Bangladesh J. Agric. Econ. X, 2(December 1987) 75-87 Note

AN ANALYSIS OF DIFFERENCES BETWEEN ADOPTERS AND NON-ADOPTERS OF HIGH YIELDING VARIETIES OF RICE AMONG SMALL FARMERS

M. A. Kashem

ABSTRACT

Small farmers constituting about two-thirds of the rural households mostly cultivate rice. Adoption of high yielding varieties (HYVs) of rice is one of the ways to increase average rice yield of an individual as well as total rice production of the country. However, as individual characteristics may differ between adopters and non-adopters of HYV rice. the present study was undertaken in order to analyse the extent of differences between adopters and non-adopters of HYV rice among small farmers. The findings indicate that very few differences in the individual characteristics exist between the adopters and non-adopters of HYV rice, Small farmers as a whole, therefore, can be considered as a single category for conducting extension work without segregating them into different categories on the basis of their adoption and non-adoption of HYV rice.

I. INTRODUCTION

Small farmers constitute about two-thirds of the rural households in Bangladesh (Kashem 1986, p. 17). These farmers are deprived most from the benefits of modern technologies in crop production. There is much evidence that large farmers control fertilizer and pesticide dealerships and so at times of shortage are least affected and able to charge a higher price to smaller peasants (Huq 1977). They dominate the irrigation groups for obtaining power pumps or deep and shallow tubewells and influence the selection of sites so as to obtain maximum benefits for themselves (Jones 1979, pp. 64-8, 1982, pp. 93-94; Islam 1980, p. 117; Hartmann and Boyce 1982, p. 50). Moreover

The author is an Associate Professor in the Dept. of Agricultural Extension and Teachers' Training, Bangladesh Agricultural University, Mymensingh. This article is adapted from the author's ph-D. thesis. The author is grateful to his. supervisor, Mr. G.L. Jones for his helpful comments and advice on an earlier draft of the paper.

large farmers have greater access to institutional credit (Alamgir 1975, p. 273), the small farmers are automatically largely deprived of the facilities (Zaman 1979, p. 99) and have to borrow money from local money lenders at an interest even up to 50 times higher than the institutional rate (Kashem 1987a, p. 185). Small farmers cannot exert sufficient control over the management of village-based co-operatives and are deprived of the benefits ; the benefits of these co-operatives if there be any, have largely gone into the pockets of the large farmers (Vylder 1982, p. 150). Therefore, if the small farmers could be effectively helped, this could largely contribute towards increasing total agricultural production in the country. As rice alone mainly determine the total acreage and crop production in the country it is reasonable to focus on rice crops. Small farmers, of course, cultivate rice mainly on their land in order to produce foodgrains for the subsistence of their families and not primarily for economic gain. But unfortunately the per unit yield of rice is one of the lowest in Bangladesh compared to other rice growing countries (Herdt and Capule 1983, p. 10). It is also worth nothing that till now only about 18 per cent of the arable land is under irrigation, and only 21 percent area under foodgrains is devoted to high yielding varieties. However, it is interesting to note that smallest farmers in Bangladesh are the highest and fastest adopters of new technology (Jones 1984, pp. 200-209). Therefore, any efforts to determine the selected characteristics of the small farmers and their obstacles to the adoption of HYVs of rice would greatly help the concerned planners and administrators to initiate operational steps in this respect. However, it has to be logically decided wheather the extension policy makers should concentrate their attention on the adopters or on the non-adopters of HYVs of rice.

Most research studies on innovation adoption in agriculture have shown that adopters do differ from non-adopters, however simple or complex the methods used to distinguish these two categories (Singh 1981). Of course it is possible that differences in farmer characteristics and their perceptions do exist between adopters and non-adopters HYVs of rice. If this is the case, there would be, *a priori*, implications for the conduct of extension work, especially the need to consider the specific problems and needs of the non-adopters. If the small farmers who form a relatively homogeneous group, those two categories (i.e. adopters and non-adopters) may not differ significantly in their personal, situational, sociological and psychological characteristics. If few or no differences exist between the two categories, then the extension implications may remain same for both the categories with the added emphasis that small farmers should be viewed as a specific category among which extension workers should direct their efforts to stimulate technological change in their farming methods.

