Agricultural Price Policy for Growth

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INTRODUCTION

Superb agricultural resources, substantial investment, and relatively liberal macroeconomic policies have provided Pakistan with a high agricultural growth rate and strong multipliers of that agricultural growth to other sectors of the economy. Those growth rates and the consequent multipliers could have been much greater. More troubling, there are unsustainable elements to the past growth rates that are already showing themselves. Thus, without attention to key policy issues, Pakistan's agricultural and overall growth rates are bound to decline significantly. Indeed, that decline is already underway. Correct pricing, investment, and institutional develop-ment policies can reverse that decline and accelerate growth rates well beyond those of the past.

Agricultural price policy is of central importance in its own right and plays an important indirect role in each of the other key policy areas. Thus, this paper, while concerned with agricultural growth and its multipliers, wraps the discussion around price policy issues.

Pakistan's agricultural resources lend themselves to a high degree of produc-tivity enhancing specialisation. Agricultural price policy in Pakistan has seriously inhibited that specialisation. Technological advance, as both a cause and effect of price relationships, has been retarded by inadequate and inefficient expenditure on research and extension, and a major, continuing deficiency in fertilizer availability. Public sector fiscal and budget policy, in part related to agricultural price policy,

have provided grossly inadequate investment in rural physical infrastructure and rural education, deeply constraining the geographic and human participation in agricultural growth. Gradual evolution of unfortunate and unsustainable irrigation policies pose an increasingly serious threat to agricultural growth and its stimulus to other sectors. That too has an important price policy element. The past effects of irrigation system mismanagement have been masked by rapid expansion in the total supply of water, which has now run its course, and by gradual improvements in technology, which are now needed for sustaining growth.

In judging agricultural price policy from a growth point of view, two key elements need to be kept in mind. First, Pakistan's agricultural growth, although based substantially on a superb set of natural resources is in the long run largely driven by technological change. That is of course the story of all rapid economic growth. The growth derived from technological change is the product of investment in the technology system including agricultural research, education, and extension systems, increased supply of inputs in which technological change is embodied, and shift of resources to those products benefiting most from improved technology.

Second, in a country like Pakistan, the single most important determinant of growth in the nonagricultural sector is the stimulus to that growth from large and rapidly growing real income in the agricultural sector itself. Thus, agricultural price policy for growth is to be judged by its effects on the rate of application of cost-reducing technology and the size of the multipliers on nonagricultural growth.

In a broad sense, agricultural price policy is important to technological change for three reasons. First, the pace of technological change, even while it is cost-reducing, is determined by the level of profitability. Price policy can raise or reduce the profitability of a given technology. Second, price policy affects the relative profitability of specific commodities. That will amplify the effect of improved technology if it favours the commodities experiencing the largest technological improvement, and conversely, if it favours other commodities. Third, price influenced level of profitability may well guide the allocation of research resources themselves. We will continually return to these three themes in the remainder of this paper.

The politics of agricultural price policy are driven by its profound effect on the distribution of income among geographic regions and income classes as well as between rural and urban regions. Thus, while the focus of this paper is on the growth implications of price policy, a careful eye must be kept on the income distribution implications. In the final analysis, agricultural price policy is highly political and will be driven by political forces. The economist must focus on the long-run advantages of a growth oriented price policy, even while noting the short-run deleterious effects on some regions and groups, and suggesting means of redressing those effects.

In the final analysis price policy and its effects are commodity specific. The commodity most discriminated against, with immense costs to the economy, is cotton, while the commodity most favoured is sugar. In theoretical terms wheat is favoured, but particularly because of the potentially transitory nature of the favouring of wheat, nonprice policies should be emphasised for increasing wheat production. The effects of price policy on horticultural specialisation and on milk production require sophisticated attention. Past price discrimination against agriculture has provided a basis for under taxation through direct taxes and hence has played a role in inadequate expenditure on public goods essential to high agricultural growth rates.

THE AGRICULTURAL PRODUCTION RECORD

The following brief presentation of growth rate statistics is not to argue a precise position, but to make three points: that agricultural growth is now in the process of slowing; that future growth can be reestablished at the fast rates of the past; but that will require concerted effort across principal crops and regions and a favourable policy environment.

The growth rate in Pakistan's agriculture averaged slightly over 4 percent in the period 1975–1991 (Table 1). Growth was almost precisely the same in the first

Table 1

The Agricultural Growth Rate, 1975–1991	
Year	Growth Rate
1975–1991	4.09
1975–1983	4.10
1984–1991	4.09

Source: World Bank (1992), *World Tables, 1992*. The Johns Hopkins University Press, Baltimore.

half of the period as in the second half (we note below the seeds of a slowdown apparent in the decomposition of that growth rate). Table 2 presents data for six countries considered to be highly successful in agricultural growth and in the multipliers of agricultural to nonagricultural growth. Pakistan's agricultural growth rate falls right in the middle of this highly successful group of countries. We note this success, but also note the low level of yields in the face of unusually favourable, soil, water, and sunlight conditions in Pakistan. These conditions suggest the feasibility of a considerably higher rate of growth, at least for a decade or two. Pakistan's population growth is the third highest of these success stories, which

Table 2

Growth Rates or GDP, Agriculture, Industry, and Population, Comparison of Pakistan with Selected Rapid Growth Countries, Specified Periods

Rate of Growth	Columbia 1964–79	Costa Rica 1960–73	Kenya 1963–78	Taiwan 1960–75	Thailand 1970–87	Punjab, India 1968–88	Pakistan 1982–1990	Simple Average of Seven Countries
Agriculture Output	4.26	5.54	5.10	3.31	3.74	4.52	4.09	4.37
Agriculture Output per Capita	1.80	2.40	1.60	0.64	1.30	2.41	0.99	1.59
Non-agriculture Output	7.34	10.53	12.11	15.03	10.11	6.63	6.94	9.81
Non-agriculture Output per Capita	4.92	7.39	8.61	12.26	7.71	4.52	3.84	7.04
GDP per Capita	3.17	3.12	3.70	6.31	4.00	3.02	3.10	3.77
Population	2.42	3.14	3.50	2.77	2.40	2.11	3.10	2.78

Source: Mellor, John W. (Forthcoming) *Agriculture on the Road to Industrialisation.* The Johns Hopkins University Press. Baltimore; Pakistan Data: World Bank (1992) *World Tables, 1992.* The Johns Hopkins University Press, Baltimore.

makes a high agricultural rate all the more essential if it is to contribute to overall growth.

In the period 1975–1991, Pakistan's high agricultural growth rate is signifi-cantly due to the extraordinary record in cotton–a 10 percent growth rate for the overall period; and, more important, the production growth rate for cotton was more than twice as fast in the last half of the period as the first half (Table 3). In contrast, for all the other major crops the growth rate dropped from the earlier period to the later one–wheat, basmati rice and horticulture dropped in half, sugarcane dropped. by two-thirds, coarse rice actually had a negative growth rate, horticulture dropped in half. The rate of growth of milk production accelerated in the second period, but that rate is only sustainable if overall economic growth is very rapid, thereby gener-ating the necessary domestic effective demand.

Table 3

Area, Yield, and Production Growth Rates, Major Commodities, 1975–1991

Period	Area	Yield	Prod.	Area	Yield	Prod.	Area	Yield	Prod.
		Cotton			Wheat			Sugarcane	
1975–1991	2	8	10	2	2	4	2	2	4
1975–1983	2	4	6	3	3	6	4	2	6
1984–1991	2	12	14	1	2	3	0	2	2
		Rice (IRRI)			Rice (Basm.)			Milk	
1975–1991	2	2	4	5	0	5	n.a.	n.a.	4
1975–1983	2	3	9	7	1	8	n.a.	n.a.	2
1984–1991	–1	0	–1	4	–1	3	n.a.	n.a.	6
		Oilseeds			Horticulture				
1975–1991	–2	2	0.0	6	3	8			
1975–1983	–2	2	0.5	7	4	10			
1984–1991	–2	2	0.0	5	2	6			

Source: Government of Pakistan (1992) *Agricultural Statistics of Pakistan, 1990-1991*. Islamabad.
Note: Horticulture includes vegetable and fruits. The yield figures are for production divided by area, and this also reflects change in composition within the subsectors.

