

PAKISTAN JOURNAL OF AGRICULTURAL ECONOMICS

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Preface

Patronage of Non-traditional Oilseed Crops

Pakistan's Agricultural Tax System: Current Policies
and Needed Reforms

Implementation of Support Price Policies in Pakistan

Farmers' Response to Support Prices of Wheat in Pakistan

Crop Production Statistics: An Analysis

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Cost of Production of Major Crops

A Note on Support Price System

Statistical Appendix



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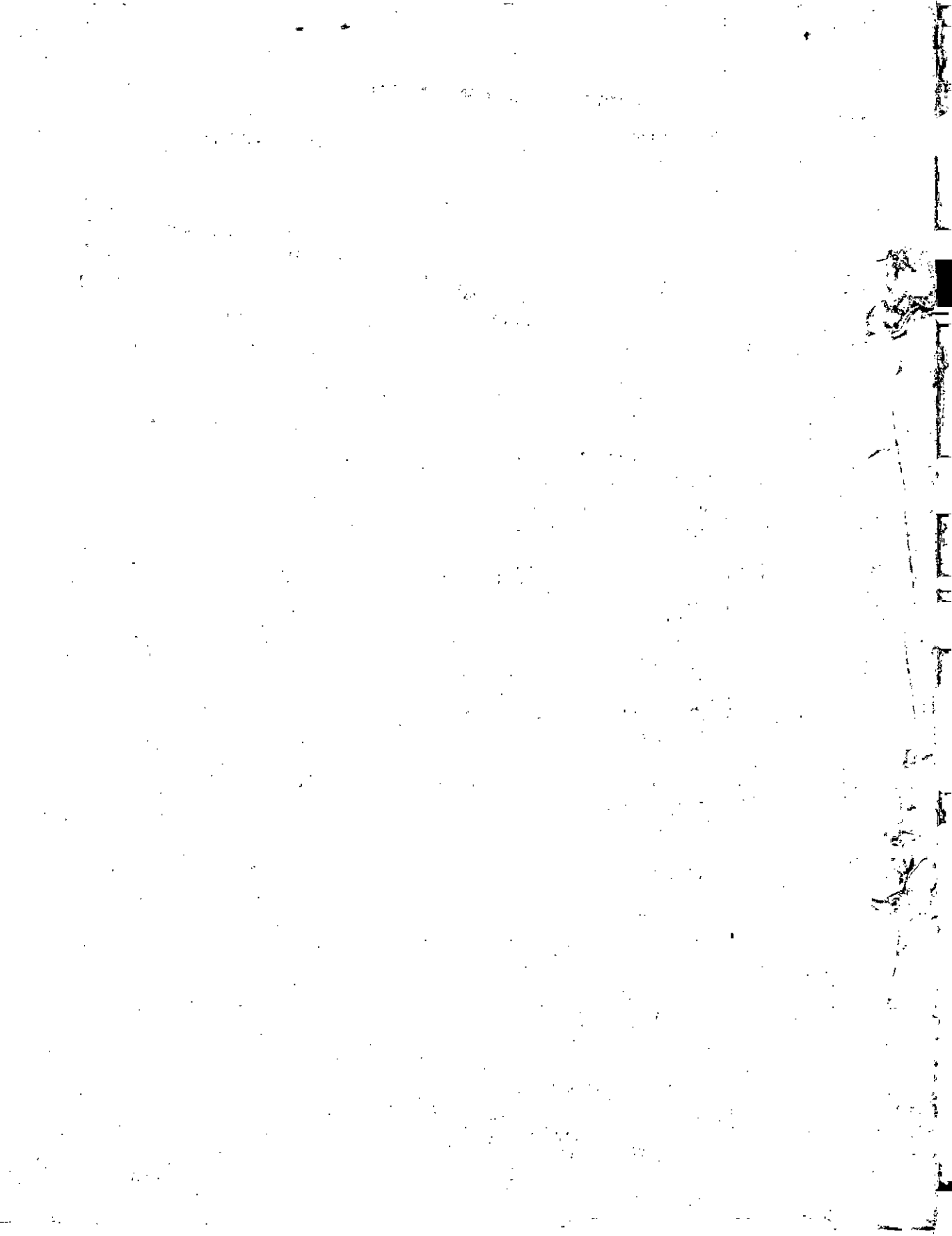
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PREFACE

