackfruit;
4. Summary and Conclusions.

Data used in the study are compiled from the field survey.

It appears from the study that cultivation of fruits or semi-perennial crops is profitable. And, according to survey data collected for this survey, their yield rates are higher than the national estimates provided by BBS.

The study also reveals that the semi-perennial crops, papaya and banana, are very labor intensive. Cost of irrigation is highest for papaya followed by, betel leaf, guava, mango, lemon and jackfruit. There is no irrigation cost for betel nut, olive and pineapple. Cost of insecticide is also highest for papaya followed by mango, betel leaf and guava. The insecticide cost is either negligible or zero for other crops. The cost of fertilizer/manuring is prevalent for all the crops but it is highest for betel leaf followed by banana, papaya, pineapple, olive, guava, lemon and negligible for betel nut, mango and jackfruit.

The total cost of production is highest for betel leaf followed by banana, papaya, pineapple, betel nut, olive, mango, lemon and jackfruit.

Net actual return (after deducting all costs including imputed family labor, inputs from own firm and accrued interest) per acre per year comes highest from betel leaf followed by pineapple, banana, olive, papaya, guava, betel nut, jackfruit, mango and lemon.

Fruit production has not increased in parallel with population growth except for papaya, guava, lemon and litchi. The production of some fruits has declined over

time, e.g., production of mango has decreased by 38% during the period 1974-75 to 1989-90.

The production of betel leaf has increased during the same period and its export has increased manyfold. Betel leaf has high comparative advantage in production and it has high demand in Pakistan, UK, Saudi Arabia, Kuwait, UAE, Qatar, Bahrain, USA, Egypt and other countries. Therefore, this study suggests that betel leaf cultivation should be intensified and proper measures, e.g., institutional credit facilities etc., should be taken.

Production of betel nut has increased only 2.6% during the period 1974-75 to 1989-90. It is imported in huge quantity in comparison to its export (59083.40 MT and 36.65 MT respectively). Therefore, appropriate measures are required to increase betel nut production.

Pineapple, mango and banana are important in the context of export and import. Foreign Trade Statistics of Bangladesh indicate that these fruits are both exported from and imported into Bangladesh but the volume of import to be larger than that of the export. Since cultivation of fruits seems to be profitable, appropriate measures should be taken for steady growth of their production.

The practice of large scale commercial cultivation of these fruits and semi-perennial crops is scanty in spite of their high rate of return due to following reasons:

1. Lack of awareness about the technology and profitability;
2. Lack of market and infrastructure;
3. Lack of credit facilities, capital etc.;
4. High risk for the perishable nature of the products;
5. Weather fluctuations, natural calamities etc.;
6. Lack of resources and suitable land;
7. Lack of appropriate policy option at various levels for production and marketing;

If the agricultural diversification process is to be extended it is imperative to intensify efforts at all levels to increase production of fruits and to increase the marketing facilities.

**ANALYSIS OF AGRICULTURAL COMMODITY MARKETS AND
PRICES IN BANGLADESH**

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EXECUTIVE SUMMARY

This study carefully considers issues relating to the marketing system of agricultural commodities. In particular it examines following:

- i) Channels and participants in agricultural and horticultural commodity marketing;
- ii) Costs, margins and profits associated with marketing;
- iii) Market integration (degree of integration among markets and the process of price formation);

A large structured marketing survey was beyond the scope of the study. Instead, a more direct approach was followed therefore. Intensive interviews with "Key-informants" (wholesalers, aratdars, exporters, suppliers, cold storage operators, millers, processors etc) were followed by field visits. Information was obtained from more than 100 market intermediaries. Primary records e.g., invoices, vouchers, cash books, transaction registers and other books of accounts of the various market intermediaries operating in each segment of the market were examined along with their verbal statements, in most of the cases.

Commodities were followed from the farmgate to the urban wholesale markets to directly observe the transactions at each stage of the marketing chain in a substantial number of cases. Careful cross-checking of the cost components, as alleged by the intermediaries, were carried out through independent interviews with power supply agencies, transport operators, communication agencies, etc. This study concludes that the domestic marketing spread-- the difference between farmgate and urban wholesale prices of agricultural commodities-- were not excessively large for the major crop i.e., rice which accounts for 75% gross output value of agriculture in Bangladesh.

Marketing margins are very large for several other commodities e.g. onions, red chillies, ginger (spices), brinjal (vegetables), potato, jute, cutflowers and all horticultural and fish exports. Consequently, the rates of return on trading capital for many of these commodities (and all the horticultural and fish exports) are above the comparable market rates of interest.

Price changes across the markets are highly correlated indicating strong market integration except in the case of vegetables, oilseeds, and one pulse variety (masur). Most agricultural commodity markets, therefore, reflect competitive market conditions. The major contributory

factor, as per this study, in making the agricultural markets more competitive over time appears to be the enormous growth of the road transportation network in Bangladesh. Agricultural products, nowadays, may be transported to Dhaka wholesale markets within 48 hours from virtually any major regional or rural assembly market.

**THE IMPACT OF TRADE AND EXCHANGE RATE POLICIES ON
ECONOMIC INCENTIVES IN BANGLADESH AGRICULTURE**

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EXECUTIVE SUMMARY

This study provides an investigation of the magnitude of direct and indirect effects of sectoral pricing policies and the indirect effects of economy-wide trade and exchange rate policies on agricultural commodities in Bangladesh.

Trade and exchange rate policies can have a large indirect effect on agricultural production, investment, growth, employment and income distribution through their impact on producer incentives in other sectors of the economy. Agricultural pricing policies, e.g., price support policies, constitute direct intervention and are more commonly focussed on in assessing the impact of economic incentives on agricultural production. Impacts of commodity specific trade policies, e.g., import tariffs or export taxes and quantitative restrictions on exports and imports of rice, oilseeds, etc., also constitute direct effects. The economy-wide trade and exchange rate policies, however, affect agriculture indirectly. The main indirect effects represent exchange rate misalignment deriving from macroeconomic policies. Such misalignment when present reduces real income of exporters and import-competing producers of agricultural commodities. Protection to the industrial sector at the expense of agriculture raises the prices of inputs to farmers and consumer prices faced by them. Change in relative prices of traded to non-traded goods, i.e., appreciation of the real exchange rate affects not only the trade balance and the domestic resource balance, but also results in additional taxation of the agriculture sector. These indirect effects on the agricultural sector can be far greater than is commonly realized.

The paper covers the following topics in the course of its discussion:

1. Introduction;
2. Agricultural Pricing Policies in Bangladesh:
Foodgrain; Jute; Sugarcane; Cotton & Tobacco.
3. Trade & Commercial Policies:
 - 3.1 Trade Policy:
 - 3.1.1 Manufacturing Sector: Quantitative Restrictions (QRs); Tariff Structure;
 - 3.1.2 Agriculture Sector;
4. Analysis of Exchange Rate:
Nominal and Real Exchange Rates;
The Real Exchange Rate (RER);
Factors Influencing the RER;

Equilibrium Exchange Rate Analysis:
The Omega Approach; Elasticities Approach;

5. Measuring the Impact of Policies on Economic Incentives;

5.1 Analytical Framework;

Direct Effects of Trade and Pricing Policies on Output prices; Indirect and Total Effects of Policy Interventions

5.2 Estimates of the Effects of Trade and Exchange Rate Policies on Output prices: Rice, Wheat, Oilseeds and Edible Oil, Sugar/Sugarcane cotton, pulses, potato, chilies, onions; Exportable: Jute, Tea, Horticultural products, Measuring ERPs and price Variations.

6. Conclusions.

The study concludes that the high protection accorded to the industrial sector in Bangladesh results in significant real exchange rate appreciation. The concern regarding real exchange rate appreciation has traditionally focussed on erosion of export competitiveness. This study however, shows that the concern must extend to implicit taxation of the agriculture sector. Thus the indirect effects of exchange rate policies have been a major determinant of price incentives in the agriculture sector.

The indirect effects of exchange rate policies consistently lowered the protection to agricultural commodities. Appreciation of the exchange rate offset the protection provided by direct trade policies for wheat, cotton and potato and increased the implicit taxation on rice, lentils, jute and tea. Rice has been implicitly taxed throughout the 18 years considered in the study.

**PRICE RESPONSIVENESS OF SUPPLY OF
MAJOR CROPS IN BANGLADESH**

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**PRICE RESPONSIVENESS OF SUPPLY OF
MAJOR CROPS IN BANGLADESH**

M19

EXECUTIVE SUMMARY

The purpose of this study was to estimate supply response of major agricultural crops in Bangladesh. Over 30 crops covering 97% of the gross value of agricultural production are included in the analysis. Additionally, meaningful commodity groups such as foodgrain, rice, pulses, oilseeds, spices and vegetables have been investigated using alternative specifications.

In view of widespread evidence of lagged price effects in the agricultural sector of developing economies, the theoretical framework used in this study postulates adaptive expectations (Nerlove 1958).

In spite of problems relating to the quality of available data the econometric results obtained for almost all crops are very good. The range of elasticities obtained are not contrary to expectation and are also comparable to estimates available for similar developing countries.

The study investigated the supply response of 32 individual agricultural commodities and 6 'group' commodities. It begins with an overview of the evolution of agricultural pricing policies in Bangladesh since 1971.

The price elasticity of cash crops, e.g., jute, tobacco, cotton and sugarcane are relatively higher as one would expect. For Boro, which is not produced mainly for subsistence, it is also high. Theoretically plausible results could be obtained for jute only when Aus price was used as the price deflator; for wheat only when Boro price was used as the price deflator; for foodgrain only when the non-foodgrain agriculture price index was used as the price deflator. The price and yield parameters consistently conformed to a priori expectations and the explanatory power of estimated equations are satisfactory in general.

Next, the price elasticity estimates show that Aman and Aus rice cannot be influenced significantly by output price policies. However, the Boro can be substantially influenced by a price support policy. The rapid expansion in production of wheat took place in response to the demand for foodgrain and under substantial government support.

The magnitude of short-run price elasticity of Aman, Boro and Wheat were 0.36, 0.50, 0.61 respectively. These magnitudes suggest that there is some scope, albeit restricted, for price policies to raise production.

Price elasticity for foodgrain (as grouped commodity) also suggest a rather limited scope for price policy to raise production. By contrast, price elasticity estimated for rice was much higher. Moreover, the yield elasticity of rice is also much higher which implies effecting technical change is the "best" option to increase production. Therefore, yield augmenting technical change should be emphasized as an instrument for raising production.

**PRO-FORMA TENDER DOCUMENTS
FOR DOMESTIC PROCUREMENT OF FOODGRAINS**

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**PRO-FORMA TENDER DOCUMENTS FOR
DOMESTIC PROCUREMENT OF FOODGRAINS**

M20

SUMMARY

The economic, budgetary and social compulsions which suggest unambiguously a lesser cost method of public procurement have been well absorbed by the policy makers within a remarkably short time. Many agencies and organizations, but not least the Ministry of Food & the DGF themselves, are responsible for such reformative turnaround in methods of procurement. The World Bank, the FAO of the UN, USAID and the in-depth studies of IFPRI, all played their silent but benign parts in this matter. The IFPRI Policy Brief No. 1 in early May 1992, along with its background papers presented the rationale of public tenders for procurement in clear and inescapable logical sequence. What was only vaguely felt to be necessary, were projected in bold numbers. An executive action plan was also suggested to make these tenders the principal instrument of procurement to satisfy PFDS needs of the government.

