

Agricultural 'Crisis' in Pakistan: Some Explanations and Policy Options

MAHMOOD HASAN KHAN

INTRODUCTION

This paper is about public policy and agricultural growth in Pakistan. The author takes the position that, in a historical perspective, public policy has been a large part of the erratic, maybe unsustainable, growth of agriculture in Pakistan. The most important policy issue, therefore, is to radically restructure the existing bureaucratic, patronage-ridden, rent-seeking, and wasteful system of institutions and services. Governments have been far too active in some areas and far too inactive in others, affecting perversely farm productivity and farmers' economic well-being. The flaws in public policy reflect two important aspects of governments: (i) their inability—reflecting both inadequate will and administrative capacity—to implement what needs to be done and (ii) their wrong diagnosis of, hence prescription for, the problems.¹

Governments have played an active role in agriculture in a variety of ways, e.g. adjusting the agrarian structure; providing physical infrastructure and inputs; regulating domestic and foreign trade; intervening in producer and consumer prices; and using fiscal and monetary policies. These interventions have affected the incentives for farmers, distribution of benefits between classes, terms of trade for agriculture, and government revenue. Their exact impact is not easy to measure because of the complex interactions among them. Certain policies have not been used or followed through because of the political constraints, even when the

Mahmood Hasan Khan is a Professor in the Department of Economics, Simon Fraser University, Canada.

¹An example of the wrong-headed public policy, contributing to the *atta* (flour) crisis, has been subjected to an excellent analysis by Kaiser Bengali, "Anatomy of the Wheat Crisis," *Daily Dawn*, Karachi, September 30, 1997. A more serious example is the 1997 "agriculture package", which relies heavily on (i) significant increase in support prices of major crops, (ii) increased budgetary subsidy on inputs and tariff concessions and (iii) substantially expanded credit through ADBP and other institutions. Most of the expected benefits of these measures are most likely to go, given the past experience, to large landowners. In this context, a general issue of public policy has to do with corruption associated with the pervasive involvement of government functionaries, including politicians, in the economy. A recent review of the literature [Bardhan (1997)] on corruption in development is of direct relevance to the debate in Pakistan.

objectives were well-defined and generally regarded as desirable. These constraints reflect the highly unequal distribution of economic political power within agriculture and the conflict between the agricultural (rural) and industrial (urban) elite about the inter-sectoral transfer of resources in the development process. Often policies and actions of governments have not been consistent with one another or with the expressed goals. Another major constraint has been the inadequate management capacity of the public sector institutions. To be fair, governments have not been well served by some of the reports in view of their misleading advice based on highly flawed or self-serving analysis of the problems.

The author does not take an apocalyptic—and of the world—view about Pakistan's agriculture. Also, he will avoid using rhetorical exaggeration (hyperbole) as is often the practice in discourse on this and related public policy issues. Too many clichés and emotive expressions are used almost habitually. Some of these are clearly vacuous, but others are seriously believed with disastrous consequences. Admittedly the issues under discussion are complex and contentious but by no means beyond reasonable solution. The paper focuses on five major issues: (1) pattern and sources of agricultural growth, (2) rights to own and use agricultural land and irrigation water, (3) public investment in infrastructure and support services, (4) macroeconomic policies affecting resource allocation, resource transfer, and income distribution, and (5) public sector agencies and enterprises involved in production, distribution and marketing.

1. PATTERN AND SOURCES OF AGRICULTURAL GROWTH

Pakistan's economic record has not been too bad: its Gross Domestic Product (GDP) has increased annually at 5 percent since 1950 (Table 1). Agricultural growth has, however, been modest and quite uneven: agricultural output has grown annually at just about 3.5 percent. The most impressive performance of agriculture was in the 1960s (5.1 percent) followed by the decade of the 1980s (4.1 percent); but in the 1950s and 1970s the rate of population growth was higher than the growth rate of agricultural output. In the last seven years, agricultural output has grown annually at 3.8 percent, with poor performance in 1992-93 and 1996-97. The decade of the 1990s so far has not been a good period for economic growth in Pakistan.²

The highly aggregate growth rates of agricultural output do not reveal several important aspects of growth and distribution. For one, thing, not all sub-sectors in agriculture have experienced sustained growth, which is amply demonstrated by serious commodity imbalances within one crop year and over time. Second, not all growth in output, even in those activities in which it has been experienced in any significant way, has come from increased efficiency or at lower cost. Third, the

²A detailed analysis of the economic and political problems of Pakistan in the last 15 years has been done by Khan (1997).

Table 1
*Changes in GDP, Agricultural Output, and Total Factor Productivity
 in Pakistan's Agriculture, 1950-1997*

Period	Annual Rate of Changes (%)		
	GDP	Value of Agricultural Output	TFP in Agriculture
1950-55	3.4	1.4	-
1955-60	3.1	2.1	-
1950-60	3.2	1.7	-
1960-65	6.8	3.8	1.0
1965-70	6.8	6.4	3.2
1960-70	6.8	5.1	2.1
1970-75	4.5	0.8	-0.7
1975-80	6.6	3.9	0.4
1970-80	5.5	2.4	0.0
1980-85	6.7	3.8	1.1
1985-90	5.6	4.4	0.4
1980-90	6.1	4.1	0.9
1990-96	5.0	4.4	1.1
1996-97	3.1	0.7	-
1960-96	5.9	4.0	0.9

Note: The average annual growth rates of real GDP and agricultural output have been estimated from data reported in various issues of *Economic Survey* and *Agricultural Statistics of Pakistan*.

growth experience has been highly uneven between various regions even within one province, particularly between regions with and without irrigation. Of course, provinces with limited irrigation facilities and infrastructure have been seriously handicapped. Finally, farm groups have also been affected unequally, depending upon their access to land and other related income-earning opportunities within agriculture or outside. All of these generalisations cannot be demonstrated with precision mainly because of insufficient data, but they are supported by a substantial body of evidence from studies based on the scattered primary (farm-level) and secondary (aggregate) data.

The growth in agriculture has come mainly from major crops. This sub-sector has dominated the agriculture sector and the national economy, with wheat, rice, cotton, and sugarcane playing the dominant role in providing food security and foreign exchange earnings. Minor crops have shown a more significant and sustained process of growth than that experienced by major crops. They have escaped the government's procurement policies and have responded well to the relatively sharper price increases in the open and unregulated markets. The increasing demand for fruits and vegetables in the domestic and Middle East markets has been another major factor, leading to an expansion of the area used for orchards and vegetables. Their

production levels have also increased significantly since the mid-1970s. Livestock products account for nearly one-third of the value-added in agriculture. Their annual growth rate increased from about 2-3 percent in the period from the early 1950s to the early 1970s to around 5 percent in the early 1980s and has been around 6 percent since the mid-1980s. Sharp price increases of livestock products and the increased area for fodder crops have been the two main sources of development in this sub-sector. Favourable changes in public policy and the increased private investment since the early 1980s have shifted the emphasis from small-scale (fragmented) production to the development of large-scale cattle farms. The dairy and meat industries are apparently now responding to the rapid growth of demand for these products. A relatively well organised and efficient poultry industry has already emerged in the urban areas of the country since the late 1970s.

In the last fifty years, the aggregate output of major crops has increased by very different proportions. The annual output of foodgrains has nearly quadrupled as has been the case for wheat and rice separately. However, the output of foodgrains in per capita terms declined from 162 kg. in the late 1940s to 134 kg. in the mid-1960s, then rose to 185 kg. in the first half of the 1980s, but has fallen to 173 kg. in the mid-1990s. The output of cotton and sugarcane has increased by nearly nine and six times, respectively, since the inception of Pakistan. The data on milk, meat and fish production are available only since 1971 and are perhaps less reliable. They show that milk output per capita was declining throughout the 1970s (from 123 kg. in 1971 to 112 kg. in 1980), but has increased significantly since the mid-1980s, rising from 115 kg. to 151 kg. until the mid-1980s. On the other hand, there has been an almost consistent increase in the level of meat output per capita, rising from 9 kg. in 1971 to 11 kg. in 1985 and 18 kg. in 1995.

Successive governments have imported various food commodities in substantial quantities to provide "food security" in Pakistan. The most striking increase has been in the import of edible (soybean and palm) oils to meet the rapidly growing demand for vegetable oil and products in the face of very slow growth of output of non-traditional oil crops in the country. Wheat has been imported in different quantities, ranging from about 4 percent (1981-85) to 14 percent (1970-75) and 18 percent (1990-97) of the domestic output. Similarly, refined sugar has been imported at a level of about 4 percent to 20 percent (1986-90) of local production. Its import has fallen to less than 5 percent of domestic output since 1990, which is a reflection of the growth of sugarcane and sugar in Pakistan mainly because of the generous protection given to the sugar industry. The import of dry milk has increased since the late 1970s because of the rapid increase in urban demand and inadequate increase in local production. Governments have also imported variable quantities of lentils and onions to meet the seasonal (periodic) shortages in urban markets.

Among the crude indicators of agricultural productivity, crop yield per hectare has been used quite widely. The current yield levels of major crops, except seed cotton, in Pakistan are far lower than the world average (Table 2). The yield gaps are very large for maize, soybean, sugarcane, and rice. Among the major producers of each of these crops, Pakistan stands in the lowest 20 percent. The estimated trend rates of yield levels show some interesting changes. The yield levels have increased only modestly in the last fifty years: cotton output per hectare rose annually at 5.2 percent, followed by foodgrains (3.0 percent), wheat (2.8 percent), rice (2.1 percent), and maize and sugarcane (each at 1.0 percent). In the first 8 years after 1947, the crop yields were either stagnant or fell (wheat, rice and sugarcane), except for cotton. In the 15 years following 1959-60, there was significant growth in the yield levels of wheat, rice and cotton but modest growth in sugarcane. Since 1980, the cotton yield has maintained an annual growth rate of 3.5 percent, followed by foodgrains and wheat (1.8 percent), sugarcane (1.1 percent), maize (1.0 percent), and rice (0.8 percent).

Table 2
Output per Hectare of Major Crops, 1947-48—1994-97

Year	Yield Level in Metric Ton per Hectare					
	Food-grains	Wheat	Rice	Maize	Sugarcane	Cotton Lint
1947-48	0.74	0.85	0.88	0.99	30.51	0.157
1949-50	0.79	0.94	0.87	1.01	35.61	0.203
1954-55	0.70	0.75	0.87	1.00	29.19	0.221
1959-60	0.76	0.80	0.99	1.03	29.93	0.212
1964-65	0.83	0.87	1.00	1.09	37.11	0.258
1969-70	1.13	1.16	1.48	1.03	42.53	0.304
1974-75	1.24	1.32	1.44	1.22	31.56	0.312
1979-80	1.41	1.57	1.58	1.25	38.30	0.350
1984-85	1.48	1.61	1.66	1.27	35.55	0.450
1989-90	1.62	1.83	1.53	1.37	41.56	0.560
1994-97	1.85	2.05	1.79	1.46	45.75	0.556

Source: See Table 1.

