BANGLADESH'S AGRICULTURE

Plotting a Strategy for the Next Century

by M. Akhter Ali

THE foodgrain sector of Bangladesh's agriculture has come along nicely. From 10% a decade ago, the proportion of imported foodgrain supply had fallen to 4% during 1990-93.

Self-sufficiency in foodgrains, a much cherished goal, had appeared to be just around the corner. Real rice price had fallen at about 2.36% during the two decades to 1992/93, and this had contributed to slowing of inflation. Exports of marine and bovine products had made important gains. Fishery and livestock production had each chalked up impressive growth rates, admittedly starting from a small base. Import substitution in dairy and poultry goods has been considerable. Community forestry appears to be making progress, and has highlighted one new dimension. Agriculture's overall growth during the 1980s to date, while not breathtakingly high, has still been adequate, broad-based and has doubtless improved millions of lives.

Government's vision, economic and production policies, and leadership in adaptive and applied technology research have played a big part here. Its interventions have been aimed at increasing farmers' access to productive technologies, improving efficiency in resource allocation, fostering competition and giving the farmers greater choice in the conduct of his business. Indeed, the government has successfully put it across that farming had better be done as an agricultural business. Towards that end, reforming market access was a desideratum. The way that markets for minor irrigation and fertiliser were transformed since the mid-1980s have served Bangladesh's crop agriculture very well and have earned Bangladesh plaudits. Of course, we are moving forward in a transitional state, and are learning and adjusting as we go along.

Bangladesh has, no doubt, a long way to go in its agricultural development. Irrigated area and fertiliser use per hectare can be more than doubled. Yields of most of the crops are two-fifths of what they can be. Total factor productivity levels remain low. Important choices between intensive mono-culture and mixed-farming remain to be made. Large swathes of coastal wetlands remain unexploited due to backward technological shelf and poor infrastructure. As much as 3.8 million hectares can be brought under intensive dryland cropping, as can a potentially large quantity of hill land resources. The need for more productive technology, commercialised on a large scale, remains paramount. This is because virtually all projections point to grim scenarios of acute food scarcity in future, even given conservative projections of population growth.

There are signs of environmental degradation too, especially where intensive irrigation techniques have been applied heavily. Diffusion of rice varieties that intensively use fertiliser, weed and pest control chemicals may have polluted the environment through runoff, and groundwater through leaching. More cost-effective harnessing of water and irrigation management that is more site-sensitive have become the need of the hour.

Bangladesh's agriculture is therefore at a momentous cross-road. International trade environment has recently changed, creating new windows of opportunity for efficient agricultural transformation, but also creating new challenges. Despite having an advantageous bio-physical endowment, Bangladesh's integration in world markets for farm produce is being hampered due to want of adequate infrastructure, rudimentary presentation standards, and limited abilities for crop hygiene. At home, growth rates have faltered after nearly a decade of relatively rapid growth. In this new era, the key words are market-driven farming tapping into productivity-enhancing technologies and entrepreneurship. This has put the premium on seizing an opportunity for stock-taking, collective introspection and plotting a strategy for the next century.

It is in this context that I see this Workshop, co-sponsored by the World Bank and the Ministry of Agriculture. The workshop brings together, for the first time after the 1988 ASR Conference organised by UNDP, some of Bangladesh's best-known scholars, agricultural policy-makers and practitioners to take advantage of some recently-completed sector work at the World Bank in an effort to brainstorm about the elements of a strategy for Bangladesh's sustainable agricultural development in the next century. I look forward to the deliberations of the workshop.

The author is Secretary, Ministry of Agriculture

Harnessing Bangladesh's Water for Agriculture in the Next Century

by Dr Z Karim

WATER is an essential component for sustainable agriculture. For rainfed or irrigated crop cultivation, livestock production, fisheries and forestry development, an adequate and timely supply of quality water is essential.During the past three decades irrigation has played a major part in total rice production in Bangladesh.