While the principles behind the tender were well established, the major variable was the unpredictable response of the private sector to the new method. Nevertheless, the responses of the bidders grew gradually from 16 in the first two tenders to 200 in the third. Though encouraging, the underlying difficulties of large scale supply through numerous small bidders still existed. Unless newer methods of payment, inspection, financial assistance etc., in short, a package was offered, large quantities of deliveries was a distant target to reach. The question of specifications was yet to be resolved. If tenders were to be the principal instrument of procurement for PFDS needs, the long-run storage characteristics, upgrading of specifications were urgently required. Some organizational changes, including physical inputs like computerization of tendering section in DGF's relevant directorate was needed for prompt decision - making, evaluation and accounting. These issues are dealt with in detail in IFPRI's forthcoming study on operational reviews of Boro tenders 1992 (M38). Meanwhile, the expected modifications and changes have been incorporated into the draft tender documents.

**AN OPERATIONAL REVIEW
PUBLIC PROCUREMENT OF RICE BY OPEN TENDER IN BANGLADESH
(Boro Season of 1992)**

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**AN OPERATIONAL REVIEW
PUBLIC PROCUREMENT OF RICE BY OPEN TENDER IN BANGLADESH
(Boro Season of 1992)**

M21

EXECUTIVE SUMMARY

1. To meet the conflicting demands of providing food security to the consumers and price support to the producers within a limited budget has always been a daunting task for the government of Bangladesh. The PFDS is a complex organism which needs careful balancing to keep it at an equilibrium. Basic to achieving these fundamental policy objectives is the need for economy of operation with least outlays of public funds. By efficient use of resources, which mainly means procurement of foodgrains at the market price, the costs of PFDS may be kept at a minimum. Procurement by open public tenders for all the foodgrains the govt. needs is a powerful device for cost containment. With this end in view, govt started to float tenders for rice beginning Aman season of 1991/92. To date a total of four tenders has been floated, the last still under execution (October 1992). The first two Aman tenders were reviewed in detail in an earlier report [Viable Procedure for open Tender-Rahman (M-12)]. The first Boro tender of 1992 is reviewed here to assess the various cost savings and benefits, as well as to draw lessons to further modify and improve future tenders, procedures and management systems.

2. Key features: This tender was floated on 8.4.92 for a total quantity of 28,800 MT of rice at 10 different LSDS& CSDS located at areas of consumption. A total of 74 bids were received, but the actual deliveries were only 31% of the required quantities totalling 9,013 MT. The performance greatly surpassed those of the first two tenders by overcoming a number of procedural snags. Nevertheless many operational difficulties were encountered, namely: (a) Delays in evaluation (b) Post-tender sanction from MOF (c) Requests for time extensions (d) Income Tax misunderstandings (e) Number of unacceptable bids (f) Unacceptable variety of rice etc. All these problems needs study and understanding to remove the difficulties and standardize procedures for the future.

3. Comparative costs: The very rationale for these tenders is primarily cost savings in procurement. Detailed cost analyses are called for to pinpoint areas of saving. Besides tenders, these analyses may become fundamental to DGF's modifications in other areas of

operation like movement, storage procedure etc. But exact and acceptable costings are difficult, owing to absence of accounts statements on many major and minor heads of expenditures, many of them implicit. Major among these cost elements are transit loss, actual godown loss and actual bank interests. Reconciliation of all accounts against inventories is also urgently required. Even on a pro-forma basis and from data derived from indirect sources, it was revealed that substantial cost-benefits accrue on account of procurement by tenders. On a countrywise average, savings range from 13.60% to 32.4% by tender, as compared to procurement and movement costs of grain procured by millgate contract. The actual savings are almost certain to be much above the provisionally costed figures of 32.4%, when all cost are determined and catered for.

4. Tender Evaluation: This tender confirmed many aspects of research findings that the present rice market in Bangladesh is fairly integrated, highly competitive and egalitarian in character, in that the bids were highly competitive and with no sign of collusion or unfair practices. The pattern of tenders indicated many kinds of traders and millers freely participating. The falling market prices for many reasons further encouraged the bidders to supply much more than bid quantities, which could not be accepted owing mainly to storage of shortage space.
5. Impact of Mill Gate Contracts: These falling market prices spurred the thousands of millgate contractors to supply large quantities of rice within a very short time to completely fill up storage spaces. It also attracted resource to these higher profit ventures rather than to the low profit competitive bids. These disincentives did not allow the DGF to exploit the full potential of economy and efficiency of tender supply. Whereas, it would have been financially prudent to suspend/slow down millgate procurement and increase supplies by tender, the reverse was the case. Suppression of millgate contracting will be essential in favor of competitive procurement for reasons of efficiency and massive cost savings.
6. Other Germane Issues: The minimum quantities for tender need be upgraded to ensure required quantities. A system of price band is suggested. Large-scale financing is also required to help procure larger quantities involved. The FAQ quality presently in vogue needs immediate upgrading. The problem of long storage may be solved by switching over to modern (CFTRI) system of parboiling which is universally practiced in India by statutory regulation. Some

modification of storage procedures ensuring sound house keeping will help towards long-term storage. Rice for long storage should be isolated in the best godowns of DGF where no other commodities (sugar, oil, used bags) prone to deterioration are kept. Some changes in organizational setup in DGF are suggested to efficiently manage these operations involving very large expenditures of public funds. They include (a) Tender cell (b) Computerization with appropriate software (c) Upgrading of communications (d) Appropriate documentation (e) Inspection and payment procedures adjustment. The timings for tenders are suggested to be set back well into the season (15th Dec. and 15th June) with at least three tenders floated each season. There should be no tenders in the lean months of April and October as the prices will be at seasonal highs.

7. Conclusion and Recommendations: The efficiency of open tender as an instrument of procurement is unsurpassed by any other system for reasons of cost containment. Other important benefits like market stabilization, modernization of DGF's administrative machinery, additional direct revenue collection by income tax, reforms in the financial sector, removal of transit loss etc are also to be noted. The mechanics of refinement include adjustments in (a) Timings and number of tenders (b) Upgrading minimum bids (c) Introduction of a price band (d) Upgraded specification (e) Payment by letter of credit as an option (d) Income tax deduction at source (e) Inspection by agencies as an option (f) Gunny bags to be supplied by tenders. Side by side, long overdue financial reforms, modified pro-forma tender documents and tender and credit manuals are also to be introduced. Properly parboiled rice is to be kept in clean, isolated storage to ensure a minimum shelf life of one year to relieve MOF of compulsion to release stocks for deterioration of quality. In conclusion, it may be said that the full benefits of this reform are only beginning to be understood. Upgrading, modifications and fine-tuning of this new device should be a continuous process to derive further benefits which will surely be felt as the system is fully introduced.

**RICE MARKET IN BANGLADESH:
A STUDY IN STRUCTURE, CONDUCT AND PERFORMANCE**

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International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

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EXECUTIVE SUMMARY

This report is about the structure, conduct and performance of the rice market of Bangladesh. Its major objectives are the following:

1. to understand the present structure of the rice market in terms of the number and size-distribution of the establishments in it;
2. to understand the conduct of its establishments amid two tiers (one public the other private), in terms of pricing of the output, the use of product differentiation and of advertizing, the utilization of any restrictive or collusive practices;
3. to understand the dense network of commercial contacts through which paddy and rice flow from upstream producers further downstream;
4. to understand the evolving size of rice markets, the size, seasonality and determinants of rice marketing and stocks;
5. to understand the costs and returns in the transformation of paddy in place, form and time, and whether they appear excessive per reasonable independent standards;
6. to evaluate the state of competitive health of rice markets, and to identify where public policy guidance may have some positive payoff;
7. to determine how well the market is integrated spatially and temporally, and understand how wholesale and retail levels are connected with each other;
8. to formulate a close understanding of the interactions between the private and public tiers of the market.

Rice economy accounts for about 27% of Bangladesh's GDP. Therefore, rice markets and marketing matter.

For the economy as a whole, 26% of household expenditures are spent on rice; however, the poorest 40% of households in both rural and urban Bangladesh spend 38% and 32%, respectively, on rice. Therefore, the real rice prices are a major determinant of real incomes of poor and rice-deficit households.

Twenty years ago no more than 15% of paddy output was marketed. In 1989/90, about a half was. In the study year 8.7 million metric tons (MMT) of rice was marketed. The Directorate of Food "procured" 0.92 MMT; the residual of 7.8 MMT was privately marketed. All evidence suggests that commercialization has embraced, albeit to varying degrees, all classes of farms.

The paddy sellers are really a very large group, close to 9 million farmers having some surplus to sell. The number of agents, of various categories, who transact in paddy and rice while linking the farmers with the consumers is estimated at about 0.19 million during the study year. Bangladesh's rice surplus is all consumed endogenously. The number of consumer households is on the order of 20 million or so.

The total number of paddy farias and paikers (intermediary agents) is a over 40 thousand. In the study year, 52% of marketed surplus was sold at the farmgate. In the year 1967/68 this was only 28%. The farmer, with adequate storage capacity on farm, are the economic sovereign of the markets, and is an important port of call for those living off paddy or rice trade. The number of market agents, about 0.19 million in 1989/90, has increased perhaps by a factor of four or so since the liberation.

Smallest and labor-using paddy processors predominate private marketing of rice in Bangladesh. This structural facet underscores an important corollary: the preponderant bulk of the rice supply and of the derived paddy demand originates from an extremely large number of geographically scattered small rice mills. And because they are without any visible corner on the balance of market power, they are likely to register greater price competitiveness.

As well as having a dense market, paddy and rice are actively marketed throughout the year.

The seasonal supply and price outcomes in the rice market are at the initiative of the supply of storage decisions of 9 million farmers. At any given time farmers own more than three-fourths of private rice stocks in the form of paddy. Traders almost entirely hold working stocks; speculation in stocks in the study year was a very minor activity.

Farm stocks are the mainsprings the offloading of which leads to trade turnover. Because price expectations are not bullish, most agents turn working stocks over at some lean constant margin: an injection of paddy supply from storage is transformed into augmented rice supply after a fixed technological time lag, with attendant repercussions for prices.

Private stocks now amount to three months' rice requirements of the rice economy: twenty years' ago, this was one month's only. Private stocks provide a much deeper margin of security against random production stocks in 1990, roughly equivalent to one fourth of consumption requirements.

The private rice economy, taking good advantage of the favorable growing conditions in study year, built up stocks on the order of 0.5 MMT, raising the rice security stocks from two weeks' to a little under four weeks' requirements. The private rice economy raised its share of economy-wide stocks (public and private) from 32% in October 1989 to about 50% a year later. As well as building up needed rice reserves, the farmers registered especially in the dry Aman season of the study year, a significant capacity to play the market: in regression analyses, market supply was found to be significantly price responsive during this season. Price increases drew forth larger market offering during the Aman season, and the effect is statistically significant.

Farm technology progress and growing commercialization seem to move in union, whether one looks at aggregate, cross-time data or at cross-section farm level data.

The instantaneous market margins computed up to wholesale stage, for SR and non-SR areas are 17% and 22% respectively during the study year. Even these exceed the margin proviso currently driving the pricing of rice in the Directorate of Food (DOF) Open Market Sales (OMS). This means the Government's OMS operations were potentially squeezing out private marketing. The above estimates include no spatial or storage costs. In early 1970s, overall market margins was about 24% of retail price. In 1982/83, this was 26%. In 1989/90, we estimate this at about 21%.

