

Modernising agriculture

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ONE of the dominant features of Bangladesh economy is its structural change with a declining share of agriculture in GDP over the last three decades and a half. Despite such a decline, the economy is still predominantly agrarian. The sector still provides about 60 per cent of the country's labour force. If only rural areas are considered, the percentage of labour force dependent on agriculture will be even larger. Moreover, agriculture production provide critical linkages for development of the rest of the economy. The performance of agriculture thus has important bearing on employment generation, food security and poverty alleviation in the country. In other words, while the declining share of agriculture in national income is a natural process, the development priorities still need to recognize the primacy of agricultural growth in providing food and income security to rural households in Bangladesh.

Growth performance

Despite many problems and constraints, a quiet agricultural revolution has taken place which is still evolving in response to natural calamities, socio-political change, population growth, urbanization, new technology in agriculture and new opportunities in rural non-agriculture sector, commercialization, changes in macro as well as sectoral policy reforms including market and trade liberalization and substantial reduction in public sector intervention in agriculture. From largely a peasant-based subsistence activity, agriculture today is more of a commercial activity than ever before. Agriculture grew at a faster rate (3.6%) than the growth of population (1.4%) during the 1996-2006 period

(Table 1). However, although both GDP and population displayed steady upward and downward growth trends, respectively, agriculture exhibited fluctuating growth over the same period. Sub-sector growth performance indicates diversification in favour of fisheries the share of fisheries in agricultural GDP increased from 15% in 1990 to 22% in 2006. Growth of crop sector has been more unstable than growth of other sub-sectors in agriculture.

Technological change

Technological change greatly influenced the growth performance of Bangladesh agriculture, specially the crop sector. From a relatively stagnant sector in the pre-Green Revolution period, Bangladesh agriculture emerged as a dynamic sector in the Green Revolution

period. Bangladesh has made significant progress in foodgrain production, particularly in rice production since independence. Total foodgrain (rice and wheat) production more than doubled since 1971, increasing from around 10 million tons in early 1970s to 25 million tons by late 1990s and further to nearly 29 million tons in 2006. This phenomenal increase can largely be attributed to two factors: first, substitution of local varieties of rice by high yielding varieties (HYVs) during the three crop seasons, aus, aman and boro, and second, increase in acreage under boro rice which has higher yield compared with aus and aman.

Sub-sector	1990-1996	1996-2000	2000-2006	1996-2006
Agriculture of which:	1.8	5.3	3.2	3.6
Crop and Horticulture	-0.1	4.6	2.6	3.4
Animal Farming	2.4	2.7	5.1	4.1
Forest and related Activities	2.9	4.7	4.8	4.7
Fishing	7.8	8.9	1.8	4.6
GDP	4.6	5.4	5.7	5.5
Population	2.0	1.6	1.3	1.4

The trend growth rate in cultivation of HYVs in relatively less suitable lands. The regional growth pattern also indicates unsustainability of high growth rate due to exhaustion of easy sources of irrigation and agronomic constraints.

The long-term trend of rice production shows that the dominant factor in growth is rice yield, stimulated by high yielding varieties, fertilizer and irrigation technology. Investment in research was small, yet there was technological progress, as evidenced by release of 43 HYV rice varieties by BRRI and 228 high yielding varieties of various crops by BARI. Extension also played a role although the much-discussed T and V system collapsed. HYV occupied

60 per cent of area shown in the late 1990s compared with only 13 per cent in the mid-1970s. Over the same period, fertilizer use increased from 48 kg per hectare to 190 kg per hectare and the proportion of irrigated area under rice increased from 12 per cent to 30 per cent. Fertilizer use was very widespread across all groups of farmers. According to 1996 Agricultural Census, 83 per cent of farm holdings applied fertilizer involving 71 per cent of gross cropped area. Irrigation development was a major factor behind spread of HYV and consequent increase in yield. From an initial focus on surface water development, emphasis of irrigation shifted to development of groundwater 70 per cent of total irrigation development largely due to advent of shallow tube wells promoted by market liberalization policies. Other concurrent developments include increasing mechanization of agricultural operation, including power tillers for cultivation, pumps for irrigation and threshers for converting paddy into rice. In some regions use of power tillers reached 60 per cent of the total area cultivated, from 28 per cent reported in 1996 Agricultural Census, prompted by shortage in drought power in the country.

Although changes in yield are often used to measure crop productivity, this is a partial indicator since land productivity can be improved by costly investments that may not be fully compensated by increases in yield. The total factor productivity (TFP) provides a better indicator for changes in productivity. In Bangladesh, the real price of rice has shown a long term declining trend. But the growth in production of rice, in the face of this declining real price, has been sustained largely due to sustained improvement in total factor

productivity. In Bangladesh, further downward adjustment in rice prices are needed in order to remain competitive with other rice producing countries in the world market. Increasing rice production thus represents a challenging task for further technical progress through research and extension.

Growth in agriculture in terms of HYV yield has been showing signs of slowing down in recent years. Seed-fertilizer-irrigation technology which phenomenally increased agricultural production in the 1980s and 1990s resulted in decline of soil fertility due to imbalanced use of chemical fertilizers, depletion of groundwater, high incidence of pests and salinity as well as arsenic hazards that led to

environmental degradation. At the same time, cultivable land has been shrinking and agriculture is being pushed into marginal and ecologically vulnerable areas due to population growth, rapid urbanization, growth of small industries, expansion of infrastructure etc. Bangladesh agriculture today faces new challenges not only because of changes that are internal to the country but also because of changes in the global environment: climate change, globalization and changes in regional trade regime. Agriculture is no more a mere domestic affair, it is a commercially competitive sector exposed to global market.