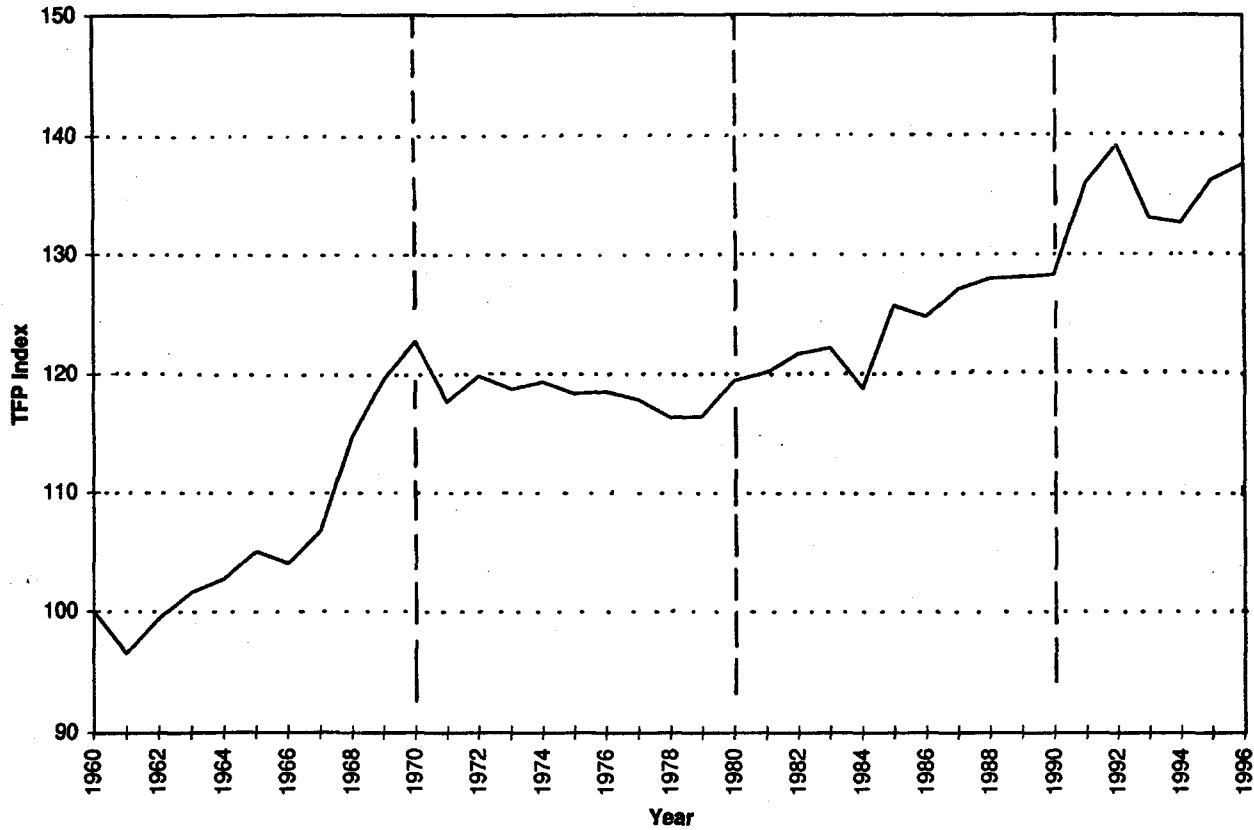
The partial productivity measures, such as crop yield per hectare, do not indicate the efficiency of all resources (inputs), such as land, labour and capital, used in agricultural production. This can be done only by measuring Total Factor Productivity (TFP). So far three studies of TFP in Pakistan's agriculture have been cited in the literature.³ However, their results are not only at variance with each other but questionable because they suffer from serious deficiencies in terms of either the indexing method or the data used for inputs and outputs. In this study, using the Tornqvist-Theil index method, the author has estimated TFP in the agriculture sector (crop and livestock production) for the period 1960–1996.⁴ The method and data are discussed in Appendix I. The estimates show that TFP increased only modestly at 0.92 percent per year during this period (Table 1 and Figure 1). A related fact is that technological change has played a very small part in the growth of total agricultural production in Pakistan: only 38 percent of the increase in total agricultural output can be attributed to technological change and the rest to increased quantities of inputs. Some interesting observations can be made by putting together the growth of aggregate output and TFP in agriculture. A respectable annual growth rate of 4 percent in agricultural output since 1960 has been accompanied by less than one percent annual growth of TFP. It was only in the 1960s that both output and TFP grew at rates of 5.1 and 2.1 percent, respectively. The decade of the 1970s witnessed no growth in TFP and aggregate output grew only at 2.4 percent. In the last sixteen years, it seems that TFP grew at around one percent, although output was growing annually at just over four percent.

Increased inputs have been the predominant source of the observed increase in agricultural production, including crop area, irrigation water, seeds, fertiliser, machinery, credit, and agricultural labour (Table 3 and Table 4). Since independence the cultivated, irrigated and cropped areas have all increased significantly: 47 percent in the case of cultivated area; irrigated area has almost doubled; and cropped area has

³Each of these studies has serious limitations. Two of the studies, one by Wizarat (1981) and the other by Khan (1994), while they cover periods of 1953 to 1979 and 1981 to 1993, have assumed a linear (Cobb-Douglas) production function and estimated arithmetic indexes of output, input and TFP. The third study, by Rosegrant and Evenson (1993), has used the Tornqvist-Theil index, but its database is highly dubious since it claims using the district-level data for prices, inputs and output for the period 1956–1985. Further, the authors estimate TFP for major crops only. In an unpublished study, Ali (1995) has estimated changes in partial and total factor productivities in crop production in Punjab and Sindh during 1970 and 1989 and attempted to link these changes to land fertility. His hypothesis is that input intensification may have led to soil degradation, which in turn would explain falling or stagnant factor productivities. However, the author, like Rosegrant and Evenson, has not explained the sources of district data on inputs. He has also used questionable methodology in linking soil fertility to changes in factor productivities. Several studies have been published on single-factor productivity measures (yields per hectare) of major crops and attempts to decompose the underlying sources of change. See, for example, Byerlee (1994) and Byerlee and Siddiq (1994).

⁴The index number approach used here and other econometric methods for the measurement of productivity and technological change are analysed in detail by Alston, Norton and Pardey (1995).

Figure 1. TFP Index for Agriculture in Pakistan, 1960-96



expanded by 88 percent. One result of increased availability of irrigation water has been a 40 percent increase in irrigation intensity and a 26 percent increase in cropping intensity: currently each cultivated hectare is being cropped throughout the year. Water availability has increased from 3.2 to 5.8 acre-feet per hectare. Fertiliser use has quadrupled since the mid-1970s and is now around 110 kg per hectare. The density of both tubewells and tractors has increased sharply in the last twenty years. Institutional credit increased from Rs 10 per cropped hectare in 1970 to Rs 865 in 1997. However, it should be added that improved seeds have not become a significant factor in crop production, except for cotton.

The clue to the very slow growth of TFP can be found in both the *institutional* (structural) and *technical* factors. Institutional factors comprise the rights to ownership and use of agricultural land, access to canal water and the macroeconomic environment. Technical factors include the quality of inputs and availability of physical and social infrastructure. In the context of low productivity growth in crop production, considerable attention has been paid in the literature to the technical factors, including low level of fertiliser use and improper balance of nutrients, poor quality seed, improper use of irrigation water, soil degradation due to waterlogging and salinity, poor disease control, and inadequate cultural practices. The institutional

Table 3

Land Use for Agricultural Production, 1947-48-1996-97

Year	Reported	Cultivated	Cropped	Irrigated	Cropping	Irrigation
	Area	Area	Area	Area	Intensity	Intensity
	Million Hectares				(Percent)	(Percent)
1947-48	46.08	14.69	12.04	8.83	82	60
1949-50	46.56	14.99	12.75	8.98	85	60
1954-55	46.69	15.32	13.24	9.97	86	65
1959-60	48.46	16.51	14.69	10.35	89	63
1964-65	52.86	18.72	16.25	11.44	87	61
1969-70	52.93	19.23	16.77	12.49	87	65
1974-75	53.92	19.55	17.37	13.34	89	68
1979-80	53.71	20.23	19.22	14.74	95	73
1984-85	58.13	20.61	19.92	15.76	97	76
1989-90	57.97	20.94	21.46	16.89	102	81
1994-95	58.06	21.55	22.14	17.20	103	80
1995-96	58.50	21.54	22.59	17.58	104	82
1996-97	58.50	21.54	22.59	17.58	104	82

Source: See Table 1.

Note: Cropping Intensity = $\frac{\text{Cropped Area}}{\text{Cultivated Area}} \times 100$; Irrigation Intensity = $\frac{\text{Irrigated Area}}{\text{Cultivated Area}} \times 100$. The agricultural censuses of 1960, 1972, 1980, and 1990 report very high cropping intensities: 120, 111, 122, and 137. These figures are not consistent with the data on cultivated, irrigated, and cropped areas reported annually in official documents.

Table 4

Changes in Use of Agricultural Inputs, 1950-1997

Year	Water Availability (AF/Ha)	Improved Seeds (Kg/Ha)	Fertilizer (NPK) (Kg/Ha)	Tubewells (Ha/Tubewell)	Tractors (Ha/Tractor)	Workers (Ha/Worker)	Credit (Rupees/Hectares)
1950-51	3.2	—	—	—	—	2.16	0.56
1954-55	3.4	—	1.1	10,215	30,389	2.10	0.37
1959-60	3.8	—	1.3	3,066	4,088	1.88	5.88
1964-65	4.0	—	5.4	481	1,290	1.66	7.85
1969-70	4.5	1.2	18.3	196	633	1.62	9.26
1974-75	5.1	1.5	24.4	114	459	1.55	58.15
1980-81	5.1	3.8	55.8	97	202	1.50	207.95
1984-85	5.2	4.3	62.9	80	149	1.50	516.38
1989-90	5.5	2.9	86.3	66	138	1.40	647.25
1994-95	5.9	9.3	99.3	52	110	1.39	1,010.54
1996-97	6.0	10.0	110.0	47	70	1.38	865.32

Source: See Table 1.

factors have started receiving grudging attention and analysis only since the structural reform programme started in the 1980s. A review of the literature reveals that public policy on institutional reform, investment in infrastructure and support services, control and regulation of prices and distribution of inputs and outputs, and the fiscal, monetary and trade regimes has either contributed very little to these underlying factors or acted against them with serious consequences for farm productivity and farmers' incomes.

2. RIGHTS TO OWN AND USE AGRICULTURAL LAND AND IRRIGATION WATER

Land and water rights are the key determinants of the level of agricultural production, farm productivity and income distribution in rural Pakistan. In fact, control of and access to agricultural land remains perhaps the single most important source of many other rights. The land tenure system—including landownership and tenancy rights—has undergone several changes since the early 1950s. Some changes reflect the effects of various tenancy and land reform acts, but most have been brought about by rapid population growth, laws of inheritance, new technologies and the forces of markets, rural to urban migration and flow of remittances, and government policies of support prices, inputs subsidies and farm credit.

In view of the fact that much of agriculture in Pakistan depends on irrigation, the rights to surface and groundwater are crucial to a farmer's ability to benefit from agricultural land. It is also a fact that almost all of the surface water through the canal system is controlled by the government in terms of its development, operation and management. The access to groundwater comes with the ownership of land and access to capital, and is significantly affected by government policies. The existing rights to water have in turn significant impact on the efficiency and distribution of water, condition of agricultural land (soils), use of complementary inputs, pattern of crop production, and income distribution.

2.1. The Land Tenure System

Landownership, as shown by individual records, is still quite concentrated, although the concentration seems to have declined in every province (Table 5).⁵ However, the number of owners and the area of small landholdings (less than 5 hectares) has increased somewhat; the proportion of large landowners (more than 20

⁵The landownership data, based on land records, have not been published or made available to the public by the Federal and Provincial Land Commissions since the early 1980s. This has greatly constrained research on changes in the pattern of landownership in Pakistan. The data on "landownership holdings" published in the agriculture census reports are not accurate indicators of individual or joint landownership. However, these data have been used erroneously by some authors as a proxy for landownership.

Table 5

Changes in Landownership and Access to Land, 1950-1990

Year	Landowners and Owned Area				Operational Holdings and Farm Area			
	Pakistan	Punjab	Sindh	N.W.F.P	Pakistan	Punjab	Sindh	N.W.F.P
1950	0.64	0.62	0.66	0.49	-	-	-	-
1960	-	-	-	-	0.62	0.59	0.51	0.73
1971-72	0.57	0.53	0.59	0.41	0.52	0.49	0.43	0.64
1976	0.55	0.52	0.58	0.41	-	-	-	-
1980-81	0.53	0.49	0.55	0.38	0.53	0.51	0.47	0.57
1990	-	-	-	-	0.57	0.53	0.50	0.61

Note: The ratios are the Gini coefficients for landownership and access to land use. The data for landownership by holding size are from the Federal Land Commission based on individual land records. The data for operational holdings (farms) and farm area by farm size are from the agricultural census reports of 1960, 1972, 1980, and 1990.

hectares) has gone down from 2.7 to 2.0 percent and their share in the total area has declined from 26 to 23 percent. In Pakistan, about 96 percent of the landowners have holdings of less than 10 hectares, but they own 64 percent of the area. The highest concentration of landownership is in Sindh. Small landowners (with less than two hectares) are preponderant in N.W.F.P. (96 percent) and Punjab (80 percent), but they own only 55 and 36 percent of the area in the two provinces. They comprise 40 percent of all landowners in Sindh and own less than 10 percent of the area. The large landowners (with more than 20 hectares) own 38 percent of land in Sindh, 20 and 14 percent in Punjab and N.W.F.P., respectively.

Three major changes in landownership seem to have occurred since the late 1960s. First, the ownership and area under very small landholdings have increased mainly due to the subdivision of holdings due to the law of inheritance and rapid population growth, though some of it may be the result of distribution of land to the landless following the land reforms of 1959 and 1972. Second, there has been a significant fall in the number and area of very large landholdings due to the intra-family land transfers in anticipation of and in response to the land reforms acts of 1959 and 1972. Finally, the medium-size holdings (10 to 40 hectares) have gained, especially in Sindh, both in number and area.

