**AGRICULTURE VISION 2030**

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A fast growing economy, a rising urban middle class, a predominantly young educated population and the changes in climatic conditions will have serious repercussions on food production, food security, nutritional status and cropping pattern in the not so distant future.

Although economic growth rates have slowed down in the last five years, Pakistan’s long term annual growth of per capita income has been around 2.5 percent. It is estimated that in real terms, per capita income had quadrupled four times by 2003. If the growth rate reverts to the historical mean, an average Pakistani will be earning eight times higher in real times by 2031. At present, this may look like a herculean task but good governance, sound economic management and continuity and consistency in economic policies would make it happen.

This general affluence will be accompanied by a rising middle class. The proportion of the middle class in 2010 is estimated to be one-third of the total population i.e. approximately 60 million. By 2030, Pakistan’s population would be around 260 million and if the current trend of urbanization and income growth persists, about 150 million people will fall in middle income class category. Their incomes and living standard would be comparable to those in Southern European countries with average incomes of over $20,000 a year. This class will comprise mainly of professionals, businessmen, public, private, NGO sector executives and services providers etc.

More than 60 percent of Pakistanis will be living in megacities, metropolitan areas, large cities, towns and peri-urban localities by 2030. Urban population growth rate has been twice as fast as rural because of migration. The pull factor of the cities largely due to better jobs and livelihood opportunities act as a magnet for the migrants to Karachi and Lahore. Other big cities by 2030 would be Faisalabad, Rawalpindi, Multan, Hyderabad, Gujranwala, Peshawar and Quetta.

By 2030, 67 percent of the total population will fall in age group 15-64. As life expectancy rates and health standards improve and female literacy rates rise the proportion of working population with both members of the family earning incomes, will also show an upward incline. Urban Literacy Rate in 2011-12 was 74 percent compared to 48 percent in the rural areas. By 2030 not only the urban literacy rate would cross 100 percent mark but the ratio of college and university graduates, skilled and technically qualified manpower and high-end professionals would be significantly large.

These changes in incomes, location, demography, educational and nutritional status would exert a demand for foods very different from the existing pattern. The tastes and preferences of urban educated middle class, with higher income will generate a shift in the food consumption basket away from cereals towards meat, poultry, dairy products, edible oil, fruits & vegetables, sugar, fish, etc.

On the supply side, the rate of increase in global food output has slowed down. Rates of investment in agricultural are lower, competition for water and land is becoming tough, the pace of new technology and innovation breakthroughs has slowed down, cost of production is rising due to high petroleum prices and the subsidy policies of high income countries continue to create price distortions in world commodity markets. Projections show that real prices for food and the inputs for agricultural production will remain higher for the coming decade compared to the past decade. This implies that Pakistan will be better off if it plans to produce food items domestically by taking advantage of its irrigated land, low cost labor and technological innovations.

In Pakistan, the average growth rate of agriculture has decelerated from 5.4 percent in the 1980s to 3.2 percent in 2000s. Any technological breakthrough of the Green Revolution type does not appear imminent in the immediate future and therefore this growth rate is unlikely to improve in the coming decade. There have also been perceptible changes in the composition of national output and agricultural sector. Agriculture now accounts for only one-fifth of the national output and this share in all probability will slip downwards to 12-15 percent by 2030. Surplus Agriculture labour force that is about 40 percent presently will also move out and expected to be absorbed in the fast growing urban centres and burgeoning services sector. Educated labor force would not stay in agriculture unless new technologies or innovative practices requiring skilled manpower are introduced. Rough estimates put the labor force working in agriculture and agriculture-allied activities at 30 percent of the total employed by 2030. Unless these constraints are removed, the domestic food supply situation does not look as promising as it did in the decades of 1980s and 1990s.

Past historical evidence, however suggests, that labor and land productivity gains can take care of the additional demand for food, provided all the inputs such as energy, irrigation water etc. are available proportionately and input price hikes do not outstrip the output price increases. Productivity per unit of land and per unit of water in Pakistan relative to Indian Punjab is low and there is thus much scope for increasing productivity. Furthermore, the mix of agriculture output has to change from staple grains and cereals to high value agricultural commodities. Livestock and Dairy products now account for more than 50 percent of the agriculture value added while 35 percent originates from the major crops, 11 percent from minor crops (lentils, fruits, vegetables etc.) and 3 percent from fisheries and forests. By 2030, the contribution of Livestock, Diary subsector and Minor Crops will have to rise at the expense of grains and cereals. There are a host of sectoral reforms that have to be implemented in the next 20 years to achieve the postulated productivity gains and meet the changing demand pattern.