The Pakistan Journal of Agricultural Economics (PJAE) was first published by Agricultural Prices Commission (APCom) in January 1992. Since then APCom has brought out two more issues - one in July 1992 and the other in January 1993. This is the 4th in the series. It includes seven articles covering important topics relating to agriculture in Pakistan, such as patronage of non-traditional oilseed crops, agricultural tax, implementation of support prices, problems relating to crop production statistics, farmers' response to the support price of wheat, cost of production of major crops, and use of fertilizer. It also contains a critical note on support price system in Pakistan. APCom is a repository of useful information gathered painstakingly through its field surveys and analyses of secondary data from domestic and international sources on crop production, input use, agricultural marketing, crop procurement and prices. Some of these data have been arranged at the end of this Journal in the form of tables. Thus, this issue of PJAE represents a wide spectrum of ideas and information and will be of particular interest to the professionals, researchers and policy planners.

The Agricultural Prices Commission was established in 1981. Its main function was to carry out needed analyses and recommend support prices for a number of agricultural commodities to the Government. The Commission has done a commendable job and has prepared 9 voluminous support price policy reports year after year and submitted its recommendations both on price and non-price measures to the Government. However, in recent years the global climate has changed against the price support programmes and emphasis has shifted towards globalization and market economy. As now we have to play by new rules, there is need for re-defining the agricultural support mechanism and reshaping our farm policies. I do hope that PJAE can play an important role in getting experts' consensus on agricultural price policies in conformity with our national interest and changing world conditions.

I take this opportunity to place on record the gratitude of APCom to one of my illustrious predecessors, Dr. Muhammad Afzal for having this Journal pioneered in 1992. I also wish to thank all the officers and staff of APCom, particularly, Mr. Muhammad Ashiq, Chief (APD), the Coordinator for having brought this publication to life again after its cessation since 1993. At the end, comments and proposals for improvement are most cordially invited.

30 June, 2000

Syed Shahid Husain

during the last two decades on development of non-traditional oilseed crops.

3. Achievements

The area and production of non-traditional oilseeds can be seen in Table-1. Total area under non-traditional oilseed crops increased from an insignificant level of 4 thousand hectares to 216 thousand during 1980-99. Similarly production increased from 2 to 283 thousand tonnes. In 1998-99, according to the PODB estimates, sunflower was sown on 144 thousand hectares and canola on 71 thousand. The former yielded 195 thousand tonnes of seeds and the latter 87 thousand. Yield per hectare was estimated at 1,349 kgs for sunflower and 1,236 kgs for canola.

Table-1: Area and Production of Non-traditional Oilseeds in Pakistan for Selected Years

Year	Sunflower	Soybean	Safflower	Canola	Total
Area ----- 000 hectares -----					
1979-80	0.59	3.51	0.22	-	4.32
1984-85	9.59	4.54	2.88	-	17.01
1989-90	25.90	1.50	0.45	-	27.85
1994-95	68.38	6.01	1.70	2.80	78.89
1995-96	86.21	2.13	1.23	40.87	130.44
1996-97	98.74	5.65	1.74	105.22	211.35
1997-98	98.46	6.35	1.59	22.26	128.66
1998-99	144.19	1.02	0.13	70.82	216.16
Production ----- 000 tonnes -----					
1979-80	0.36	1.33	0.24	-	1.93
1984-85	7.79	1.80	3.14	-	12.73
1989-90	24.58	0.85	0.23	-	25.66
1994-95	85.70	7.23	0.93	3.80	97.66
1995-96	109.52	2.69	0.78	42.00	154.99
1996-97	128.57	7.31	1.17	130.00	267.05
1997-98	129.69	8.23	1.13	34.00	173.05
1998-99	194.54	1.24	0.08	87.50	283.36

Sources:

- For sunflower, soyabeans and safflower: Agricultural Statistics of Pakistan (various issues).
- For canola: Pakistan Oilseeds Development Board (PODB).