Of course, not all landowners cultivate their land, either their own or anyone else's and not all cultivators own land. A large proportion of the land is farmed by small landowners and the rest is given by large landowners to tenants mainly on a sharecropping basis. The access to land for cultivation is reflected in the distribution of "operational holdings" or farms by size and tenure. The data on changes in the distribution of farms and farm area by size and tenancy have been generated by the agricultural censuses in 1960, 1972, 1980, and 1990. Generally speaking, Sindh has had the least concentration of farms due mainly to the widespread sharecrop tenancy; N.W.F.P. has been at the other end because of the preponderance of self-cultivation of small holdings (Table 5). It is important to note that land concentration has declined somewhat in all provinces since 1960, but with some interesting changes. Apparently, land concentration fell significantly in the 1960s, but rose marginally in Punjab and Sindh in the 1970s and substantially in all three provinces in the 1980s. These changes reflect a clear tendency toward reduced sharecropping tenancy and increased incidence of self-cultivation on all farm sizes.

The average farm size has declined from 5.3 hectares to 3.8 hectares, but the average size of large farms has increased. The number of farms have increased from about 3.75 million in the early 1970s to just over 5 million in the early 1990s. The share of small farms has increased slightly (from 67 to 71 percent) in number, but declined in area from 52 to 39 percent. These changes reflect the large relative increase in the number and area of very small farms. While the share of large farms has fallen in number (from 11 to 7 percent) their share in the area fell only slightly

from 43 to 40 percent. Tenurial arrangements seem to have changed significantly in the last 30 years. The proportion of owner-operated farms has increased significantly both in number and area. In fact, the owner-operated area has increased from just over one-half to three-quarters of the total farm area. Most of the owners-operated farms are small and located in Punjab and N.W.F.P. Sharecropping is still the major form of tenancy, especially in Sindh and some areas of Punjab and N.W.F.P. Sharecropped farms are in the range of 3–5 hectares, but they have declined sharply in both number (34 to 19 percent) and area (from 30 to 16 percent). A similar reduction has been observed in the case of "owner-cum-tenant" farms, but large farms have been increasing. The tendency away from sharecropping is clearly reflected in the reduction of tenant-operated area from 46 to 26 percent of all farm area. It seems that large landholdings dependent on tenants have also reduced their tenant-operated area.

The transition from the quasi-feudal to the capitalist mode of agrarian structure in Pakistan has made the land tenure system even more differentiated than it was before the 1960s.⁶ The capitalist farmers have emerged from the ranks of landlords and rich peasants. Labour is increasingly provided by landless workers, who could be from among the poor peasants (family farmers) and displaced or evicted sharecroppers as the landlords transform into capitalist farmers by extending their self-cultivated (*khud kasht*) area. However, not all of the landless labour is absorbed in the capitalist sector of agriculture. Increasing number of unattached workers either are engaged in non-farm activities in the rural area or migrate from the village to towns and cities.

The growth of wage labour is an indicator of changes in the agrarian structure. Despite the decline in the proportion of labour working in agriculture, from 60 percent in the early 1960s to around 45 percent in the mid-1990s, the absolute numbers are still rising. The level of demand for labour and the conditions of employment are directly affected by the organisation and performance of the agriculture sector itself. Employment in agriculture is of two types: (i) self-employment as household labour on farms cultivated by small landowners and tenants, and (ii) hiring out of labour by the households of landless non-farm workers, tenants and small landowning peasants. Several significant changes have occurred in the composition and use of labour in the last 25 years. The use of family labour on small farms has not declined by much, but its use on larger farms has certainly fallen. While permanent hired labour was traditionally used mostly on large farms, fewer farms are now reporting its use. A high proportion of farmers now hire casual labour: its share in wage labour has increased from 30 to nearly 55 percent. Pakistani farmers no longer depend entirely on family workers and most of them engage outside workers, at least for some of the time during the crop season. It is also a fact that an

⁶Some of these changes have been analysed in some detail by Khan (1983).

increasing proportion of the labour from farm households is engaged in non-farm activities on a short or long term basis because wage income from farming activities is insufficient to meet the growing needs of the family in a cash economy.

2.2. Land Tenure Reforms

The tenancy reforms of the 1950s enacted in the three provinces had little impact on the contractual arrangements between landlords and sharecroppers.⁷ The first visible pressure on the large landowners (landlords) came with the Land Reform Act of 1959 (Martial Law Regulation 64) in February 1959 enacted by the first Martial Law government in Pakistan. This Act abolished *jagirs*—revenue free estates—without compensation and imposed a ceiling on what had been unlimited individual landholdings. However, there is evidence that the 1959 Land Reform Act did not significantly alter the concentration of landownership, because the ceiling on individual holding remained quite generous—expressed in land area and the Produce Index Unit (PIU)—and there were substantial intra-family land transfers and even outright evasion of the ceiling requirement on individual holdings. Consequently, the landless and the near-landless peasants received little land. A high proportion of the beneficiaries were the small and medium landowners. The Act did not introduce changes in the existing tenancy laws of what was then the province of West Pakistan.

The second land reform act was passed by the Pakistan People's Party (PPP) in 1972, soon after the separation of East Pakistan. The Land Reform Act of 1972 (Martial Law Regulation 112) was seemingly more radical than the 1959 Act. Though the impact of the 1972 Act on land redistribution was far more limited than the 1959 Act in terms of the area resumed by the state, its tenancy legislation apparently had a favourable effect on the legal position of sharecroppers. The third land reform act (Act II of 1977) was introduced by the PPP a few months before it lost power in 1977. Its major provision was to reduce the ceiling on individual holdings to 40 hectares for the irrigated (and 80 hectares for the unirrigated) lands. After the imposition of Martial Law in July 1977, little progress was made in implementing the Land Reform Act of 1977. In 1982, the military government made several important amendments to the Land Reform Act of 1977 in order to promote the development of large-scale private (mainly livestock) farms in Pakistan.

Under the three land reform acts (1959, 1972, and 1977), the government has distributed 1.3 million hectares to about 280,000 beneficiaries from a total area of 1.6 million hectares (about 8 percent of the country's cultivated area) resumed from the large landowners. About two-thirds of the resumed area and three-quarters of the distributed lands were under the Act of 1959. It should be added that a substantial part of the distributed land was not of high quality. Secondly, not all beneficiaries have been sharecroppers; a high proportion of the recipients in the 1959 Act were

⁷A detailed analysis of land reforms has been done by Khan (1981).

already landowners. Less than three-quarters of the distributed area was under cultivation in any case.

It is difficult to make quantitative judgements about the impact of these land reforms because of the absence of systematic micro-level studies. However, on the basis of the available evidence, some important observations can be made:

- Resumption and distribution of land have been greatly diluted by numerous exemptions and allowances included in the land reform acts, and by evasion and concealment during the implementation process. The administrative structure was seriously handicapped in countering the social and political strength of the landlords.
- There was no follow-up support system, providing protection to the new landowners from their former landlords and access to inputs needed to increase production. On the contrary, it seems that a deliberate and systematic policy has been followed against organisations or groups supporting small landowners, sharecropping tenants and landless wage workers.
- The small parcels transferred to the new owners generally had a positive impact on employment and productivity, given the more intensive use of household labour and new inputs.
- While the Land Reform Act of 1972 provided increased security of tenure than existed previously—by expanding the occupancy rights and defining the division of produce and costs of inputs—sharecroppers have not received a fair treatment from the landlords and government officials.

There is no ceiling on landholdings for farming in Pakistan, notwithstanding the sterile debate in the popular media. The ceiling on individual ownership of land, while it exists in law, has been circumvented by various means, resulting in the ownership of land far in excess of the legal limit. Also, in 1982, the military government granted the ceiling exemption to landholdings owned and used for large-scale (commercial) livestock farms.

It is fair to say that the land reform efforts so far have made no major impact on the process of differentiation observed in the agrarian structure of Pakistan. The existing duality of the land system—between the landlord and tenant and between the large and small landowner—affects all interactions in the marketplace and in the access to public sector services between these groups. Control of land confers upon large landowners considerable economic and political power since landownership is highly concentrated. Public policies on providing infrastructure and inputs, price support and subsidies, services of research and extension, etc. tend to exacerbate inequalities and adversely affect farm productivity. There is substantial evidence that a small proportion of the landowners exercise a disproportionately large influence on

the machinery of the state in promoting their own interests. For the last nearly 20 years, no structural reform programme for the land tenure system has been on the national (government) and international (donor) agenda, although much lip service has been paid to institutional reforms to make agriculture more productive and improve the well-being of people in rural areas.⁸

2.3. Land Fragmentation and Consolidation

Land fragmentation, especially of small landholdings, has been a serious problem affecting efficient use of farm resources. For example, according to the 1990 census report, about 52 percent of farms and 70 percent of the farm area are fragmented and each farm has about four fragments. The earlier (1960 and 1972) census data reveal that there has been no significant improvement in these numbers. However, according to the official reports, 12.2 million hectares or 60 percent of the cultivated area have been consolidated since 1950. It is also worth noting that about 45 percent of the area was consolidated in the 1960s.

Land fragmentation has been due to many factors: operation of the law of inheritance, excessive exercise of the right of alienation, population pressure, lack of alternative opportunities for work and income, productivity differences among various class of soils, personal preferences due to sentimental attachment to a piece of land, and inadequate laws for consolidation and their enforcement. The issue of land consolidation is admittedly complex, particularly as it may involve transfers between various classes of land or soils within the village. However, to many marginal and small landowners, consolidation of their landholdings may be the most important break in their struggle against poverty. It is no less important for the society since it would remove a serious impediment to efficient agriculture. Land consolidation should be high on the policy agenda, not to be left to the discretionary powers of revenue officials and without accountability to farmers' representatives. Few pertinent suggestions in this regard can be made:

- The land consolidation programme should be integrated with the on-going On-Farm Water Management (OFWM) programme. This integration will have the added advantage of mobilising farm labour for building capital in the village.
- The consolidation machinery should include elected representatives of all of the landowning groups so that they participate in the process and exercise control over the officials responsible for land consolidation. The OFWM and land revenue officials should provide the needed technical support.
- In order to minimise the number of land fragments, transfers between various classes of soils should be encouraged by (i) reducing the number of soil (land)

⁸See, for example, Government of Pakistan (1988 and 1993) and Faruquee (1995).

classes through land improvement, (ii) establishing soil (land) quality equivalents with reference to the best quality of land in the village, (iii) establishing new compact blocks on the basis of location of the largest existing land parcel of the owner with provision for compensation, and (iv) establishing the compensation rule on the basis of market value of the soil (land) equivalents already established.

- The arbitration process should be relatively expeditious and inexpensive, using village representatives, land revenue officials and the OFWM field staff.
- The resources required for the programme should be recovered from the village over a reasonable period, say ten years.
- The post-consolidation measures should include (i) enforcement of floors on landholdings and (ii) strict scrutiny of the compactness of new blocks and parcels by the revenue officials and village committees.

2.4. Water Rights

Irrigation water from the Indus river system is the lifeline of agriculture in Pakistan. The rainfed areas give ample evidence of the absolute constraint that water imposes on all farmers, but its consequences on small farmers are often devastating. Dependence on uncertain rainfall, as in the rainfed areas of Punjab and N.W.F.P. and inadequate canal water without tubewells, as in many parts of Balochistan and some parts of Sindh, have been the major barriers to the use of new agricultural inputs and technologies, resulting in serious inter-regional disparities. In the irrigated area—which constitutes about 80 percent of the cultivated area—the public canal system is the most important source of water, followed by groundwater through private tubewells in Punjab mixed with surface water.⁹ The institutional structure for the

⁹There are four aspects worth noting here in terms of the impact of private tubewells on the regional distribution of benefits and impact on farmers' income. First, private tubewells have been installed mainly in the plains of Punjab. They are not economical in the mountainous areas because of the depth at which water is available. Similarly they have not spread in Sindh because of the depth and poor quality of water. This uneven development of groundwater has been an important factor in some of the inter-regional disparities observed in the country. Second, tubewells have been installed mostly by landowners with holdings of 10 hectares or more. Given the indivisible and large capacity of the diesel and electric tubewells, even the middle peasants cannot afford their fixed and variable costs. Therefore, there is a high concentration of tubewell ownership. This has two associated problems: (1) While a market for tubewell water has developed, it has not been easy for non-owners to buy water at reasonable rates and at the time when they need it most. This has created increased uncertainty, which acts against innovation. (2) The apparently high concentration of tubewells has provided added incentive to large landowners to lease their neighbours' land or buy it. Third, the inducement to invest in tubewells has been provided by handsome public subsidies on fuels, electricity, installation and maintenance costs. In fact, these subsidies have become an important component in transferring public tubewells—which were installed in the Indus basin to alleviate the problem of waterlogging and salinity—to private ownership since the mid-1980s. Fourth, private ownership of tubewells has been encouraged by a credit policy in which loans have not only been readily available, given the collateral of land, but distributed at low rates of interest and with convenient terms of repayment.

regulation and distribution of canal water has had serious impact on the use of water and soil conditions. Its visibly expensive consequences include: serious incidence of waterlogging and salinity, waste of water in the canal system and on the farm and maldistribution of water among water users by location and size of farm.¹⁰

The treatment of water as a public good and its management by the public bureaucracy have caused (i) serious misallocation of this resource, (ii) rent-seeking behaviour and (iii) inequity among water users. It is well known that, in spite of several ad hoc increases in recent years, the water charge (*abiana*) is far lower than the marginal (financial) return to farmers, resulting in substantial rents. The rents are split between water users and irrigation officials. In the absence of a market for water, this has led to "competition" for the appropriation of rents. The situation is that, while the official revenue from water charges covers 30–50 percent of the operation and maintenance (O&M) expenditure borne by the provincial governments, farmers pay far in excess of the official water charge. It should be added that the O&M expenditure of the provincial irrigation departments is probably highly inflated, concealing much waste and graft. In fact, underinvestment in the irrigation system has been a major contributor to the reported deterioration in the delivery system.

