

# Farmers' Use of Soil Fertility and Nutrient Management Practices for Crop Production in Bangladesh: A Field Level Study

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## INTRODUCTION

Bangladesh has an agriculture-dependent economy with a growing population and one of the world's lowest land areas per capita. Not surprisingly, the most important issue for the agriculture of the country is to enhance and sustain growth in crop production. Therefore, the most pressing problem is the current state of gradually decreasing soil fertility, stagnating crop yields and declining productivity of several food crops. With negligible room for area expansion, as most of the arable lands of the country are already under cultivation, future growth will have to continue to rely on rising productivity per unit of land (WB 2004). Although crop production depends on many factors, integrated soil fertility and nutrient management approaches, which have not been studied at the farm level yet, can play an important role in ensuring that food production keeps pace with population growth in Bangladesh in an environmentally sound way. The present study was conducted with this view in mind.

## METHODOLGY

The field survey was conducted during 2005-2006. Data were collected from randomly selected 120 (39 landless, 34 marginal, 19 small, 20 medium and 8 large) farmers from eight villages in four districts of Bangladesh for personal interviews. The areas were selected because of their low agricultural productivity and gradual declination of soil fertility. The respondents were asked to mention the extent of their different soil fertility management practices and their organic manure and chemical fertilizers usage for crop production. Descriptive statistics were used for data analysis.

## RESULTS AND DISCUSSION

### Use of Soil Fertility Management Practices by Farmers

The field-survey data shows that though medium (1-3 ha) and large farmers (>3 ha) practiced some kind of soil fertility management, the conditions were very miserable for resource-poor farmers (landless, marginal and small farmers constitute about 80% of total farmers community). Due to improper soil management, resource-poor farmers obtained lower yields of different crops than medium and large farmers. For example, the average yield of rice (the staple food of Bangladesh that covers 73% of cultivated land) obtained by resource-poor farmers was 1.93 t ha<sup>-1</sup> while medium and large farmers obtained 2.56 t ha<sup>-1</sup> (Field Survey 2005-06).

### Use of Plant Nutrients (organic and inorganic) by Farmers

Data indicates that 80% of farmers who are resource-poor (landless, marginal and small farm holders) used organic manure rarely or occasionally, while the remaining 20%, which are medium and large farmers, used it regularly. Due to the shortage of bio-fuel, resource-poor farmers burned most of the crop residues and cow dung instead of using them to improve or maintain soil fertility. The findings about the fertilizer usage reveal that the majority (87%) of respondents used fertilizers after a self-assessment or partially

recommended doses. Only 13% used recommended doses. Fertilizer is a purchased input, and family income and expenditure were directly related to the usage of its usage. However, farmers used Zn fertilizer rarely due to lack of awareness about the importance of Zn for crop production even though it is essential for most of the cropping patterns in the study areas. Zinc deficiency can cause a reduction of net photosynthesis and dry matter production which affects crop yields. Thus, a poor nutrient management causes nutrient depletion that contributes to lower yields of different crops and also creates undesirable conditions for the agro-ecosystem.

### Probable Causes and Effects

It was observed during the field survey that there were several reasons for improper management of soil fertility and plant nutrients by farmers in the study areas. Some factors including financial inability and lack of knowledge of the farmer, inadequate extension support, high prices and unavailability of fertilizers during cropping seasons, and shortage of bio-fuel influenced the management of soil fertility and plant nutrients directly. Excessive population pressure, on the other hand, reduced the quantity of cultivable land which influenced soil fertility management indirectly by pressing farmers not to cultivate legume and green-manuring crops. Such improper managements decline soil fertility, reduce water holding capacity and create a situation of unavailability of essential plant nutrients. All of these factors can hamper crop yields individually or collectively. Reduced crop yields affect the total crop production, which leads to a situation of household-food insecurity and reduces the living standards of the farming community.

**Table 1. Comparison between recommended doses of nutrients and farmers' use (1999-2004).**

Major Cropping Patterns	Recommended amounts of different nutrients (kg ha <sup>-1</sup> )					Amounts of nutrients used by the farmers (kg ha <sup>-1</sup> )				
	N	P	K	S	Zn	N	P	K	S	Zn
Fallow-Boro-Taman	212	43	94	18	2	186	28	53	11	0
Aus-Taman-Wheat/vegetables	245	48	68	31	2	201	30	42	10	0
Mustard-Boro-T aman	263	59	115	25	3	210	36	70	13	0.3

Source: BBS (2004).

### CONCLUSIONS

Improper management of soil and plant nutrients poses a threat to yield sustainability and soil fertility in Bangladesh. Although medium and large farmers of the study areas are trying their best to maintain crop yields using some improved production techniques, resource-poor farmers are facing problems in this regard. Therefore, agricultural and rural-development organizations should consider the situation to improve yields of farms operated by resource-poor farmers in the study areas and in rural Bangladesh.

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### REFERENCES

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