According to the National Water Plan, total gross water demand in the dry season (March) is 25,697 Mm^3 which include 16,155 Mm^3 for agricultural use. Total water supply in March is 25,101 Mm^3 which comprises 6,872 Mm^3 of ground water from regional rivers, 11,736 Mm^3 from the main rivers and 741 Mm^3 from storage in haors and beels.

The present high rate of water use has resulted in declining trends in the water table. On the other hand, the capacity utilization of the existing irrigation systems is low. This warrants evaluation of the potential of water resources and the development of low water consuming agricultural production technologies.

Minor Irrigation Technologies

Minor irrigation has contributed over two-thirds of the annual growth rate of about 3 per cent in rice production during the past 15 years. The area under minor irrigation increased from about 1.5 million hectare in 1980 to 2.6 million hectare in 1993-94. Shallow tubewells alone account for 53 per cent of the total minor irrigation command area, while LLPs, DTWs and traditional irrigation devices contribute around 18, 15 and 13 per cent respectively. The recent privatisation in the agricultural sector and with the withdrawal of restrictions, the sale of STW has increased at an annual rate of 14 per cent from 1987 to 1993. It is, however, striking that about 28 per cent of the existing DTWs are currently out of operation in the country. BADC's present facilities and skilled manpower should be employed to make them serviceable.

Opportunities and Challenges

There exists good surface water potential though the area under major irrigation has not increased as envisaged. Most of the present large scale gravity irrigation systems are operating at much below the planned capacity. The future development of surface water would require a large amount of public investments. In Bangladesh, groundwater tables are generally at shallow depth. Recharge conditions are favourable in 80% of the alluvial basin due to heavy monsoon rains and prolonged flooding. The high permeability of the aquifers and the quality of water contained by the system is good except in the coastal zone having brackish and saline groundwater. Widespread lowering of the water table beyond the suction lift range during dry months will have adverse impacts on 80% of the total irrigation command area.

In the coming century environment and agriculture will become crucial issues. In line with the convention on global warming and abatement of greenhouse gases there would be increasing pressure to reduce wetland agriculture. Sustainable development of agriculture and water use will thus take a new shape in the years ahead.

The looming scarcity of fresh water resources for irrigated agriculture under an inflated population-demand situation leaves no choice but to devise means of growing crops with less water. Using agro-ecological data base, potential irrigable Rabi crop areas of Bangladesh have been estimated to be about 7.2 million hectare as against current irrigated are of 2.8 million hectare. This indicates scope for the expansion of irrigation. High water use efficiency together with crops requiring less water will be an essential prerequisite for the country's agricultural development.

Policy Considerations

Bangladesh has a large agro-economic potential for a wide variety of crops including pulses, oilseeds, tuber crops and vegetables. For market-driven agriculture, a shift from rice production to some other economically potential low water consuming irrigated food and cash crops, which are well suited to the country's agro-ecological conditions, deserve priority consideration.

To harness the country's water resources, the future thrust in agriculture should encompass the following:

a) Flood irrigation methods are expected to retain their popularity in the foreseeable future. Comparatively high efficiency can be achieved with surface systems by land grading, tailwater recirculation and on-farm storage etc. Public sector investment would be required for the purpose.

b) In general, irrigation potentials are operative only in dry Rabi season. To maximize agricultural production and to make the system viable, they should be kept operative round the year to cover both primary and supplementary irrigations.

c) Operation and maintenance of large scale gravity irrigation system (surface water) must be improved through inter-disciplinary on-farm evaluation. There exists significant opportunity for establishing devices that will allow better rainwater utilization.

d) Wet-seeded and semi-dry rice systems have been found to be superior in water use efficiency. Wet-seeded rice production needs 20-25% less water than transplanted rice system. Wide application of the system is necessary through an efficient extension programme.

e) About 40% of the total water normally used for wetland rice production can be saved by maintaining a saturated soil regime as high yield of rice do not require continuous field submergence. Dissemination of the idea is essential.