There is consensus that the existing institutional arrangement for the distribution of canal water has no redeeming feature, hence beyond reform, since it is premised on a wrong notion of rights to water which is delivered only through the public sector. It has been rightly argued that the only sensible policy option is to treat canal water as a private good. However, the problem is both political and administrative in terms of the alternatives to be tried. The system proposed by the World Bank has created opposition mainly because of (a) the poor articulation of concepts and structures and (b) the power of vested interest groups.¹¹ To be fair, there are serious questions about the sustainability of Public Utilities (PUs) and Farmers Organisations (FOs)—at the distributory/watercourse level—given the unreformed agrarian structure and less than successful experience of Water Users Associations (WUAs) in the OFWM programme since the early 1980s. The appeal to establish and nurture farmers organisations along the lines of the Aga Khan Rural Support Programme (AKRSP) is to ignore the societal context and the lessons learnt from the experience of WUAs and three regional rural support programmes managed by non-governmental organisations (NGOs).¹² Experiments of economic and social

¹⁰A detailed analysis of these problems has been done by the World Bank (1994 and 1996).

¹¹See World Bank (1994).

¹²The author has done a detailed study of three major regional rural support programmes, which are all based on the AKRSP "model" [Khan (1998)]. A major conclusion of the study is that these programmes are tentative, fragile and not too effective. It may be added that a federal government "Task Force on Poverty Eradication" has proposed establishment of District Support Organisations (DSOs) throughout Pakistan using the experience of AKRSP and other programmes [Government of Pakistan (1997)].

engineering—which is what the proposed system for water distribution is—must be conducted with great care, starting from small-scale pilot projects in areas where they are most likely to work. The federal and provincial governments have been ill advised to legislate the establishment of Provincial Irrigation and Drainage Authorities (PIDAs) without first gaining support and developing an effective lobby for the idea to start on a small scale.¹³

3. PUBLIC INVESTMENT IN INFRASTRUCTURE AND SUPPORT SERVICES

There are two inter-related aspects of public investment in infrastructure and support services. The first one has to do with the physical infrastructure that directly affects the production process in agriculture: building and maintaining the irrigation and drainage system, building market to farm roads, providing electric power, and maintaining a research-extension support system. The other aspect is related to the expansion and improvement of the social infrastructure—like education and training, sanitation and water supply and health care—necessary to maximise the benefits from other investments in agriculture and improve the well-being of people residing in rural areas who are directly or indirectly dependent upon agriculture.

Several problems have plagued public investment in infrastructure and support services: underinvestment; fiscal centralism, bureaucratic controls; political patronage; and lack of involvement of intended beneficiaries in the planning and implementation of projects and services. It is also well known that public spending has not been directed to the appropriate areas and a high proportion of it has been used inefficiently. Often the existing physical infrastructure masks serious deficiencies in the delivery of services due to inadequate or poor quality of complementary inputs and services: roads that are not maintained; rural health units without health services; schools without teachers or poorly trained teachers and without supplies; agricultural extension offices (structures) without or with poorly trained field staff; distributories and watercourses without proper O&M; electricity poles without or highly unstable flow of electricity; and so on.

As shown in Table 6, the share of agriculture and water in the public sector development spending has decreased consistently since the early 1970s, falling from nearly 26 percent in the early 1970s to just over 10 percent in the 8th five-year (1993–98) plan. Most of this fall has been due to drastic cuts in spending on agriculture and fertiliser subsidy. In a broader context, the public sector development expenditure on activities that affect the agriculture sector and welfare of the rural people have experienced a similar trend in the last decade (Table 7). The shares of public spending on agriculture (including water) and rural sector infrastructure

¹³This is one of the issues included in the *Kissan Bachao Tehrik* ("save the farmers movement") led by the rural elite.

Table 6

Share of Rural Sector in Public Development Expenditure in Selected Years

(Million Rupees)

Year	Expenditure (1)	Expenditure (2)	Expenditure (3)	Total Public Development Expenditure	Percent Share of Expenditure 1 in Total Expenditure	Percent Share of Expenditure (1+2+3) in Total Expenditure
1975-76	3,340	1,054	232	13,558	24.6	34.1
1980-81	6,644	1,776	385	26,137	25.4	33.7
1985-86	10,590	2,481	933	37,672	28.1	37.2
1990-91	16,305	5,449	2,220	83,112	19.6	28.8
1995-96	23,813	11,740	5,074	172,816	13.8	23.5

Note: Expenditure (1) includes: agriculture, water and rural development. Expenditure (2) is 25 percent of total expenditure on health, nutrition, and transport. Expenditure (3) is 10 percent of total expenditure on power. The data are from *Economic Survey 1996-97*.

Table 7

Share of Agriculture and Water Sector in Public Development Expenditure in Five-Year Plans, 1955–1998

Sector	First Plan	Second Plan	Third Plan	Non-Plan	Fifth Plan	Sixth Plan	Seventh Plan	Eighth Plan
	(1955–1960)	(1960–1965)	(1965–1970)	Period (1970–1977)	(1978–1983)	(1983–1988)	(1988–1993)	(1993–1998)
Agriculture								
Fertiliser	9.5	6.5	6.2	5.5	4.0	3.4	3.8	0.9
Subsidy	0.0	2.0	4.2	3.1	5.7	3.8	1.0	0.1
Water	19.9	43.3	34.2	16.9	10.3	9.4	8.7	9.3
Total	29.4	51.8	44.6	25.5	20.0	16.6	13.5	10.3

Note: These estimates are from the data reported in *Economic Survey 1996-97*.

(including power, transport, education, sanitation, health, and nutrition) were 28 and 37 percent in the mid-1980, but have fallen to 14 and 24 percent, respectively, in 1996. There is strong evidence that in real terms public expenditure—of which more than 55 percent is current spending—for agriculture (including irrigation) has decreased in the last 15 years.¹⁴

3.1. Investment in Physical Infrastructure

All of the irrigation and drainage infrastructure, roads, electricity, research-extension, and market information services are provided in the public sector. Vast national resources have been invested to expand the surface irrigation system and to alleviate waterlogging and salinity. A rapid expansion of water resources was initiated in the late 1950s in order to increase the cultivated area and to improve the yield levels after the stagnation of agriculture in the 1950s. Development of water resources was a major focus of public investment in the 1960s. It was also in this decade that the installation of private tubewells as supplementary source of water became profitable. The investment in the development of water resources has, however, not been well protected looking at the waste of water and the incidence of waterlogging and salinity.

In view of the high losses of irrigation water in watercourses, a major national OFWM programme, with substantial donor contribution, was started in the early 1980s. The programme was founded to rehabilitate and maintain the improved watercourses through active WUAs. There is evidence that most WUAs have not fulfilled their intended objectives as (i) a vehicle for carrying out construction and O&M activities, (ii) an organised voice in planning, construction and operation of irrigation and drainage facilities, and (iii) a mechanism for conveying irrigation-related extension information [World Bank (1994)]. Apparently a vast majority of WUAs are nominal or become defunct organisations soon after the watercourses have been improved or rebuilt. In other words, WUAs exist to meet the legal requirements of the OFWM programme. There are several reasons for the unsustainability of WUAs, among which two stand out: the highly differentiated (unequal) agrarian structure in many villages and the OFWM bureaucracy. The OFWM bureaucracy has had serious problems in planning and designing of watercourse improvement and, in close liaison with the local elite among water users, has been involved in substantial rent-seeking resulting in the high cost of watercourse improvement.

Waterlogging and salinity started to pose major hazards for irrigated agriculture in the 1950s and 1960s. Originally the canal irrigation system was designed to meet the needs of a limited population and land area for crop cultivation. However, the dynamics of population and cropping started to create pressures on the system in the 1960s due to poor systemic water management and inadequate

¹⁴See Faruquee (1995), pp. 54–56.

drainage. It was to address the twin menace that the Salinity Control and Reclamation Project (SCARP) tubewells were installed which have led to some improvement in the SCARP areas. However, the problem of salinity has become more acute in recent years as a result of increased tapping of brackish groundwater for irrigation.¹⁵ Due to explosive growth in the use of groundwater, there is danger of excessive lowering of water tables and intrusion of saline water into fresh water aquifers. The increased use of groundwater in most areas is also related to the inequitable distribution of canal water.

While drainage is a public good, governments have not attempted to recover the drainage costs from beneficiaries. In addition, underinvestment in drainage, lack of autonomy in investment planning and implementation and constraints of regulations have made the improvement of drainage difficult. Recently a National Drainage Programme (NDP) has been initiated as part of an integrated irrigation and drainage strategy for Pakistan. Most of the resources for NDP have been contributed by donors, particularly the World Bank, on conditions that include establishment of PIDAs, farmers organisations for distribution and management of water, pricing of water as a private good, and cost recovery for drainage as a public good. As stated earlier, since the proposed institutional arrangements for irrigation and drainage services have not received support from the farmers' lobby and probably lukewarm support from the public sector bureaucracy, it is doubtful if the provincial governments can effectively implement the NDP. Further, the experience of the Left Bank Outfall Drainage (LBOD) and the Mardan and Swabi SCARP projects does not inspire much confidence in the ability of governments, especially the Water and Power Development Authority (WAPDA), to implement the NDP without considerable waste of national resources.

Broad-based agricultural growth requires other physical infrastructure like transportation, particularly the village and village-to-market roads, and electricity. It is well known that transportation network and telecommunications play a central role in the commercialisation of agriculture. Intensification of agriculture also involves increased energy use, particularly electricity. Rural Pakistan is seriously deficient in all of this infrastructure even after 50 years after independence. Studies in many countries have shown that good transport (road) network has significant effect on the growth of production and productivity. In Pakistan, fewer than one-third of the villages have access to wholesale trading centres on all-weather roads. In fact, certain areas are isolated from the rest of the country because of poor roads throughout the year. Further, the road network is in poor condition. Inadequate roads raise the transportation costs by as much as 40 percent.¹⁶ A major cause of poor road

¹⁵According to recent estimates, over two million hectares of land are waterlogged and probably 40,000 hectares are being lost annually to this menace. It is also estimated that nearly three million hectares of irrigated land are affected by salt [World Bank (1996)].

¹⁶See John Mellor Associates, Inc. (1993).

network in rural areas is fiscal centralism in which the local councils, which are supposedly responsible for construction and maintenance of the village and village-to-market roads, are not fiscally empowered by the provincial and federal governments. In fact, the two levels of government, including the Members of Provincial and National Assemblies, have not given adequate fiscal and administrative support to the local councils to invest in and maintain the rural infrastructure. It is not simply the case that there has been underinvestment in roads and communications but that the stakeholders (or intended beneficiaries) have not been allowed to exercise the necessary fiscal authority and administrative responsibility.

Electricity is one of the most important forms of energy needed for agricultural production and rural households. The electricity infrastructure, controlled by the public sector, in rural areas is grossly inadequate in supplying power on a reliable basis. A majority of the rural households are without electricity. In addition, power cuts affect the rural areas for up to ten hours a day, forcing people to postpone operations or activities or rely on private generators. All of this adds to the cost of operations. Underpricing of electricity and state control are among the major contributors to inadequate public and private investment in power supply. Innovative small-scale power supply systems, involving both public and private sector, for organised rural communities have not been tried. In many areas, these communities are willing to pay the true cost of power provided they are involved as stakeholders.