Cotton production in Pakistan can, with adequate investment and research, be expected to grow at a rapid rate–but a rapid growth rate by the standards of any country is the 6 percent achieved in the earlier period, 1975–83, not the extraordinary rate achieved in the later period. But, even the 6 percent rate presumes considerable catching up in technology. Thus, to achieve even the average growth rate of the 1975–1991 period will require maintaining a very high growth rate in cotton and returning to the highest growth rates of the past for the other commodities. That will require improvement in policy of the type presented in this paper. Further improvement in those policies particularly including those for irrigation, research, wheat and cotton, combined with the favourable resource base, and a growth rate of agricultural output on the order of 5.6 percent is probably sustainable for at least a decade. That in turn is consistent with close to a 7 percent growth rate in GDP and consequent gradual reduction in the relative size of the agricultural sector. After a decade the agricultural growth rate will be increasingly sustained by high growth rates in livestock and horticultural production.

SPECIALISATION

Specialisation and consequent trade are a major source of accelerated growth generally and particularly so in agriculture. Adam Smith gave us our first lessons and the new trade economics brings added sophistication to the concept. The two most important policies for encouraging specialisation are prices to direct resources in accordance with comparative advantage and investment in transport and telecommunications to reduce transaction costs. Pakistan's policies have been negative in both of these key areas.

Price Policy

Agricultural price policy in Pakistan has both philosophically and in practice worked to reduce the growth advantages of specialisation. An important element of the philosophy of the Agricultural Prices Commission and hence of government policy has been to argue price relationships which relate output prices to the cost of production. As compared to international prices, commodities which have a low cost of production in Pakistan (relative to international prices) have relatively lower prices than those with high cost of production (Table 4). Thus, cotton prices are kept very low by international standards and sugar prices relatively high. Cost of production studies have a useful place, but not in allocating resources towards the higher cost commodities.

The prices in Table 4 include not only import and export parity prices, but also the prices at wholesale markets in the respective countries. Calculating parity prices is fraught with errors in estimating grades, transport costs, and other market-

Table 4

Various Prices and Cost of Production, Wheat and Cotton Commodities, 1991

Commodity	Domestic Wholesale Price	International Price@	Procurement Price	Cost of Production	Import/Export Parity Price*
	Wholesale Price ($/MT)				
Wheat	139.54	94.06	140.90	94.33	154.72
Cotton Lint	1001.82	1479.30	937.50	934.54	1329.00

Source: Government of Pakistan (1992), *Agricultural Statistics of Pakistan, 1990-91*, Islamabad; John Mellor Associates, Inc. (1993), *"Agricultural Prices Study"–Main Report, vol.I*, in cooperation with Asianics Agro-Dev International (Pvt.) Ltd., Pakistan; Cost of Production and Import/Export Price: Agricultural Prices Commission (1992), *Support Price Policy, 1992-93 Crop, (wheat, sugarcane, seed cotton, rice (paddy))*, APCom Series Nos. 105, 108, 109, 110. Islamabad, Pakistan.

Note: @ *International market for Wheat, Cotton lint, Rice (IRRI and Basmati), Milk, Urea, and DAP* Chicago. Caribbean prices are quoted for Sugar (refined). Oilseed price for U.S. is for Repast oil.
* Export parity price for Cotton lint, Rice (IRRI and basmati).
  Import parity price of Wheat.

ing costs. In some respects it is reasonable to ask the question how are prices in Pakistan compared to what farmers receive elsewhere. Of course, the export parity for cotton is much lower than the international price and similarly the import parity price for wheat is much higher than the international price. But, as calculated by various analysts those prices tend to understate the poor quality endemic in Pakistan as well as the very high transaction costs derived from poor roads and communications and relatively uncompetitive markets. With all these caveats, the cotton export duty, averaged over a period of years, makes the Pakistan cotton price on the average at least 20 percent below international prices. The effect of Pakistan's price policy is to have a more diversified agriculture than would be the case if international price relationships prevailed. Less of highly profitable commodities are produced and more of less profitable commodities. Not at all surprisingly, Pakistan's cotton farmers complain less vehemently about low prices than Pakistan's wheat farmers–the cotton farmers are profiting more despite much lower relative prices than wheat farmers because Pakistan's conditions are conducive to very low cost of production for cotton. But, that is precisely why Pakistan should specialise more in cotton.

The new trade economics emphasises scale economies in determining comparative advantage. It also tells us that comparative advantage is very much a policy-determined variable. Price policy encourages (or discourages) the specialisation that provides scale economies in technology generation and in marketing insti-

tutions. The scale economies in technology generation also make it efficient to reduce risk, particularly with respect to biological phenomena; and, the scale economies in marketing and market development effectively reduce risk of shifting markets.

In the same vein as the new trade economics, comparative advantage may be lost by inadequate investment in research. Pakistan may have come close to that in the case of cotton where a new virus disease hit cotton in a circumstance in which inadequate investment had been made in pretechnology research that would have provided the basis for solving the virus problem relatively rapidly.

In passing, low cotton prices, which encourage greater diversification of agriculture cause a costly over concentration in the low value added end of the textile industry. The benefit of lower prices has a larger percentage effect on the cost of producing yarn, compared to upscale textiles for which the cotton raw material is a much lesser part of the price. More important, the transfer of income away from cotton farmers results in less stimulus to the wide range of largely rural, employment intensive goods and services consumed at the margin by cotton farmers.

Of course, a strong comparative disadvantage may well not be turned around by institutional investment. The large investment in oilseed research in Pakistan is probably a good example. The lack of results after large expenditure with a large international input would suggest that the losses in this investment should be cut by transferring those resources to other commodities where a better response might be expected. Perhaps it is better to see institutional investment and scale economies, at least for agricultural commodities, serving to reinforce underlying comparative advantage, rather than nullifying it.

Transaction Costs

As discussed above, price relationships are a principal determinant of the extent to which the benefits of specialisation are realised. The actual prices faced by farmers in making their decisions about the extent of specialisation are strongly influenced by transaction costs. In the make believe word of neo-classical economics there may be an assumption of zero transaction costs. In the real world of developing countries the transactions costs may be very high. The costs include transport costs driven high by lack of roads or poorly maintained roads; uncompetitive markets with large inefficiencies or profits in trade; and, poor and costly communications which raise risk premiums. All these factors increase the spread between buying and selling costs. For example, the difference between input parity and export parity prices as usually calculated are 40 to 60 percent. The higher those costs the more subsistence oriented (the less specialised will production be). At the extreme, Robinson Crusoe's isolated island presented infinitely high transaction

costs and hence a completely subsistence economy. Pakistan's transaction costs are high due to all the factors stated above.

In a later section we will deal with the relation between agricultural prices, direct taxation of agriculture, and investment in rural physical infrastructure. For now, it is noted that Pakistan has grossly under-invested in rural roads. For example, the Punjab has half the rural road mileage per unit of arable land as the Punjab of India. Similarly other countries generally have much more substantial road networks (Table 5).

Table 5

Road Density, Selected Countries, 1990

Country	Per Capita GDP (US$)	Km/Km² Area	Km/¹,000 Persons	Km/Km² Arable Land
Malaysia	2,320	0.30	2.28	2.00
Thailand	1,420	0.15	1.39	0.34
Philippines	730	0.52	2.57	1.69
Indonesia	570	0.11	1.21	0.63
Pakistan	380	0.14	0.98	0.43
India	350	0.46	1.75	0.84
Punjab	na	0.63	1.57	0.76
Bangladesh	210	0.10	0.14	0.15
Vietnam	200	0.29	1.65	1.39
Nepal	170	0.05	0.38	0.15

Source: Qureshi, S. (1993) *"Macro-Economic Framework and the Agricultural Sector. Case Study of Vietnam"*, unpublished; World Bank (1992) *Social Indicators of Development, 1991-92*. The Johns Hopkins University Press. Baltimore; Government of India, Ministry of Finance, Economics Division (1993), *Economic Survey, 1992-93*. New Delhi, India.

TECHNOLOGICAL ADVANCE AND AGRICULTURAL GROWTH

Research Expenditure

Increased factor productivity is far more important than increased quantity of inputs in providing economic growth. That is particularly true for agriculture once land frontiers have been exhausted. In agriculture, yields per hectare are a good representation of technological advance, given the low price of labour and the limit-

ed land resource. The rate of return on research has been comparable in Pakistan to that in other developing countries–a high 40 to 60 percent rate. However, the level of expenditure on agricultural research has been very low in Pakistan with a consequent low aggregate effect on production (Table 6).

