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Agriculture in Bangladesh: The last and the next fifty years

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Almost 75 years ago, the British had left India and yet the people in this part of the world were not yet meaningfully free of their political and economic shackles and their struggle to be free continued. Ultimately, the people prevailed and this year we are celebrating the golden jubilee of liberation from Pakistani oppression. This is thus the right moment to reflect back on what we as a nation have achieved and what we must strive to aim for.

While food and nutrition security in its fullest sense is yet to be achieved, major progress has been made and at least in the case of rice, the main staple, the country is self-sufficient. Aquaculture has changed the face of fisheries sector while poultry farms supplying meat and eggs are ubiquitous. This is highly laudable progress but these sectors are still prone to shocks from nature and the risks of slippage are quite real. As a result, unless long-term vision and corresponding planning based on science and technology is in place, and unless it is well-managed and implemented through people's ingenuity and cooperation, much of the gains made so far may be lost. The country has a vision to transition into a developed country in another 20 years or so – realisation of which calls for proper attention to the elimination or substantial reduction of these risks in a coordinated manner.

Role of Agriculture

Historically, in most countries, over time the relative significance of income and employment from agriculture has fallen and that is also true in the case of Bangladesh. Mind you, I am only saying 'relative' contribution. The absolute contribution has not fallen, rather it has increased. Just take the case of Bangladesh's agricultural GDP over the last five years. If we take the average of agricultural GDP for, say, 2005/6-2008/09 and 2014/15-2018/19, we see an increase from Tk 96,700 crore to Tk 135,000 crore (or 40 percent or so) while the contribution to total GDP fell from around 18 percent to 14 percent. On the other hand, despite the fall in its share, agriculture still remains the main source of employment, providing a livelihood to 40 percent of the labour force. While services account for a similar percentage of employment, they are an amalgam of many heterogeneous types of activities and no single activity is responsible for much employment except perhaps transport services. Thus, agriculture still remains the largest sector in terms of employment.

The other indirect contribution of agriculture is to provide basic raw materials for industrial processing. Immediately, jute comes to mind as that is an early example of a product of the agro-processing industry. And at present many agro-processing industries are fully dependent on agriculture for basic raw materials which include rice milling, sugar, tea, fruit juice, spices, edible oil, tobacco, jute textiles, cotton textiles, starch, etc.

It has been 81 years since Sir Azizul Huq published his "Man behind the Plough" which described the sufferings of the peasants in the then Bengal, mainly due to the yoke of the zamindari system around their necks as well as the exploitation by the British who forced peasants to cultivate at one time the indigo and much later jute which remained under-priced so that jute mills run by them could make abnormal profits. But that pauperised the peasants. That pauperisation process has remained, by and large, unchanged although the zamindari system was done away with in the early 1950s but the vagaries of the market, craftily manipulated by marketing agents, have kept them poorer than they should be. But more on this later.

Agriculture: The Last Five Decades

Crops

In case of crops, rice output has gone up from around 12 million metric tonnes in the late 1970s to more than 36 million metric tonnes today. This was possible due to several factors. The main reason was the increasing predominance of the dry season boro rice facilitated initially by introduction of deep tube wells as well as surface irrigation. But the main impetus came since the mid to late 1980s when privatised shallow tube wells were encouraged through policy shifts. Simultaneously, the policy of subsidised chemical fertiliser provided the additional impetus to grow high yielding varieties. While boro was no more than around 2 million metric tonnes in the late 1970s, before the turn of the century, it rose almost four times to more than 8 million metric tonnes and overtook aman as the main rice. The larger shift came about during the last 20-25 years and by now, boro output stands at just short of 20 million metric tonnes while aman output has risen from 7-8 million metric tonnes to 13-14 million metric tonnes. Aus has become totally marginalised accounting for only less than 3 million metric tonnes. As we shall discuss later the predominance of boro has made it possible for Bangladesh to become more or less self-sufficient in food grain while it has also exposed the country to other risks which may ultimately curtail its growth.

Wheat showed quite some promise early on and contributed nearly 2 million metric tonnes around the turn of the century. But the output later dwindled to nearly 700,000 million metric tonnes in around 2006-07 although it slowly revived but only to somewhere around 1 million metric tonnes. On the other hand, maize output has steadily grown to around 3.5 million metric tonnes by 2018-19. This was mainly due to its increasing demand for use as poultry feed. Potato is another crop which saw an increase in output to 10 million metric tonnes in the present day from about 1 million metric tonnes in mid-1980s, a 10-fold increase.

The other crop which saw a large increase is oilseed (an amalgam of several types in official statistics, including mustard as well as, curiously, coconut). From around 450,000 metric tonnes of output in 1987-88, it fell to around 300,000 metric tonnes and later increased to just above 500,000 metric tonnes by 2014-15. What happened since then is anybody's guess as for the next 3 years, the outputs (as published in Economic Review 2019 quoting BBS) were 934,000 metric tonnes (a jump of 86 percent), 560,000 metric tonnes (a fall of 60 percent) and then 1,026,000 metric tonnes (or a 83 percent rise). We will be coming back to the issues of data as well as implications for agricultural planning later on.