Overall distribution costs including traders' profit seem not only to have stayed low relative to retail price but to have perhaps fallen a little. Farmer's share in the retail price has either held its own or, even better, has gained a little.

Net before-tax profits average at 44% of total capital employed per establishment in rice markets in the study year. Earning at wholesale level is significantly lower than at the retail level. The least profitable are the automatic mills, followed by major rice mills and small rice mills in that order.

Of course, profitability being high in one year may be followed by another with dismal profits. Public intervention in rice markets may foster profit volatility. However, some plausible reasons can be adduced for such healthy profits which include: i) rice's national market; ii) dense market contacts; iii) well-functioning

infrastructure and stable prices, by being public goods, redound to returns to private investment; iv) rice market credit relations; v) greater capacity to manage risk.

In sum, the rate of returns are high but not necessarily excessive, given what is said about fluctuations. Moreover, this is not because a small group of agents, each lavishly capitalized, earn high rates of profit and rents to the hurt of more numerous but less capitalized ones. They are high because the numerically populous classes of agents, under-capitalized but sustained by egalitarian credit relations, manage their meager capital resources keenly. While returns rate favorably, margins on sales price remain lean. Relentless turnover of pipeline stocks at competitive margins virtually throughout the year is the best-kept secret of profit making in this market. Mostly, in the study year, rice agents behave like competitive profit makers, not profiteers.

**RE-EQUILIBRATING BANGLADESH'S
PUBLIC FOOD DISTRIBUTION SYSTEM**

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SUMMARY

The Public food Distribution System (PFDS) is a complex organism. Adjustments in one part of the system knock another out of alignment. So any major change requires subsequent adjustment elsewhere in the system.

The abolition of Rural Rationing, in December 1991, has triggered a series of adjustments in the PFDS. In the short run, government sought to find an alternate outlet for 400,000 of rice, previously distributed through Rural Rationing. In the medium term, they must re-equilibrate the system. Either they must lower procurement quantities, or they must increase offtake through other channels.

This short paper reviews the major objectives of food policy and identifies alternative levels of public intervention. It suggests long-run safety valves such as trade liberalization and a domestic livestock industry, both of which serve as built-in stabilizers for the domestic foodgrain economy.

**PROJECTIONS OF SUPPLY AND DEMAND OF FOODGRAINS
AND
PROSPECTS OF RICE EXPORTS IN BANGLADESH**

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PROJECTIONS OF SUPPLY AND DEMAND OF FOODGRAINS AND PROSPECTS OF RICE EXPORTS IN BANGLADESH

M24

EXECUTIVE SUMMARY

This paper has two main objectives. First, it aims to gain some insight into the likely foodgrain situation in Bangladesh during the 1990s using food demand parameters and the production growth rates available from previous studies (Goletti 1992). Second, it examines the prospects of Bangladeshi rice exports in the international market.

The study was organized as follow:

I. Chapter 2 addressed demand and supply situation of foodgrains through the year 2000 under different growth scenarios. It also reviewed the import situation of foodgrains with particular emphasis on Bangladesh's ability to import from its own resources.

II. After reviewing production and export performances of the major exporting countries, chapter 3's main thrust was on comparison between international and domestic market prices of rice.

III. Chapter 4 presented a model which analyzed a swap of rice for wheat in the context of overall production, consumption, and prices of rice and wheat, the two major staple food of the country.

IV. Chapter 5 embodied discussions about preconditions of rice export, and

V. Chapter 6 gave conclusions.

The study concludes, from the results of projections of the likely foodgrain situation until the end of the decade, that Bangladesh may still be a foodgrain deficit country. The composition of this deficit will be characterized by a likely rice surplus accompanied by a wheat deficit. At the same time the capacity of the country to pay for her imports is going to increase. Price comparisons between domestic prices and border prices indicate that regular varieties of rice are not yet competitive in international markets, even though their position is improving, as results of yield growth. Nevertheless, preliminary comparisons of aromatic rice varieties (such as Kalizira and Kataribhog with Basmati rice) indicate that there is a scope for exports of these superior qualities.

This study also examined a simple trade model where the rice surplus is swapped for wheat in the international market. The effects on production, consumption, prices have been analyzed. The main indication of the model is that exporting limited amount of superior rice quality may improve the overall foodgrain consumption. Moreover, this improvement of food security is achieved through reduction of the price of coarse rice, which is the quality consumed by most of the poor. Therefore, this export strategy would have the added benefit of partial redistribution of food consumption toward the more needy.

Finally, this study ends by indicating a series of preconditions to facilitate the export of rice. Among these preconditions, the most highlighted are the importance of basic infrastructure, quality control and market development orientation. The establishment of a grading system has been considered essential to the overall process of export, for Bangladesh to enter the international rice market. This would clearly imply a series of improvements in the milling process, the storage technology, the transportation system, and the marketing capacity.

**REVIEW OF THE MINISTRY OF FOOD'S TENDER NO. 5
THE FIRST AMAN TENDER OF 1992/93**

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(USAID Contact No.: 388-0027-C-00-9026-00)

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SUMMARY

This paper summarizes the performance of the Ministry of Food's fifth foodgrain procurement tender.

This tender failed to perform for several, very simple reasons:

a) quality specifications were unrealistically high, especially the 13% moisture requirement and damaged grains percentage of only 0.5%. Open procurement also foundered during the early months of the 1992/93 Aman season because no supplier could furnish grain at these high specifications. Thus, the overly high quality standards prevented all procurement, not just that attempted through tendering.

b) Simultaneous open procurement at fixed prices precludes purchase by tender. No supplier will tender for a lower price when he can sell at the same location at a higher, guaranteed fixed price.

c) Timing was too early. The tender was due in mid-November, before the post-harvest prices were established.

d) Tender documents failed to specify the following information, necessary to prospective bidders:

- quantity of grain required
- delivery location
- delivery date.

To correct these problems, the paper suggests the following remedies:

- a) clarify specifications (alternative provided)
- b) tender only in consumption zones
- c) open tender bids later
- d) mention key requirements (quantity, location, date) in tender notice.

With these adjustments, all government rice could be procured through competitive tender, at considerable cost savings to government.

**COSTS AND RETURNS OF 1992/93
TRANSPLANTED AMAN CROP CULTIVATION**

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**COSTS AND RETURNS OF 1992/93
TRANSPLANTED AMAN CROP CULTIVATION**

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EXECUTIVE SUMMARY

This report elaborates the results of a Rapid Rural Appraisal (RRA) on costs and returns of 1992/93 T. Aman paddy cultivation. The RRA was conducted jointly by IFPRI MOF, Directorate of Agricultural Extension (DAE), and Bangladesh Bureau of Statistics.

As T. Aman cultivation is practiced by farmers of various farm sizes, growing different varieties, and employing a range of cultivation practices, sampling of respondents was made to assure representation from those categories that are considered important to present study. Eight greater districts were selected on the basis of their importance in T. Aman paddy production, while survey thana and villages within the district were randomly selected.

Farmers were interviewed at village market or at the farm. Data were obtained from farmers of various farm sizes and growing different seed varieties. In total, 541 farmers were interviewed during the RRA.

A short, pre-coded questionnaire was designed and three survey teams were formed and trained for the RRA. Given the limited man-power and time available, labor and bullock coefficients for respective districts were taken from the IFDC farm survey study, and were utilized to estimate the use of these inputs. However, information was collected on total number of hired labor used for cultivation.

This study computes costs per mound with and without land rent. The study reveals that the cost per maund of HYV paddy, even with land rent, was lower than the Tk210/md-official procurement price in all major procurement zones. Cost was relatively higher in other regions mainly due to lower yields and high wage rates of labor. Variability in costs among farm size, variety, and region was quite high.

**COSTS AND RETURNS SURVEY DESIGN FOR RICE AND
WHEAT CULTIVATION PRACTICES**

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COSTS AND RETURNS SURVEY DESIGN FOR RICE AND WHEAT CULTIVATION PRACTICES

M27

SUMMARY

The structure of costs associated with foodgrain production, and consequences for farmers' profitability, are crucial indicators of farmers' welfare and of the pace of transformation to improved cultivation practices. An understanding of these basic parameters of foodgrain production is required for policy formulation for sustaining growth in production, raising productivity, and increasing levels of income of farm population. This understanding can be gained by the collection and analysis of information about the production process on a regular basis.

This paper lays out a strategy for ongoing monitoring of farm production costs in Bangladesh. The methodology proposed is summarized below.

As paddy and wheat cultivation is practiced all over Bangladesh by farmers of various sizes, growing different varieties and employing varied cultivation practices, purposive selection of survey areas and respondents are considered important. Respondents should be selected from major paddy and wheat production regions and HYV seed users. Survey districts should be selected on the basis of their relative importance in production of paddy/wheat. Two to three thanas may be selected from the sample districts on the basis of their importance in cultivation of respective survey crop. Two survey unions, each representing a typical area for the survey crop should be selected from each sample thana.

A census of all households in the survey village needs to be conducted to draw the sample of respondents from each village. About 10 percent of the farmers should be drawn randomly from the list.

Two survey questionnaires were designed by IFPRI to conduct 2 training sessions for 15 selected MOF/MOA officials who in turn would train the selected Field Investigators on census, sampling and data collection procedures. Field data collection should be supervised by the 15 trained MOF/MOA officials. A pilot survey would be conducted in two villages for the 1992/93 boro paddy cultivation designed for practical training on village census, sampling, etc.

**OPTIONS FOR TARGETING FOOD INTERVENTIONS
IN BANGLADESH**

The Working Groups on Targeted Food Interventions

International Food Policy Research Institute (IFPRI)
Bangladesh Food Policy Project

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OPTIONS FOR TARGETING FOOD INTERVENTIONS IN BANGLADESH

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EXECUTIVE SUMMARY

Half of all households in Bangladesh cannot afford an adequate diet. In the long run, these poor families require increased employment and incomes to ensure adequate food intake. Consequently, any long-run solution to undernutrition will require widespread, labor-using economic growth.

In the interim, targeted safety net programs may provide needed relief. But the need overwhelms available resources.

To provide nutritional supplements to undernourished households would require \$1.4 billion per year, over half of annual government revenue and roughly two-thirds of yearly foreign aid flows. These requirements dwarf the \$110 million in annual food subsidies currently allocated through government's existing monetized ration channels. Given limited resources, government and donors must carefully target short-run relief to the people, locations and seasons where they will achieve greatest impact.

The purpose of this report is to systematically review the most cost-effective ways of targeting short-run relief. In doing so, it considers two broad categories of interventions. First are those that increase household income, then let households decide what foods to purchase and how to divide it among family members. Second are interventions that try to influence household caring behavior. These efforts target vulnerable individuals within the household and behavior that affects the quality and distribution of food consumed.

Existing Programs:

1. Targeting income to poor households

The overwhelming majority of interventions in Bangladesh direct income supplements to vulnerable households. The largest of these programs include Food for Work (FFW), the recently discontinued Rural Rationing (RR) program, Vulnerable Group Development (VGD), and the Rural Maintenance Program (RMP). Together, even after the abolition of Rural Rationing, these programs operate at a cost of about \$250 million per year.

Two of these income-transfer programs, FFW and RMP, deliver income in return "for work" performed. In contrast, the ration channels deliver income subsidies "for free," while VGD delivers free grain each month in return "for training".

By region In spite of widespread regional differences in nutritional status, the Vulnerable Group Development (VGD) is currently the only major program attempting to target at-risk regions. Even they are only partially successful, in large part because it appears politically difficult to institute a strong regional focus.

