**Risks and Vulnerabilities of Agriculture in Pakistan**

2162 words

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 Agricultural Development in Pakistan has been strong and robust in the past if viewed in terms of structural transformation of the economy, growth and poverty reduction, exports and rural employment. However, going forward a new set of challenges face the sector and these are climate change, Food Security, Water and Energy Security. These emerging trends call for a re-examination of the future role of agriculture in the economy.

 Like all other countries going through transformation, Agriculture’s contribution to GDP has declined to 20 percent but it takes care of the food and fibre needs of 180 million people of Pakistan. Its direct Contribution in employment and downstream activities – processing, transportation and supply chain remains quite significant. Pakistan’s agriculture based exports – Direct and Indirect – using agricultural raw materials – still account for more than one half of the total earnings. As per capita incomes have risen and the middle class has expanded there has been a gradual shift towards high value products such as dairy, meat, eggs, fruits and vegetables, fisheries. The four Major Crops – Wheat, Cotton, Rice and Sugarcane – which used to form the bulk now account for a little more than one-third of the agriculture sector value added. Despite such dominant importance of agriculture in Pakistan’s economy the recent stagnation in agriculture growth rates and farmers’ yields, declining availability of water and high rate of malnourishment have become sources of major concern.

 Table I below shows agriculture sector growth rates in Pakistan for the last five decades.

Table I

Agriculture Sector Growth Rates

**1960 – 2010**

**%**

1960s 5.1

1970s 2.4

1980s 5.4

1990s 4.4

2000s 3.2

*Source: Pakistan Economic Survey 2009-10*

 From an average growth rate of 5.1 percent per year – one of the highest in the developing countries – it has slowed down to 3.2 percent – a little above the population growth rate. The main reason for this decline and stagnation lies in the gradual erosion of productivity gains. Two-thirds of the growth in the 1980s emanated from productivity increase. By 1990s productivity increase accounted for one third and in 2000s only one fifth of the average growth. The gap between the national average yields and those of the progressive farmers has been widening during the last two decades. In case of Rice and Wheat the gap is about 45 percent of progressive farmer yields while in sugarcane it is about 73 percent.

 Among the multiple factors responsible for losses in agriculture productivity and the widening gap between the national average yields and those of the progressive farmers one that stands out on the top of the list is the inefficiency of Pakistan’s national agriculture research system. After the big impact of the Green Revolution Technology of Fertilizers and Seeds tapered off in the 1980s, there has hardly been any major breakthrough in agriculture technology. The agenda for research is quite vast and includes development of high yielding heat and cold tolerant, drought resistant and short duration varieties of field crops, water and soil conservation technologies, moisture management, green manuring, precision leveling, tunnel farming, bio-fertilizers, reclamation of saline and water logged soils, zero tillage, intercropping, and ridge sowing. Some of the progressive farmers who are using some of these technologies along with drip and sprinkler irrigation have obtained higher returns to their investment. Agriculture credit system and crop insurance targeted at small and medium farmers could induce them to adopt these techniques on their farms. National Agriculture Research system has suffered not only because of the budgetary allocations being curtailed the human resource capability, organizational inertia, bureaucratic procedures and processes, overlap and lack of clarity in the roles of national and provincial agriculture research institutions have all contributed to this poor outcome.

 Another critical constraint is the poor utilization of the vast irrigation system. Per capita availability of water has decreased to 1066 cubic meters placing Pakistan in high water stressed countries category. Any other country which had about 95 percent of arable land cultivated under irrigation would have been a major player in global food and commercial crops markets by utilizing this scarce resource more efficiently. But this potential has not been realized as the total water productivity in Pakistan in 2011 remains only one half of that of India. Pakistan produces only 0.13 kilogram per cubic meter of water. This shows the tremendous scope of increased GDP and agriculture production if this gap in productivity is narrowed. Irrigated crop intensity is also lower. Despite the rate of irrigation expanding at 1.4 percent a year cropland has been shrinking at an average 0.4 percent a year. Mismanagement, governance and poor maintenance of the Irrigation System have limited farmers’ access to water particularly those at the tail-end of the water courses. Influential and politically well-connected farmers receive excessive supplies and waste water by over irrigating their land. while the poor farmers can’t get even one or two watering in the required quantities for their crops. Studies have shown that 60 percent of the water delivered at the head does not reach the farms because of transmission losses in the distributaries, canals, water courses and fields. There is also the issue of timing between the supply and demand for water. Supply peaks during summer; demand is spread over the year. Storage capacity that could collect excess water in the peak season and release it according to the demand is inadequate and no big dam has been constructed since Tarbela in the 1970s. Political controversy has vitiated the overall atmosphere for building storage dams in the country.

Financial Sustainability of the system is another major area of concern. Water user charges collected from the farmers amount to a paltry 0.5 percent of crop revenue and do not cover even 25 percent of the operations and Maintenance expenses of the Irrigation Canals, channels and courses, accentuating Vulnerabilities and risks to the integrity the system. The collection rate of these charges is also low about – 60 percent of the receivables – forcing Government to subsidize the irrigation water users. Moreover, the big farmers are also for all practical purposes exempt from paying agriculture income tax. Irrigation System therefore naturally suffers from serious underinvestment in balancing, modernisation, expansion, storage, lining of canals, drainage etc. The present flat rate of irrigation charges is both inefficient and inequitable. Consumption by volumes should form the basis for assessment of charges. This would lead to both water conservation as well as fairness in burden sharing.