3.2. Investment in Social Infrastructure

Public and private investment in human capital has a high return because of its impact on both efficiency and equity. Several studies have shown that the educational and nutritional status of farmers has significant effect on farm productivity. There is no debate about the low level of investment in social infrastructure and its quality in Pakistan. Also, there is little argument that the rural-urban differences are large and serious. However, it needs stressing that the observed rural-urban disparity of access to social infrastructure and support services does not depend simply on one's residence in the rural or urban area, but on the basis of income and gender. The "urban bias" thesis should be seen in this context. Most rich farmers and landowners do not reside in the rural area and can depend on private and public social services and infrastructure in the urban area. Those middle-income and rich farmers who do reside in the rural area can adequately afford these services in the urban area. The low level of public investment in rural social infrastructure and its poor quality affect mainly the households of small landowners, landless tenants and wage workers. Periodic crash programmes for the rural area announced by governments, and most of them launched with much fanfare, do not seem to filter down to the intended beneficiaries.

Pakistan must spend more on building the social infrastructure and improving the support services for its rural people. But it must also increase the effectiveness of these investments. These investments have a high return and can reduce the income, gender, and location gaps. In the short run, the donor-supported Social Action Programme (SAP)—which was started in 1992—may make some difference. But governments will have to make major readjustments in their fiscal affairs—switching expenditures, making them more effective and increasing the revenue—to meet the obviously desperate need for building human capital as a means to strengthen agriculture and fulfil the objective of improved well-being of rural residents. The political test of governments lies in their ability to build the institutional capacity to mobilise additional resources and to invest in people, particularly those engaged in the agriculture sector and reside in rural areas. So far they have not done too well on this test.¹⁷

3.3. Investment in Support Services

Research and extension services can play a key role in the growth of agricultural productivity and transformation of agriculture. In Pakistan, capital and current expenditure on agricultural research and extension by the federal and provincial governments has been rising more rapidly than the growth of GDP and value of agricultural output: the ratios of total expenditure on these services to GDP and agricultural output have increased from 0.12 and 0.41 percent in the First Five-Year Plan period (1955–60) to 0.45 and 1.40 percent the Eighth Five-Year Plan period (1993–98). However, this apparently impressive increase in spending in the last forty years does not seem to have had the desired impact on agricultural productivity. There are several reasons for this. For one thing, Pakistan even now spends relatively far less of its resources on these services than many other underdeveloped countries. Second, the low level of literacy and educational achievement among farmers has been a major constraint in properly utilising new information and technologies. Third, there are serious constraints on the access to and availability of desired agricultural inputs on time and in needed quantity. Finally, the management and quality of the research and extension systems have not improved their effectiveness.

It can be argued that the adequacy and quality of the research and extension systems has declined in the last 10 to 15 years, notwithstanding the much publicised introduction of the training and visit (T&V) extension system and expansion of the national institutions for agricultural research, particularly the Pakistan Agricultural

¹⁷The gross underinvestment in social infrastructure has not been alleviated because of the structural adjustment programme under way to reduce the high level of fiscal deficit. Governments have so far targeted disproportionately at reducing their capital spending or investment. So far they have also failed to reallocate expenditure from other uses (expenditure switching) and raise the level of revenue through expanded direct taxation of income and wealth. See, for example, Khan (1997).

Research Council (PARC), since the early 1980s. The agricultural research-extension linkage has been weak and ineffective. The well documented failure of the T&V approach provides ample support for this contention. Several factors can be readily identified. First, it was a bad policy decision in the provinces to split the integrated education-research-extension network, which had worked reasonably well for over 30 years, into separate empires without maintaining strong and effective linkages. Second, the universities of agriculture have been starved of funds for research. Finally, a very high proportion, probably as high as 80-90 percent, of the spending on agricultural education and extension services is reportedly used for salaries and wages.

Effectiveness of agricultural research seems to have declined because of lack of well-defined goals and strategy, material support, effective planning, and monitoring and evaluation of programmes. Agricultural research covers plant breeding and resource management: its record in breeding new varieties has not been too bad, but it has been seriously deficient in the work on natural resource management because it lacks a systems perspective. The research system, in spite of the substantial increase in capital spending, is chronically short of operational funds, particularly in the provinces. The expansion of PARC was a highly misguided investment since (i) it has been largely at the expense of resources which should have gone to the provincial research institutions and (ii) it has not strengthened the country's capacity for adaptive research suited to site-specific problems of crops, soils, water, and livestock. The research system has to be brought closer to where the problems are and integrated with the delivery system to reach the intended beneficiaries. In the provinces, there are too many research institutes (65 large institutes with 162 stations and sub-stations), funded poorly and lack skilled researchers, duplicating plant breeding research. Economies of scale can be realised by consolidating some of these institutes and providing them with adequate resources for adaptive research. Incentives should be provided for excellence in research by emphasising merit and differentiated rewards. Plant breeding research in the private sector has been discouraged by the existing plant variety protection laws and regulations.

Several studies have shown that the elaborate agricultural extension system, employing an army of front-line extension agents (field assistants), has not served the farmers well. The top-down and supply-driven extension service—poorly funded and staffed by inadequately trained personnel—has clearly failed. The farmers' demand for new technologies, crop, livestock, and resource management information should be met by localised adaptive research establishments to act as the meeting point for suppliers and demanders. The adaptive research units should become the nodes for two-way dissemination of information between research establishments (suppliers) and farmers (demanders). In fact, a large part of the extension service can be done

effectively through these entities in collaboration with the private sector companies and farmers (village) organisations. The cost saving from a significantly reduced size of the extension bureaucracy can be used to improve the research-based delivery system and rural education. Farmers organisations and individual rich farmers will respond positively to the idea that good quality and economically profitable information is worth paying for. This approach will require (a) crop, livestock and resource management research with greater site specificity and decentralisation, (b) reintegration of the education, research and extension systems, and (c) direct involvement of farmers in identifying problems, setting priorities and implementing technology packages.

4. MACROECONOMIC POLICIES

Production incentives in the agriculture sector have been affected by successive governments through their policies on prices of outputs and inputs, taxation, subsidies, trade protection, and control and regulation of the distribution of commodities and inputs. Rapid industrial growth has been viewed as the best means to serve national interests. Governments have tried to meet this goal by providing high levels of protection to the industrial sector, low prices for the domestic raw material, and "food security" to the urban (industrial) population. At the same time, they have attempted to maintain incentives for farmers to expand the production of crops and livestock products. Admittedly it has been a difficult balancing act in achieving multiple objectives, of which some are evidently contradictory. There is substantial evidence that most macroeconomic policies have been quite costly considering: (i) the distortionary effect on resource allocation at the national and sectoral levels; (ii) the deadweight losses to the society; (iii) the rent-seeking behaviour of government officials, industrial and agricultural producers and traders; and (iv) the massive, and largely unjustified, income (welfare) transfers within and between sectors. Mercifully, since the mid-1980s, governments have been forced to make serious attempts to readjust their macroeconomic policies. However, there is well documented evidence in the donor and federal government reports that not all of these adjustments have been right or effectively implemented.

The role of "support" price and input subsidy, regulation of internal and external trade and exchange rate policies of governments have been debated extensively in the literature both at the level of theory and in the context of Pakistan.¹⁸ There is general agreement that these policies have transferred substantial resources from the agriculture sector to the rest of the economy in Pakistan. However, the rate of surplus transfer has declined significantly—from 8–14 (average 10) percent in the 1980s to 4–8 (average 5) percent in the 1990s—due to favourable adjustments in output prices, exchange rate, and deregulation of trade. It should be

¹⁸See, for example, John Mellor Associates, Inc. (1993); Khan (1994) and Faruquee (1995).

noted that the barter terms of trade for agriculture have improved significantly in the 1990s after falling throughout the 1980s. More importantly, the income terms of trade—which reflect the purchasing power of farmers—have kept on improving since the 1950s, rising sharply in the 1960s, slowed down in the 1970s followed by rapid improvement in the late 1970s and the early 1980s; the improvement slowed down considerably in the second half of the 1980s followed by a significant improvement in the 1990s.

4.1. Prices of Crops

Governments have intervened in the pricing of agricultural outputs and inputs for a variety of reasons, including: (i) stabilisation of prices for producers and consumers (e.g., procurement and issue prices of wheat and guaranteed minimum price for cotton); (ii) incentives to producers for the adoption of new technologies and use of inputs that may increase production and productivity (e.g., subsidy on improved seeds, fertilisers, tractors, electricity and gas, water, and farm credit); (iii) subsidy to consumers of food and processors of raw material (e.g., cotton textile and sugar mills); and (iv) government revenue through indirect taxation.

A support price programme has been used for all major crops in Pakistan. It is designed to provide stable prices to farmers. In theory, a guaranteed minimum price (GMP) for each crop is set by taking into account many factors. When market prices fall below the GMP, government agencies are required to purchase all quantities brought by farmers at that price. This support price programme has been maintained at a high cost to the society for at least three reasons: (i) GMP for some crops has either been below (e.g., cotton and wheat) or far above (e.g. sugarcane and rice) the border price, thus penalising certain producers and protecting others; (ii) parastatals have not been efficient and their officials have often colluded with processors and traders to share the gains as rents; and (iii) governments have borne a heavy budgetary burden. Government intervention in the price system has evidently resulted in resource misallocation, considering the reported differences in the domestic resource cost (DRC) of major crops as an indicator of their comparative advantage.

The entire support price (procurement) and consumer subsidy system should be abolished. Price stabilisation can be achieved without these costs if governments and financial institutions can assist the private sector marketing channels in maintaining competitive conditions and investing in the distribution network (storage). Let the private sector determine the prices of agricultural products with the government providing the necessary institutional support and infrastructure.¹⁹ Consumers can and should be protected by targeted (price or income) subsidies.

¹⁹In this context, two different suggestions have been made: (i) establish a price stabilisation fund to regulate the buffer stocks of major crops [Afzal, *et al.* (1993)] and (ii) promote crop-specific private hedging to manage price risk [Faruqee, *et al.* (1997)].

Generalised consumer subsidies on wheat flour, sugar and edible oils are a major source of cross-frontier smuggling and substantial rents for traders, processors and the officials of parastatals. The existing consumer subsidy, borne entirely by the government budget, is probably appropriated more by those (processors, traders and government officials) for whom it is not intended and the intended beneficiaries (low-income urban consumers) end up paying unsubsidised (market) prices.

4.2. Prices of Farm Inputs

The case for price subsidy on agricultural inputs has never been too strong or persuasive since its incentive effect is more than offset by (i) waste of inputs and (ii) unfair distribution of benefits. An elaborate system of subsidies on farm inputs—fertilisers, plant protection, improved seeds, tubewells, canal water, electricity and fuels, and farm credit—was started in the 1960s. These subsidies rose from less than one percent of the value of agricultural output in 1961 to 5 percent in 1980, but have declined to 2-3 percent since the early 1990s.²⁰ Subsidies on pesticides have been removed and substantially reduced on fertilisers; they remain on diesel and electric tubewells, natural gas used in fertiliser industry, purchased seeds, canal water, imported tractors and associated machinery, and farm credit. The subsidies on canal and tubewell water, agricultural machinery (tractors) and institutional credit have been the most distortionary and unfair in their effects on production and incomes of farmers. The issue of subsidy on irrigation water has been discussed in an earlier section. Tractors and credit need some analysis here since they are interrelated.

The case for tractors in agriculture was first made in the early 1960s. It was argued that tractors would increase crop yields, reduce the cost of farm power by replacing work animals, increase cropping intensity, and lead to increased demand for labour, hence expanded employment, in the agriculture sector. A lucrative subsidy on tractors has been maintained by successive governments through a permissive credit regime and favourable commercial policy. While there is room for debate about the impact of tractors in Pakistan, some important generalisation can be made.²¹

- Tractors have had little or no positive effect on crop yields.
- Cropping intensity has increased only if there is additional water.
- Tractor ownership by large landowners—most of the tractors are between 33 and 55 HP and owned by landowners with more than 10 hectares—has led to an increase in the average size of the already large landholdings, by resumption of land from sharecroppers for self-cultivation and leasing of land

²⁰A brief analysis of the changes in inputs subsidies during 1979–1995 has been done by Chaudhry and Sahibzada (1995).

²¹Tractor prices in Pakistan have been lower than in most other countries and in real terms have fallen by 5–9 percent in the last decade. See Faruquee and Carey (1996).

from the small and marginal landowners.