f) In light textured soils not suitable for irrigated HYV rice cultivation but potentially suitable for a wide variety of high value winter crops and T. Aman rice with supplementary irrigation may be practiced. System development and crop restructuring should be encouraged.

g) During the dry season and in areas of declining water table, deep-set shallow tubewells have a strong potential, provided the cropping patterns are restructured with more low water consuming crops. In some selected zones where shallow aquifers do not assure adequate water supply, DTWs should be installed. To turn DTW irrigation profitable, price incentive on DTW, supply of electricity and maintenance along with spare parts should be done by public sector organisations. Determining aquifer properties and development of a system of conjunctive use of surface and groundwater is essential.

h) Privatisation policy has had a positive impact, but its benefit to the rural population in terms of equity has been disproportionate. It would be necessary to safeguard the interest of the poor farmers.

By the year 2030, the demand of foodgrains will stand at around 45 million tons and the demand of other crops like pulses, oilseeds, sugar and vegetables will be three to four times the present consumption. Under such greater demand and high population growth situation, and in the context of biophysical and other opportunities, Bangladesh can make better use of her hydrological resources and can get 'better harvest' sustaining agricultural productivity and can satisfy the demand of increasing millions.

The author is Director General C/O Bangladesh Agricultural Research Council

The Future of Bangladesh Agriculture

by Ridwan Ali and Rashid Faruqee

OVER the past 30 years, overall agricultural growth has been roughly 3%--a rate that is significantly lower than many other countries in Asia, including India and Pakistan. Within agriculture, only the livestock sector has shown strong growth in recent years, while fisheries has stagnated. Overall, the rate of agricultural growth has been declining, with growth of 3.2% in the 1960s, declining to 2.5% during the 1980s. The sector almost stagnated between 1985-89 growing at only 0.6% per annum. Agricultural performance has continued to be weak in the 1990s, except for an exceptionally good year, 1989-90, agricultural GDP increasing by 1.8% annually between 1991-94, with an average annual growth in the crop sector of only 1%.

Rice remains the most important crop contributing over 50% to agricultural GDP. Over the last 20 years, strong growth in rice yields and increased use of high-yielding varieties have led to production growing at roughly 3%, while the area under production fell slightly. Growth has not been steady, however. For instance, in the period 1986 to 1993, market liberalisation coupled with favourable growing conditions, led to strong growth, but since 1993 production has stagnated. Within the overall trends, rice production is highly unstable with large inter-year fluctuations in output.

Although the share of rice within crops remained dominant, agriculture has also become more diversified over time. For instance, raw jute fell from 43% to 31% of agricultural exports from 1984-86 to 1990-92, while jute and jute products dropped from 48% to 20% of total exports in the same period. From 1984-1992, the sub-sectoral composition of output changed, with a decrease in the crops sub-sector from about 80% to 60%.

A number of important reasons have been identified to explain the overall slow growth in the agricultural sector. Firstly, there seems to be a constraint stemming from the lack of effective domestic demand. The population growth has slowed and while per capita incomes have grown, the low income elasticity of demand for rice has meant there has been little impact on consumption. Increased urbanisation has also contributed to slow demand growth for rice. The key implication for slow domestic demand is the need to exploit world trade and to focus more on export-led agricultural growth.

The second factor is technology. Agricultural research has deteriorated, largely as the result of weak public institutions and the 'brain drain' to research centers overseas. Finally, agricultural growth has stagnated due to poorly performing "local government/rural infrastructure nexus", and the failure of rural institutions to provide the necessary infrastructure(particularly roads) for an efficient agricultural production and marketing system.

In the case of rice, poor performance in recent years has been explained by the cost-price squeeze that significantly reduced profitability resulting from the simultaneous decline in real output prices and increase in input costs, particularly fertiliser. Another explanation for the stagnation in rice production in the 1990s was that the reforms that improved farmer incentives during the 1980s have not been pursued vigorously in recent years and that there may be even some backtracking.