The most important reform to make the agriculture sector efficient, remunerative for the farmers, competitive for the consumers and responsive to the changing demand pattern has to be in the area of agriculture marketing. The present collusive marketing system where the petty officials of Agricultural Departments and the cartels of arhthis or middle men are causing havoc to both the consumers as well as producers will have to be dismantled. Pakistan will have to develop a unified market linking the farms to retail outlets covering the full supply chain particularly in the high value commodities . Investment in on-farm storage, refrigerated vans and specialized trucks, silos and warehousing, wholesale chains supplying to the processors and opening up the highly inefficient and regulated marketing competition will eliminate the excessive rents earned by those involved in the present arrangements. This ‘unearned’ premium under a reconfigured modern value chain bolstered by competitive forces will then accrue to the farmers and the consumers while acting as a restraint on food inflation..

The positive effects of marketing reforms should be considered against the backdrop of the water availability particularly due to the changes in Climatic conditions. 18 million hectare land is irrigated out of the total cultivated are of 21 million hectare but 55 percent of irrigated land is devoted to low value high water consuming crops. The yield per cubic meter of water is only 0.4 tons of wheat compared to 0.9 tons in India and 2.5 tons in Argentina. Water losses between Canal heads and water courses account for one third of the total amount drawn from the rim of the river tributaries. Another 25 percent is lost within the farms. Thus 76 MAF out of 135 MAF average annual flows is lost due to poor transmission and seepage. Surface water is augmented by about 55 MAF of ground water pumped out by 0.5 million Tubewells throughout the Basin. Ground water thus provides half of all farm irrigation requirements. The actual water use in the four major crops is given in Table I below:

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| **Table I** |
| **Water Utilization in Major Crops** |
| **Crops** | **Hectares (Million** | **Water in Cubic Meter(Millions)** | **Water in Cubic Meter/ Hectares** |
| Rice  | 2.419 | 70.508 | 29.15 |
| Cotton  | 2.955 | 51.427 | 17.40 |
| Wheat | 7.554 | 51.418 | 6.81 |
| Sugarcane | 1.059 | 48.882 | 46.16 |

It can be seen from the above table that sugarcane requires 6.8 times more water than Wheat, 2.7 times more than Cotton and 1.6 times more than rice. But the farmers pay flat charge of Rs.150/ hectare irrespective of the amount of water they have used. Had there been volumetric pricing the cropping pattern would have shifted away from water-intensive crops and inefficiencies and waste would have been curbed. The challenge for Pakistan’s agriculture in the future is how to maximize yields per cubic meter of water. System improvement through remodeling, rehabilitation and lining of canals and water courses and then periodic maintenance and effective management of the entire system will help.

The main reason for this disastrous situation is that the institutions responsible for managing irrigation system have become politicized. They are highly bureaucratic and ridden with corrupt practices and misuse of power. There is hardly any accountability for the results as those responsible for supervision of the field officials are themselves complicit in these practices. Modern agriculture depends on economic land holdings of a certain minimum size. Sub-division of land because of inheritance laws, on the other hand, have led to declining farm sizes. A highly intrusive land bureaucracy characterized by the stranglehold of patwaris and tehsildars has made land record keeping and maintenance of ownership deeds and title extremely opaque and susceptible to manipulation and tampering. This legacy has not allowed a transparent land market to function and limited investment in on farm improvements, land consolidation and other related infrastructure .

Under the unchanged scenario the projected shortfall in water requirements for agriculture by 2030 is estimated between 25 to 30 percent. There is overwhelming evidence and almost a consensus that carbon-di-oxide emissions will raise the global temperature by more than 2oC. This will cause melting of glaciers in the Himalaya range, with sudden floods followed by reduction in the flows in Indus River. These losses in water flow would reduce the availability of irrigation water for crop. Although there are no firm estimates but the shortfall may reach as high as 40-50 percent if timely policy actions are not taken. Yields are , therefore, bound to decline from their current levels at a time when population will be rising. High value crops and livestock products that will be in high demand are more water intensive will require more water inputs. For example, it will take three to four times more water to produce one kilogram of beef than one kilogram of grains. The use of water will therefore become the critical constraint for agricultural production. But paradoxically, both the surface and ground water are being, at present, used inefficiently and inequitably. Israel has 1.4 MAF of water producing $12 billion worth crops annually. Pakistan has 135 MAF producing crops valued at $40 billion. The factors responsible for this inefficiency and inequity are manifold. Markets in water are non-existent, regulatory framework is ineffective and mispricing and system losses are widespread. Scarcity premium on dwindling water availability is not reflected in the end-use price. Irrigation charges (Abiana or water user charges) that used to recover the operation and Maintenance (O&M) of the system have fallen to such low levels that they are able to cover one tenth of the O&M costs. Irrigation cost at one time was as high as 45 percent of the overall cost structure of typical rice growing farmers. Today it is less than 1 percent. The incentive for waste and misuse under such distorted price structure is naturally quite high. In absence of adequate budgetary allocations, repairs, periodic maintenance and strengthening of the system have been neglected reducing the usefulness of the asset. Instead of focusing on water resources management that is able to deliver reliable timely water to all the users with minimal losses there is a single minded preoccupation with building new dams, canals, barrages and other physical infrastructure works. The estimated value of Irrigation infrastructure built in Punjab alone is about $20 billion. Maintenance and replacement require about $0.6 billion annually. The actual expenditures are only $20 million and the backlog of postponed maintenance is causing serious risks to the system. The World Bank in its latest report has turned this phenomenon as “Build, Neglect and Rebuild”.