Crops for which output showed either a decline or static situation include pulses, sugarcane and possibly jute. In case of pulses (much of it lentils and *kheshari*), in early 1980s, the officially reported production was around 500,000 metric tonnes which fell to

less than half of that to around 200,000 metric tonnes in around 2009-10 and then somewhat revived to roughly double of that by 2017-18. For sugarcane it is a story of a continued decline from nearly 7 lakh metric tonnes in the 1980s to roughly half of that by now.

The other commercial crop that has apparently shown major swings in output is jute.

In summary we can say that while Bangladesh has largely solved the problem of not producing enough rice, its record in case of other crops is mixed at best and in some cases dismal. The database for understanding the changes is not up to the mark although it must be said that this problem of data collection, data consistency and reliability is more than a century-old issue in this country.

Fisheries and Aquaculture

Fish production based on official statistics had been growing at around 5 percent per annum over the last two decades or so. Much of the growth had taken place, based on these statistics in inland culture and marine industrial catch. In case of inland capture, flood plain subsistence fisheries and catch from rivers and estuaries reportedly account for 75-76 percent of total capture fisheries. How far these estimates are based on sound data collection system remains an open question. For example, rivers and estuaries data are based on a Frame Survey by SPARRSO carried out, as reported by Department of Fisheries, in 1983. Over almost four decades, a lot of land use changes have taken place and it can be safely guessed that many water bodies no longer exist. Similarly, it is not clear as to how data on subsistence fishing (i.e., by definition catch for own consumption) by millions of rural households without large-scale surveys has been estimated year after year. Be that as it may, anecdotally, people believe based on experience that catch from capture fisheries has fallen or at least much less is available than before. At the same time, they also believe, again based on anecdotal evidence, that culture fisheries have become far more important than before and that much of what they buy and consume come from such sources.

Given that commercial aquaculture has become ubiquitous, one would have liked to understand how extensive it is. The data of Department of Fisheries shows that by 2017/18 pond fishery yielded just above 19 lakh tonnes accounting for some 44 percent of total fish production and just about 79 percent of cultured fish catch.

Livestock and Poultry Output

Whenever we go to the kitchen markets, we see that the supplies and variety of livestock and poultry products have increased over time. The relative abundance of poultry meat and eggs is undeniable. And yet, there are major gaps and inconsistencies in the related data. The problem becomes more acute when we consider that historically, livestock and poultry were and still are kept by all kinds of rural households, farm and non-farm. On the other hand, more recently there has been major growth in commercial poultry farms for both meat and eggs. Yet, we do not definitively know the extent of such commercialisation. For example, from various sources we find that there may be commercial poultry farms numbering anywhere between 65,000-70,000 and 150,000. The number of eggs produced per year is given in one source as 7.34 bn/year which translates to 20 million eggs/day. Another source puts it at 33 million – a difference of more than 50 percent. One also finds between successive years, milk production has suddenly gone up by 45-46 percent or about 30 percent without any reported change in the number of cattle. What all this means is that those who are officially mandated to keep track of these developments are yet to come to grips with changes in the livestock economy.

The Farmers

As indicated earlier the situation of farmers may not have changed much over all these years despite changes in the farming sector, be it in crops, fisheries or livestock. The first issue here is who the farmers are. The Preliminary Report of the last Census of Agriculture in 2019 shed light on the proportion of farm households which seems to be going down. It fell from around 73 percent in 1983/84 to nearly 56 percent by 2019, although the absolute number has been rising. It did not mention, however, distribution of farms by size. In 2008, the size distribution showed that farms with up to 1 acre of land and those up to 2.5 acres were 52 percent and 84 percent respectively. Also, they operate with only 16 percent and 50 percent land at most. On the other side of the scale, large farms operating with 7.5 acres of land or more constituted just short of 2 percent of farms but operated 13 percent of the area. These indicate that most farmers are very small. On the other hand, it is known anecdotally that large commercial farms and institutional holdings are on the rise. However, the government's official arm, BBS, so far has not tried to collect information on these new entrants into the scene.

These farmers, or rather their forefathers, toiled under the zamindari system which was done away with after independence from the British. While that system was gone, unfortunately the invisible fetters of market forces kept them shackled, particularly when they began to cultivate high cash input crops like boro rice and had to depend on rural money lenders for financing cultivation expenses. As over time institutional credit slowly replaced them, and farmers became more dependent on the market for sales of output either to market intermediaries or rice mills, then began another episode of unending woes of financial losses as prices became low. For quite a few years this never-ending drama has been repeating itself.

Apparently, new commercial aquaculture has been able to avoid this fate of crop cultivators. Here, however, large aquaculture enterprises are more numerous and also control much bigger proportion of area under them. Here, according to one carefully done survey, small pond operators (with area up to half acre) constitute 36 percent of all such operators but they control 12 percent of area. Medium (1/2 to 2 acres) and large farms (greater than 2 acres) comprise 37 percent and 27 percent of such operators but they operate, respectively, 35 percent and 53 percent of pond area. It is no wonder therefore that these farms in general have much better bargaining power with the marketing intermediaries.