The most striking feature about Table 6 is the very low level of support per research worker–Pakistan is half the level of all other countries except for Nepal. Nepal is notorious for its low level of research support and for its poor results in economic growth.

Over the long-run Pakistan has done well in technological advance and has a physical resource base which responds well to improved technology. In general, improvements in technology increase the response to favourable conditions. Pakistan, with good soils, ample sunlight, and ample supplies of water is well placed to benefit from improved technology.

Cotton yields have increased at an extraordinarily rapid 10 percent rate for the period 1975–1991, and in contrast to most other crops actually grew more rapidly in the second half of the period than the first (Table 3). It is notable that this record was largely without foreign assistance from international research centres. It will take a well managed and well financed research system to maintain even half that pace in the future. The research will have to become more sophisticated, particularly including pretechnology research providing more basic services to the applied researchers.

All other crops shown in Table 3 have experienced rather low rates of yield increase (2 percent per year) and that rate has been either the same or lower in the second half of the period compared to the first. The 2 percent is similar to the levels attained in developed countries. Pakistan with yields far lower than in developed countries should be able to experience rates of 4 percent or more for a considerable period of years as it catches-up with the more developed countries. Particularly given the work of the international centres in wheat and rice, Pakistan should have been able to achieve higher growth rates.

Research is generally more successful in improving productivity of crops which initially have a comparative advantage–that tends to be crops which do well under those conditions. It is rare for agricultural research to turn comparative advantage on its head.

In contrast to cotton, oilseeds research has not been very successful despite over five times as much expenditure per hectare on oilseeds research as on cotton and two-thirds as much overall [John Mellor Associates, Inc. (1994a)]. The lesser profitability of the crop has resulted in a 2 percent per year decline in the area, thus, production has not grown at all, which is a clear signal to cut back on oilseeds research and direct the funds in more promising directions.

It is notable that wheat research expenditure is less than for rice in total,

Table 6

Comparative Data of Agricultural Research Expenditure, Selected Asian Countries, 1989

Country	Expenditure* per Worker	Total Research Expenditure (Millions PPP)* Dollars per Year	Number of Researchers	Number of Researchers per 000 Ha of Arable Land	Agriculture Share in GDP (%)	Agri. Research Expend.* as % of Agriculture GDP (%)
Bangladesh	73,786	68.4	927	0.10	44.3	1.04
India	53,642	450.0	8389	0.05	31.7	0.71
Indonesia	104,600	141.8	1349	0.06	24.1	0.69
Nepal	23,991	10.7	446	0.17	58.7	0.79
Pakistan	25,000	74.3	2972	0.14	26.6	0.92
Sri Lanka	54,731	21.4	391	0.21	26.0	1.11
Thailand	46,420	77.8	1676	0.08	16.9	1.24

Source: ISNAR (1991) "Agricultural Research Policy–International Quantitative Perspectives". Ed: P. G. Pardey, J. Roseboon, J. R. Anderson. P. 44. The World Bank (1992), *World Tables, 1992.* The Johns Hopkins University Press; World Resource Institute (1992), *World Resources, 1992-93.* Oxford University Press.

*PPP–Purchasing power parity exchange Rate; the local currency unit price of a commodity bundle divided by the dollar price of the same bundle. Note in these columns for which PPP provides a food basis for comparisons, it inflates the research levels by three to four times compared to official exchange rates.

despite nearly five times the area, and the expenditure per hectare is about one-fifth as great. A more nearly congruent allocation of research expenditure to wheat would play to an underlying comparative advantage and help move Pakistan to self-sufficiency in wheat.

Fertilizer

Improved crop production technologies are virtually always embodied in increased fertilizer use. That is because, in general, higher yields require more plant growth, requiring more nutrients. Those nutrients must be replaced or even increased if high-yield potentials are to be realised.

The vast quantities of fertilizer that will eventually be used, even with increased attention to efficient use of fertilizer, and the high growth rates undoubtedly require a competitive private distribution system, probably including all stages of the process from contracting for imports to the arrival at the farmers field. Pakistan does not have such a system, as evidenced by the continuing, year after year, scarcity of fertilizer at the time and place and quantity demanded by the farmer. And, once pent up demand is realised the system will require a heavy selling and educational effort if it is to continue to grow at the pace demanded by steadily improving plant varieties and agronomic practices.

The current fertilizer system encourages inadequate imports, and discourages the stocking policies necessary for high growth rates. There must be fully open imports, with a system that does not rely on cross subsidising from the domestic fertilizer industry, and competition at the village level. It may be that the government has an important role in monitoring supplies and arrivals, pioneering new markets, linking research, extension and private marketing of fertilizer, and other tasks. The issue is so important that at least for the next few decades a high level commission, diagnosing gaps in the system and recommending and indeed enforcing remedial action is needed. The guiding principle should be encouraging a competitive private system.

Prices and Productivity

Agricultural prices interact with research generated technological advance to raise factor productivity in agriculture. As is clear from Table 4, prices have been relatively depressed for cotton, the crop with the highest rate of productivity increase. They have been well above international levels for sugarcane with a slow rate of productivity increase. Indeed, while productivity has increased at a very slow pace, the area in sugarcane grew rapidly at 4 percent per year in the period 1975–1991–that rate has subsequently slowed to zero. The negative relation between price distortions and productivity growth is to be expected.

Depressed prices slow the rate of adoption of innovation and may reduce the research expenditure as compared to that made available if the crop was of greater importance. It is notable that the responsiveness of output to price is greater for cotton and sugarcane than for rice and wheat (Table 7). That is a relatively stronger argument for using price to shift production with respect to cotton and sugar commodities and nonprice factors on wheat and rice.

Table 7

Own Price Supply Elasticities, Selected Commodities,
Various Years, 1980's

Commodity	Long Run	Short Run
Cotton		
Area	.50	.10
Yield	.50	.20
Total	1.00	.30
Sugarcane		
Area	.70	.22
Yield	.20	.08
Total	.90	.30
Rice		
Area	.40	.08
Yield	.20	.12
Total	.60	.20
Wheat		
Area	.25	.10
Yield	.15	.05
Total	.40	.15

Source: Tweeten, Luther (1987) *Supply Response in Pakistan Agriculture: A Systems Approach.* APCom Series No. 58, Government of Pakistan, Islamabad.

Thus, given time for long-run adjustments to occur, a 20 percent reduction in cotton prices (the typical level of the export duty and hence the minimum by which domestic prices are depressed by policy) would reduce production by 20 percent, which would be the same for sugarcane. Thus, price policy has undoubtedly played an important role in depressing the gains from factor productivity increasing techno-

logical improvement. Of course increased specialisation must be accompanied by increased expenditure on research and market development expenditure to reduce risks.

In passing, price policy for cotton in effect reduces cotton seed oil production by some 20 percent, a far larger negative effect than the positive effect of a high level of research expenditure or support prices for vegetable oil.

INVESTMENT, FISCAL POLICY AND PRICES

Pakistan has grossly under invested in roads, thereby raising transaction costs, reducing farmers incentives to produce and reducing the degree of specialisation. Similarly under investment in education slows the pace of technological advance as well as having other deleterious effects on growth. An adequate level of investment in these key public goods may require major institutional change, for example by increasing the authority of local governments to levy taxes and administer expenditures which local people want. In the meantime, raising direct taxes on rural people is made more difficult by the perception that they already bear heavy indirect taxes through exchange rate and direct pricing policies. Qureshi has estimated the cost of providing an adequate rural road network to rural Pakistan [Qureshi (1994a)]. The numbers are immense, reinforcing the argument that a system of direct taxation of rural people for local purposes is needed.