II. METHODOLOGY

The population for this study was 1619 small farmers included within Agri-Varsity Extension Project of the Bangladesh Agricultural University, Mymensingh. Data

were, however, collected from a sample of 205 small farmers during June to September 1983.

Information was collected from farmers on the acreage of rice they grew in each season (i.e. aus, aman and boro) and how much of this was planted to HYV and local varieties, and on the yield of rice for each season and according to the variety category. Table 1 shows the frequency of farmers as rice growers in different rice growing seasons.

TABLE 1. FREQUENCY OF FARMERS AS RICE GROWERS AND THEIR USE OF HYV IN DIFFERENT RICE GROWING SEASONS

	Total growers (N-205)		No. of growers in each season			% of growers in each season		
Crops	Number	Percent	HYV only	HYV + local	Local only	HYV only	HYV + local	Local only
Aus	196	95.61	18	6	172	9.18	3.06	87.76
Aman	199	97.07	47	4	148	23.62	2.01	74.37
Boro	40	19.51	14	0	26	35.00	0	65.00

It is clear from Table 1 that a high proportion of the small farmers grow rice in two seasons (aus and a man) and a minority may be growing rice in all three seasons. The frequency distribution of farmers as rice growers in different combinations of rice crops is presented in Table 2 which reveals that :

1) most farmers (75.61 percent) grow aus and aman and 17.07 percent grow all 3 crops (i.e. aus + aman + boro) ;
2) of the majority, who grow aus and aman, 71.61 percent grow local varieties only, of the remainder, 21.94 percent grow HYVs with local varieties and 6.45 percent grow HYVs only ;
3) of the category of farmers who grow aus + aman + boro, 57.14 percent grow local varieties only, 5.71 percent grow HYVs only, and the rest grow HYVs with local varieties.

TABLE 2. FREQUENCY DISTRIBUTION OF FARMERS AS RICE GROWERS IN DIFFERENT COMBINATIONS OF RICE CROPS (N=205)

Combinations of rice crops grown	Aus only	Aman only	Boro only	Aus + Aman	Aus + Boro	Aman + Boro	Aus + Aman + Boro	Total No.	Total %
HYV only	1	2	0	10	0	0	2	15	7.3
HYV+Local	0	0	0	34	0	2	13	49	23.9
Local only	3	4	0	111	2	1	20	141	68.8
Total	4	6	0	155	2	3	35	205	100.0

In order to explore the significant differences between adopters and non-adopters of HYV rice with their various personal, situational, psychological and sociological characteristics, and rice cultivation obstacles, the Chi-square (x^2) test was employed. In its simplest form, an adopter is a small farmer who grows HYV to any extent in any crop season, i.e. a non-adopter does not plant any HYV rice. In this sense, over two-thirds (68.8 percent) of the farmers are non-adopters. Data are available on the total acreage devoted to rice in all seasons,and the total production of rice, and the proportion of these attributable to HYVs. As might be expected, the greater the proportion of the rice acreage devoted to HYVs, the greater the percentage of production from HYVs (splitting in both cases as median, $x^2=25.024$, $df=1$, $p<0.001$). Either variable is probably equally suitable for distinguishing the relatively high and relatively low adopters among the 64 small farmers who grow HYVs. It was decided to use acreage, since this implies the extent of a farmer's decision, whereas production (acreage X yield) is not under his control to the same degree. On the basis of HYV acreage, approximately half (31) the adopting farmers planted HYVs on under 45 percent of their rice land and are designated 'low adopters,' and the remainder (33) are termed 'high adopters' (Table 3),.

The selected characteristics of small farmers and rice cultivation obstacles were determined in order to find out the significant differences between the adopter categories. The characteristics included : age, education, family size, family labour, agricultural knowledge, farm size, commercialization, income, flexibility, attitude towards community,

TABLE 3. CLASSIFICATION OF FARMERS ON THE BASIS OF THEIR ADOPTION AND NON-ADOPTION OF HYV RICE

Categories according to percent acreage under HYV		Farmers	
Categories	% acreage	Number	Percent
Non-adopters	0	141	68.78
Low adopters	≤44.9	31	15.12
High adopters	≤45.0	33	16.10
	Total	205	100.00

organizational participation, non-localite behaviour, contact with information sources, economic insolvency, credit need, risk aversion, and fatalism. The rice cultivation obstacles were high yielding variety obstacles, recommended fertilizer obstacles, plant protection obstacles, irrigation obstacles, other cultural operations obstacles, total rice culti vation obstacles, and perceived factor obstacles. The scores for selected characteristics and rice cultivation obstacles were determined either by putting absolute numerical values or through scales.