So far we have not looked at gender dimensions of agricultural activities. The latest national picture we have from the 2016-17 Labour Force Survey by BBS shows that of the total of 22.7 million people involved in agriculture, 45 percent are women and of all women in the labour market, they constitute nearly 73 percent. Two things are clear from here. The main sector of women's participation in the labour force is agriculture and they comprise nearly half of the total labour force in that sector. This means that whatever happens to agriculture impacts women similarly as men.

While not shown officially almost anywhere, the fact remains that homestead gardening and home food production by rearing poultry and livestock were almost the exclusive preserve of women and it probably still is, particularly if the main purpose is to grow vegetables, fruits, poultry and livestock products such as eggs and milk and occasionally also meat. Indeed, recent analyses show that dietary diversity in households, which positively impacts nutritional balance, depends on such practices of home food production. Unfortunately, the usual agricultural statistics do not properly consider these in the estimation of output under agriculture which again leaves unclear the output changes in non-rice, non-field outputs. It may be noted that the pandemic has highlighted the importance of homestead gardening and food production for supply of vegetables and fruits to households in the event where normal supply chains break down.

Weaknesses and Risks of the Present Agricultural and Food System

Before we go on to the issues of the future growth and development of agriculture, it is necessary to examine some of the risks of the present system of production. Unless measures are taken to reduce or neutralise these risks, these will continue to keep the system weak and may also lead to food insecurity.

As discussed earlier, boro rice has emerged to be the most important type of rice in Bangladesh. This is totally dependent on irrigation which again is based by and large on groundwater which is curious given that in practically all other rice-growing countries, rain-fed rice with supplementary irrigation is the norm and that too mainly sourced from surface water. One would have expected a similar pattern in Bangladesh, being endowed with high rainfall as well as surface water bodies, which did not happen for various reasons. Two types of problems have arisen because of this pattern.

One is that the agronomic practice of flooding results in very high water use in the rice field. In Bangladesh farmers use roughly 3,000 litres of water to produce 1 kg of rice. In South East Asia, it is nearly one half which means even if they have to irrigate their lands, the water lifted is far less. In case of boro, all the water is irrigation water – either ground or surface water. The heavy dependence on groundwater means that in many areas, particularly in North West Bangladesh, groundwater has been depleted creating problems already in many places. If this practice continues, boro cultivation may face a decline creating problems of food insecurity. Question is, do we have the means for doing that?

Shallow tube wells owned privately by farmers are the main method for extracting water for irrigation in the country. These farmers irrigate their own land and also sell water to others for a fixed fee based on the area and water the farmer may need. Traditionally, farmers flood their rice land for much of the growing period as that is the custom and also because it helps in keeping weeds in check. In any case, that leads to overuse of water. On the other hand, there are methods such as alternate wetting and drying (AWD) which uses at least a third of water less without lowering productivity. Obviously, when water has to be paid for by area and with no restriction on water supplied, those buying water have no incentive to conserve water as they have to pay the same whether they take less water or more. In case of deep tubewells, however, in some areas as in BMDA, there are smart cards owned by farmers through which they buy water by volume and are therefore conscious as not to use excessive water. BADC is trying to apply similar methods and in case of surface water, at least in one area (Muhuri), a similar experiment has begun. If at the same time, farmers can be induced to switch to AWD in such cases, at least 50 percent of water can be conserved. Using buried pipes instead of kutca channels lowers water consumption further. Unfortunately, while attempts have been made to introduce smart cards universally as well as technological changes applied in water use, success so far has been limited. On the other hand, water is going to be a scarce resource over time.

The government has started an exercise for the valuation of water in its various uses as desired by the Honourable PM. Once this is completed, we will have some idea of its social value which may be used for proper public sector investment appraisal where water is a major input (certainly in agriculture) and also for regulating fees charged for private use of water.

Coming back to the issue of risks, the other major problem is data inconsistency and incompleteness which creates difficulties for future planning in terms of structure of the food system because the base situation is not properly clear. This in turn may create or is already creating problems related to the over- or under-production and supply of some foods. This may result in nutritional imbalance of the consuming households. This is compounded by the problems of marketing and supply chain management resulting in a lot of waste as well as lower income for farmers. This may lead to major changes in cropping patterns such as mango orchards replacing paddy lands in many areas in North West Bangladesh which has also resolved the water problem to a large extent because of low demand for water for mango orchards.

One problem which we have not discussed so far is the issue of natural disasters that create problems of variability in production. Floods, drought, cyclones and storm surges regularly ravage the country and farmers have somewhat adjusted to these through cropping pattern changes, but only partially.BBS regularly tries to estimate output losses due to various disasters but these may be underestimates; while output losses may be somehow valued, the costs incurred for inputs seem to be hardly considered and thus loss estimates are probably underestimates.

The Future Five Decades

What might happen to agriculture depends on several factors outside agriculture. The first is population and income changes. Both will impact the total demand for food as well as its structure. BBS projections for population extend up to 2061 with a range from roughly 210 million to 250 million, with an average

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