Increased investment in rural education is also essential to rapid spread of innovation in agriculture as well as for other important elements of development. School attendance at both the primary and secondary level is shockingly low in Pakistan compared to other Asian countries (Table 8). Expenditure on primary and

Table 8

School Attendance, Selected Countries, 1991-92

Country	Gross Enrollment Ratios (% of School-age Children)		
	Secondary	Primary	Tertiary (Sci/Eng)
Bangladesh	17.0	70.0	24.0
Pakistan	20.0	38.0	15.7
Thailand	28.0	88.0	11.2
Nepal	30.0	86.0	2.2
Vietnam	42.0	102.0	n.a.
India	43.0	98.0	28.8
Indonesia	47.0	118.0	15.7
Malaysia	59.0	96.0	26.5
Philippines	73.0	111.0	35.0

Source: World Bank (1992) *Social Indicators of Development, 1991-92.* The Johns Hopkins University Press. Baltimore, London.

secondary education is low compared to other countries. Qureshi estimates that a 14 percent increase in education expenditure is needed to bring consistency with the education targets for Pakistan, which themselves are modest (Table 9). The important issue, as for roads is that of how these needed expenditures will be paid for.

Table 9

Expenditure on Education, 1990-91

Federal Govt.	Current Expenditure	Development Expenditure	Total Expenditure	Expenditure on Education as Percentage of Total Expenditure	Required Yearly Increases in Allocations over 1990-91 (%)
1990-91	2300	2958	5258	2.24	13.88

Source: Qureshi, Sarfraz K. (1994). "Fiscal Impact of Government Interventions in Agriculture", Agricultural Prices Study, volume II, John Mellor Associates, Inc., Washington, D.C.

At one time the level of indirect taxes on agriculture was very high–largely because of the effect of gross over-valuation of the Pakistan Rupee. Most of that effect on agriculture has now been removed by successive devaluations of the Rs. At present the level of direct taxes, at .35 percent of value added in agriculture is very low and the level of indirect taxes is less than 2 percent of value added in agriculture (Table 10). We have argued elsewhere for permanent elimination of the export duty on cotton; however, we have also argued for elimination of the import restrictions that raise the price of sugarcane and have argued that the import subsidies on wheat should not be operative if an effective production policy is followed for wheat. Thus, the net discrimination remaining through prices is small. Therefore the time has come to face the importance to growth in farmers incomes and overall

Table 10

Direct and Indirect Taxes on Agriculture, 1989–91

Year	Total Direct Taxes (Mil. Rs)	Total Indirect Taxes	Direct Taxes as Percentage of Value Added in Agriculture	Indirect Taxes as Percentage of Value Added in Agriculture
1989-90	784.3	5247	0.40	2.66
1990-91	808.8	4543	0.35	1.95

Source: John Mellor Associates, Inc. (1994a) *"Priority Institutional Reform to Accelerate Growth in Irrigated Agriculture", Vol. II.* In cooperation with Asianics Agro-Dev International (Pvt.) Ltd., Pakistan.

economic growth of the investments in physical infrastructure and then to raise the question as to where those funds will come from, including higher taxes on agriculture. The most efficient form of such taxation would be some form of land tax, perhaps mildly progressive by exempting the very smallest farms.

SUSTAINABLE IRRIGATION INVESTMENT, WATER PRICING AND INSTITUTIONAL REFORM

Water delivered by canals in Pakistan is grossly under priced compared to even operating and maintenance costs. Concurrently adequate maintenance and operating input is not made for lack of funds. Now the water charges are placed in general government revenues and an unrelated allocation of funds is made for operations and maintenance. Thus, to the farmer there is no connection between water changes and the services received. But, the problem is even more difficult. Some farmers receive water on such uncertain terms that it is probably not even worth the low level of present changes, let alone radically higher charges. And, these problems can only be solved by radical change in the institutional organisation of the irrigation system. Thus, there is a water charges problem standing in the way of more effective irrigation, but the solution to that problem requires radical institutional change. Pricing problems rarely turn out to have simple solutions.

The root of the present irrigation management problem is a failure to follow the rules of allocation laid down in the original development of the irrigation system and a vast increase in the quantity of water delivered by the system. One of the causes of failure to follow the rules lies with gross political interference. One of the results is an unsustainable system with too much water at some points and too little at others. Salinisation of the water table is proceeding rapidly, yields are declining, albeit masked by larger quantities of water, by biological improvements to crop varieties, and increased use of fertilizer. The product is less growth than otherwise would occur and the specter of eventual major deterioration of the system.

The solution to these problems lies with converting the present irrigation departments into irrigation authorities with a broad range of services from technical agriculture to organisational skills; formation of farmers irrigation groups with authority as well as responsibility for collecting water charges and seeing that operations are well carried out; and, most important, a judiciary body that will prevent current gross political abuses of the system.

PRICES, GROWTH, AND INCOME DISTRIBUTION

The serious effects on growth of price distortions has been argued above. Favourable effects on income distribution would arise from the accelerated agricultural growth and its strong linkages with increased employment. Further increased

expenditure on rural roads and irrigation maintenance would increase employment. Higher cotton prices would have only a very modest effect on consumers. Lower sugar prices would have a larger effect on low income consumers than in earlier periods due to the increasing budget share. However, since for the lowest income consumers the share is still only 3 percent, lower sugar prices would have only a small favourable effect.

While this paper does not argue for higher wheat prices, a shift to import parity prices would bring a significant increase. In addition, since the Provincial wheat subsidies are probably largely a subsidy to inefficient marketing and processing, with little actually reaching the poor consumer. Those subsidies should also be eliminated. With rising incomes, for even the poorest 10 percent in the income distribution wheat now only makes up 14 percent of consumption expenditure, down from 19 percent in the earlier period (Table 11). The relative weight of milk has increased 2½ times to be two-thirds as important as wheat. Higher wheat prices would probably reduce milk production and raise milk prices as wheat cut into the high-quality roughage production. Poor consumers have not significantly reduced their proportion of expenditure on food (a decline from 54 percent to 53 percent) but their expenditure patterns have diversified making the price of commodities like wheat substantially less important in determining real income. Thus, distorting prices of specific commodities as a means of making income transfers to the poor gains less for income distribution than a few decades ago and loses more in depressed production efficiency. The time has come to adjust to this change in the environment and to end such programmes.

AGRICULTURE AND GROWTH

High rates of growth in agriculture have powerful multiplier effects on growth in other sectors of the economy. Those multipliers rise from the expenditures of income by farmers. Those expenditures are largely for locally produced goods and services. At most, 20 percent of incremental expenditure will be for capital goods; of the 80 percent or more on consumption goods, 20 percent is typically spent for labour intensive high-value agricultural commodities, such as livestock and horticultural products, and 40 percent for locally produced nonagricultural goods and services. These commodities have a high employment content and hence spread the benefits of rising income broadly and they tend to have high cross elasticities so bottlenecks in supply of one good or service allow a ready switch to other goods and services.

The multiplier from agricultural output depends on increasing real incomes and so it is the growth rate per capita of the total population that is relevant. Thus, high population growth rates require very high rates of agricultural growth if a

Table 11

Distribution of Expenditure on Selected Commodities by Income Group,
1969-70 and 1987-88

	1969-70		1987-88	
Commodity	Percentage of Food Expenditures	Percentage of Total Expenditures	Percentage of Food Expenditures	Percentage of Total Expenditures
	0–99 Rupees (11% Households)		0–800 Rupees (8% Households)	
Wheat	36	19	26	14
Milk	8	4	20	10
Sugar (Mill)	2	1	6	3
Sugar (Desi)	1	0	0	0
Total Sugar	2	1	6	3
Food Expenditures	54	–	53	–
Nonfood Expenditures	46	–	47	–
	100–199 Rupees (46% Households)		801–2000 Rupees (56% Households)	
Wheat	31	18	24	12
Milk	13	8	23	10
Sugar (Mill)	3	2	6	3
Sugar (Desi)	1	1	0	0
Total Sugar	4	1	6	3
Food Expenditures	59	–	52	–
Nonfood Expenditures	41	–	49	–
	200–399 Rupees (34% Households)		2001–4000 Rupees (28% Households)	
Wheat	26	14	20	10
Milk	15	9	25	9
Sugar (Mill)	4	2	6	3
Sugar (Desi)	1	0	0	0
Total Sugar	5	3	6	3
Food Expenditures	56	–	47	–
Nonfood Expenditures	44	–	53	–
	400+ Rupees (9% Households)		4000+ Rupees (8% Households)	
Wheat	13	4	16	6
Milk	14	5	24	7
Sugar (Mill)	5	2	4	2
Sugar (Desi)	1	0	0	0
Total Sugar	6	2	4	2
Food Expenditures	10	–	38	–
Nonfood Expenditure	60	–	62	–

favourable effect on overall growth is to occur. Conversely, reducing population growth rates, percentage point by percentage point, is as valuable as raising the agricultural growth rate for achieving an agricultural impact on overall growth.