The Chi-square test was employed between (a) non-adopters and adopters, (b) non-adopters, low adopters, and high adopters, (c) low adopters and high adopters, and farmers' selected characteristics as well as rice cultivation obstacles. Five percent (0.05) level of probability has been used as the basis for statistical significance. The T coefficient (after Tschuprow) was computed to measure the strength of relationship between variables, and it was calculated by using the following formala :

$$T = \sqrt{\frac{1}{N} \times \frac{x^2}{\sqrt{df}}}$$ (Yule and Kendall 1937, pp. 70-71)

The value of T can range from 0 to 1, the more the value of T approaches 1, the greater is the strength of relationship.

III. EMPIRICAL FINDINGS

The Chi-square tests have shown that of the 72 necessary for all combinations of the distributions of variables in the contingency tables, only 6 were statistically significant at acceptable levels of probabilities. Therefore only the significant relationships will be discussed in the light of policy implications.

There is significant positive relationship between age and adoption, i.e. adopters tend to be older (Table 4). The highest proportion of farmers who had adopted the HYVs of rice were from old aged category and vice versa. This implies that increased age of the

TABLE 4. DISTRIBUTION OF FARMERS ACCORDING TO THEIR AGE AND ADOPTION OF HYVs OF RICE (N 205)

Age (years)	Adoption		Total (percent)
	Non-Adopters (percent)	Adopter (percent)	
Young (≤34)	25.85	8.30	34.15
Middle aged (35-49)	26.83	10.24	37.07
Old (≥50)	16.10	12.68	28.78
Total	68.78	31.22	100.00

$\chi^2=6.559$; df=2 ; $p<0.02$; T=O. 150 ; positive significant relationship

farmers does not hamper their adoption behaviour. Although chronological age may have an impairing effect on physical abilities, which is important on family holdings, research study elsewhere has indicated that age does not seriously impair managerial ability, at least up to 60 to 65 years of age (Hobbs, Beal and Bohlen 1964). The positive relationship of farmers' age with their adoption of HYVs of rice suggests that there is considerable scope for the extension workers to work with older people especially in the case of innovation decision-making. Old farmers can take decisions to adopt the innovations without involving others in the family, but in the case of a young farmer this may not be possible if there are one or more older family members from whom he has to seek advice in taking any decision. The prevalence of many joint families (also

cohesive), in Bangladesh greatly interferes an individuals' innovation decision-making, as taking a decision in the family mainly rests with the oldest member (mostly male), although he may not formally be the head of the household. Extension workers should, therefore, concentrate their efforts to identify the real decision maker in the family, whether he is the formal family head, or an eldest family member other than the family head, or an other opinion leader who exerts strong influence on his decision. This does not mean that extension workers should devote all or most of their efforts to motivating young farmers, but that rather they should give attention to both young and old farmers simultaneously in order to achreve desired objectives.

Adoption of HYVs of rice was found to have significant negative relationship with the family size of the small farmers (Table 5). The highest proportion of farmers

TABLE 5. DISTRIBUTION OF FARMERS ACCORDING TO THEIR FAMILY SIZE AND ADOPTION OF HYVs OF RICE (N 205)

Family size (absolute)	Adotption		Total (Percent)
	Non-adopters (percent)	Adopters (percent)	
Small (≷4)	16.10	10.24	26.34
Medium (5 - 6)	24.88	14.15	39.03
Large (≤7)	27.80	6.83	234.63
Total	68.78	31.32	100.00

having large family size did not adopt the HYVs of rice and vice versa. Small farmers having large families may have to be heavily pre-occupied in meeting basic necessities unless the dependent family members are able to earn money to meet the family's needs. Since the adoption of HYVs of rice requires surplus money to procure necessary inputs, small farmers very often consider their financial abilities to adopt HYVs, but other factors are also important in their decision-making. Many family members (especially those who are non-earning) are, in most cases, a cause of worry among small farmers, and many thus discourage them from considering the use of the HYVs. It is, therefore, necessary for extension workers to locate individual farmer's obstacles in using the

HYVs of rice. If large family size is the foremost barrier for a farmer, any fruitful help and advice for enabling family members to earn more money may come first, before advising him to adopt HYVs of rice.