The Table-1 indicates that the sunflower and canola crops have picked up while soyabean and safflower crops have not shown much prospect. Area under sunflower which was 590 hectares in 1979-80 reached 68 thousand hectares in 1994-95 and 144 thousand in 1998-99 i.e. 244 times increase over 1979-80. Like wise, its production which was only 360 tonnes in 1979-80, reached 86 thousand tonnes in 1994-95 and 195 thousand in 1998-99. In 1979-80, the soyabean crop was sown on 3,510 hectares. In 1994-95, this figure jumped to 6,010 hectares but dropped to 1,020 hectares in 1998-99. Its production peaked at 8,230 tonnes in 1997-98 but fell to a negligible quantity of only 1,240 tonnes in 1998-99. Area under safflower was 220 hectares in 1979-80, 1,700 hectares in 1994-95 and only 130 hectares in 1998-99. Similarly, its production which was just 240 tonnes in 1979-80 declined to 80 tonnes in 1998-99.

Canola crop was introduced in 1994-95, when its area was 3 thousand hectares. It rose to 105 thousand hectares in 1996-97 but dropped to 71 thousand in 1998-99. A similar trend has been seen in its production which was only 4 thousand tonnes in 1994-95, rose to an abnormal level of 130 thousand in 1996-97 but declined to 88 thousand tonnes in 1998-99. The statistics on canola crop are collected by PO DB itself because the Directorates of Crop Reporting Service of the Provincial Governments do not treat canola as a distinct crop from rapeseed and mustard and accordingly do not separate their statistics on acreage and production. The statistics of PO DB seem to be self-serving in intent and are contested by experts as they perceive a vested interest on the part of PO DB to exaggerate the figures to claim a dazzling performance.

4. PO DB Claims

PO DB has claimed phenomenal success in oilseeds development during the last five years (1994-99). It claims that it has increased domestic production and reduced oil imports. In 1994-95, Pakistan had imported the highest ever quantity of 1,395 thousand tonnes of edible oil. During the next three years the annual imports declined to around 1,100 thousand tonnes. However, in 1998-99 the oil imports jumped to 1,346 thousand tonnes. Although volume of imports was lower than in 1994-95, the cost was Rs 9.76 billion higher. Targets of area and production fixed by the Federal Committee on Agriculture during 1989-90 to 1998-99 were never achieved. The under achievement was as high as 67% in case of sunflower

production in 1996-97, 95% in case of soyabean production in 1990-91, 98% in case of safflower in 1998-99 and 74% in case of canola in 1997-98. As calculated in Table-2, the production of domestic edible oils from all the four non-traditional oilseed crops could at best be estimated at 32 thousand tonnes in 1994-95 which increased to 97 thousand tonnes in 1998-99. The share of sunflower was 66 thousand tonnes (68%) and of canola 31 thousand tonnes (31%). The contribution of soyabean and safflower was negligible.

Table-2: Domestic Production of Edible Oils from Non-traditional Oilseed Crops in Pakistan for Selected Years

Year	Sunflower	Soybean	Safflower	Canola	Total
----- 000 tonnes -----					
1979-80	0.13	0.21	0.05	-	0.39
1984-85	2.65	0.29	0.66	-	3.60
1989-90	8.36	0.14	0.05	-	8.55
1994-95	29.14	1.16	0.20	1.33	31.83
1995-96	37.24	0.43	0.16	14.70	52.53
1996-97	43.71	1.17	0.25	45.50	90.63
1997-98	44.10	1.32	0.24	11.90	57.56
1998-99	66.45	0.20	0.02	30.60	94.85

Source: Calculated from Table-1 by using the oil extraction rates of 34%, 16%, 21% and 35% for sunflower, soyabean, safflower and canola, respectively.