From various analyses of microdata and from international cross-section data a similar multiplier for agricultural to nonagricultural growth is derived. For the set of Asian countries documented by the World Bank, and removal of the four outliers provides a relationship of a 1.5 percentage point increase in the rate of growth of the nonagricultural sector for each one percentage point acceleration in the per capita agricultural growth rate (Figure 1).
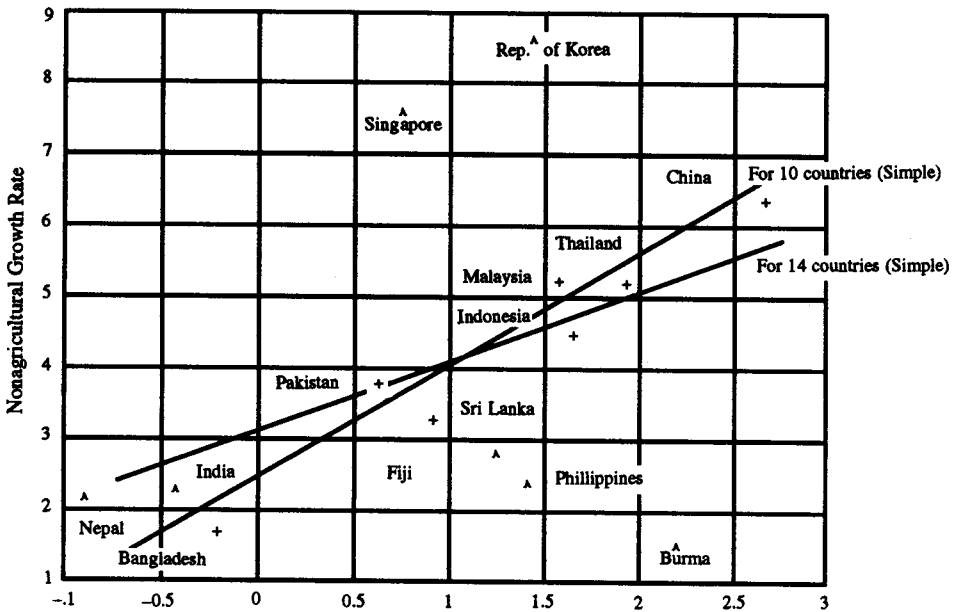

Fig. 1. Growth Rates of per Capita Agriculture and Nonagriculture GDP, Asian Countries, 1960–1986.

Agricultural Growth Rate (%)

Descriptive variables for simple fit of 10 countries (excluding Burma, Philippines, Republic of Korea, and Singapore): R-square, 0.91; value of coefficient of agricultural growth rate, 1.43; T-stat. of agricultural growth rate , 9.33; and standard error of agricultural growth rate, 0.15.

Descriptive variables for simple fit of 14 countries: R-square, 0.23; value of coefficient of agricultural growth rate, 1.07; T-stat. of agricultural growth rate, 1.92; and standard error of agricultural growth rate, 0.56.

Source: The World Bank, World, Tables, 1988-89 Edition.
Note: Constant 1980 price GDP at market prices in local currency.

Table 12 uses that standard multiplier to explore structural change in the agricultural sector and the over-all economy for Pakistan. We use the data from the growth in Pakistan for the five-year period 1986–1991. In that period, the agricultural growth rate was 4.3 percent, minus the population growth rate of 3.0 percent, providing per capita growth of only 1.3 percent. Multiplying that by the multiplier of 1.5 and adding back the population growth rate gives an expected rate of growth of the nonagricultural sector of five percent.

The actual growth rate for the nonagricultural sector 1986–1991 was 5.3 percent. The nonagricultural sector performed marginally better than predicted because the per capita agricultural growth rate was quite slow and foreign aid, foreign remittances, and growth stimulated from within the nonagricultural sector all helped add to the nonagricultural growth. Nevertheless, the actual rate was rather close to the rate calculated through this simple exercise.

We provide, in Table 12, two exercises for the future. First, we calculate the near future, using the same weights for the three sectors as in the 1986–1991 period. We then insert the agricultural growth rate justified below, which represents an acceleration by one percentage point, or a nearly one-quarter faster growth. We also assume a decline in the population growth rate to 2.5 percent. We do so for three reasons: The population growth rate shows some signs of declining and of being overestimated; the fast growth in Pakistan should have led to faster decline in the population growth rate; and we want to illustrate the importance of the population growth rate in the context of agriculture-led growth.

It should be noted that the assumption, about a half percentage point reduction in the population growth rate, adds a quarter of a percentage point to the per capita nonagricultural growth rate. It does so simply by increasing the per capita rate of agricultural growth and hence increasing the size of the multiplier from agricultural to nonagricultural growth. (Of course, the total per capita increase in the nonagricultural growth rate is more, three-quarters of a percentage point.)

To calculate the nonagricultural growth rate for the near future, we simply take the posited increased growth rate in agriculture and apply the multiplier of 1.5 for the nonagricultural sectors (to simplify), we assume the same rates in services and industry). The result is a 6.4 percent growth rate, a 1.3 percentage point increase over the base period, or a 25 percent acceleration. It is a 28 percent acceleration over the calculated growth rate of nonagriculture in the base period. That growth in the nonagricultural sector is only that associated with the agricultural growth. Put differently, it is the acceleration in the agricultural growth rate that is depicted as inducing the acceleration in the nonagricultural growth rate.

We follow with one more exercise to make a simple point. We project the growth rates for the near future ten years ahead, calculate a new set of weights for the sectors and subsectors, then maintain the same growth rates as for the near-term

Table 12

A Growth Accounting Framework for the Total Economy and Agriculture of Pakistan, 1986–1991, Near Future, and after Ten Years

	Percent of 1991 Output	Growth Rate (Percent)	% Addition to Growth of Agriculture	Percent of Growth
Present, 1986–1991, Actual				
Sector				
Agriculture	26	4.3	1.1	20
Service	31	5.9	1.8	40
Industry	43	4.9	2.2	40
Total	100	5.1	5.1	100
Subsector				
Major Crops	48	3.5	1.7	40
Minor Crops	18	3.6	0.6	20
Livestock	34	5.7	1.9	40
Total	100	4.3	4.3	100
Near Future, Hypothetical				
Sector				
Agriculture	26	5.3	1.4	22
Service	31	6.7	2.1	33
Industry	43	6.7	2.8	45
Total	100	6.4	6.3	100
Subsector				
Major Crops	48	4.0	1.9	36
Minor Crops	18	4.1	0.8	15
Livestock	34	7.7	2.6	49
Total	100	5.3	5.3	100
After Ten Years, Hypothetical				
Sector				
Agriculture	26*	5.6	1.5	22
Service	31*	7.2	2.2	32
Industry	43*	7.2	3.1	46
Total	100	6.8	6.8	100
Subsector				
Major Crops	42*	4.0	1.7	30
Minor Crops	16*	4.1	0.7	13
Livestock	42*	7.7	3.2	57
Total	100	5.6	5.6	100

Source: Calculated from data in Government of Pakistan (1991) *"Economic Survey, 1990-1991"* Islamabad.

*New weights are derived by projecting output for ten years, using the "near future" growth rates.

projection for agriculture and compute a new nonagricultural growth rate as above. The result is acceleration of the agriculture growth rate from 5.3 percent to 5.6 percent and of the economy wide growth rate from 6.8 to 7.2 percent.

This substantial acceleration is the product only of the increased weight of the faster growth sectors and the effect of that derived accelerated agricultural growth on nonagricultural growth. It is a simple but important effect of the economic transformation. We will indicate that the faster growth sectors are indeed able to maintain higher growth rates and, hence, that this is an important observation about the growth potentials. What we recommend not only accelerates growth substantially in the short run, but it carries the seeds of further acceleration in the future.