- Tractors do not provide incremental power, but tend to substitute for the power of draft animals.
- Private returns to tractor ownership are high because of the subsidies on credit and fuel costs.
- There is no conclusive evidence that tractors have created more employment, but there is considerable evidence that they have weakened the position of tenants and reduced dependence on outside labour. Tractors and associated machines give greater control over the labour force used in agriculture. The adoption of tractor-powered threshers and other machines and the spread of machine-hiring services are producing labour-saving effects on all types of farms.

In view of these generally well documented observations, it is incredible that the federal government has reportedly extended handsome tariff concessions for the assembly and manufacture of tractors and made generous provisions in its questionable credit programme for the purchase of 19,000 tractors in 1997-98.

4.3. Agricultural Credit

Farm credit can be a major source of acquiring new technology for an efficient and profitable agriculture. Farmers in Pakistan have been greatly constrained by the inadequacy of the credit market. Most of the credit acquired by small farmers comes from non-institutional sources. Private debts are usually under-reported because most households borrow in small amounts from friends and relatives, traders, moneylenders, and landlords. In the early 1960s, it was realised that the lack of institutional credit was inhibiting the progress of agriculture. The first response was to establish the Agricultural Development Bank of Pakistan (ADBP), which was almost the only institutional source of farm credit until the early 1970s. Commercial banks were inducted into lending for agriculture after their nationalisation in 1972 and the cooperative system was restructured under the Federal Bank of Cooperatives (FBC). The federal government has maintained its intervention in the rural credit market by regulating the credit institutions and credit rationing under the umbrella of the State Bank of Pakistan (SBP). The growth of institutional credit has been quite impressive since the early 1970s, with ADBP and commercial banks accounting for most of the lending. Credit is given for production-related activities, although a sizeable part of it apparently gets channelled into the non-institutional credit market. The public sector financial institutions have proved to be a disaster since their activities have been dominated by political and not market forces.²²

²²See, for example, Qureshi, *et al.* (1996). These institutions have 'unrecovered'—some say unrecoverable—loans worth Rs 24 billion extended mainly to large and well-connected farmers. The federal government has decided to increase the institutional credit by 50 percent—from Rs 20 to Rs 30 billion—in 1997-98 as part of its agriculture package for tractors, livestock farms and seasonal inputs.

The cooperative credit system has been plagued by (i) low participation by small (poor) farmers, (ii) weak administrative capacity to extend and recover loans and (iii) inefficient management of financial affairs. The absence of multi-level societies and dominance of the provincial bureaucracy have not encouraged participation by small farmers. The introduction of pass books in 1973 and the policy of interest-free loans in the early 1980s—which were supposed to make institutional credit more accessible and cheap to small farmers—led to many rent-seeking practices both by public officials and (large) landowners. Similarly, the practices of ADBP, which is the largest source of farm credit, have not been financially responsible or fair: three-quarters of its so-called production and investment loans have been channelled to farmers with holdings of over 5 hectares; about two-thirds of the value of these loans has been used for purchasing tractors (and associated machinery) installing tubewells and one-third for livestock farms and agro-processing enterprises; over 40 percent of its loans remain unrecovered; and its management and field personnel are involved in pervasive rent-seeking, ranging from 5-10 percent of the loan value. It is obvious that a substantial subsidy implied in public loans for agricultural production has been transferred to a small number of large landowners, farmers and entrepreneurs on the basis of their political influence or contacts. The unsustainable financial position of the cooperative banks and ADBP, supported by borrowed money, is the result of a highly misguided public policy pursued by governments to this day.

There are no good estimates of the total demand for agricultural credit, based on the rate of return, level of technology and financial conditions. Since the supply of institutional credit has been rationed and the rate of interest much below the equilibrium rate, there has always been excessive demand for loans. A bias in favour of large landowners and well-connected farmers is built into the credit system because of risk minimisation, through the collateral requirement, low administrative cost and convenience, and the influence of landlords and similar urban-based groups. These constraints militate against small farmers and the landless peasants, who must depend on non-institutional sources. Sharecroppers have no direct access to institutional credit: landlords act as their moneylenders. The cost of these loans is difficult to measure, but cannot be insignificant considering the asymmetrical relationship between landlords and tenants.

Non-institutional sources remain important for the small peasants and poor rural households. Friends and relatives cannot always be a stable and adequate source of loans to meet the investment requirements for profitable farming. Acquiring credit from moneylenders and merchants may be convenient, but the debt charges can easily exceed the total cost of acquiring credit from the institutional sources. For a vast majority of small landowners and sharecroppers, credit from non-institutional sources also provides cash for consumption and expenses between

seasons. It is often the consumption needs of the peasants which explain their dependence on moneylenders and discourage investment spending and innovation. Small farmers cannot get loans for developing or improving their land, although these investments can make a big difference in the level of production. They do not usually require large amounts to purchase seasonal inputs and their repayment record has been good. Since the hidden cost and inconvenience of acquiring public sector loans for seasonal inputs are high, small farmers either go to non-institutional sources or do without the inputs required to increase their incomes and farm productivity. This, in turn, adversely affects their capacity to survive as productive farmers.

Cheap credit controlled by government agencies has been a costly failure in Pakistan. The government should neither manage the financial institutions nor set interest rates. Its job should be to provide prudent regulatory and supervisory environment and let competition among commercial banks determine the interest rate for rural credit. The cooperative banking system and ADBP should be folded or radically transformed into financially viable institutions controlled by shareholders and managed by accountable professionals. They should function as private sector financial institutions for mobilising rural savings and extending loans for agriculture. The credit needs of small farmers and the landless poor should be met largely by a well-targeted delivery system based on participatory farmers (villagers) organisations. The transaction costs can be minimised by using these organisations as joint liability groups. This system should, however, be subject to financial criteria of adequate loan recovery rates, market interest rates and mobilisation of savings. The experiences of AKRSP in Northern Areas and similar programmes in other countries should be used to meet the needs of small landholders, rural entrepreneurs, and the landless poor. However, a note of caution must be added: the three major NGO-managed rural support programmes under way in Pakistan have so far produced little helpful evidence to launch a countrywide targeted credit programme for the disadvantaged groups.

4.4. Exchange Rate, Tariffs, and Taxes

Pakistan's economy, including the agriculture sector, was highly regulated until the mid-1980s. A process of gradual deregulation of markets and production was started by the military government in 1978 and hastened in the early 1980s with the support of donor agencies.²³ The overvaluation of the rupee has almost completely disappeared in the last five years, thus reducing the price distortions on agricultural exports and imports. The federal government has lowered the average tariff rate, but the industrial sector protection still remains high because of duties, surcharges, etc. The crop sector is affected by a mix of tariff and non-tariff policies: high level of subsidy on imported wheat goes against wheat producers and subsidises

²³See Khan (1994); Faruqee (1995) and World Bank (1997).

millers; duties and quotas on imported sugar gives protection to sugar mills and subsidises sugarcane growers; minimum export price, duties and quotas for cotton export subsidise textile industry and penalise cotton producers; and low tariff rate on imported tractors and duty-free tractor kits for assembly in Pakistan have subsidised domestic manufacturers and large landowners. These policies are wrong because they are distortionary, unfair and costly.

One of the major reasons for high fiscal deficit in Pakistan—at present around 6.1 percent of GDP—is that the federal and provincial governments collect only 14 percent of GDP in taxes and this ratio has not changed in the last decade. The other problem is that, in spite of significant improvement in the 1990s, around three-quarters of the revenue is from a variety of indirect taxes. Finally, the share of customs duties and sales tax on imported goods in the total indirect taxes has stayed around 52 percent since the late 1980s. There are no estimates of the indirect taxes paid by farmers on account of sales and purchases of goods and services in the domestic and foreign markets. As stated earlier, price distortions have been the major form of (implicit) taxation of the agriculture sector, but this burden has fallen significantly in the 1990s.

Dependence on implicit and indirect taxes has not served the agriculture sector well because of the perverse efficiency and equity effects. It has also given much misplaced support to the farm lobby against restructuring the existing direct tax system for income earners in agriculture. At present, the provincial land revenue with associated levies and the federal wealth tax on agricultural land generate annually only Rs 1.0 billion to Rs 1.2 billion. In other words, the high income earners in agriculture pay only 1.6 percent of the direct taxes collected in the country. Put it in another way. The top 20 percent of the landowners and farmers, whose share in total agricultural output is around 40 percent, pay no more than 0.5 percent of their income in direct taxes.²⁴ That successive governments have failed to discard the existing land tax (revenue) in favour of a tax on income from agriculture is a reflection of (a) the entrenched political power of the rural elite and (b) the unnecessary, though declining, burden of implicit and indirect taxes on all agricultural producers.

5. PUBLIC SECTOR AGENCIES AND ENTERPRISES

Several arguments for the expansion of government's role, particularly in the supply of inputs and marketing of outputs, in the agriculture sector have been extended: balancing regional development; protecting farmers from "exploitation" by private agents in the input and output markets; checking concentration of economic

²⁴This issue has long been the subject of debate in Pakistan. It has become a key policy issue in loan negotiations between the international donors and federal government since the early 1990s. See Khan (1994) and Khan and Khan (1997).

power; providing food security to low-income urban consumers; and making adequate quantities of the key agricultural inputs available to farmers. It has become obvious that the direct involvement of government ministries and departments (GM&Ds) and state owned enterprises (SOEs) or parastatals in the production, distribution and marketing of agricultural inputs and outputs has been a major source of (i) market inefficiency, (ii) drain on the public exchequer, (iii) rent-seeking behaviour of participants, and (iv) patronage for public sector jobs and associated benefits.²⁵ The most direct form of government intervention in the agriculture sector has been through a large number of GM&Ds and SOEs. The best count shows that six federal government ministries (represented by a number of divisions, wings, units, and departments)—Food and Agriculture, Water and Power, Planning, Industries, Commerce, and Local Government and Rural Development—and eight provincial departments—Agriculture (represented by a number of agencies), Irrigation, Revenue, Livestock, Forestry, fisheries, Cooperatives, and Food—directly affect the welfare of agricultural producers. At the same time, there are eight federal SOEs and two provincial SOEs each in Punjab and Sindh and one in N.W.F.P. (Appendix II).

Until the early 1960s a number of provincial GM&Ds—Agriculture, Irrigation, Revenue, Livestock, Forestry, Fisheries, and Cooperatives—inherited from the colonial administration had direct contact with farmers. The provincial Food department was operating an elaborate system of food rationing in urban areas. The federal government played its role only through the ministries of Food and Agriculture and Water and Power. The rapid growth of GM&Ds and SOEs started in the mid-1960s and found its zenith in the 1970s as part of the rhetoric of “socialism” A process of gradual denationalisation and deregulation of production and markets was started by the military government soon after it took power in July 1977. Since then successive governments have continued this process mainly in response to the conditions imposed by international donors as part of the structural adjustment programme.²⁶

The problem is that so far the rhetoric of privatization of SOEs, deregulation of markets, and downsizing of GM&Ds has not been effectively translated into practice. The entrenched interest groups, whose jobs, salaries and rents depend on the operations of GM&Ds and SOEs, seem to have enough clout to maintain the expensive status quo. In fact, their representatives have used various excuses for perpetuating direct government intervention in the agriculture sector which has evidently distorted incentives, arrested market competition, unfairly transferred resources and incomes, drained government budgets, and crowded out the private sector from finance and investment. As was stated earlier, government’s role in

²⁵A detailed analysis of the major input supply and output marketing parastatals has been done by Faruqee, Ali and Choudhry (1995).

²⁶See Khan (1994) for major achievements in the deregulation of markets and denationalisation of processing industries.

support of the agriculture sector should not include direct intervention in the production, distribution and marketing of inputs and outputs. It follows that most of the existing GM&Ds should be closed down and/or reorganised to avoid duplication and waste and all of the federal and provincial SOEs—input supply and output marketing parastatals—should be folded or privatised.

CONCLUSION

The author has argued, with supporting evidence, that public policy must share a large part of the blame for the low growth of resource productivity in Pakistan's agriculture. Public interest has not been served well by policies that are both *distortionary* and *unfair* in terms of their effects on the allocation of resources and distribution of income and wealth. Governments are not being asked to withdraw from the economy. Far from it. They must continue to play an active role but avoid or minimise their own failures and correct the market failures. This principle, in the context of the agriculture sector in Pakistan, means that governments should:

- maintain good records of landownership and tenurial contracts;
- restructure property rights and contracts on land, including redistribution and consolidation of land;
- invest in public and merit goods like physical and social infrastructure in rural areas, including irrigation and drainage, roads, electricity, education, health care, potable water, and sanitation;
- maintain a stable macroeconomic environment, including prudent regulation of financial institutions and efficient and fair fiscal arrangements;
- promote liberalised (competitive) domestic and foreign trade;
- provide support services of research and extension with community participation;
- support targeted programmes for the disadvantaged groups of producers, entrepreneurs and consumers;
- support the growth of participatory farmers organisations; and
- maintain an efficient, well-paid, transparent, and accountable bureaucracy.