By season. Food for Work (FFW), the major "for work" program in Bangladesh, operates primarily during the dry season. About 40% of FFW income payments occur during the first lean season, in March and April. The smaller "cash for work" program, RMP, operates at the same level year-round, as do VGD and the ration channels.

Only the Ministry of Food's Open Market Sales (OMS) program operates specifically in both of Bangladesh's lean seasons, the first in March/April, the second in September/October. OMS dampens seasonal price spikes by selling public grain when market prices surpass pre-set trigger prices. Thus, OMS is not a targeted program, but rather a general program available to all consumers of wheat and rice.

2. Targeting caring behavior and vulnerable individuals.

Surprisingly few programs in Bangladesh target vulnerable individuals within poor households or attempt to improve the caring behavior so important in determining intra-household distribution and the quality of food consumed. A handful of organizations run rehabilitation centers and maternal child health programs for pregnant women and preschool children. Others offer nutrition education, growth monitoring and income generation. Yet few provide direct food supplementation for those household members who normally receive lowest priority in household food allocations. The largest programs targeted at vulnerable individuals include the Ministry of Health's (MOH) general-purpose health extension network and the joint MOH/UNICEF universal vitamin-A capsule distribution for preschool children. Altogether, current programs focused on caring behavior and vulnerable individuals expend only about \$20 to \$30 million per year. With its additional \$10 to \$15 million per year, the World Bank nutrition project currently under design will help redress the current imbalance.

The country's large family planning program, as an important byproduct, also influences vulnerable groups - pregnant and lactating women, infants and preschool children. To the extent they promote breast feeding, family planning efforts directly improve the health of infants and preschool children. Breast feeding also influences birth spacing and thereby improves nutritional status of mothers. It also increases the birthweight and survival prospects of subsequent children. Annual expenditures on family planning total as much as \$100 million per year in Bangladesh.

Program Performance:

Because the current array of interventions in Bangladesh focus overwhelmingly on transferring income to vulnerable households, it is possible to directly compare their effectiveness in doing so. Table i summarizes performance by calculating the cost each program incurs in delivering taka 1 in income to a vulnerable household.

RMP and VGD. Among existing programs, the Rural Maintenance Program (RMP) and Vulnerable Group Development (VGD) transfer income to poor households at least cost. RMP, a "cash for work" scheme, supplies taka 1 in income at a cost of taka 1.2. VGD, a "food for training" program, does so at a cost of taka 1.5.

Ration channels. In contrast, the ration channels have proven least effective at directing income to vulnerable households. They operate with enormous rates of system leakage - 70% to 95%. And like other commodity-based channels, the ration system bears the high cost of physical commodity handling. Because leakage lowers income benefits to poor households and commodity handling raises costs, the ration channels require taka 6.6 to 360 to transfer taka 1 to a target household.

FFW. The intermediate performer is Food for Work (FFW). Because of moderate system leakage - of 30% to 35% - and because it, like the ration channels, bears the cost of commodity handling, FFW transfers taka 1 to a poor household at a cost of taka 1.8 to 2.4. It is important to recognize that this calculation evaluates FFW purely as a vehicle for targeting income relief. The development impact of FFW is unaccounted for in these relief-effectiveness calculations.

Cash Transfers: A principal conclusion of this review is that food is a cumbersome resource, while cash is more flexible and less costly to manage. Food transfers immediately raise program costs by 25% because of the costs of handling these bulky commodities. They also invite leakage. So in general, cash-based programs deliver income relief at lowest cost.

Cash transfers or "cash for work" programs can build on the technology pioneered in the Rural Maintenance Program (RMP). Based on RMP's experience, these cash-based programs can probably deliver entitlement to poor households at the lowest cost of all, taka 1.2 to 1.3 for each taka received by a poor household.

Monetization: To realize these cost savings and to enhance programming flexibility, this report advocates expanded monetization of small amounts of additional food aid. These funds will introduce more flexibility in food aid

programming and enable experimentation with pilot programs such as those suggested in this report. But large-scale expansion of monetization will require prior review of mechanisms, price effects and their consequences on foodgrain production, consumption, and trade.

Nutritional Impact: Preliminary analysis suggests that effectively targeted programs, such as VGD, can significantly affect both income and household food consumption (Figure i). Yet ineffectively targeted programs, such as the ration channels, do not.

Program Recommendations:

This report remains agnostic on the absolute magnitude of resources to be marshalled for combatting undernutrition. Short-term relief is a worthy objective. But it is one that must compete against many other highly valued programs such as: agricultural research, supply of farm inputs, primary school education, physical infrastructure, industrial promotion, and national defense. Tradeoffs among these programs require value judgments and debate. They are not technical questions. So allocations of Bangladesh's very scarce resources among these competing options can only be made in a political arena.

Given a specific allocation, either for income targeting or for programs aimed at improving caring behavior, the following recommendations identify the most interesting programming options within each group.

Targeted income transfers: existing, "on-the-shelf" programs.

1. No new ration channels. Resources available for poor households can be far more effectively delivered through other programs.

2. Expand RMP or VGD. In the short run, if Government wishes to expand targeted safety net programs, expansion or replication of RMP and VGD offer the quickest proven means of delivering additional resources to low-income households. Where cash is available, RMP-like "cash for work" programs offer the most effective income transfer mechanism (1.3 taka). Where food must be programmed, VGD offers the most effective outlet (1.5 taka).

To demonstrate the gain in targeting efficiency, consider the \$60 million in food subsidy previously spent through Rural Rationing. If channeled through an RMP-like "cash for work" program, those resources would increase vulnerable household income by \$46 million. Through VGD, similar resources would generate \$40 million for target households, and through FFW \$25-33 million. Yet with the same resources, Rural Rationing directed only \$9 million to its

intended beneficiaries.

3. Expand Open Market Sales (OMS). Open Market Sales enjoys clear potential for targeting distressed regions during the second lean season, in September-October. But to perform more effectively, OMS will likely require some modifications: a) guaranteed supply of OMS grain in remote areas; b) open access to OMS grain, not just through authorized dealers; c) advertizing of OMS availability; and d) sale by auction to lower cost and avoid discouraging private storage.

Targeted income transfers: pilot programs:

4. Modified "for work" programs. "Cash for work" can reduce program costs by about 25% over food-based public works schemes by avoiding commodity handling costs. A further switch, from construction to more easily supervised maintenance activities, reduces scope for leakage and thus offers prospects for increasing benefits by 30 to 35%.

Yet expansion of many "for work" programs is constrained by a shortage of capacity to manage labor-intensive public works. It is also restricted by a dearth of productive activities that undernourished, unskilled poor people can perform. To at least partially address the management constraint, we suggest experimenting with geographic targeting new "cash for work" or FFW programs in urban slums in secondary urban centers. We also propose more intensive targeting of distressed rural regions such as the flood-prone zones bordering Bangladesh's major rivers. Interesting "for work" activities, with potential for expansion, include: canal digging and drainage in low-lying areas; urban environmental clean-up; social forestry; latrine construction; fish-tank excavation; and construction and maintenance of primary schools.

5. "Food for Education". As a pilot activity, we propose experimentation with a modified VGD-like program that ties vulnerable household income supplements to primary school enrollment of their children. The goal of this program would be to increase primary school attendance by children from low-income households. In the medium run, it will allow poor families access to job opportunities unattainable under current circumstances. The FFE income supplement may be operated with or without a school feeding component. While the FFE ration aims to increase school attendance, the optional school feeding component would aim to improve classroom performance. We believe it will be important to include both government and private schools in any pilot efforts. We also note that expansion on a large scale will require collateral focus on facilities, teacher salaries, curriculum and supplies.

6. Cash transfers for the destitute. For the bottom two to three percent of the population, government may wish to consider income supplements via cash transfers through banks or post offices. Such entitlements would have to be scrupulously targeted to the hard core physically and mentally handicapped and those with other disabilities. Payments would probably need to be of limited duration, as with the VGD's two-year limit on ration entitlement.

Caring behavior and targeting vulnerable individuals: new programs

7. Iron supplementation. Iron supplementation for pregnant women offers substantial nutritional payoff at very low cost. It should claim highest priority among targeted nutrition interventions. For that reason, UNICEF and MOH have already agreed to institute such a program.

8. Maternal Child Health Supplementation. In view of the extreme nutritional vulnerability of pregnant and lactating women, infants, and preschool children, we recommend piloting supplementation programs that would include the following elements: regular check-ups; iron supplementation; post-natal monitoring; growth monitoring and immunization of children; screening of the most undernourished women and children; and possibly, for the very poor, food supplementation through food stamps. In piloting efforts in Bangladesh, nutrition specialists advocate integrated, community-based programs modeled on the widely touted Iringa Project in Tanzania. The FFE pilot suggested above might provide a novel forum to focus a portion of these efforts in Bangladesh.

In sum, a range of exciting opportunities exist for combatting malnutrition. An optimal mix will probably involve some combination of income targeting and attention to caring behavior.

Many times before, Bangladesh has led the development community - with the Comilla Project, the Grameen Bank, BRAC and others. Perhaps yet another great wave of creativity will emerge from among the options proposed here for combatting malnutrition.

FOOD CONSUMPTION PARAMETERS IN BANGLADESH

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Bangladesh Food Policy Project

(USAID Contract No.: 388-0027-C-00-9026-00)

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OBJECTIVE:

To estimate food demand parameters for Bangladesh, based on data from the Household Expenditure Survey conducted by the Bangladesh Bureau of Statistics in 1988/89.

METHOD:

To estimate quantities consumed as a function of prices, income, and socio-demographic variables. The estimation was done by income quartile and by location (urban and rural).

CONCLUSIONS:

Price responsiveness was found to be pervasive both in rural and urban households. Price and income elasticities decline with income. Wheat was found to be an inferior good in rural areas, while its consumption per capita does not vary significantly in urban areas.

**AGRICULTURAL GROWTH THROUGH CROP DIVERSIFICATION
IN BANGLADESH**

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EXECUTIVE SUMMARY

This study outlines the policies and issues that are likely to influence the growth, diversification and sustainability of agricultural production in Bangladesh.

The prospects of agricultural growth through crop diversification involves a great many issues concerning agronomic sustainability, farm-level incentives, changing technologies, marketing efficiency, comparative advantage, and macro level supply-demand balances. Broader issues like income distribution effects and nutrition effects of crop diversification and long-run role of crop agriculture in an economy undergoing a process of structural change are also involved.

The scope of this study has modestly been defined to focus on only a few of these issues. In particular, the emphasis has been placed on source-of-growth analysis (Chapter II), regarding the crop-sector's performance, leading to an assessment of agricultural supply response behavior (Chapter III), and an evaluation of the structure of farmer incentives in relation to comparative advantage in crop agriculture (Chapters IV and V).

A comprehensive database has been used which, in terms of crop-wise disaggregation, is similar to that used in the official national income accounts. But revisions have been made in respect of data on certain crops to make these consistent over time.

The source-of-growth analysis of this study shows that virtually the entire real growth in gross farm revenue is due to increased production of foodgrains alone. Increased production appears to have resulted from reallocation of area in favor of higher-value crops rather than from any sustained yield improvements for individual crops or crop groups. The area under non-cereal crops has continuously fallen since the late seventies. It was mainly due to expansion of irrigation and the simultaneous expansion of dry-season HYV Boro. Since most of the non-cereal crops are grown on non-irrigated land and compete for land in the dry season, HYV rice replaced non-cereals where the lands came under irrigation coverage.