The relatively high rates of population growth in Pakistan, even assuming the reduced rate of 2.5 percent, mean that acceleration of the overall income growth rate has a leveraged effect on per capita income growth; thus, from the base growth rate of 5.1 percent income growth, the per capita growth rate is only 2.6 percent. Accelerating the overall growth rate by 25 percent brings a 50 percent increase in the per capita income growth rate. Further acceleration depicted to 6.8 percent brings a 70 percent increase in the per capita income growth rate.

The growth rates in the subsectors of agriculture are reasonable relative to past growth. Note that the livestock sector initially accounts for 40 percent of incremental growth and it rises close to 60 percent in the later ten years case. Table 12 assumes accelerated agricultural growth. That is reasonable but requires the actions set forth in this paper. The substantial fear is that the agricultural growth rate is slowing and that that will in turn retard the nonagricultural growth rate. The latter in Pakistan may be even more dependent on the agricultural growth rate because of the substantial dominance of the exports of cotton-based commodities. Cotton and cotton-based commodities represent 43 percent of agricultural exports from Pakistan.

COMMODITY PRICING PROGRAMMES

Price policy is commodity specific, thus, policy requires pulling together the preceding discussion in terms of recommendations for specific commodities.

Cotton

Pakistan has a clear comparative advantage in cotton. Perhaps the best way to put this is to point out that over the past ten years the average price of cotton in Pakistan has been 55 percent below the international price and 25 percent below the export parity price. The export parity price is substantially below the international price, not only by normal cost of transportation and marketing, but by abnormally high transaction costs because of poor physical infrastructure and a history of lack

of competition in the marketing of cotton. That lack of competition was evidenced first by government monopolies and then by a private firm situation which is not particularly competitive. The purpose of the price policy reforms is to being greater specialisation in cotton production because of the unusually high productivity of resources devoted to cotton and the immense potentials for further major increases in the productivity of those resources in cotton production.

There are three major arguments raised against increased specialisation in cotton.

1. There is the fear that the international price may decline further over time. The implication is that Pakistan might lose its comparative advantage with declining prices. This is clearly not the case since the Pakistan industry has done so well in the world cotton trade with prices far below international prices. In other words, international prices could drop substantially from their present level and leave the domestic industry at least as well off as it is now.

2. There is concern with vulnerability to diseases such as the recent virus epidemic. The answer to this lies in the new trade economics. The greater the specialisation the more money available for spending on research and thus the less likely one is to be hit by such an epidemic. As we point out below, the Pakistan cotton production industry is at least some 20 percent smaller than it should be, hence 20 percent more resources could easily have been spent on cotton research than has been the case. That expenditure should have brought a much more rapid expansion of cotton research and a much more rapid solution of the virus problem.

3. There is a concern that higher cotton prices will hurt the domestic textile industry. At one time there may have been a legitimate infant industry argument for protection of the domestic textile industry and the feeling that this could best be done by low cost raw materials. That argument has long gone in the sense that by now Pakistan should have been going upscale in the use of textile fibers in moving from its present extraordinarily high dependence on yarn up to higher and higher value-added textile products. Even with the modest export tax on cotton yarn, the bulk of the benefit of lower cotton prices falls on the yarn industry and shifts resources in that direction at the expense of more upscale textile manufacture. From the point of view of healthy growth of a nonagricultural sector, clearly the existing cotton-pricing policy has been a major negative.

A Further factor, which is even more important than the preceding one,

is that with higher cotton prices and hence higher real income of cotton producers, there will be a powerful multiplier effect on the nonagricultural, nontextile part of the economy. In other words, the industrial base would have been diversified away from textiles as a result of higher cotton producer incomes. Thus the effect on industrial policy of the low cotton prices has been highly deleterious.

We can make a rough estimate of the effect on cotton production of present cotton policy. If one takes the average export duty of 20 percent and a long term (five years) supply elasticity of one then we have cotton production 20 percent lower than it would otherwise have been. Cotton farmers gross income would rise by the 20 percent export duty, and more as they shifted resources to the now more profitable crop. Such a large increase in incomes would have strong multiplier effects on rural employment and incomes. It is not clear that the textile industry would contract significantly over the longer term since it would still have a major advantage over the bulk of its competitors by paying the export parity price for cotton which would still be at least 30 percent lower than the "international price".

There is another advantage to a higher cotton price. With a 20 percent increase in cotton seed oil production one would have a 50 percent addition to the supply of domestically produced vegetable oils. That is a far larger increase than can be expected from any other source of vegetable oil production, and it is one in which Pakistan has a clear comparative advantage.

Cotton price stabilisation would probably not be desirable or necessary. With an increase in cotton prices and with a strong comparative advantage cotton producers should have highly favourable incomes. We know that farmers understand the concept of permanent income and will tend to invest or save funds in high price years and to draw upon those investments and savings in low-price years. They probably do a better job of stabilisation of their incomes than does the government.

Sugar

Pakistan's sugar prices have averaged out at 50 percent higher than the Caribbean price [John Mellor Associates, Inc., (1994)]. That would certainly be 20 percent higher than an import parity price. The critical problem with respect to high sugar prices is they result in allocating substantial quantities of water to this voraciously thirsty crop. In the short-run that probably reduces area to cotton, wheat, high quality fodder crops like berseem, and in the long run will reduce allocations to horticultural commodities. It is notable that in comparable farming areas of California, 35 percent of the area is devoted to the high-value horticultural, landscaping, and forage crops, whereas only 3 percent is devoted to those crops in Pakistan.

In essentially all countries, once investment has been made in the processing for sugar there is no drawing back from supporting at least level of production. Thus the critical issue for Pakistan is to see to it that the sugar price is brought down to a level which discourages further investment in processing.

There is a further serious concern with respect to high sugar prices. At present, a gross misallocation of water occurs between the upstream and downstream consumers. It is high sugar prices that provide the high level of profitability of sugarcane production and provides a particularly strong incentive to diversion of water to upstream users. Thus, a powerful inequity is being reinforced by high sugar prices.

Wheat

Wheat prices in Pakistan have averaged about the same as international prices or 27 percent lower than the import parity price (Figure 2). That has resulted in a large cost to the government in the form of import subsidies that have amounted to about 1500 million rupees per year, averaged over for the last 11 years [Qureshi (1994)]. There is also a consumer subsidy of wheat provided by the provinces that averages out to 1862 million rupees per year. There is some doubt whether this is truly a consumer subsidy; it is probably more nearly a subsidy for inefficient marketing in the public sector. Thus, there will probably be no loss to the consumers or the producers by eliminating that subsidy and encouraging a vigorous competitive private trade.

Wheat production in Pakistan has been constrained by the following nonprice factors:

1. A shortage of fertilizer, which alone probably accounts for 20 percent reduction in wheat production;
2. inadequate progress in wheat research with the general under-expenditure on research and somewhat disproportionately low expenditure on wheat; and
3. lack of an effective extension programme in circumstances in which very clear monitorable targets could be set for the extension programme which could bring about a large increase in production of wheat.