 The impending risks associated with Climate Change have not yet caught the attention of the policy makers. Climate Change is mostly likely to melt glaciers affecting downstream water availability, impact annual rainfall pattern and raise sea level. The irrigation system of Pakistan draws its sustenance for fresh water from the glacial melt of the Himalayas as 70 percent of the flow of the Indus River is contributed by this Glacial melt Global warming will accelerate the melting of the glaciers increasing the risk of floods in the short run due to more run offs in the rivers. In the long run, there will be shortages of water as the run offs decline. A study has shown that by 2050 almost 35 percent of the glaciers will disappear and river run-offs will increase. After that, the glacial recession will result in a decrease in river flows by 30 to 40 percent during the next 50 years. Simulation studies depicting various scenarios of Climate Change show that the agricultural GDP could decline by 5 percent from its base value. However, if an additional 12 MAF of Canal Water out of 106 MAF could be saved and utilized for irrigating cropland, agricultural GDP could be boosted by 4.2 percent.

 Monsoon rains are a vital source for agriculture production supplementing the canal and ground water use. Warm temperature by decreasing rainfall and increasing variability in the magnitude and timing of rainfall can result in greater water stress. Rain-fed agriculture is the main source of livelihood for the poor population living in the arid and semi-arid zones of the country. The negative impact of this changing weather pattern would have disastrous consequences for their lives. It is projected that there would be a decrease in monsoon precipitation of about 20 percent in Pakistan.

 The other risk from Climate Change is the probability of increased incidence and frequency of extreme weather events such as floods, droughts, cyclones etc. Floods in Pakistan in 2010 affected more than 20 million people and were followed by the floods in Sindh province in 2012.

 In an environment of system-wide water stress, declining per capita water availability for agriculture and food production, growing need for hydropower development the likelihood of Trans-boundary disputes and conflicts between upper riparians and lower riparians are also likely to surface more intensely. The retention of water upstream in India for energy generation has already given rise to serious apprehensions in Pakistan that this will restrict water flows downstream for Pakistani farmers. The Indus Water Basin Treaty provides the framework in which these disputes are resolved but in the coming years the overall shortages of supplies resulting from glacial melting and precipitation losses will give rise to greater contention between the two countries. A new mechanism will have to be evolved and agreed upon for meeting the future disputes.

 Climate change will thus impact the agriculture sector by negatively affecting crop yields with serious consequences for food security. Rice and wheat yields would be reduced and the overall decline would be between 2 to 4 percent by 2020. There may be a shift in the sowing time due to heat stress while increased humidity will heighten the threat of pest attack. Physiological stress may reduce the reproduction of animals affecting livestock production in the country. A study by IUCN suggest that Livestock production could decline by 20-30 percent due to rising temperature creating crises in milk, meat and poultry supplies pushing prices beyond reach of the average Pakistani. On average, rough estimates show that Pakistan’s agriculture sector could lose $2-16 billion per annum due to change in climate by the end of 21st century.

 The other burning issue that requires attention is that of Food Security. Public policy has so far focused exclusively on increasing aggregate food production and self-sufficiency in wheat – the staple food consumed by most Pakistanis. Food security has never been an explicit objective of policy makers. The average per capita daily consumption which was 2,375 Kcal in 1990s has fallen to 2250 Kcal by 2007 compared to 2,630 Kcal in developing countries. Lack of access rather than lack of food supply is the main factor behind food insecurity because per Capita Food Production index has increased from 99 in 1991 to 106 in 2008. It is estimated that about 15 percent of the wheat crop is lost annually due to wastage inefficient handling in procurement, distribution and transportation, inadequate and poor storage facilities. The other factor is income inequality as almost half of the population spends less on food than required for a healthy and active life. The situation gets worse for those in the lowest income quintiles. Average monthly household consumption in the lowest quintile in urban areas is only one third of the highest quintile and less than half of the average. This disparity in the consumption pattern is an outcome of several factors – open and disguised unemployment and underemployment, high inflation and lagging real wage rates, absence of social safety nets and poor access to health care and unhygienic practices related to nutrition, child and maternal care. In last six years, food inflation in urban areas has outpaced growth in income. In the rural areas 60 percent of the rural population buys food from markets. Inflationary pressures therefore hit them equally hard. Although the government pays substantial amounts on wheat subsidy in the name of poor urban consumers the beneficiaries are the flour mill owners. Similarly, the subsidies on fertilizer are also captured by producers and large farmers rather than those for whom the subsidy is intended – small and marginal farmers.

In the case of sugar industry, political patronage rather than consumer welfare has been the major determinant of public policy. When there is surplus production, the government takes upon itself the responsibility to purchase the surplus sugar from the mill owners and sell it at a loss in international markets. When there are shortages domestically imports are delayed until the sugar mills have realized windfall gains by selling at higher market prices.

The Millennium Development Goal (MDG) to reduce the number of undernourished population by half by 2015 is unlikely to be achieved. The latest number show that one in every four of the population is still malnourished and child nutrition has not shown much improvement either.

To sum up, there is a need to rethink our agriculture sector strategies away from the past emphasis on production and supplies alone but to address the new challenges that we are likely to face in the next three to four decades. Climate change, water productivity, Food insecurity are the emerging issues that need the focus and attention of public policy makers.