The cropping patterns can broadly be classified into rain-fed and irrigated patterns. Among all categories of land the proportion of land allocated to non-cereal crops is markedly lower under irrigated conditions than under rain-fed conditions.

There is an apparent paradox as to why land under modern irrigation is almost exclusively devoted to rice cultivation even though the production of many high-value non-cereal crops under irrigated conditions is potentially much more profitable. The authors suggest that the answer may lie in a combination of technical and economic factors. There are very high price risks associated with the marketing of most of these crops. The average annual variability of harvest price of these produces around the estimated trend are very high compared to that of foodgrain. In addition, the existing irrigation and on-farm water management systems do not allow rice and non-rice crops to be planted in the same service units. But a risk-averting farmer would seldom prefer to allocate his entire land for non-cereals. Traditional irrigation, being divisible, allows farmers to grow these high-value, but risky, crops on small parcels of land.

The authors recommend the following to address these problems:

1. reducing the price risk through improved marketing;
2. making non-rice crops more profitable through technological improvements (to compensate for high price risk) and
3. Introducing water management systems that allow rice and non-rice crops to be grown within the same service units.

The authors opine that the currently practiced cropping patterns evidently offer little scope for crop diversification through expansion of modern irrigation. The prospects for crop diversification are often sought in more intensive cultivation of non-irrigated land. But it appears from the recent trends in cropping intensities, particularly in respect of dry-season non-irrigated crops, that there may not be much scope left. There is however considerable scope for increasing the yields of non-cereal crops through better farm practices and varietal improvements even under non-irrigated conditions. Such yield improvements, rather than more intensive cultivation of land, perhaps offer better growth prospects for these crops. The real prospects of crop diversification, however, would still depend on how far technological innovations could make non-cereal crops competitive under conditions of modern irrigation.

Among non-cereal crops, the HYV technology is well-established only in potato cultivation. It is only recently that HYVs with very high yield potentials have become available for some vegetables and fruits (like tomato, beans, watermelon and banana). Improved technologies are also now available for pulses, mustard, jute, sugarcane, maize, sweet potato and some country vegetables. But the technical and socio-economic constraints to the diffusion of

improved technologies in the case of non-cereal crops are still little understood. Things will depend much on how far adaptive research and extension activities can be strengthened to identify and overcome these constraints. Provision of credit and improved marketing facilities are likely to be important determining factors in the adoption of the new technologies which are often highly resource intensive.

The study asserts that although the price incentives do matter in farmer decision-making, outward shifts in the supply curve arising from technical changes are likely to be more important in determining long-run changes in supply. In crop area allocation, farmers are found to respond much more strongly to yield changes than to price changes.

The profitability analysis undertaken for this study yields a number of conclusions which appear robust in spite of many conceptual and data limitations. Moving to a rice-export regime would generally imply a very substantial decline in the profitability of agricultural production as a whole, given the dominance of rice in crop agriculture.

The study maintains that judging from the profitability estimates of many non-rice crops, it would appear that the country has more profitable options compared to rice export at the prevailing world price of rice. And this in turn, raises the question of sustaining the profitability of other crops as well. (This does not rule out the possibility that the export of certain special varieties of rice i.e. high-quality aromatic rice can be very much profitable.)

A striking feature of the profitability estimates made is that a number of crops such as potato, vegetables, onion and cotton show economic and private returns that can be significantly higher than those of HYV rice. This suggests that there exists potential scope for reorienting the existing cropping patterns in a socially profitable way.

Wheat, sugarcane and oilseeds show very low, even negative, economic returns, although in the case of sugarcane, private returns are quite high.

There has been some moderate decline in the domestic price of rice in real terms since the mid-eighties and this has caused some concerns among policy-makers about the resulting effect on the profitability of rice production. However, this study suggests that these price movements may be interpreted as a reflection of a changing comparative advantage in Bangladesh agriculture.

**FOOD CONSUMPTION AND NUTRITIONAL EFFECTS OF
TARGETED FOOD INTERVENTIONS IN BANGLADESH**

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EXECUTIVE SUMMARY

It is a high priority of the Bangladesh Food Policy Project of the International Food Policy Research Institute (IFPRI) to study the effects of public food interventions on household food consumption and nutrition. Accordingly, this report attempts to assess the food consumption and nutritional effects of the Rural Rationing (RR) and the Vulnerable Group Development (VGD) programs, the two large targeted food interventions in Bangladesh to provide food security to the rural poor.

The RR program was designed to distribute rationed rice at concessionary price to low-income families. However, the program was abolished in May of 1992 due to its unsatisfactory performance in reaching the target group cost-effectively. Before its extinction, the RR program accounted for about 20 percent of all foodgrains distributed through the 14 channels of the Public Food Distribution System (PFDS). The VGD program is one of the largest components of the PFDS that distributes a monthly free ration, normally wheat, mainly to destitute women. In 1991/92, the share of the VGD program in total PFDS foodgrain offtake was about 10 percent.

IFPRI conducted a household survey to evaluate the effects of RR and VGD programs. The survey was conducted in eight villages, two in each of the four divisions of the country. The survey was repeated seasonally to obtain three observations over one year. This study is based on data from the first survey round conducted in 1991 during the October-November lean season. The first survey round included only the low-income households--RR, VGD, and corresponding two control groups of households. A sample of 553 households (consisting of 200 RR, 117 VGD, and 236 control households) was chosen. Detailed information was collected on income, expenditures, individual food intakes, sanitation, health, morbidity, and anthropometric measurements. Intra-household distribution of food was determined by weighing food intakes of individual household members. Recall method was used for recording food consumed outside home. Anthropometric measurements were taken for all household members.

The results of the comparative analysis suggest that, with income transfers from the programs, monthly income of VGD beneficiary households were significantly higher than that of the control group members. However, the difference of income between RR and control group was not statistically

significant. The effect of the RR program in increasing incomes of the poor was minimal, accounting for only 3.7 percent of per capita household income. In contrast, the VGD program transfers 19.4 percent of additional income to individual beneficiaries. Per capita expenditures were higher than income for all groups, showing a dissaving during the lean season.

For the entire sample, food accounted for about 75 percent of total expenditures, on the average. About 55 percent of the average food budget was spent on rice. Foodgrains (rice and wheat) accounted for 86 percent of total calorie intakes, implying a very little diversity in diet. Average calorie intakes by VGD members were significantly higher than that of the control group members, but the difference was not significant between RR and control household members.

In terms of calorie adequacy, preschool children were at the greatest risk of undernutrition, followed by pregnant and lactating women, among all household members. The average calorie intakes of preschoolers were far below requirements, for both boys and girls. Although calorie intakes of preschool boys were higher than that of girls, the gender difference was not statistically significant in terms of calorie adequacies. There was no significant difference in calorie adequacies of preschoolers between programs and control groups.

Among all age groups, statistically significant difference between calorie adequacy rates of male and female members are found only in adults. Calorie adequacy of female adult members across all programs and control groups were significantly lower than their male counterparts.

Pregnant and lactating women, wives, and other adult women, as well as the male household heads in the VGD program had significantly higher calorie adequacies than the corresponding control group members.

Severely underweight preschool children as percentages of total children in different groups were not significantly different between programs and control groups. Also, the difference in the rates of severely underweight children between boys and girls was not statistically significant. The comparative analyses suggest that the RR program had no positive effect on nutrition of the program participants. In contrast, the VGD program substantially improves nutrition of the adult household members. However, the program has no significant impact in improving the nutritional status of children.

This study supplements the comparative analysis by the results of the multivariate analysis. The income elasticity

of demand for food suggests that a 10 percent increase in household income results in a 7.8 percent increase in food expenditures. However, the calorie-income elasticity is quite low--a 10 percent increase in income increases calorie intakes by only 2.8 percent. The relatively low calorie-income elasticity indicates that the households spend a large portion of increased income in upgrading the quality of their diet.

Income transfer in wheat from the VGD program results in a higher intake of calories than that of other sources of income. However, this difference is not evident in the RR program, which transferred income in rice.

At the margin, calories are not distributed equally among household members. Preschool children get only 45 percent of their share of incremental calories in the household. This intra-household food distribution pattern, however, does not reflect a deliberate discrimination against the children. The study suggests that several factors, such as, lack of care and knowledge, economic hardship, and sickness of children are likely to be responsible for the maldistribution of incremental calories.

Healthy mothers have a positive and strong effect on the health status of their children, probably because mothers' good health enables them to take good care of their children. Several other statistically significant determinants of child nutritional status relate to caring behavior. These findings suggest that the gains from improved household food security, and developed health facilities at the community level can be effectively brought to a child by proper caring practices. Nutrition counseling and training programs, if appropriately designed, might play an important role in convincing the mothers or caretakers to improve their caring practices for children.

The short-run preschooler nutritional status elasticity with respect to income is only 0.03. This suggests that the net direct effect of incremental household income on the nutritional status of children is negligible in the short-run. Two "leakages" are mainly responsible for such a minimal effect of income on child nutritional status. A large leakage occurs between increases in household level calorie acquisition from increased income, and child calorie intakes. The other leakage occurs when even this modest increase in child calorie intake is only partially translated into the child's growth, because of the sufferings from illness that lower his or her body's absorption capacity of nutrients.

The study evaluates the cost-effectiveness of targeted interventions in improving food consumption and nutrition. The results indicate that, although income transfer in cash

is more cost-effective than that of in-kind transfers, the latter is more cost-effective in enhancing household food consumption. However, this finding is valid if the quantity of ration commodity in-kind is greater than the amount of that commodity the household would have consumed without the ration. The VGD income transfer in wheat meets this condition.

The study examines the nutritional consequences of the recent wheat-to-rice swap in the VGD program. The swap was one-to-one, that is, the VGD beneficiaries received the same quantity of 21.25 kilograms of rice ration instead of wheat. Due to the one-to-one wheat-to-rice swap, the program cost increased substantially because rice price is higher than wheat price in both domestic and international markets. Although one-to-one swap increased the real incomes of the recipient households, the findings suggest that the wheat-to-rice swap actually reduced the household nutrient (calorie and protein) consumption, instead of increasing it.

The VGD program is quite successful in improving household food security, and this success is mainly due to the form of income transfer in wheat, more than anything else. Therefore, this study suggests that wheat should be distributed for targeted food interventions, instead of rice, to alleviate the protein-energy malnutrition at a least cost.

To improve the nutritional status of children, however, food intervention programs alone are not cost-effective, in spite of their potentials of significantly improving household food security. Nevertheless, the provision of a low-cost nutrient-dense weaning food for households with malnourished young children, and proper nutrition counseling and training may extend the VGD-type program's nutritional benefits to children as well.

**STRUCTURAL DETERMINANTS OF MARKET INTEGRATION:
THE CASE OF RICE MARKETS IN BANGLADESH**

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**STRUCTURAL DETERMINANTS OF MARKET INTEGRATION:
THE CASE OF RICE MARKETS IN BANGLADESH**

M32

OBJECTIVE:

To describe the extent of rice market integration in Bangladesh and its structural determinants.

METHOD:

Weekly rice prices in 64 Zilas between 1989/90 and 1991/92 were analyzed within a two-stage approach. In the first stage, a time series approach was used to arrive at different measures of integration. In the second stage, the contribution of structural determinants to market integration has been identified.

CONCLUSIONS:

The analysis found a negligible number of segmented market links and a moderate degree of market integration. Market integration is affected negatively by the distance of markets and the number of strikes, whereas it is positively affected by road infrastructure, and by mild production shocks. Price stabilization was found to have a positive effect on comovement of prices and to slow down the process of price transmission.