The relationship between the adoption of HYVs of rice and farm size of the small farmers was significantly negative (Table 6). It must be stressed that these farm size cate

TABLE 6. DISTRIBUTION OF FARMERS ON THE BASIS OF THEIR FARM SIZE AND ADOPTION OF HYVs OF RICE (N=205)

Farm size (hectare)	Adoption			Total (percent)
	Non-adopters (percent)	Low adopters (Percent)	High adopters (percent)	
Small (≤0.24)	25.37	1.95	5.85	33.17
Medium (0.25-0.40)	29.27	6.83	4.83	42.93
Big (>0.40)	14.14	6.37	3.42	23.90
Tot:	68.78	15.12	16.10	100.00

gories are relative terms among *small* farmers ; the largest amount of land occupied by a farmer in the enquiry was only 0.54 hectares, and small farms were 0.24 hectares or less in extent. In the past, however, it has been shown that farm size is positively related to the adoption of new farm technology (see for example, Marsh and Coleman 1955 ; Wilson and Gallup 1955 ; Lionberger 1960 ; Rahim 1961 ; Beal and Sibley 1967 ; Reddy and Kivlin 1968 ; Gaikwad *et al.* 1969 ; Singh 1969 ; Hossain 1972 ; Islam and Halim 1976 ; Asaduzzaman 1979). It may be true that when the HYVs of rice were first introduced in Bangladesh in the mid sixtees, it was the richer and larger farmers who first used them. The reasons are obvious ; large farmers were relatively financially solvent, they could take risks in terms of monetary involvement and offer a small area of land to be used for HYV trials. But by today, most probably, the trend has been reversed. Farmers possessing a small portion of land are now more convinced and motivated than large farmers to use HYVs provided they can afford the additional costs involved and take advantage of other necessary facilities. Therefore, the findings of this study imply that poorer farmers with only very small acreages of land in Bangladesh can be innovative if tangible

opportunities (i.e. ensuring the availability of HYV seeds, fertilizers, plant protection materials, irrigation water, credit, and marketing of produce) can be offered to them. Development planners and extension workers need to consider these factors carefully in order to fulfil the national obectives of food production.

In terms of flexibility, the relationship is different to that which might have been anticipated. For example, Copp (1958) found a positive relationship between the flexibility of farmers' mental approach and their adoption of recommanded farm practices, and such an association might be what it would be logical to deduce. However, in this study, adoption is found to be related to low flexibility (Table 7). The flexibility scores ranged from 1 to 17, against the possible range of 0 to 22. The highest proportion of high adopters had low flexibility and vice versa. Small farmers in Bangladesh mostly seek advice on new technology from local fertilizer and seed dealers, ideal farmers (Kashem

TABLE 7. DISTRIBUTION OF FARMERS ACCORDING TO THEIR FLEXIBILITY AND ADOPTION OF HYVs OF RICE (N=205)

Flexibility (scores)	Adoption			Total (percent)
	Non-adopters (percent)	Low adopters (percent)	High adopters (percent)	
Low(≷5)	19.02	5.37	6.83	31.22
Medium (6-11)	22.44	7.80	6.34	36.58
High (≷12)	27.32	1.95	2.93	32.20
Total	68.78	15.12	16.10	100.00

$x^2=12.743$; df=4 ; $p<0.05$; T=0. 176 ; negative significant relationship (when low adopters and high adopters are combined, $x^2=11.706$; df=2 ; $p<0.01$; T=0.201)

1986, p. 278) and probably from other opinion leaders. Once they have been, or become convinced of the new technology, they soldom change their decisions, whether or not they are in their best interests or technically appropriate. This might explain the higher adoption of HYVs by farmers having low flexibility. However, it may not be always true that the less flexible farmers would have higher adoption levels of HYVs. The flexibility of a farmer in an actual life situation is difficult to measure. The findings of

this study, however, need further verification under more or less similar agro-ecological and socio-psychological situations before stronger policy implications can be drawn.

Table 8 shows that there is a significant relationship between the adopters of HYV rice and their identification of other cultural operations obtacles.