APPENDIX I

TOTAL FACTOR PRODUCTIVITY IN PAKISTAN'S AGRICULTURE, 1960-1996

1. Method of Estimation

Total factor productivity (TFP) is defined as:

$$TFP = Y/X \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

where *TFP* measures aggregate output (*Y*) produced per unit of an input aggregate (*X*). It follows that the observed proportionate rate of growth of TFP is equal to the rate of growth of measured output minus the rate of growth of measured inputs:

$$tfp = y - x \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

where:

$$tfp = (dTFP_t/dt) \cdot (1/TFP_t)$$

$$y = (dY_t/dt) \cdot (1/Y_t)$$

$$x = (dX_t/dt) \cdot (1/X_t)$$

The output and input aggregates can be formed by using the Divisia indexing procedure and from Equation (2) it would be possible to calculate change in TFP without explicitly identifying the functional form of the underlying production relationship. Among the indexing procedures, the Tornqvist-Theil (T-T) method is a superlative index which is exact for the linear homogeneous translog production function. By using current prices, it accounts for changes in the quality of inputs.

Using the T-T index, the rate of change of TFP is obtained by taking the difference between the rate of change of the indexes of aggregate output and input:

$$\begin{aligned} tfp &= \ln(TFP_t/TFP_{t-1}) \\ &= \ln(YI_t/YI_{t-1}) - \ln(XI_t/XI_{t-1}) \quad \dots \quad \dots \quad \dots \quad (3) \end{aligned}$$

where:

$$\ln(YI_t/YI_{t-1}) = 1/2(W_{j,t} + W_{j,t-1}) \cdot \ln(Y_{j,t}/Y_{j,t-1})$$

$$\ln(XI_t/XI_{t-1}) = 1/2(S_{i,t} + S_{i,t-1}) \cdot \ln(X_{i,t}/X_{i,t-1})$$

2. Data Used

The aggregated inputs include land (crop area), labour, tractors, tubewells, chemical fertilisers, and work animals. All of the input data are taken or reconstructed from the annual issues of *Economic Survey* and *Agricultural Statistics of Pakistan*. The author has found several inexplicable discrepancies in the official numbers on crop area, labour and work animals. The price data for these inputs were far more difficult to obtain or construct. Land rents per hectare are interpolated from the reported annual rents on irrigated land cited in different official or published reports. The annual labour charge is estimated by multiplying the average daily wage rate for agricultural labour, reported in numerous surveys and official documents, by 265 working days in the year. Tractor prices and tubewell costs are reported in several official documents. The annual service charge for tractors and tubewells is assumed to be equivalent to their depreciated value at the rate of 11 percent. Fertiliser price is the average annual price of urea per nutrient metric ton. The price of work animals is taken from official reports; the annual service charge of these animals is assumed to be equivalent of 15 percent of the average cost.

The output data are simply the gross value of agricultural output (crops and livestock) measured in current prices as reported in national income accounts. This limitation may have introduced some bias in the estimates of the output index. Given the time and resource constraint, it was almost impossible to use the current price data for a large number of crops and livestock products.

Table A-1
*Output, Input, and Total Factor Productivity Indexes for
 Agriculture in Pakistan, 1960-1996*

Year	Output Index	Input Index	TFP Index
1960	100.0	100.0	100.0
1961	99.8	103.4	96.5
1962	105.8	106.4	99.4
1963	110.8	109.1	101.6
1964	113.2	110.2	102.7
1965	118.3	112.7	105.0
1966	118.6	114.0	104.0
1967	123.8	116.0	106.7
1968	134.9	117.6	114.7
1969	139.5	116.7	119.5
1970	148.4	120.9	122.7
1971	145.3	123.5	117.6
1972	149.0	124.4	119.8
1973	150.4	126.7	118.7
1974	154.7	129.7	119.3
1975	153.0	129.3	118.3
1976	157.7	133.1	118.5
1977	159.9	135.7	117.8
1978	162.4	139.6	116.3
1979	165.3	142.0	116.4
1980	172.0	144.0	119.4
1981	175.4	146.0	120.1
1982	180.2	148.1	121.7
1983	184.2	150.7	122.2
1984	178.6	150.4	118.8
1985	189.3	150.6	125.7
1986	195.1	156.3	124.8
1987	198.2	156.0	127.1
1988	200.9	156.9	128.0
1989	207.7	162.2	128.1
1990	210.3	163.9	128.3
1991	215.3	158.3	136.0
1992	224.9	161.6	139.2
1993	219.0	164.5	133.1
1994	223.8	168.7	132.7
1995	230.9	169.4	136.3
1996	236.6	172.0	137.6

APPENDIX II

PUBLIC SECTOR AGENCIES AND ENTERPRISES FOR
AGRICULTURE IN PAKISTAN

Government Ministries and Departments	Public Sector Enterprises
<p>A. <i>Federal Government Ministries</i></p> <p>Food, Agriculture and Cooperatives Fertiliser Import Department Pakistan Central Cotton Committee Federal Seed Certification Department On-Farm Water Management Cell Pakistan Agricultural Research Council Agricultural Prices Commission Industries Water and Power WAPDA Planning National Fertiliser Development Centre Local Government and Rural Development Commerce</p>	<p>A. <i>Federal</i></p> <p>Cotton Export Corporation (CEC) Rice Export Corporation of Pakistan (RECP) Trading Corporation of Pakistan (TCP) National Fertiliser Corporation (NFC) National Fertiliser Marketing Ltd. (NFML) Ghee Corporation of Pakistan (GCP) Agricultural Marketing and Storage Ltd. (AM&SL) Pakistan Agricultural Services and Supplies Corporation (PASSCO) Agricultural Development Bank of Pakistan (ADBP)</p>
<p>B. <i>Provincial Government Departments</i></p> <p>Agriculture (Research and Extension) Irrigation Revenue (Board of Revenue) Food Fisheries Livestock Cooperatives</p>	<p>B. <i>Provincial</i></p> <p>Punjab Agricultural Development and Supplies Corporation (PAD&SC) Punjab Seed Corporation (PSC) Sindh Agricultural Supplies Organisation (SASO) Sindh Seed Corporation (SSC) N.W.F.P. Agricultural Development Authority (ADA)</p>

REFERENCES

- Afzal, Muhammad *et al.* (1993) Support Price System in Pakistan. *Pakistan Journal of Agricultural Economics* 2:1 68-96.
- Ali, Mubarak (1995) Intensification Induced Land Fertility Degradation in Pakistan. Asian Vegetable Research and Development Centre, Tainan, Taiwan. (Mimeographed.)

- Alston, M. George W. Norton, and Philip G. Pardey (1995) *Science under Scarcity: Principles and Practice for Agricultural Research Evaluation and Priority Setting*. Ithaca: Cornell University Press.
- Bardhan, Parnab (1997) Corruption and Development: A Review of Issues. *Journal of Economic Literature* 35:3 1320–46.
- Byerlee, Derek (1994) Agricultural Productivity in Pakistan: Problems and Potential. Paper for World Bank Agriculture Sector Review. The World Bank. Washington, D. C.
- Byerlee, Derek, and A. Siddiq (1994) Has the Green Revolution Been Sustained? The Quantitative Impact of the Seed-Fertiliser Revolution in Pakistan Revisited. *World Development* 22:9 1345–61.
- Chaudhry, M. Ghaffar, and Shamim A. Sahibzada (1995) Agricultural Input Subsidies in Pakistan: Nature and Impact. *The Pakistan Development Review* 34:4 711–22.
- Faruquee, Rashid (1995) *Structural and Policy Reforms for Agricultural Growth: The Case of Pakistan*. Washington, D.C.: The World Bank.
- Faruquee, Rashid, Ridwan Ali, and Yusuf Choudhry (1995) *Pakistan's Public Agricultural Enterprises*. The World Bank, Washington, D.C. (World Bank Discussion Paper No. 305.)
- Faruquee, Rashid, and Kevin Carey (1996) *Agricultural Growth and Poverty in Pakistan*. The World Bank, Washington, D.C. (HCD Working Papers HCDWP 71.)
- Faruquee, Rashid, Jonathan R. Coleman, and Tom Scott (1997) Managing Price Risk in the Pakistan Wheat Market. *The World Bank Economic Review* 11:2 263–92.
- Khan, Mahmood H. (1981) *Underdevelopment and Agrarian Structure in Pakistan*. Boulder, Col.: Westview Press.
- Khan, Mahmood H. (1983) Classes and Agrarian Transition in Pakistan. *The Pakistan Development Review* 22:3 129–62.
- Khan, Mahmood H. (1994) The Structural Adjustment Process and Agricultural Change in Pakistan in the 1980s and 1990s. *The Pakistan Development Review* 33:4 533–591.
- Khan, Mahmood H. (1997) Economic Performance, Structural Reforms and Government Budgets in Pakistan. *Canadian Journal of Development Studies* 18:2.
- Khan, Mahmood H. (1998) *Climbing the Development Ladder with NGO Support: Experiences of Rural People in Pakistan*. Karachi: Oxford University Press. (Forthcoming.)
- Khan, Mahmood H., and Mohsin S. Khan (1997) *Taxation of Agricultural Land and Income in Pakistan*. International Monetary Fund, Washington, D.C. (Discussion Paper.)

- John Mellor Associates, Inc. and Asianics Agro-Dev International (Pvt.) Ltd. (1993) *Agricultural Prices Study*. Vol. II. Report to the Government of Pakistan. Islamabad.
- Pakistan, Government of (1988) Report of the National Commission on Agriculture. Ministry of Food and Agriculture, Islamabad.
- Pakistan, Government of (1993) Report of Prime Minister's Task Force on Agriculture. Ministry of Finance, Revenues and Economic Affairs, Islamabad.
- Pakistan, Government of (1997) *Overcoming Poverty: The Report of the Task Force on Poverty Eradication*. Ministry of Finance and Economic Affairs, Islamabad.
- Qureshi, Saeed, Ijaz Nabi, and Rashid Faruqee (1996) *Rural Finance for Growth and Poverty Alleviation*. The World Bank, Washington, D. C. (Policy Research Working Paper 1593.)
- Rosegrant, Mark W., and Robert E. Evenson (1993) Agricultural Productivity Growth in Pakistan and India: A Comparative Analysis. *The Pakistan Development Review* 32:4 433-451.
- Wizarat, Shahida (1981) Technological Change in Pakistan's Agriculture, 1953-54 to 1978-79. *The Pakistan Development Review* 20:4 427-445.
- World Bank (1994) *Pakistan Irrigation and Drainage: Issues and Options*. The World Bank, Washington, D. C. (Report No. 1188-PAK.)
- World Bank (1996) *Pakistan: Economic Policies, Institutions, and the Environment*. The World Bank, Washington, D. C. (Report No. 15781 PAK.)
- World Bank (1997) *Pakistan: Recent Developments, Policy Issues, and Agenda for Change*. The World Bank, Washington, D. C.

Comments

It is a privilege for me to discuss this interesting paper on Pakistan's agriculture by a prominent scholar. For this privilege I am grateful to the Pakistan Society of Development Economists. I would like to compliment Professor Khan for his well-researched paper and forceful arguments. A number of the issues discussed in the paper were also articulated by him in the daily *DAWN* in April, 1997, which he has now further elaborated, exploiting the economies of scale, I believe. I am in agreement with many of the observations and points made by Professor Khan, but also have some important disagreements with his analysis and prescriptions. I have organised my comments around the major themes of the paper under discussion.

PATTERN AND SOURCES OF AGRICULTURE GROWTH

I share Dr Khan's concern for the erratic and uneven performance of the agriculture sector. I also share his concern about the lesser role of technological change in this context which has accounted for only 38 percent of the increase in total agricultural output. Given excellent resource endowment and hard-working farmers, inadequate performance of the agriculture sector manifested in low crop yields is a matter of serious concern for the students of Pakistan's agriculture. A number of Commissions and Task Forces have identified the constraints in raising farm production and productivity. However, what is surprising is the poor implementation record in this context. Given the increasing population pressure, declining per capita land and water resources, and increasing prices of inputs, it is extremely important to address the issues inhibiting the productivity of farm resources. In modern agriculture, the role of human capital is very important and we must give due attention to upgrade the skills and technical know-how of the farm population.

While analysing of the crop yields and growth rates for various crops, Professor Khan mentions that since the 80s cotton yield has maintained a high rate of growth of 16 percent, followed by wheat (9.3 percent) and sugarcane (6.6 percent). I have checked the yield performance of these crops and have not been able to confirm these growth rates in yields. I wish these growth rates had been actually realised. According to my estimates, the yield rates of these crops have been much lower, about 5 percent in cotton, 2 percent in wheat, and 1.7 percent in the case of sugarcane.