Future growth of Bangladesh's agriculture will originate from three fundamental sources. These relate to the use of additional inputs, productivity gains, and finally movement to higher-valued crops.

Additional inputs would include increasing cropping land, growth in the irrigated area and significant increase in the use of fertiliser.

LAND: Additional land for crop can come from increases in the actual number of hectares under crops (such as conversion of non-crop land, conversion of non-agricultural land, and restoration of degraded land), and increases in the cropping intensity.

In terms of expanded land area, there is little prospect for growth and in fact point to some contraction. The annual trend rate of growth of cultivated area was 0.78% from 1973/74-1983/84 and -0.28% from 1979/80-1989/90. Therefore, no additional crop land is likely to be available from conversion of non-agricultural land and it is equally unlikely that new land will be available from conversion of non-crop land, such as forests and pastures. Even if all that land could be sustainably converted to crops, it would add less than 10% to the total cropped area.

In terms of cropping intensity, between 1982/84 and 1990/93, the average intensity for the country as a whole rose from 1.55 to 1.75. These rates compare favorable with other Asian countries, including Punjab, India at 1.78 and Pakistan at 1.25, but lower than Vietnam and Java, Indonesia. While this source of growth could continue up to a level, further increases will not be possible without much increase in irrigation, prospects for which are not unlimited.

IRRIGATION: Growth in the irrigated area was about 160,000 hectares annually, from 1982/83-1991/92. There was a jump after 1987 due to the elimination of restrictions on irrigation, on pump imports, and on domestic marketing of fertilisers and crops. From 1982-86, the average gross irrigated area was some 2.0 million hectares (78,000 hectares annually). Current estimates of sustainable new irrigation are 150,000-200,000 hectares per year for 10-15 years. So this is going to be an important source of growth in the near future.

FERTILISER: Although the public sector still has some role in fertiliser distribution, the market reforms of the 1980s have led to significant increases in its use. Consumption in 1992/93 was more than twice what it was in 1983/84. The average annual growth rate during the 1980s has been estimated at about 9%. But in spite of the recent growth in fertiliser use, Bangladesh uses less fertiliser per acre than other Asian countries in comparable environments. The apparently low average rate might indicate the scope for greater use and corresponding higher yields. But the higher rates in some of the other countries are at least partly due to fertiliser subsidies and output protection, which leads to inefficient resource use, not a desirable option. It is reasonable to conclude that Bangladesh's lower use is related to its lower output/input price ratio. A broad expansion of fertiliser use is economically justified only if there are significant distortions in domestic pricing and distribution. However, the historically close relation between Bangladeshi nitrogen prices and world prices, suggests that eliminating domestic price distortions would not have a major effect on fertiliser use. (More recently, however, the domestic prices of fertiliser are higher than world prices, adjusted for trade/transport margins). The reforms in fertiliser distribution in the late-1980s did lead to a significant jumps in fertiliser use and increase in rice output, indicating that inefficient fertiliser policies had previously retarded growth.

PRODUCTIVE RURAL INFRASTRUCTURE: Infrastructure is a special case of input expansion because it is at once an input, a type of technical change and sometimes a public good. The chief productive infrastructure investments are markets, roads, utilities (e.g. water, electricity), and communications. Those investments can improve efficiency by cutting intermediation costs (e.g. transport and communications), leading to lower input prices, higher output prices, and cheaper technology.

Productivity Gains

Technical Change: Significant technical change has occurred in Bangladesh agriculture. In the case of rice, technological change has been responsible for growth in yields for two distinct reasons. First, technical change led to the development of modern varieties (MVs) which on average have yields double those of local varieties (LVs). This led to the increased area under MVs from 1.4 million hectares in the early-1970s (14% of the total rice area) to 5 million hectares in the early-1990s (50% of the total area). If the conversion from LVs to MVs continues at the historical trends, it is estimated that within 10 years all suitable land will have been converted to MVs. Second, technological change has led to increases in yields among the LVs (increasing average yields of MVs across all seasons have not increased over time, measuring 2.4 tons per hectare for both periods 1972/73-1974/75 and 1991/92-1993/94). For instance, 20 years ago average yields for LVs were 0.9 tons per hectare, while today they have risen by a third to more than 1.2 tons per hectare.