Emerging challenges

The growth in land productivity in rice cultivation has

slowed down considerably due to technological progress reaching its limit in the irrigated ecosystem and nonavailability of suitable technologies for the unfavourable rainfed environments. This development raises concern regarding the country's ability to maintain the food-population balance in the coming years. Rice research must deal with a number of difficult problems to meet these challenges: raising the yield ceilings of the available rice varieties; protecting the past yield gains in the irrigated ecosystem; and using biotechnology to develop high yielding varieties for the rainfed system that are tolerant to drought, submergence and problem soils. The speed and extent of meeting these challenges depends on the level of resources that can be mobilized to support crop improvement research in the public sector.

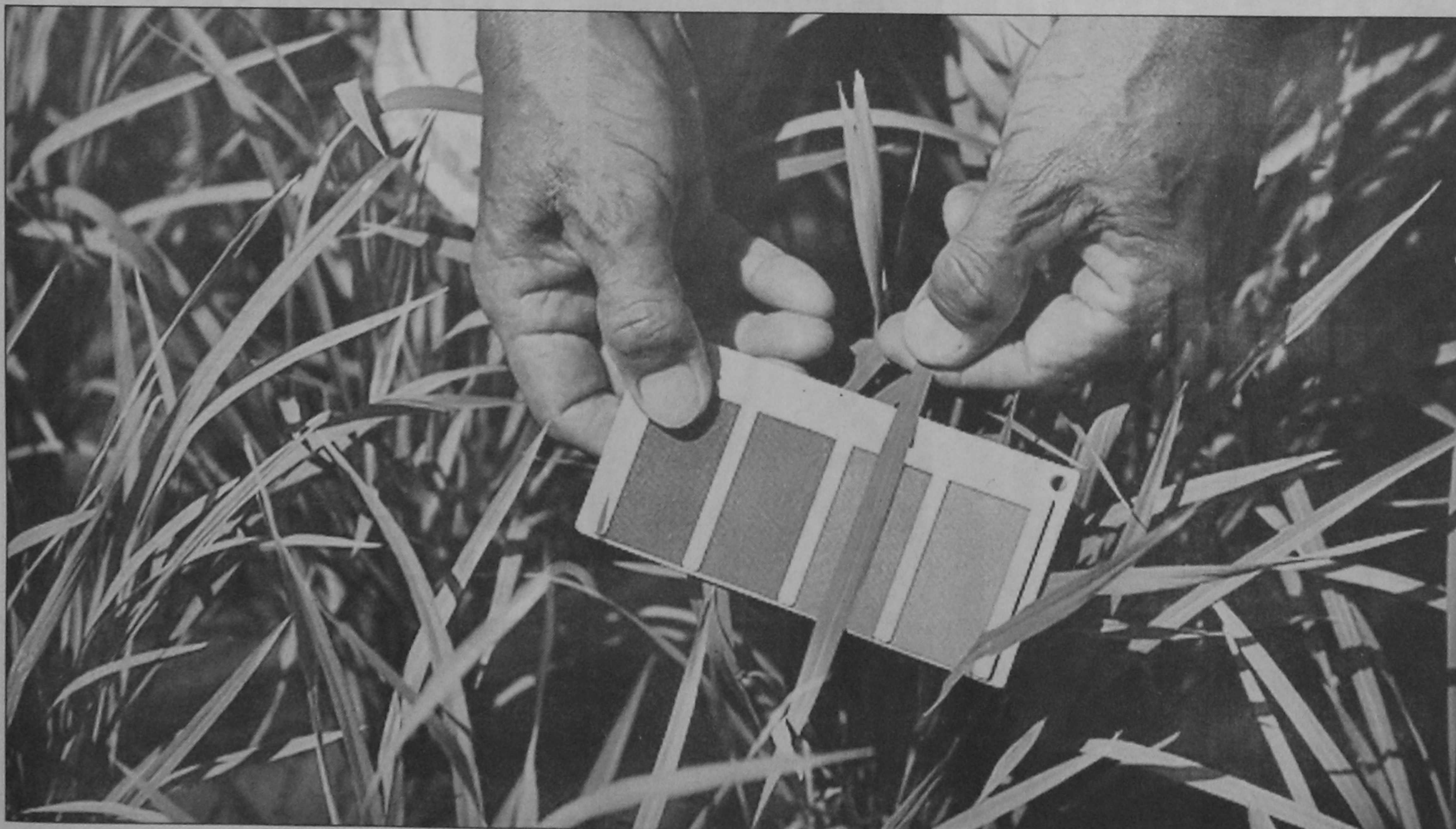
Under the existing technology, there are several specific challenges, which have to be dealt with as the country strives to sustain a high rate of GDP growth over the longer term with agricultural sector making its due contribution. In case of seed, the farmers are concerned with timely availability of quality seed in adequate quantity at a reasonable price. This is easier said than done when the seed sector has been largely privatized. In this context, one has to deal with questions related to the relative role of public versus private sector in seed production, processing, storage and distribution.

In case of fertilizer also, the farmer is concerned with timely availability of fertilizer in adequate quantity at reasonable price. Price is a major issue linked to unbalanced use of fertilizers, which is not only adversely affecting production, but also causing serious conservation problem. Other problems include quality of fertilizer, price fluctuation due to international price changes, unethical practices of private dealers, anomalies in the fertilizer distribution, buffer stock, government import and

Agriculture will be transforming itself, in the process of its modernisation, from subsistence to more commercial activity driven by considerations of food as well as livelihood security, economic growth, employment generation, poverty alleviation, risk management and natural resources conservation.



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