RIGHTS TO OWN AND USE AGRICULTURAL LAND AND IRRIGATION WATER

In Section 2 of the paper, Professor Khan has addressed the changes over time in land tenure, concentration of land, farm size, land fragmentation, and water rights.

Notwithstanding the declining trend in concentration of land, it remains significant as 96 percent of the landowners owing less than 10 hectares account for 64 percent of the total land area. Land ownership is more concentrated in Sindh than in the NWFP and Punjab. It may, however, be noted that access to land for cultivation is reflected in the distribution of operational holdings and not necessarily in ownership of land.

The average farm size has declined from 5.3 ha. to 3.8 ha., but the average size of large farms has increased. Professor Khan has concluded that the number of owners and the area of small holding i.e., below 5 hectares, has increased while the proportion of large owners (more than 20 hectares) and their share in total area has declined due to sub-divisions of holdings through the operation of the law of inheritance and land reforms.

The share of small farms in numbers has increased from 67 to 71 percent but declined in terms of area from 52 percent to 39 percent. The share of large farms declined from 11 percent to 7 percent in numbers with marginal decline in their area share from 43 percent to 40 percent.

Professor Khan has rightly noted the tendency in tenurial arrangements of moving away from share-cropping and towards self-cultivation on all farm sizes. He has also noted the changes in structure, suggesting the trend towards the capitalist mode of farming as the capitalist farmers have emerged from the ranks of landlords and rich peasants.

The tenurial arrangements on the ground, however, reflect several new patterns emerging, for access to land, sharing of inputs and output depending on the population pressure, off-farm employment opportunities, dominant cropping pattern, etc., in the region. For example, cash rent has supplanted share-cropping in certain regions specialising in vegetable farming, with land rent frequently demanded and paid in advance. In some regions, the tenant just provides the labour and the landlord all other inputs, the share of produce going to tenants varying between 16 to 20 percent of the produce, etc.

As regards the absorption or otherwise of landless labour in capitalist agriculture and the resulting out-migration, it is a complex issue. On the one hand, there is a large pool of unemployed labour in the rural areas but, at the same time, farmers often complain about shortages/non-availability of farm hands and high wages.

The existing duality of the land system—between the landlord and tenant, and between the large and small farmers, Prof. Khan rightly observes, affects all interactions in the market place and the access to public sector services between these groups. He argues that public policies on providing infrastructure and inputs, price support and subsidies, and services of research and extension tend to exacerbate inequalities and adversely affect farm productivity. However, it may also be noted that reliance on market forces may not provide the answer to these problems either, as the dice would remain heavily loaded against the small guy.

The author's arguments for land consolidation are quite convincing, and endorsed.

The importance of canal and tubewell irrigation in agricultural development is underscored. I support the author's contention that experiments of economic and social engineering impacting on the lifeline of Pakistan's agriculture must be conducted with great care. Pakistan's agriculture sector should not be treated as a guinea pig for exotic ideas as it remains the backbone of the Pakistani Economy.

PUBLIC INVESTMENT IN INFRASTRUCTURE AND SUPPORT SERVICES

I endorse the analysis of the author that in real terms public expenditure for agriculture and irrigation has decreased in the last 15 years. The author's identification of the problem areas and the analysis of issues is quite convincing. The discussion on the role of Water Users Association in the construction and maintenance of improved water-courses is well-focused and balanced. He has also skilfully diagnosed and articulated the problems inherent in the recently-launched National Development Programme!

The need for investment in human capital is the need of the hour. To enable farmers make the best use of modern technology, farm machinery, and improved farming methods, their know-how of these materials and methods must be upgraded. Similarly, the author has forcefully and rightly argued for spending more on building the social infrastructure and for improving the support services for the rural people and increasing the effectiveness of these investments. However, important as these investments are, they must not be left to the largesse of the donors—to avoid the experience of Village Aid Programme!

The role of research and extension in farm production is well documented. Professor Khan has rightly pointed out the deficiencies in the research and extension systems, and in the access to and availability of agricultural inputs on time and in the required quantity. He also laments about the management and quality of the research and extension systems, which have, over time, become fragmented and vulnerable to extraneous influences.

The links between agri. research and extension have weakened over time due to the separation of previously integrated agri. education, extension, and research system. However, the recent experience with bringing education, research, and extension within one fold in the NWFP has also not been an unmixed success.

Lack of operational funding for research is resulting in wasteful and inefficient use of trained manpower. Fragmentation of the research facilities, too many mono crop research institutes without sufficient trained manpower, and lack of priorities are also causing sub-optimal use of the meagre resources.

No doubt, extension staff has not been able to serve the cause of the modern agri. culture but their problems, service structure, and outside interference in the

system, and many other protocol activities which the frontline workers are required to perform; also need to be considered while evaluating their role. The role of the electronic media in spreading information about technology also needs to be exploited.

Macro Economic Policies

In the wake of structural reforms and changing fads in economic development, privatisation, deregulation and adjustment of exchange rates and downsizing of the public sector have become buzz-words in economic jargon assuming the role of gospel or dogma. The author has also argued for increasing the role of private sector in the input and output markets and for deregulation of economic activity. However, it may be instructive to recall that a number of public sector organisations, like RECP and CEC, were created in response to the malpractices of private sector but now the pendulum has swung in the other direction. The experience and performance of RECP and CEC did not come up to the expectation of the policy-makers and these are being phased out. Their roles and functions are being transferred to the private sector. Nevertheless, the experience with the private sector, again, has been mixed with many complaints about malpractices, default on contracts, poor trade practices, etc. In the process, the gains which were made possible by the public sector agencies are also being ignored. For example, due to the quality control of the CEC, Pakistan cottons were upgraded from *Index-B* to *Index-A*, bringing higher export prices. However, now the private sector has succeeded in getting extension in relaxation of the grading standard successfully launched by Pakistan Cotton Standards Institute.

The private sector has been increasingly involved in the import and marketing of fertilisers, while the role of the Fertiliser Imports Directorate (FID) is being scaled down. However, the FID is reported to have been able to import phosphatic fertiliser at considerably cheaper rates and lower incidentals as compared to the private sector, which is generally regarded cost-effective and efficient. The exchange rate adjustments have not been an unmixed blessing for the agriculture sector either. In the wake of successive devaluations, the input prices have increased and farmers are complaining that these inputs have gone beyond their reach, resulting in low productivity and higher cost of production, which are threatening our export competitiveness.

Prices of Crops

The author has argued for abolishing the price support system and also criticised the Government increase in prices of wheat and other commodities as instruments to increase their output. Government intervention in output markets has been and continues to be in vogue all over the world in one form or another. In Pakistan, where small farmers abound in number—making significant contribution in farm output, having meagre on-farm storage facilities and while being in dire need

of cash to meet their production and consumption requirements if left to the vagaries of imperfect markets, they are most likely to be exploited by the trade. There have been many cases/instances when the government agency could not intervene in time and the commodity prices fell much below the fixed prices announced by the Government. However, the market prices were stabilised above the support price when the agency intervened, although it did not procure substantial quantities.

In view of the experience in Pakistan, and given the ground realities, doing away with the support price system is likely to hurt the cause of agricultural production. No system comes without a cost but the benefits of the system also need to be carefully evaluated.

Comparative Advantage

Pakistan enjoys a favourable climate and excellent resource endowments, for the production of a number of commodities. Obviously, in view of the varying efficiency in the production of different crops, the comparative advantage for producing various crops varies across different agro climatic zones. However, the fact of life is that even in the case of commodities where we have an advantage in production and quality over our competitors, the favourable position is often lost in the processing, transport, and marketing. In this context, the example of hand-picked Pakistani cotton can be given which fetches a lower price in international markets due to poor ginning and admixtures. In the case of paddy also, the finest quality of *basmati* rice suffered due to poor milling and admixtures, adversely affecting the market share. These are some of the policy areas which need the attention of policy-makers.

Prices of Farm Inputs

During 60s and 70s subsidies had become very popular with the planners and policy-makers all over the world. However, the subsidies have gone out of fashion now and nobody wants to hear of input subsidies even in cases when benefits may out-weigh the costs by a wide margin. The case of phosphatic and potash fertilisers can be quoted in this context. In the wake of removing fertiliser subsidies, the prices of phosphatic fertilisers have increased manifold. Consequently, the N:P ratio has become unfavourable which has adversely affected the agricultural production. I have discussed some of the consequences of the Structural Reforms for the farm sector in the hope of encouraging some second thoughts in this direction.

Agricultural Credit, Farm Mechanisation, and Downsizing of Public Sector

Problems in agricultural credit are well-articulated by the author. It has also been argued that the ADBP should be abolished or privatised. The role of institutional credit in modern agriculture hardly needs to be overemphasised. Let

there be no brief for either the public sector or the private sector credit agency. Both have had their successes as well as failures. However, the important questions are: Will the credit needs of agri. sector be met? Will the private sector lend to farm sector? What has been the past experience in Pakistan and in other countries in this regard? No doubt, there are bad loans in agriculture but there are also loan defaults of staggering amounts in the industrial sector. The situation warrants a dispassionate analysis of the pros and cons of the proposed solution in view of the increasing role of purchased inputs and liquidity requirements of the farm sector. The author's proposals having far-reaching implications for this sector, however, need to be discussed with the farmers to have their input and feedback.

Professor Khan has been critical of the mechanisation policies and programmes and argued that mechanisation has not contributed much towards higher productivity. It may be noted that mechanisation in Pakistan has primarily involved replacement of bullock power with tractors to augment the supply of draft power in the farm sector. However, in spite of the increasing use of tractors, per unit availability of draft power has been much below the requirements. Moreover, the use of tractors has not been accompanied with the use of improved implements for one or another reason. Most of the intercultural operations and crop harvesting are still being performed by the traditional/conventional methods. The mere replacement of bullocks by tractors cannot *per se* be expected to raise crop yield unless improved tillage practices and complementary inputs are also used. Farm mechanisation by reducing the turnaround time has helped in increasing cropping intensity, which has also been supported by the rise in water supply and the use of fertilisers.

In case of wheat, however, tractor-driven threshers have totally replaced the bullock-driven devices, which has helped in reducing not only the drudgery of the operation but also the crop losses. It may be noted that the goal of agricultural development and increased farm production entailing higher crop yield and lower unit cost of production may not be realised with the traditional bullock-driven implements, and selected farm mechanisation is the crying need of the hour.

To control budgetary deficit a number of austerity measures have been adopted. These measures, though essential, have hurt the functioning of the technical and research organisations by curtailing their operational funds, and their financial and administrative autonomy by concentrating these powers in the Finance Ministry. A number of exercises have been and are being undertaken to downsize public sector organisations in the garb of rightsizing. For a number of years, the recruitment as well as the promotions in the technical organisations have been banned, while recruitments and promotions to the generalists' cadre have continued. Most of the brunt of the downsizing/rightsizing and austerity measures have been borne by the technical, research, and professional outfits adversely affecting their functioning and efficiency. Moreover, the multifarious exercises undertaken in this context continue

to assume zero opportunity cost of the time and resources expended in these exercises, which needs reconsideration.

THE CASE FOR BUILDING INSTITUTIONAL CAPACITY

Professor Khan has passingly alluded to the quality of data. It is common knowledge that yield and production data on minor crops, fruit and vegetables, livestock, poultry, and dairy are deficient in various respects. Resources provided to the Provincial Government for the collection of these data remain meagre and we continue to build sophisticated models on these poor building blocks. It is imperative to strengthen the capacity of the Departments of Provincial Governments to generate reliable data on the production of minor crops, livestock, and dairy products in addition to the major crops.

I would like to avail of this opportunity to plead the case for building and strengthening the indigenous institutional capacity to identify, analyse, and respond to the emerging technical and policy issues in the farm sector rather than blindly follow the prescriptions by donors.

Here, it may be pertinent to cite the experience of fertiliser use in the wake of structural reforms and the abolishing of input subsidies. As a result, the prices of phosphatic fertilisers have become very high and the N:P ratio for *kharif* crops has increased to 7:1, and that for *rabi* crops to 4:1, against the 2:1 recommended by agronomists and crop experts. The imbalance has definite implications for soil fertility, crop productivity, cost of production, and farm incomes. Similarly, in the wake of the establishment of the W.T.O. and increasing 'globalisation', we must strengthen our institutional capacity to monitor the trends in world commodity markets and keep abreast of the policy shifts of the countries competing with us in these markets.

Abdul Salam

Agricultural Prices Commission,
Islamabad.