RAPID APPRAISAL OF THE RICE MARKET NETWORK IN BANGLADESH

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**RAPID APPRAISAL OF THE RICE MARKET NETWORK
IN BANGLADESH**

M33

OBJECTIVE:

To report the result of a rapid market appraisal conducted during February and March 1993 in 27 markets distributed over 19 district of Bangladesh.

METHOD:

Based in interviews with trader and rice millers with the objective of deriving market-level information.

CONCLUSIONS:

Markets are well integrated, exhibiting a complex network of trade flows and a high degree of price information. Most of the external communication is by telephone and most of the transportation is by truck. Price are reported to react asymmetrically, much more downward than upward. Prospects for rice exports are still considered uncertain, but are considered a feasible option.

**DATA SOURCE COMPARISONS FOR AGRICULTURAL PRICES.
RICE PRICES FROM THE DEPARTMENT OF AGRICULTURAL
MARKETING AND THE DIRECTORATE GENERAL OF FOOD**

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**DATA SOURCE COMPARISONS FOR AGRICULTURAL PRICES.
RICE PRICES FROM THE DEPARTMENT OF AGRICULTURAL
MARKETING AND THE DIRECTORATE GENERAL OF FOOD**

M34

OBJECTIVE:

To analyze the properties of weekly price data of agricultural commodities collected by the Department of Agricultural Marketing (DAM) and the Directorate General of Food (DGF).

METHOD:

A description of different methods of collection was followed by a time series analysis of the two price series. A model of misreporting information was also tested.

CONCLUSIONS:

DAM prices were found to be proxies for urban markets, and DGF proxies for rural markets. The two series are complementary. The incentives to misreporting on the part of DAM are virtually absent; for the DGF the incentives exist, but the extent of misreporting is negligible. The congruence analysis of trend and seasonality suggests that both sources are consistent with each other.

NOTE ON FOOD DEMAND PARAMETERS IN BANGLADESH

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OBJECTIVE

To clarify the methodology and the conclusion of the food demand study (M 18), with particular reference to foodgrains.

METHOD

Descriptive.

CONCLUSIONS

Expenditure elasticity of rice declines with income. For wheat, expenditure elasticities are zero for most groups, except for poor rural households for whom the elasticity is negative. Most commodities are price responsive. Cross-price elasticities of wheat have very high values. Wheat price does not have any significant effect on rice demand, but rice prices have a very strong effect on wheat demand. Price and income elasticities differ significantly across expenditure groups.

**CREDIT RELATIONS AMID BANGLADESH'S RICE MARKETS:
WHERE CHARING IS THE CURRENCY**

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EXECUTIVE SUMMARY

(i) Prospective millers in Bangladesh's rice economy are likely to face a relatively wide range of technological options, with unit fixed capital requirements to match. Best-practice techniques, e.g. automatic mills, price out most except a favored few, to be sure. But the market's response has been to circumvent the capital constraint via adoption of the small rice mill option. Quite against technology-theoretical predictions, the proliferation of the less mechanized small rice mills (SRMs) has served the rice farmer well. Fixed capital requirements have not significantly barred entry nor stifled competition in rice-milling. The qualification implied in the above sentence is deliberate: to muster Tk. 10 lakh (approximately US dollar 25000), which a SRM takes to create, was beyond the capacity of innumerable venture capitalists in rice markets.

(ii) The extent and character of the demand-supply balance for operating capital, frequently abbreviated as *credit relations*, was perfunctorily researched in the literature. It was maintained, perhaps too readily too blithely, that high-cost preharvest trader-farmer credit contracts did not exist in rice markets. This has recently been documented to be incorrect in certain specific cases. Using a relatively limited number of case studies, Crow demonstrated the presence of preharvest credit contracts, especially in a few backward farm regions, which ostensibly charged the farmer usurious rates. These contracts have been named *dhaner upore* (DU): the loan is repayed in *predetermined paddy quantities* to be paid after harvest, the implicit prices being throwaway ones. The present research shows that both Farruk/Islam et al. and Crow were off the whole truth. Of course, preharvest DU contracts exist in Bangladesh's rice system, but only 4% of the farms on IFPRI Farm Survey sample had been party to at least one such contract. The incidence of the Bangladeshi farmer being haplessly tied via DU contracts is *quantitatively insignificant in the general case*. Less than 20% contracted any noninstitutional credit, though such loans only cost 19% in interest annually, as against 16.6% on bank loans. Only 14% took bank credit for farming. Overall, the sample strongly suggested the presence of internal financing. Significantly enough, farmers collectively source a nonnegligible part of trade credit demand. This incipient relative solvency was due to greater availability of rice surpluses, even on the populous

category of small farms.

(iii) Trade credit is both actively disbursed and received in virtually all tiers of this market. Networks of trade credit are dense: more than three-fourth of all agents disburse trade credit and about two-thirds receive it. Market-wide disbursement per year amounted to Tk. 59.6 billion, while receipts amounted to Tk. 25.7 billion. Net disbursement was estimated at Tk. 33.9 billion, or Tk. 179.5 thousand per establishment. The total net disbursement corresponds to the marketing of 7.77 MMT of privately marketed rice, worth about Tk. 62.7 billion at wholesale stage of the market. Net disbursement is about 54% of throughput. Thus, informal credit markets have a strong presence. Paddy and rice wholesalers/*aratdars*, who account for only 20% of the sample, account for 60% of disbursement and 58% of receipt of trade credit. A strong circularity in credit flow is here evident, receipts being followed by disbursements. Credit relations are based upon a convergence of business interests cutting across primary and secondary levels of the market. Sharing, not exclusion, seems to be the dominant trait of this web of credit relations. Second, *dadan* credit, arguably with greater tying conditionalities than for the over-the-counter credit, accounts for only 24% of firm-to-firm credit, and only 16% of total disbursements on the sample. *Dadan* is a far cry from being a preeminent credit source. Clearly, this implies that credit relations ameliorate conditions of operating capital paucity on the part of traders. And yet credit, substantively, is not nearly as inequitable as argued by some recent authors. Informal credit performs a fairly positive role in rice markets.

**INTERACTIONS BETWEEN PRIVATE RICE STOCKS AND PUBLIC
STOCKS POLICY IN BANGLADESH: EVIDENCE FOR A CROWDING OUT**

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**INTERACTIONS BETWEEN PRIVATE RICE STOCKS AND PUBLIC
STOCKS POLICY IN BANGLADESH: EVIDENCE FOR A
CROWDING OUT**

M37

EXECUTIVE SUMMARY

This paper shows that amid growing technological change, rice in Bangladesh has become a seasonal, rather than an annual, crop, with profound implications for the seasonality of prices, average period for private storage and the strength of the rationale for public rice storage. It is further shown that rice prices are determined in the process of interaction between market supply, future prices (proxied by public stocks) and onfarm demand for storage. The responsiveness of market prices to changes in public and private stocks is in opposite directions, as one would expect. However, farm stocks are far more potent in determining market prices than are public stocks. Evidence suggests, too, that public stocks significantly squeeze private rice stocks.

Two policy - relevant conclusions emerge from the paper. One, that public stocks have to be pared back in order to provide a level playing field for private storers. Two, there should be a public effort to generate and disseminate information regarding the magnitude of private stocks, which have acquired the connotations of a public good.

**THE LAWS OF GRAVITY:
A REVIEW OF RICE PRICE MOVEMENTS
DURING THE BORO SEASON OF 1992**

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**THE LAWS OF GRAVITY: A REVIEW OF RICE PRICE MOVEMENTS
DURING THE BORO SEASON OF 1992**

M38

SUMMARY

The Boro season of 1992 was unusual. Rice prices, instead of rising as the season progressed, declined throughout much of the season. In a falling market, private millers and traders can only lose money. This undermines their confidence and their incentives for participating in the rice trade. Government's price stabilization efforts are also confounded by this reversal of normal price trends. In the rapidly changing cereal markets of Bangladesh, Government must track and understand these changes in market structure and behavior in order to shape appropriate policies. Market monitoring and feed-back provide the basis for policy modifications.

To understand this unprecedented behavior in the rice market, the authors launched a rapid field survey of eight key rice markets. There, the study team interviewed traders and millers, recording their perceptions and transactions over the 1992 Boro season. The team supplemented this primary data with a historical review of price seasonality in those same markets.

This study thus aims to answer the following key questions: 1) Were price movements indeed unusual during the 1992 Boro season? 2) Why did they occur? and 3) What are the consequences - for both the private sector and for government. Discussion with key informants in the rice trade, government and among market watchers lead to a series of testable hypotheses and, after empirical testing, the following conclusions.

1. Were price movements unusual?

Yes. Rice prices went down throughout most of the 1992 Boro season, not up. Prices peaked very early - at the beginning of July and not, as normal, in mid-October. After a short initial rise, half of the normal amplitude, prices fell steadily from July onwards.

2. Why?

Natural causes played a role in the unusual price behavior.

Hypothesis 1. Boro harvest was larger than expected. True

Hypothesis 2. Dry monsoon weather lowered post-harvest crop loss. True

Hypothesis 3. Surprisingly large Aus harvest, or extended Braus, dampened rice prices from July and August onwards.

- a) in the aggregate. False
- b) in traditionally deficit zones. True

Government intervention also contributed.

Hypothesis 4. Millgate contracting, with its above-market fixed government procurement price, induced speculative stock building by millers early in the season. True

Hypothesis 5. Concentration of government purchases in the early months of May and June increased intensity of procurement and made market vulnerable to speculative let-down. True

Hypothesis 6. The unanticipated early stoppage of government procurement, necessitated by the suspension of rural rationing, precipitated two waves of falling price,

- a) the first due to suspension of government purchases; True
- b) the second due to millers' sale of unwanted stocks. True

3. What were the implications for private traders?

Traders and millers sustained heavy losses. Because most could not unload stocks fast enough as prices fell, they carried over large surplus stocks into the Aman harvest season. Shortage of working capital, together with high carryover stocks, dampened their ardor as well their capacity to purchase vigorously in the Aman season. Coupled with the very reduced level of government procurement, this lack of trade demand pushed early season Aman prices to record lows.

4. What are the implications for government?

The millgate contract, like any fixed-price procurement system, was subject to abuse given the inevitable spread between market and procurement price. With its free advance financing and liberal milling ratios, the millgate contract proved an especially tempting target for abuse and malpractice. Suspended prior to the 1992/93 Aman season, the millgate contract imposed high cost on both government's treasury and on market confidence.

The focus of future procurement efforts must be to design a reliable, predictable successor to the expensive and disruptive millgate contracting system.

**DOES PRICE STABILIZATION MATTER ANY MORE TO
LOW-INCOME CONSUMERS IN BANGLADESH?**

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**DOES PRICE STABILIZATION MATTER ANY MORE
TO LOW-INCOME CONSUMERS IN BANGLADESH?**

M39

SUMMARY

To relieve nutritional stress among Bangladesh's large vulnerable population, government has intervened in two principal ways, through: a) price subsidies on foodgrain; and b) targeted income transfers. This paper develops a multi-market model to compare the relative effectiveness of these two different tools in improving nutritional status of the poor.