Poor Governance and corruption have made distribution system highly inequitable. One third of the total flow in some areas is diverted by large and influential farmers from ‘direct outlets’ bypassing the varabandi system of sharing. Small farmers and tail enders get 40-50 percent less than those at the head-end. Head Enders usually apply 4 to 5 irrigations per field while the tail-ender may apply as few as one or two. As water is not available on time and in required quantities, small farmers and tail-enders are unable to use other complementary inputs such as fertilizers. Consequently, water stress damages a crop’s growth cycle. The productivity gap in the same ecological zones between the progressive and large farmers and other farmers can be bridged by redistribution of water currently used in excess by head-enders. The latest Agriculture census shows that about 70 percent of the total private owned land belongs to farmers with less than 20 hectares. The yield differences between the average national yields and those of the progressive farmers vary between 30 to 70 percent.

Agriculture extension services of the Provincial Governments have been weak as they are infested with people with poor technical skills and subject matter knowledge, little accountability for results, and outdated practices of dissemination and communication. Whatever limited resources are available with the Agriculture departments are mainly deployed to serve the interests of large and politically connected farmers. Small farmers who need extension services badly get hardly served.

The above analysis shows that to meet the needs of food production and food security in an adverse climatic conditions, agriculture sector reforms world have to be implemented in a number of key areas. These reforms are briefly sketched in the following paragraphs:

 **Reforms in agricultural sector**

1. Develop flexible rural factor markets – Land, Labour, Water, and Finance – and allow them to operate in a competitive market structure.
	* 1. Establish clear land titles and land right security, computerized land records, web-based information on ownership and tenancy arrangements. Simplified alienation, transfer and mutation procedures are needed for efficient land markets to function. These land markets will lead to consolidation of holdings and avoid increasing fragmentation. Land can then be pledged as collateral for bank borrowing and investment. Leasing land by paying rentals can become a source of livelihood for landless and poor households neutralizing the detrimental effects of land purchase and consolidation by efficient commercially-oriented farmers.
		2. Water markets with alienable water rights along with alternative systems to conserve and save water such as Drip irrigation, Sprinkler Irrigation and appropriate water pricing can bring about some improvement in the efficient utilization of the scarce resource. Water charges from the users should be based on actual volumetric draw down and the total annual collection must atleast equal the maintenance cost i.e. 1% of the value of irrigation infrastructure.
		3. Labour market in agriculture would face shortages as educated young men and women migrate to live in urban centres or overseas. Skill intensity and capital intensity would have to be raised to substitute for declining unskilled agriculture labor force. Sector-specific technical and vocational training would have to be promoted and delivered.
2. Remove the restrictions imposed on whole sale transaction for agriculture commodities under the Agriculture Produce Markets Act 1939; discontinue government procurement of Wheat and issuing of Wheat at subsidized prices to the flour mills from government stocks and limit the roles of Foods Departments, PASSCO and TCP in the purchase and trading of agri-commodities.
3. Agri-business sector should be facilitated to modernize the whole value chain from the farm to retail outlets. Input supplies, transport, storage and warehousing, Cold Chains and refrigerated vans, processing and wholesale and retail marketing of agriculture commodities should be in the hands of the private sector. Government’s role should be limited to quality control, enforcement of standards, grading, consumer and farmer protection, and food security.
4. Access to agriculture credit for production, distribution and exchange is limited to a small proportion of farmers. Innovative schemes such as warehouse receipt system linked to a bank which can pledge stocks and advance loans should be introduced.
5. Intensify efforts on Research and Development and its linkages to extension with focus on system-based approach in place of commodity specific research. Finding new strains that can survive and produce high yields in water stressed conditions should get priority. Allocations for Agriculture Research and development by the provincial governments in partnership with universities and the private sector should be stepped up. Transfer and dissemination of technology and research findings can take place through strong partnership with private sector and NGOs.
6. Institutions such as WAPDA, IRSA, Irrigation Departments, PIDAs, Area Water Boards and Users Association have to be restructured and reorganized. Their technical and organizational capacity should be geared to manage the integrated water resources system equitably and efficiently. Performance evaluation and annual increments should be linked to key indicators of delivery of services and maintenance of the system. Their budgets should be based on the assessment and collection of water user charges. The responsibility for bulk water supply from rivers and canals should remain with Irrigation Departments or Authorities but the distribution from minors and water courses should be assigned to Farmers organizations and private service providers.