TABLE 8. DISTRIBUTION OF FARMERS ACCORDING TO THEIR OTHER CULTURAL OPERATIONS OBSTACLES AND ADOPTION OF HYVs OF RICE (N=205)

Other cultural operations obstacles	Adoption			Total (percent)
	Non-adopters (percent)	Low adopters (percent)	High adopters (percent)	
Low(≤40)	20.00	8.78	4.88	33.66
Medium (40.1-55)	27.80	2.93	6.83	37.56
High(≥55.1)	20.98	3.41	4.39	28.78
Total	68.78	15.12	16.10	100.00

$x^2=10.311$; df=4; $p<0.05$; T=O.153 ; negative significant relationship

The other cultural operation obstacle scores of the farmers ranged from 10 to 95 against the possible range of 0 to 100, the mean score being 48.27 Culivation of HYV rice usually requires more cultural operations than the local or local improved varieties. The highest proportion of low adopters had low other cultural operations obstacles. Probably non-adopters perceived more imaginary other cultural operations obstacles in using HYVs of rice than they would have to face in a real situation (i.e. if they became adopters). For example, non-adopter may imagine that if he does not have adequate labour for weeding, stirring and other intercultural operations at peak periods during HYV rice culivation, his production potentials will be greatly reduced. This explains the farmers' lower adoption of HYVs of rice with the increase of other cultural operations obstacles. This finding implies that extension workers need to find out and keep in mind what small farmers think concerning the availability of necessary facilities involved in other cultural operations if they are to succeed in stimulating small farmers to adopt the HYVs of rice.

IV. CONCLUSIONS

Although past research record and evidence suggest that adopters do differ from the non-adopters irrespective of their farm size and crop selection, the findings of the present study support this in part mainly because small farmers who grow rice have more or less similar objectives in mind, i.e. to fulfil their basic necessities especially in meeting up their physiological needs. Small farmers usually do not cultivate rice solely due to economic consideration while they have to struggle hard for foodgrains for survival. Consequently the personal, situational, sociological, and psychological characteristics as well as rice cultivation obstacles do not differ between the adopters and non-adopters of HYV rice in case of small farmers to the extent that different strategies need to be taken by the policy makers in order to increase the ovrall rice production in the country. Rather the administrators, extension planners, and policy makers need to consider small farmers who constitute the bulk of the rural households as one of the target categories and concentrate their efforts to benefit them from all productive means (i.e.g HYV seeds, fertilizers, pesticides, irrigation water, credit, and marketing as suggested elsewhere (Kashem 1987b). Undoubtedly the small farmers as a whole have the potentiality of increasing the total food production of the country as well as in improving their socio-economic condition through the adoption of HYVs of rice if only the policy makers can adequately identify and recognize their concerned problems and take appropriate measures in solving those problems.

REFERENCES

Alamgir, M. (1975) : "Some aspects of Bangladesh Agriculture : Review of Performance and Evaluation of Policies", *The Bangladesh Development Studies*, 3.3.

Asaduzzaman, M. (1979) : "Adption of HYVs in Bangladesh : Some Preliminary Hypotheses and Tests" in : M.H. Rahman and N. Ahmed (eds.) *Select Annotated Bibliography on Social Science Research Work in Bangladesh*. Social Science Research Council, Ministry of Planning. Dhaka : Govern ment of the People's Republic of Bangladesh.

Beal, G.M. and Sibley N. (1967) : *Adoption of Agricultural Technology by the Indians of Guatemala*. Rural Sociology Report 62, Department of Sociology and Anthropology. Ames, Iowa : Iowa State University.

Copp, J.H. (1958) : "Toward Generalization in Farm Practice Research", *Rurdl Sociology*, 23, 2, 103-11

Gaikwad, V.R., Verma G.L. and Raju K.N. (1969) : "Adoption Processes and Change Inducing Capacities of Characteristics", *Indian Journal of Agricultural Economics*, 24.

Hartmann, B. and Boyce, J.K. (1982) : *Needless Hunger, Voices from a Bangladesh Village*. San Francisce : Institute for Food and Development Policy.

Herdt, R.W. and Capule C. (1983) : *Adoption, Spread and Production Impact of Modern Rice Varieties in Asia*. Los Banos : International Rice Research Institute.

Hobbs, D.J., Beal G.M. and Bohlen J.M. (1964) : *The relation of farm operator values and attitudes to their economic performances,* Michigan AES Special Bulletin 317. East Lansing : Michigan State Uuiversity.