The analysis indicates that price-induced nutritional stress has receded dramatically over the past two decades as a result of steady growth in foodgrain production. The emergence of a large Boro rice crop has dampened seasonal price spikes by about 19% during what was formerly a four-month lean season. As a result, caloric intake of vulnerable households has increased by 5% during those former lean season months. In addition, in the face of steady production increases, real foodgrain prices have fallen. They fell about 25% from 1972 to 1992, then a further 30% in the past year alone. The latest 30% fall in rice price has probably increased vulnerable group consumption by 7.4% raising about 15 million people above the poverty line.

To further improve food consumption of the poor, projections modeled here suggest that income targeting will prove more effective than either general or targeted price subsidies.

**THE STRUCTURE AND CONDUCT OF BANGLADESH'S WHEAT MARKETS:
SOME EMERGING INSIGHTS**

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EXECUTIVE SUMMARY

Introduction

(1) With projections up to the year 2000 pointing up strong likelihood of wheat deficits in most years (and rice surpluses in most years) and with visible gains in relative wheat prices to match, the case for the crystallization of a core of firm knowledge about the structure, conduct and performance of the wheat market in Bangladesh has become compelling as never before. This study, presented as no more than a modest first cut in an involved area, utilizes data from two sample surveys designed specifically to address the issues that relate to these themes.

Issues of Wheat Demand

(2) During the seventeen years through 1991/92, trend growth rate of wheat utilization, at 1.5% per year, tops that for rice. In 1988/89, wheat fared about 15% of total foodgrain availability. For the same year, wheat's proportionate share in national foodgrain consumption according to Household Expenditure Survey (HES), at 11%, understates, as does its estimate of urban Bangladesh's relative share in wheat consumption. What the HES passes for wheat consumption omits that of wheat-using processed food --- where urban areas predominate --- and wheat's use as cattle feed, the dairy industry being a suburban activity. HES therefore understates urban wheat consumption more. Estimates of cross-price elasticity of wheat demand with respect to rice price in currency seem likely to overstate because omitted, mainly urban, component is more powerfully influenced by a battery of nonprice variables --- female labor force participation, for example --- most of whom having positive correlation with incomes and unit values (the proxy for prices used by most demand models using HES data). Absent these nonprice variables in the estimation, which is the case with the estimates in currency, cross-price elasticity can overstate.

(3) The case is more firm that rural wheat consumption demand has negative income elasticity. Urban wheat consumption, for all its understatement, is mildly income-responsive. The component of wheat demand omitted from HES is presumably more income elastic. There is some room for agnosticism about the overall wheat income elasticity of demand.

Issues of Wheat Market Supply

(4) Domestic wheat production grew at a trend rate of 12% during the seventeen years through 1991/92. Area growth swamped yield growth as a source of production growth: in this respect, Bangladesh stands off from other nontraditional wheat growers among developing countries. Production variability is extremely high: here, too, area, not yield, variability leads. In turn, wheat area variability is more substantively due to climatic, morphological and crop rotational imponderables, not price-responsive rice-wheat substitution.

Factors determining Bangladesh's wheat import dependency

(5) Some admittedly ad hoc regressions show that imports per capita registers a significantly positive time trend. Public rice stock and wheat imports, both lagged by one year, decrease per capita wheat imports. The first of these effects turns on price expectational effects of public rice stocks. The second effect reflects a possible two-year cyclicity of international wheat donations to Bangladesh.

Prices

(6) During the seventeen years through 1991/92, real wheat price fell at annual rate of 2.8%, as against 2.9% for rice. Note that wheat availability grew far more rapidly than for rice but that real price declines for both are of the same order of magnitude.

Structure of the Wheat market

(7) In 1992, we estimate the wheat economy to have 11,981 processors including thousands of small units for custom milling, and about 28 thousand traders of assorted description and about 8 thousand bakeries. Between 1985 and 1992, the number of wheat allottees in the Flour Mills (FM) channel of the public food distribution system (PFDS) grew at a compound annual rate of 7.8%. The number of atta chakkis rose also at 7.8% between 1987 and 1992. The ranks of wheat processors thus swelled rapidly. The number of wheat wholesaling, however, grew more slowly, by common consent.

(8) Despite relatively rapid growth in the number of units, the industry appears to remain concentrated: forty eight per cent of milling capacity is retained by only 2% of the establishments. The class of units at hand here relates to major and compact mills: nearly three fourths of their capacity are located in four terminal markets, viz. Dhaka, Narayangnaj, Chittagong and Khulna. Wheat milling, despite the appearance of concentration, is, however, not oligopolistic in structure.

Spatial Movement of Wheat

(9) Western parts of Bangladesh, especially the five greater districts of the Rajshahi division, produces a lion's share of the country's marketed surplus of wheat. Market coordination has these surpluses transported to the mills that, for the most part, are located in eastern Bangladesh. Much like the spatial flow of surplus domestic wheat, the flow of the wheat deflected mainly off aided channels is also from western Bangladesh into the eastern cities and populous towns.

Wheat's Marketing Channel

(10) The summary observations here treat the marketing channel of domestic wheat and imported wheat separately.

(11) Seventy seven per cent of farm wheat surplus are marketed during first two months following harvests. These are mopped up by terminal wholesalers but also by assembler-wholesalers. Wholesalers on our sample were found to tap other wholesalers for as much as half their purchases of domestic wheat. Even at the wholesalers' level, there is a division of labor between two sets of agents. Specialization has proceeded far. Beparis, farias and farmers divided up the balance of wholesalers' collection on a 54:34:12 ratio. More than two-fifths of the farias' collections are from other farias. Beparis collect about 40% of their merchandise from other, presumably smaller-scale, beparis. Numerous, parttime petty traders, with low opportunity costs to match, are transporting the wheat from the farmgate to the wholesaler, each adding a little of marketing value in the process.

(12) The "retrading" channel for imported wheat is different. The evidence suggests active retrading for "dudhia", "dhepa" and Australian varieties after they leach into the market. FFW sardars and chairmen of the project implementation committee (PICs) are a rich artery to tap for farias and beparis for two of the five grades covered. The wholesalers draw forth their supplies of imported wheat from a number of *concurrent* sources --- evidence that the network of trade contacts that comprise the market chain is dense.

Marketing Chain for the Millers

(13) Both roller and major/compact classes of mills actively rely on trade networks, as opposed to their own buying staff, for sourcing wheat requirements. Major/compact class of millers tap wholesalers for about 52% of their wheat purchases; and beparis for about 30%. Roller mills tap wholesalers for 55% of their wheat needs, and beparis for about 27%.

Ownership and Dispersion of Wheat Stocks

(14) Seasonal data show that farm wheat stocks disappear especially quickly during March and April, as a consequence of heavy selling. Eighty-nine percent of a year's marketing are all marketed during the first five months after harvest. Surplus stock transits during this part of the marketing season from the farmer's storage to assembler-wholesalers', involving transportation in the 25-100 mile range. But this may also entail a spatial relocation of the farm stocks to terminal wholesalers' storage in eastern Bangladesh altogether, involving transits in the 200-350 miles range. From dispersed locations among numerous farms, especially small farms, in wheat-surplus districts, the stocks are relocated into a regime of more concentrated ownership of wholesalers and stockists, in wheat-deficit eastern Bangladesh.

Conduct of Wheat Market

(15) During the year through march 1993, the milling industry sourced their wheat requirement by tapping (a) leakages off PFDS channels; (b) DGF allotments; (c) marketed surplus of domestic production; and (d) private imports. During study year, a total of 160 thousand MT of wheat, or 45% of the total, are estimated to have been monetized in FFW and VGD. A preponderant proportion (80% or more) of this was mediated by wheat's market channel to urban mills, not retained within rural areas. The point is not that so much of publicly-subsidized wheat is recycled into the market flows due to the *esprit de corps* of invisible market coordination, which has been known for quite some time, but that so much of it should be ending up as part of urban consumption. Because an overwhelming proportion Bangladesh's poor population live in rural areas, the urban bias of monetization of targeted wheat deliveries significantly weakens the case for inkind distribution.

(16) Wheat milling is a year round industry: it is not seasonal or spasmodic. Wheat markets are open for business throughout the year, even though there, as would be inevitable, is some marked seasonal ebb and flow in the volume of business. Millers' rate of wheat millage registers a fair degree of stability across months for virtually all types of imported wheat. The notable, but unsurprising, thing is that the rate of millage of domestic wheat --- the trade in which is legal --- is much more seasonally variable than for imported wheat, of which a significantly large component is taboo for retrading. This is unsurprising because, characteristics of final demand shape supply, seasonality included, and flour demand, of which the staples are the imported wheat, is seasonally more stable, than can be said for the domestic wheat.

(17) Cross-month variability in prices is not excessive for any of the imported wheat varieties, but the matched variability is significantly larger for domestic wheat.

Performance of Wheat Markets

(18) Wheat marketing margin is estimated at 41% for the year through March 1993. This is significantly higher than for rice. This is higher, too, than the magnitude reported by an earlier rapid rural appraisal for 1991/92. Marketing margin of wheat is higher than for rice, in part because retrading, which is taboo *de jure*, chalks up costs *sotto voce*, which do not exist in rice marketing. Also, the marketing grid is spatially more truncated and specialized, not of national scope and as "democratic" as for rice.

The Case for Monetization

(19) The evidence creates some nagging questions about what remains of the case for targeted distribution of wheat for such schemes as Food for Work Program, Test Relief and the like. Foodgrains are available; their markets, for the most part, are labor-intensive, participatory. Even poor households in remote areas are able to buy rice in most seasons what quantity it has money to buy. For these types of targeted programs, powerlessness is not at issue to justify distribution in kind. And bureaucratic managerial capacity is not more suited to handling food in kind than cash funds. (For VGD, powerlessness can be invoked with greater conviction.)

DEMAND PARAMETERS IN RURAL BANGLADESH

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EXECUTIVE SUMMARY

This study estimates a complete demand system for rural Bangladesh, applying the Almost Ideal Demand System (AIDS) model. The estimates of demand parameters are based on primary data from the rural household survey conducted by IFPRI in 1991/92.

The estimates of income elasticity of demand suggest that rural households in general are highly responsive to changes in income in adjusting their consumption patterns. There is a tendency for the higher-priced foods, such as meat and milk, to have higher income elasticities.

Demands for commodities are also quite responsive to changes in their own prices, with the exception of salt. The estimates of cross-price elasticities indicate that substitution effects are strong, and therefore have important implications for price policies.

Disaggregated by income groups, the estimates of demand parameters of rice and wheat suggest that low-income households are more price and income responsive than high-income households. Differences in elasticities in absolute values between the two groups are quite striking.

The estimates conform with the findings of other studies that wheat is an inferior commodity in rural Bangladesh. This attribute makes wheat a self-targeting commodity for targeted food intervention programs.

The study contends that government price interventions may lead to serious price repercussions in the economy. Particularly, rice price stabilization programs are likely to skew producer incentives in non-rice crops. In contrast, income generating programs and policies foster higher levels of consumption for all normal commodities, and thus, a steady growth in production by enhancing effective demand.

**STATUTORY RATIONING:
PERFORMANCE AND PROSPECTS**

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SUMMARY

In response to the Great Bengal Famine of 1943, the Governor of East Bengal instituted an urban area rationing system from 1956 onward. At independence, Bangladesh continued this urban ration system under the name of Statutory Rationing (SR). Until 1974, they issued ration cards to all inhabitants of the four principal cities of Bangladesh - Dhaka, Chittagong, Khulna and Rajshahi. The system continues to operate in 1993, although, with few exceptions, no new ration cards have been issued since 1974.