Modelling exercises by the Economics Wing of the Ministry of Agriculture suggest that institution of appropriate non-price policies as above could bring about a move to self-sufficiency on wheat or perhaps even a modest export surplus of wheat. The latter perhaps is likely because of the significant export demand through Afghanistan and the effect of a rapidly growing dairy industry on either increased feeding of low-quality wheat or diversion of area from wheat into maize.
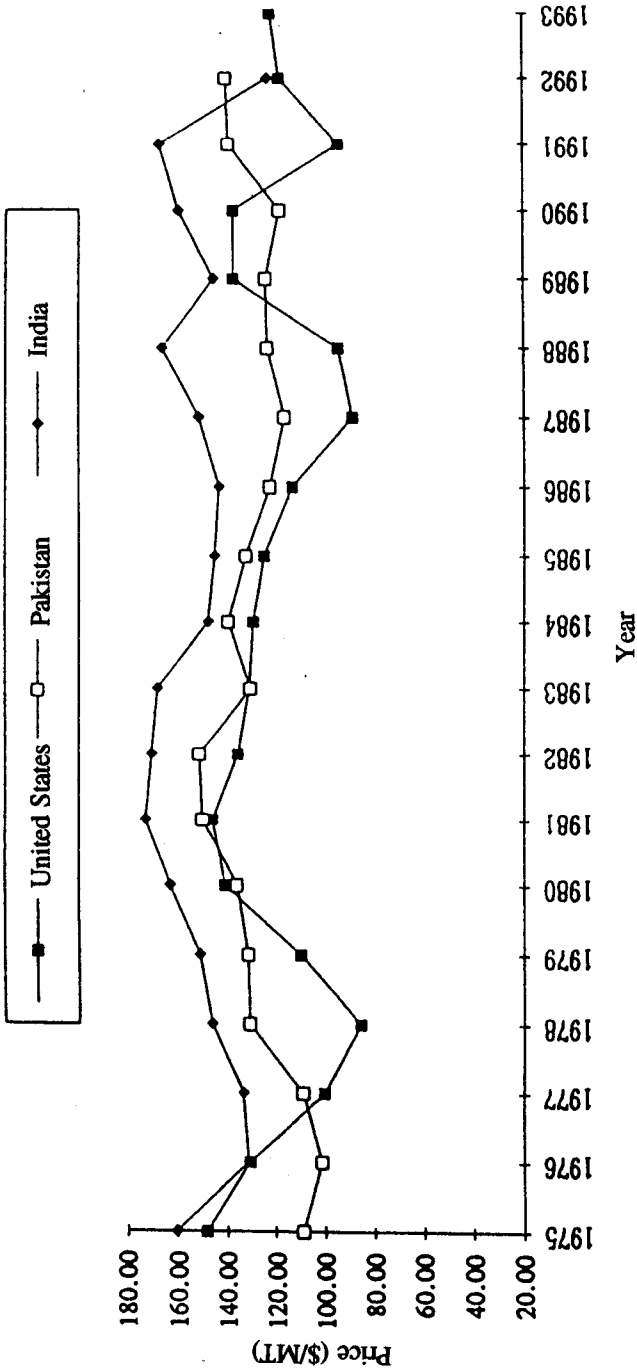
John W. Mellor

Fig. 2. Wholesale Price of Wheat, Selected Countries, 1975–1992.

The implication of the preceding analysis is that price policy is not the logical policy for bringing about improved wheat production; however, improvement in wheat production would probably leave Pakistan in a position of fluctuating from one year to another in whether it was a net importer or net exporter of wheat. With very large divergence between import and export parity prices due to costly internal transport and only moderately competitive systems this means that prices would fluctuate 60 percent from one year to another driven by such exogenous factors as the weather, changes in international prices, and changes in other domestic policies.

In those circumstances, it becomes extremely important to have a price stabilisation programme, both from the point of view of political pressures from farmers and even more important, the equity issues relating to low-income consumers.

Oilseeds

With respect to vegetable oils we have already indicated that the efforts to increase production through unusually large research expenditure have been ineffective. Research expenditure undoubtedly should not be eliminated but it should be reduced to more normal levels. The primary means of increasing the domestic vegetable oil production is through increased cotton production through higher cotton prices and large expenditure on cotton technology. That would increase domestic vegetable oil production by 50 percent.

Horticultural Commodities

Pakistan has experienced a 8 percent rate of growth in horticultural production over the past 16 years (Table 3). One would expect that as per capita income grows and as scale and institutional economies are achieved in horticultural production that the importance of horticultural commodities would grow rapidly. The critical issue is the allocation availability of water. While horticultural commodities are kept at free market prices sugar is propped up at a much higher than free market price diverting area to a much lower value use.

Milk

In the next decade or two, livestock production, dominated by milk, will represent over half of incremental growth in a high-growth rate agricultural sector. How does price policy affect the extent to which this demand-led growth will occur? First, high sugar prices divert area from *kharif* and *rabi* fodder crops. Although a somewhat more subtle argument, the "tax" on agriculture through depressed cotton prices makes it more difficult to levy other forms of taxes for achieving improved infrastructure. The lack of physical infrastructure is deleterious to all elements of agriculture but is particularly deleterious for a bulky perishable

commodity such as milk.

CONCLUSIONS

Pakistan's agriculture is not realising the growth potentials nascent in its superb resource base. Consequently, the stimulus to other sectors is reduced and overall growth rates are constrained. Inefficient price policy is a significant factor in failure to realise the full benefits of specialisation and technological advance. However, benefits from reforms in price policy are inextricably linked with reforms in institutional structures. The one cannot proceed effectively without the other.

1. The cotton price needs to be increased by some 20 percent on the average by permanently eliminating the export duty on cotton. But, the risk inherent in greater specialisation must be reduced by greatly increased research, by further reduction in cost of production, and by increased efforts to develop strong markets for Pakistan's cotton exports.

2. Sugar prices need to be reduced at least to the import parity price level by removing all constraints on sugar imports. The first objective of that policy is to prevent further investment in sugar mills so as to slow the diversion of scarce water resources towards sugar from higher value uses–those might include wheat and certainly in the long run high value fodder and horticultural crops.

3. Nonprice factors to increase wheat production, including a wheat production programme, and increased expenditure on wheat research, will bring self-sufficiency which will increase the urgency of effective price stabilisation policy for wheat in circumstances in which the prices would naturally fluctuate wildly. Some public stocks held in conjunction with a variable levy and subsidy system on imports may be needed. These system should be operated so as not to inhibit operation of the private marketing and processing system.

4. In the face of improvement of agricultural income from the foregoing measures and the past changes in the real exchange rate, direct taxes on agriculture should be increased. They should be equity oriented–progressive according to land holding size and exempting the smallest farmers. The proceeds should go directly to transaction cost reducing investment in rural physical infrastructure and rural education.

5. Radical reform of the fertilizer distribution and supply system and the irrigation system is required.

6. Radical expansion of the agriculture research system in the context of major reforms is required.

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Comments on
"Agricultural Price Policy for Growth"

This is an important and constructive paper. It raises three main issues on
which I wish to comment. First, are Pakistan's agricultural growth rates price-
responsive? Second, what would be the effect of the specific changes in agricultural
price policy that Mellor advises? Third, how is price policy related to supportive
measures in the areas of infrastructure and agricultural research?

(1) Most estimates suggest that aggregate farm product, at constant prices,
shows a supply elasticity in the 2-3-year time-horizon of around 0.1–0.4,
and seldom above 0.3. Even this overstates genuine aggregate response,
for two reasons. First, the supply elasticity of agricultural value-added is,
on normal assumptions, smaller than that of total agricultural gross
output. Second, some of the extra farm output (and value-added) materi-
alises because of the transfer of non-farm resources into agriculture, so
that the GNP gain is significantly smaller even than the gain in agricul-
tural value-added. In long-run dynamics, the latter point may be less
important, to the extent that linkages from extra farm output to extra
non-farm output are stronger than *vice versa*; and also to the extent that
removal of price distortions reduces intra-agricultural inefficiencies, free-
ing up resources for use elsewhere. However, Mellor is absolutely right
to emphasise that "correct pricing, investment, and institutional develop-
ment policies", including education and infrastructure, are complements
in the search for accelerated growth of efficiently added value in agricul-
ture.

A good single-crop price response, e.g. for cotton in Pakistan as
discussed by Mellor, is of less economic worth if it is associated with a
substantial reduction in output of substitute field crops. Nevertheless,
Mellor is absolutely right to insist on the high cost of substantial resource
misallocations due to getting *relative* crop prices far out of line with
appropriate border parities. It is of interest that India has shown very
similar price distortions to Pakistan's–sugar and oilseeds favoured,
cotton and rice (and to some extent wheat) penalised. One wonders what
the political economy of these persistent similarities in crop price distor-

tions might be.

It would be worth considering the environmental impact of big shifts in the crop-mix due to price adjustments. Mellor rightly makes the classic economic case for specialisation. However, technical progress itself is inducing specialisation, as rapidly improving crops (and varieties, often homogeneous in genetic base) drive out less satisfactory cultivars. If price policy further reduces diversity, might this increase the risk of pest wipe-out, or of sensitivity to world price fluctuations, both for individual farmers (and regions) and for the nation, as compared with a less specialised, less "economic" but more robust package? A related issue–modifying this concern, but also one's enthusiasm about rapid specialising responses to price adjustments–is the fact that many crops are grown in fairly pre-set rotations, and in some cases are mixed in the field.