The poor performance of the non-traditional oilseed crops calls for a serious review of their development strategy. The nation has spent billions of rupees, during the last 19 years on development of these crops which contribute a modest 17% to the domestic production of edible oils and merely 5% towards total consumption requirements (Table-3). At this pace one needs an eternity to achieve self sufficiency in edible oil production.

Table-3: Domestic Production, Imports and Consumption of Edible Oils for Selected Years

Year	Domestic Production			Imports	Consumption	Share of NTO's in	
	NTOs	Others	Total			Domestic production	Consumption
----- 000 tonnes -----							
Per cent ---							
1979-80	-	255	255	346	601	0.15	0.06
1984-85	4	305	309	664	973	1.17	0.37
1989-90	9	321	330	962	1292	2.59	0.66
1994-95	32	446	478	1395	1873	6.66	1.70
1995-96	53	479	532	1143	1675	9.88	3.14
1996-97	91	476	567	1057	1595	15.98	5.58
1997-98	58	446	504	1192	1696	11.42	3.39
1998-99	97	456	553	1346	1897	17.59	5.12

* Include cotton seed oil and rapeseed & mustard oil.

Sources:

- Pakistan Oilseeds Development Board (PODB).
- For Non-traditional Oils Production: Table-2.

As stated earlier, the domestic oil production from non-traditional oilseeds in 1994-95 was estimated at 32 thousand tonnes. These crops registered annual increases of 21, 38, -33 and 39 thousand tonnes of oil during the next four years over the respective previous years, while the imports decreased by 252 thousand tonnes in 1995-96 and further by 86 thousand tonnes in 1996-97. In the next two years, the imported quantities again moved upward and in 1998-99 were close to the level of 1994-95. PODB's claims to have brought about significant reduction in imports are hard to accept because:

- i) Increases in production of non-traditional oils over that of 1994-95 were quite modest and did not match the decreased quantities of imported oils. The decrease in imports could be for a variety of other reasons like carry over of stocks etc.
- ii) At the rate of acclaimed savings of rupees 10 billion (in 1995-96), the nation could have got rid of imports by 1998-99 i.e. the fourth year of PODB's brilliant success. But this has turned out to be a pipe-dream.

- iii) In fact, there was a drop of 252 thousand tonnes in oil imports in 1995-96 worth Rs 6 billion. The figures quoted by PODB of 300 thousand tonnes reduction in imports or a saving of Rs 10 billion are gross inaccuracies.
- iv) Reduction in imports of 252 thousand tonnes in 1995-96 do not correspond to the increase of 57 thousand tonnes in the domestic production of edible oils (inclusive of 24 thousand tonnes of non-traditional oils).
- v) In mid 1990's our annual imports averaged around 1,100 to 1,200 thousand tonnes. The year 1994-95 was an abnormal year during which some other factors caused an extra ordinary 23% increase in imports over 1993-94. Claim of success should have been made with reference to a normal year of imports, such as 1993-94, 1996-97, 1997-98 etc. and not to an abnormal year i.e. 1994-95.

5. Constraints

For expanding cultivation of non-traditional oilseed crops, the GCP and NODP were assigned all the functions necessary for this purpose. The PODB is a successor organization. Therefore, it has also been entrusted the activities relating to research, development, marketing and processing of non-traditional oilseeds. Even the function of quality and safety control in oil production, processing and preservation including packaging, labeling and other technical requirements have been assigned to it. Prescription of quality standard for edible oils, development of human resources involved in promotional work and collecting the statistics relating to oilseeds sector also fall within its purview. All these functions appear to be necessary and appealing but due to one or the other reason the responsible organizations GCP/NODP/PODB did not perform these functions well. According to experts' view based on field surveys of Agricultural Prices Commission (APCom) and discussions held in the meetings of the APCom's Standing Committee on Non-traditional Oilseeds the following problems are hampering the production of oilseed crops:

5.1 Technical

- i) The concerned organizations could not develop local sunflower hybrids and a dependable system of their seed production and distribution. There are instances when seeds of unsuitable hybrids both in quality and performance were supplied to farmers.
- ii) The farmers are not convinced of the comparative advantage of growing non-traditional oilseed crops in preference to other crops. Acreage has shrunk in some cases. Soyabean is confined to Matta tehsil of district Swat and its cultivation in southern Sindh and in Multan and Vehari districts of the Punjab has disappeared. Similarly, the safflower has almost vanished from Shikarpur and Larkana. Only sunflower and canola give some hope to increase the domestic edible oil production in future.
- iii) The expansion of area of sunflower and canola is restricted because of the high cost of imported seed and uncertainty about its quality.
- iv) Knowledge of production technology involving harvesting and threshing for each crop is lacking in local languages.
- iv) There are serious marketing problems. Market, particularly for safflower does not exist. NODP officials cheated the poor growers by falsely promising to buy back their produce at higher than support prices. No procurement arrangements have been made with PASSCO either for purchase of non-traditional oilseeds.
- v) It is believed that non-traditional oilseed crops lack comparative advantage at national level against the traditional crop of wheat.

5.2 Administrative

- vi) PODB is an anachronism in the existing environment of free markets. Expenditure of millions of rupees every year on trying to develop the cultivation of non-traditional oilseed crops which lack a comparative advantage, amounts to risking meagre national resources. The achievements by PODB and its predecessor organizations provide an ample proof that government intervention in trying to prop up non-traditional oil crops has failed.
- vii) PODB is self-financed through a cess of 5 paisa per kg on import of edible oils. Higher the imports greater the income. Therefore, there is, an in-built incentive for the PODB not to encourage domestic production but to have higher imports.

6. Some Remedial Measures

- Agriculture research and crop development is a provincial subject and the Federal Government should not indulge in the luxury of throwing tax payers money on quixotic ideas.
- Comparative advantage of producing oilseed crops can only be established through increasing their yields substantially. Thus the provincial Research Departments should concentrate to evolve/introduce such varieties/hybrids which are suitable to grow in different ecological zones and capable of enhancing the yield more than double the present level.
- All attention should be given to the local production of seed of hybrids and other varieties. This would also lower the cost of production.
- Instead of thinly spreading the development funds over a number of crops, concentration should be on promoting sunflower and canola.

- The Agricultural Extension Departments should disseminate knowledge to the growers about the production technology of sunflower and canola through pamphlets and electronic media in local languages.
- The farmers be educated that only the use of quality seed of canola, true to its specifications can facilitate its marketing at premium price.
- As market for non-traditional oilseed crops is non-existent, the government should resort to get the support prices of these crops implemented effectively.

REFERENCES

- APCom -- Various Field Survey Reports, Islamabad.
- "Support Price Policy for Non-traditional Oilseeds," Islamabad – Various reports.
- Finance Division, Government of Pakistan, "Economic Survey, 1998-99", Islamabad.
- Ministry of Food, Agriculture and Livestock, Government of Pakistan, "Agricultural Statistics of Pakistan," Islamabad – Various issues.
- Pakistan Oilseeds Development Board (March, 2000) "A Brief on Pakistan Oilseeds Development Board", Islamabad.

PAKISTAN'S AGRICULTURAL TAX SYSTEM: CURRENT POLICIES AND NEEDED REFORMS

By

M. Ghaffar Chaudhry
Rana Muhammad Ashiq
and
Muhammad Ijaz Ahmed

"In the efforts to resource mobilization at the domestic front, taxation is an important source both for the direct contribution which it can make to economic development and for its indirect effects on control and incentives and an egalitarian distribution of available incomes. As agriculture is still the largest sector in Pakistan, its contribution to resource mobilization could be immense. It may, however, be noted that resource squeeze on agriculture would be fruitful only if agriculture is itself rapidly growing and/or contains a large surplus for investment. By contrast resource transfers that tend to diminish that surplus from agriculture can prove to be self defeating and counter productive to agriculture [Timmer (1988)]. It is a common perception that agriculture in Pakistan falls out of the tax orbit. This may be true for direct taxes. The burden of indirect and implicit taxes on agriculture is heavy by any standard of taxation. In contrast to overall revenue - GDP ratio of 15-16 per cent for the Pakistan economy, incidence of taxes on agriculture goes as high as 35 per cent of value added by this sector according to one estimate and upto 48 per cent according to other."