Under this system, card holders are entitled to purchase a weekly ration of staples at what was originally a subsidized ration price. The number of commodities available through the urban rationing system has declined over the years. Today, wheat and small amounts of oil are the principal commodities available. The volume of ration purchases by cardholders has declined steadily over the past two decades, as general food policy reforms have gradually eroded the subsidy implicit in the ration price.

Based on an IFPRI/FPMU survey conducted in June of 1992, this paper reports the following principal findings:

- Current SR cardholders are middle and upper income groups, not recent migrants or the urban poor.
- Cardholders lift less than 5% of their allotted ration.
- Over 95% of all foodgrains lifted under the SR scheme are leaked by dealers onto the open market at market price.

This study concludes that Statutory Rationing has outlived its usefulness. It does not aim to benefit the needy. Even its intended target, the urban middle class, does not benefit from the rations. Only dealers, who are able to dummy records and lift on behalf of cardholders, gain from the system by reselling the high quality wheat and oil at market prices when price spreads permit.

Statutory Rationing, to the extent it operates at all, functions purely as an open market sales outlet. Dealers sell virtually all offtake on the open market at market price. The discontinuation of Statutory Rationing, with its commodities folded into government's Open Market Sales operation, would result in savings to government without any loss to consumers.

**DETERMINANTS OF POSITIVE AND NEGATIVE DEVIANCE
IN CHILD NUTRITION**

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DETERMINANTS OF POSITIVE AND NEGATIVE DEVIANCE IN CHILD NUTRITION

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SUMMARY

Children are the most vulnerable among malnourished populations of Bangladesh. Interventions concentrated on increasing household income alone have failed to address malnourished children, at least in the short run. This positive and negative deviance study attempts to identify adaptive and avoidable childcare practices that may help in designing policies and programs to improve nutritional status of children.

In the present study, children possessing remarkably good health compared to the others in the same environmental setting are identified as positive deviants. Those who are doing worst are categorized as negative deviants. Children falling in between positive and negative deviance are labeled as median growers.

The analysis indicates that determinants of child nutrition are not exactly the same for different groups of children. Determinants of negative deviance are: child's calorie intake; child's age; gender of the child; low-birth-weight; early weaning; occurrence of diarrhoea; continuation of breast feeding until the breasts are emptied; mother's weight; primary caretaker's frequent illness; primary caretaker's exposure to sources of knowledge on nutrition and child care; empowerment of primary caretaker; and primary caretaker's satisfaction with her family life.

Determinants of positive deviance are: child's calorie intake; child's age; gender of the child; early weaning; occurrence of diarrhea; mother's weight; primary caretaker's ability to understand child's physical and emotional needs and respond to them appropriately; and primary caretaker's exposure to sources of knowledge related to nutrition and child care.

**THE CHANGING PUBLIC ROLE IN A RICE ECONOMY MOVING
TOWARD SELF-SUFFICIENCY. THE CASE OF BANGLADESH**

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EXECUTIVE SUMMARY

Bangladesh is moving in a sustained way towards rice self-sufficiency. Production of rice, the major food staple of the country, has grown at a rate of 2.7 percent in the 1980's versus a population growth of 2 percent. For a country characterized by chronic food deficit for a very long time, this is a remarkable accomplishment. Even though the country will continue to be importing wheat for the rest of the decade, the gap between foodgrain requirements of the population and production is narrowing over time. The process of growth has been increasingly stable over time, as shown by a declining coefficient of variation of deviations of rice production around trend from a value of 5.5 percent during the 1970's to 3.3 percent in the 1980's. The sustained growth of rice production and its stability are related to the introduction of high yielding varieties, mainly the Boro rice crop during the winter season, which has risen from 21 percent of total rice production in 1972/73 to 35 percent in 1989/90. It was found that the two main rice crops within one year, Aman and Boro, are negatively correlated. This tendency to intra-year compensation implies also a more regular flow of production and a changed pattern of seasonality characterized by smoother price fluctuations.

The growth of production has been accompanied by an increasing reliance on the market process. A series of reforms in the foodgrain sector has removed numerous controls and actively promoted the development of markets. In some cases both an attempt to liberalization, and to privatization has been carried out. Both domestic and international trade of foodgrains and agricultural inputs have been largely opened to the private sector and numerous food subsidies have been eliminated.

This experience of growth of rice production and market development has been characterized by some positive aspects, such as a relatively stable foodgrain price environment and a declining incidence of poverty. Both inter-year and intra-year price variability have decreased substantially during the past two decades, with the coefficient of variation of domestic rice price around their trend declining from a value of 28.1 percent to about 7.5 percent. The decline in variability of domestic prices was partly, but not entirely, paralleled by decline in variability of border prices and international prices. Inter-year variability of domestic prices has declined much more than for international prices. However, that has not implied a complete isolation of international prices from

domestic prices. Both domestic prices and border prices of rice and wheat were found to be cointegrated, implying a long term relation between the series. The incidence of poverty and malnutrition also shows positive improvement, with the percentage of people having a diet less than 80 percent of the calorie requirement declining from about 50 percent in 1981/82 to about 30 percent in 1988/89 according to the Bangladesh Bureau of Statistics.

The degree of commercialization in the foodgrain sector has grown tremendously in the past two decades, from about 15 percent of total production in 1972 to about 50 percent in 1990; at the same time the ratio of public distribution in total marketed supply has decreased from about 78 in the 1970's to 36 percent in the 1980's. The country is now also in a better position of financing the imports of foodgrains. While the value of foodgrain imports represented about 54 percent of total foreign receipts in the Seventies, it declined to 22 percent in the Eighties.

At present, many of the reasons given in the past for the existence of the Public Foodgrain System seem to be less urgent. The changing environment characterized by sustained rice production and market liberalization call for a redefinition of the role of the Public Foodgrain System in the decade of the 1990's.

To this purpose, there is a need to understand the features of foodgrain markets in Bangladesh. The analysis conducted in this study shows that rice markets have exhibited a remarkable capacity of communicating signals of scarcity over time. Moreover, they have proved to be efficient processors of information, without destabilizing prices. The concern that markets may react in a very disordered way generating excessive price variability, once the government withdraws its stabilization policy, is not supported by the data.

Domestic markets have also proved to be fairly integrated spatially. Only a negligible number of segmented market links was found in a sample including weekly coarse rice prices for the 64 districts (zilas) of the country. In most of the remaining market links, prices exhibit long term stationary relations, even after common trends and seasonality are removed. About 60 percent of the magnitude of price shocks is transmitted on average among market links and it takes about 2.6 weeks. Road infrastructure was found to be one major structural determinant of market integration. The effects of price stabilization policy on market integration were found to be more complex. On one hand, stabilization policy has reinforced comovement of prices at markets located in different district; on the other hand, it was found to slow down the dynamic process of price transmission.

Notwithstanding the encouraging developments in markets and production, still many problems remain. Poverty is widespread in the country, with too many people still lacking basic entitlement to food, even if the country is moving toward self-sufficiency in rice. The official estimates of extreme poverty are in the amount of 30 million in 1988/89. The government can assist these people through a set of well targeted distribution programs, such as subsidies, transfers, and employment schemes. Subsidies under the rationing scheme have come increasingly under attack in the most recent years, because of the large leakages to non beneficiaries. Direct transfers to the poor that are self-targeting such as food for work programs and vulnerable group feeding programs have been indicated as more appropriate than broad programs, such as food subsidies and price stabilization.

In the past, price stabilization was viewed as a desirable goal of food policy. Both programs to support prices through domestic procurement during the harvest months and programs to put a downward pressure on prices during the lean season have had a negligible effect on prices. The effect of price stabilization on producers and consumers economic welfare have been found to be limited, even if aversion to risk on the part of consumers and producers is taken into account. From the point of view of poverty, price stabilization has also a rather negligible effect; the analysis shows that rice price stabilization is not able to reduce either the number of poor nor their average calorie gap below the poverty level. Only the distribution of poverty is affected, eliminating the extreme deviations below the poverty level. However, the implementation of efficient price stabilization is quite complex and its cost may well outweigh the quite limited benefits. Finally, even though the contribution of policy to the decline in price variability has been important, counting for about 40 percent of the total reduction, the remaining 60 percent has been the result of various other factors, such as the technological change leading to a more balanced intra-year rice crop production and development of efficient markets, in which the useful function of storage to moderate price fluctuations has played an important part.

The prospects of continuous growth in rice yields have been examined within the context of a simulation model where demand parameters for both rural and urban population and different income groups have been used. Coupled with available estimates of supply response parameters, the prospects of rice surplus appears moderate. On average, only 157 thousand metric tons of rice surplus would result if current prices were to prevail. If prices are let to adjust, only a negligible price decline would result. That is also the case in the more favorable scenario of high growth of rice yields. Domestic demand will be capable of

absorbing the increased rice surplus without an appreciable decline in price. The analysis of the proposal of supporting rice prices through procurement of domestic production has led to the conclusion that even massive increases of domestic procurement would result in very small price increases, while, at the same time, causing serious capacity and budgetary problems to the government.

The prospects for exporting rice are more interesting. Even though international markets of rice are very thin, the major exporters have been able to improve their share of world exports. In the most recent period, Bangladesh has shown a dynamism in rice production even superior to the first five exporters. The analysis of various comparable varieties of rice produced domestically and internationally has led to the conclusion that high quality varieties of Bangladeshi rice have a comparative advantage. The implications for food security have been examined in the case of swap arrangements whereby rice of high quality rice are traded in exchange of wheat in international markets. It was found that export of moderate quantities of high quality rice has a positive effect on aggregate foodgrain consumption, without compromising the food security of the poor.

**PATTERNS OF FOOD CONSUMPTION AND NUTRITION
IN RURAL BANGLADESH**

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SUMMARY

This study attempts to provide an understanding of the food consumption and nutritional patterns in rural Bangladesh. The analyses are based on primary data from rural household survey on consumption and nutrition, conducted by IFPRI in 1991/92.

About half of Bangladesh's 112 million people cannot afford an adequate diet. A well-managed and appropriately targeted intervention can improve food consumption and nutrition of the poor in a cost-effective way. The patterns of food consumption and nutrition of rural households, as revealed in this study, may facilitate policymakers' efforts in identifying the appropriate targeting mechanisms for interventions.

The findings of the study suggest that rural households, particularly, the poor are highly responsive to changes in income in adjusting their food consumption patterns. Thus, a targeted intervention of transferring income can be an efficient way of increasing real income, and thereby, improving food consumption and nutrition of the poor.

Preschool children are the most vulnerable to undernutrition among all family members. The study suggests that among all preschoolers, children aged 12-35 months from the poorest households are at the greatest risk. Therefore, to achieve greater cost-effectiveness, targeting interventions to malnourished children may be limited to this group, rather than targeting all children under five years of age.

The food consumption patterns across income groups indicate that wheat is an inferior commodity in rural Bangladesh, and thus has the self-targeting characteristics. Wheat is also the cheapest source of calorie, protein, and iron among all food items consumed in rural areas. These attributes make wheat an ideal commodity for targeted food interventions.

The findings show a high degree of regional and seasonal variations in food consumption and nutritional status. Thus, limiting interventions to specific distressed areas of the country, and operating the programs only during the lean seasons may considerably improve cost-effectiveness of such interventions.

The study documents that the recent sharp decline in rice price significantly improved food consumption and nutritional status of low-income rural households. However, such an unusual fall in rice price may be a temporary

phenomenon. Nevertheless, real rice prices have declined steadily over the past two decades, and the landless and other poor consumers have been the principal beneficiaries of declining rice prices.