Mellor modifies *his* concern, that agricultural research should complement the rationalisation of prices (by making it easier and more attractive for farmers to respond), when he follows the Hayami-Ruttan arguments about induced technical progress: when he says that "the pace of technical change is determined by the level of profitability". One has to reply, "Up to a point, Lord Copper". Mellor himself demonstrates the huge growth of cotton production, presumably due mainly to research, not to attractive pricing; public-sector policy-ordained research need not be price-responsive, except perhaps in the very long run. Anyway, many research findings are imported.

(2) Passing to price policy issues, Mellor is absolutely right that the argument about "agriculture plundered by pricing" has been seriously overplayed, compared with the much more important and less avoidable forms of plunder associated with depriving the rural sector of any conceivably efficient or equitable shares of infrastructure: teachers, doctors, roads or research. He is also right that, to the extent that the State does set prices, the cost-of-production approach is a systematically inefficient and inequitable way of doing this, producing windfall profits for low-cost producers, and inadmissible subsidies (and encouragements to produce the wrong crops) to high-cost producers.

I pass now to Mellor's interesting and on the whole persuasive remarks on cotton price policy. My first question is: who will gain? If it leads to higher returns to cotton farmers in *particular* areas–rather than to shifting the crop-mix in *many* areas–there is a risk that the extra return will pass substantially into higher rents for scarce land, as the constraining factor. This will especially reduce any impact on producers and hence supply

elasticity) if the producers are tenants rather than owner-occupiers. But even if they are owner-occupiers they will be encouraged to rent out, which may again change the crop-mix. As for the gains to cotton special-isation, they need to be offset against possible losses to diversity, possi-ble increases in risk, and possible reductions in nutrient cycling. As for labour-force specialisation, as Adam Smith already pointed out, this is limited in agriculture by the sequence of operations, and often of crops, through the agricultural year.

Passing to wheat price policy, I am convinced by widespread experience that the elasticity of wheat supply to research expenditure is likely to be higher than its elasticity in response to price, although I am not sure whether this is a correct comparison! Indeed, Mellor's caution about wheat price increases may not go far enough. He questions the effect of dearer food staples, especially wheat, on the poor. However, I think that the claim of "low proportion of expenditure on food staples", among the 24 percent of Pakistanis who are below the poverty line, cannot be correct. The data, quoted from Table 11 of the Household Income and Expenditure Survey, appear to refer to the 8 percent of households with a total household income below 800 rupees; but these will be mainly small households (1 or 2 members) rather than every poor households, though there will be some of the latter. There is ample work to show that total household income is an extremely poor predictor of ranking in terms of poverty (household income per person, or per consumer unit). The fact that Tables 18 and 5 of the *Household Income and Expenditure Survey* show no fall in the share of food expenditure in total expenditure among the "lowest 52 percent of households" as total household income rises, and also no fall in expenditure per person, is surely conclusive proof that these households are not being ranked in ways significantly correlated with poverty rankings.

A more general point is that we need to know a bit more about the effects, on poverty and income distribution, of (a) raising agricultural prices in general relative to other prices, (b) raising the price of cotton relative to wheat. The answers clearly depend largely on the distribution of land, and secondly on the labour-intensity of the various product lines. Land reform is a very important way to get the benefit of price reform through to the poor; with very unequal distribution of land, their losses through dearer food are likely substantially to outweigh the gains through higher agricultural employment. Even if the elasticity of aggregate farm output with respect to price is as high as 0.4, and the elasticity of net employment with respect to agricultural output as high as 0.5, a 10

percent rise in agricultural prices would lead to a rise in farm employment of only 2 percent, and in total employment of only 1 percent or so. For people spending half their income on food staples–typical for the very poor–this would not offset the 5 percent rise in the cost of living. Of course, this is all very partial-equilibrium and ignores linkages; much more empirical work on the specific effects of different price changes would be needed for a firm conclusion. But we do need to be extremely careful about the impact of price reform without land reform. Land reform may be as important a complement to price reform in pursuit of equity, as is agricultural research in pursuit of efficiency.

(3) Finally, let me pass to the infrastructural and research support for price reform. On infrastructure, Mellor's comparisons of rural road density show Pakistan in a very bad light, but they may need some amendment. One needs to allow for the dispersion of agricultural and other rural activity, which obviously increases the cost, relative to value-added which is moved along the roads, of a given roadbuilding programme. A dispersed agriculture, far from markets and/or with low value-added per hectare, needs to be extremely "road-responsive" to justify a costly grid of roadbuilding. A nearly rural town might be a much more cost-effective form of "infrastructure" (and might have environmental advantages too, relative to the "central hub and big roads to the periphery" model).

On agricultural research, the real dialogue must be between Mellor and his fellow-experts on Pakistan, but it looks to me that the "low research expenditure" castigated is the highest in Table 6, relative to agricultural GDP, of all the countries listed–and that may well be the most relevant comparison. In Table 6, it looks as if there are many agricultural researchers per unit of GDP in Pakistan, but relatively little expenditure per worker–a situation reminiscent of many countries in Sub-Saharan Africa. Does it mean that the researchers are too low-paid, in which case one would not except them to stay around in Pakistan for long; or, more probably, does it mean that there are too few support services for the researchers?

Maybe Table 8 (on basic education) provides part of the explanation. A very low primary enrolment ratio–less than half of India's or even Nepal's–and a heavy bias against female education are presumably responsible for the fact that, despite a quite high tertiary enrolment ratio, there is not a very high offtake of quality agricultural scientists, although the best are certainly of world class. If the "catchment" automatically excludes most women, and many men, who have not received even primary education, it will be difficult for a tertiary system to produce

quality and quantity jointly. One of the great strengths of Mellor's paper is that, instead of again covering the familiar micro-analysis associated with price theory and policy, he redirects our gaze on issues such as these, upon which the equity as well as efficiency consequences of price policy ultimately depend.

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Comments on
"Agricultural Price Policy for Growth"

Professor Mellor has made an important contribution to the policy debate in Pakistan. Mellor's vision of a fast-growing agriculture providing raw materials and wage goods as well as markets to the industrial sector through labour-intensive growth in both sectors assigns a central and dynamic role to the agricultural sector in the development process. His emphasis on maximising labour-intensity in the production process resulting in broad-based increases in effective demand ensures a rapid reduction in the incidence of poverty. As I am in full agreement with both the analysis and the policy prescriptions, my comments complement the analysis and the vision provided in the paper by Professor Mellor.

Professor Mellor correctly focusses on recommending price policy changes for cotton, wheat and sugarcane. Pakistan does not have a comparative advantage in sugarcane. Due mainly to political economy considerations, sugarcane has been protected while cotton and wheat in which Pakistan has comparative advantages have been disprotected. The scope for increasing output along the fixed supply curve by changes in relative prices only is generally not high. In the case of Pakistan, there have been severe price distortions for/against some crops in the past. The eliminations of such distortions can have a significant impact on the output levels of different crops. Professor Mellor's price policy presumptions suggest the path to be followed to capture the output gains from improvements in resource allocation. The output gain from price changes in the short-run indicated above would be complemented by the output gains from increased investment and technical change if Mellor's policy recommendations are implemented. By far the most important source of output increase is, however, the shift of the supply curves to the right. In this context too, Mellor's package of investment consisting of human capital investments, rural infrastructure and research and extension is a sound one. It is easy to note that investments in all three components are needed. The issue requiring some consideration is how to decide on the optimal mix of investments in the package for a given country at a given time.

The issue of financing the package of rural investments is at least as important as the question of the allocation of the investments between different elements within the package. Professor Mellor's recommendation in this regard with respect to a progressive land tax is an important one. The revenue-raising potential from

such a tax is substantially less than the revenue requirements to fund Mellor's package of rural investment. The exemption of small farmers from the purview of such a tax erodes the tax base. It also makes the collection of the tax an expensive proposition as one has to continuously determine the threshold level of small farmers that has to be exempted from the tax. The income gains to small farmers from agricultural-led growth are large and important for the alleviation of their poverty. Complicating the structure of land tax may not be a cost-effective way of improving the welfare of the small farmers. There is a need to implement a fundamental tax and expenditure reform to mobilise enough resources from the economy and allocate sufficient funds for the agricultural sector. An effective land tax that Mellor recommends would be an important element, of the tax structure to be evolved as a result of fundamental tax reforms geared both to raise resources and improve efficiency and equity.

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