Wheat production has increased from nearly nothing in 1970 to more than 1 million tons in 1990s owing to research that generated modern varieties and efficient fertiliser recommendations. Research has also been productive in jute, sugarcane, and fisheries, among others. Research, thus, has had some effect on the major crops. A recent study found that total factor productivity (measuring the contribution to output of research, technology transfer, producer education, and markets) grew by 0.84% during 1975-85.

Correction of Market Distortions: Bangladesh's agricultural economy is relatively free after the reforms of the 1980s, during which most public interventions became less intrusive. Today, trade protection for agricultural products is minimal, except for restrictions on private sector imports of the major cereals, and domestic producer prices of rice have been closely related to world prices. Rice prices have long fluctuated between import and export parity prices. The long-run nominal rate of protection (NRP) for urea, the main variable input, has only been -2% since 1980. While such significant progress in freeing up markets is encouraging, some further reforms are still needed. For instance, government policy continues to distort price signals for some remaining agricultural inputs, including seeds and fertilisers. Trade policies restricting foodgrain trade discourage private sector development in agriculture storage activities, while quotas still remain on imports of sugar.

Bank sector work recommended policy changes in four key areas: (i) Strengthening private sector trade by permanently abolishing re strictions on that trade; (ii) Making the price stabilization mechanism more efficient by relying on international trade (both public and private) in place of public storage; (iii) Targeting the food insecure and removing untargeted subsidies that are now captured, at least partly, by the affluent; (iv) Making public food operations more efficient by withdrawing from commercial activities that can be done by the private sector.

One other area considered key to promote growth is an improved land policy that will allow land use by the most efficient users. In Bangladesh it is estimated that 40% of agricultural households are landless or hold fewer than 0.4% hectares on average. Such households operate less than 10% of total farm land while those holding more than 3 hectares operate about 25%. The preponderance of very small holdings is sometimes considered a source of inefficiency, particularly an impediment to diversification out of rice to higher value crops, but empirical work in Bangladesh is not very revealing on the relation between size of holding and productivity. The best policy option for the government is to facilitate smooth functioning of the land market with means that will improve the titling and registration of land as well as reduce costs of transferring land and settling land disputes.

Diversification to High-value Crops

Attaining high growth rates in the future will likely depend increasingly on the performance of non-rice, high-valued crops and emergence of a more diversified pattern of agricultural production. A recent Bank study showed that Bangladesh does have a comparative advantage in certain high-valued crops, including traditional fruits and vegetables, specialty rice and cotton, given the backdrop of a conducive market and policy environment. But the future of non-rice crops will depend on the removal of a number of constraints that currently inhibit expansion, including the poor availability of appropriate technology, inadequacies of market infrastructure and services (including credit), and inappropriate policies affecting the production and marketing of these crops.

Conclusions

Future growth in Bangladesh agriculture is thus expected from: expanded irrigation and increased cropping intensity; research and technological changes; improved infrastructure; correction of remaining market distortions and sustaining market reforms already completed; and creation of a level playing field for non-rice, high-value crops through measures outlined above.

These changes will come only if the appropriate policy environment exists in which government's role is limited to correcting market failures and providing public goods. And while Bangladesh has made important strides in deregulation and in moving towards a more open market-oriented setting, there is still more to be done. In addition, investments in appropriate technology that enhance the productivity of both traditional crops and increase the viability of high-value non-traditional crops are also key to sustained future growth. With the right policies and investments Bangladesh will reach its full potential of agricultural growth

Ridwan Ali is Chief, South Asia Country Department 1, Agriculture and Natural Resources Division, The World Bank, Washington. Rashid Faruqee is from the South Asia Country Department 1, Agriculture and Natural Resources Division, The World Bank, Washington.

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