Hossain, M.A. (1972) : Adoption of Improved Farm Practices by the Transplanted Aman Rice Growers in Gouripur Union of Mymensingh District. M. Sc. (Ext. Ed.) Thesis. Bangladesh Agricul tural University, Mymensingh.

Huq, A. (1977) : *Exploitation and the Rurl Pooor.* Comilla : Bangladesh Academy for Rural Development.

Islam, R. (1980) : "Foodgrain Procurement, Input Subsidy and the Public Food Distribution System in Bangladesh : An Analysis of the Policy Package", *The Bangladesh Development Studies,* 8, 1 & 2 89-120.

Islam, M.M. and Halim A. (1976) : "Adoption of IRRI Paddy in a Selected Union of Bangladesh". Department of Agricultural Extension and Teachers' Training. Bangladesh Agricultural Uni versity, Mymensingh.

Jones, S. (1979) : "An evaluation of rural development programmes in Bangladesh", *Journal of Social Studies,* 6.

Jones, S. (1982) : "A Critical Evaluation of Rural Development Policy in Bangladesh" in : S. Jones, P.C. Joshi and M. Murmis (eds.) *Rural Poverty and Agrarian Reform.* New Delhi : Allied Publishers Private Limited.

Jones, S. (1984) : "Agrarian structure and agricultural innovation in Bangladesh : Panimara Villagn Dhaka District", pp. 194-211 in : T.P. Bayliss-Smith and S. Wanmali (eds.) *Understanding Green Revolution—Agrarian Change and development planning in South Asia.* Cambridge University Press.

Kashem, M.A. (1986) : Obstacles to the Adoption of Modern Rice Cultivation Practices by Small Far mers in Bangladesh. Ph. D. Thesis. Agricultural Extension and Rural Development Centre, The University of Reading, U.K.

———(1987a): "Small Farmers' Need for Institutional Credit in Bangladesh", *Savings and Development,* XI, 2, 181-90.

———(1987b) : "Alternative Approaches to Exte nsion under the Framework of the Training and Visit (T & V) System in Bangladesh", *Bangladesh Journal of Extension Education,* 2, Special Seminar Issue, 69-85.

Lionberger, H.F. (1960) : *Adoption of New Ideas and Practices.* Ames . Iowa State University.

Marsh, C.P. and Coleman, A.L., (1955) : "The Relation of Farmer Characteristics to the Adoption of Recommended Farm Practices", *Rural Sociology,* 20, 3 & 4, 289-96.

Rahim, S.A. (1961) : *Diffusion and Adoption of Agricultural Practices, Technisal* Publication No. 7, Second Printing. Comilla : Bangladesh Academy for Rural Development.

Reddy, S.K. and Kivlin J. E. (1968) : *Adoption of High Yielding Varieties in Three Indian Villages.* Research Report 19. Hyderabad : National Institute of Community Development.

Singh, S.N. (1969) : "A Study on Adoption of High Yielding Varities in Investment Pattern of Additional Income by the Farmers of Delhi Territory", Ph. D. Thesis. IARI, New Delhi.

Singh, K.N. (1981) : "The Need for a Communication Strategy for Rural Development", pp. 15-32 in : B.R. Crouch and S. Chamala (eds.) *Extension Education and Rural Development, Vol.* 2 (Experience in Strategies for Planned Change). John Wiley & Sons Ltd.

Vylder, S. De (1982) : Agriculture in Chains, Bangladesh : *A Case Study in Contradictions and Constraints.* London : Zed Press.

Wilson, M.C. and Gallup G. (1955) : *Extension Teaching Methods and Other Factors that influence Adoption of Agricultural and Home Economics Practices.* Extension Service Circular 495, Federal Extension Service, Washington, D.C. : United States Department of Agriculture.

Yule, G.U. and Kendall M.G. (1937) : *An Introduction to the Theory of Statistics.* 11th Edition. London Charles Griffin & Co. Ltd.

Zaman, M.R. (1979) : "Sharecropping and Economic Efficiency in Bangladesh", in : M.H. Rahman and N. Ahmed (eds.) *Select Annotated Bibliography on Social Science Research Work in Bangladesh* 1972-1978. Social Science Research Council, Ministry of Planning. Dhaka : Government of the People's Republic of Bangladesh.