1. Introduction

Pakistan has a history of taxing agriculture through the land revenue system. Being income and price inelastic, the replacement of the system with agriculture income tax has been widely proposed to meet financial

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- M. Ghaffar Chaudhry is Joint Director at the Pakistan Institute of Development Economics, Islamabad, Mr. Muhammad Ashiq and Mr. Ijaz Ahmed are respectively Chief and Assistant Chief at Agricultural Prices Commission, Islamabad

needs of the growing national economy. Under pressure from the World Bank and International Monetary Fund (IMF), Pakistan introduced various types of agricultural income tax in the past and in full during 1993 and 1996 respectively [World Bank (1999)]. However, introduction of income tax is thus far a highly debatable and controversial issue in Pakistan. For example, out of the nine commissions [Pakistan (1959, 1960, 1963, 1964, 1970, 1986, 1988, 1989 and 1993b)] that studied agricultural taxation, only two recommended introduction of agricultural income tax [Pakistan 1960 and 1993b] and the remaining seven favoured continuation of the existing land revenue system. The studies of individual economists also demonstrate conflicting evidences on the issue. There seems to be general consensus among such writers as [Hamid (1970), Yaqub (1971), Chowdhury (1971), Khan (1991) and World Bank (1999)] on the repeal of land revenue system in favour of agricultural income or graduated land tax. Contrarily an equal number of economists seems to have shown dissatisfaction with the efficiency of agricultural income tax as an effective tool of taxing agriculture [Ahmed and Stern (1989), Bird (1974), Oldman (1990), Chaudhry (1999), Chaudhry and Maan (1993), Gold and Foster (1972) and Newbery (1987)].

The existing state of affairs necessitates a study of capital formation role of agricultural taxation in Pakistan. There are studies [Hamid (1970), Khan (1991) and Qureshi (1986)] that hold that agriculture's role in capital formation in Pakistan has at best, been dismal. Others [Chaudhry (1973), Pakistan (1986 and 1988)] have argued that agriculture in Pakistan was heavily taxed and suffered from excessive resource transfers.

With this background, the purpose of the present paper is to quantify the magnitude of total taxes in agriculture during 1995-96 through 1998-99 with the following outline. In addition to this introductory section, the paper extends over four sections. Section 2 gives details of structure of taxes in agriculture. In section 3, an attempt is made to quantify the magnitude of different types of taxes collected from agriculture. Section 4 discusses the policy implications of agricultural tax structure and tax burden on agriculture. In section 5, a brief summary of findings and conclusions of this paper is presented.

2. Tax Structure in Agriculture

Agriculture in Pakistan is taxed by all three tiers of the government; that is local, Provincial and Federal. The Provincial Governments because of their legislative powers place heavy reliance on direct taxes in

agriculture, although indirect taxes also generate some revenue. Local Governments finance their expenditures solely out of the receipts from direct taxes approved by the Provincial Governments. The Federal Government depends, to a large extent, on indirect taxes where farmers like other consumers are liable to payment of taxes or on implicit taxes through fixation of prices of agricultural commodities and rate of foreign exchange. Because of the varied nature of these taxes, it is necessary to discuss them separately.

2.1 Direct Taxes

Direct taxes in agriculture consist of agricultural income tax, wealth tax, land revenue and a large number of cesses. Previously, Ushr as a religious levy was also enforced but has been discontinued in the recent years. Although land revenue rates vary directly with land productivity and are low by any standard, many of its cesses have appeared with the passage of time for stabilizing its otherwise eroding base. The most common among these cesses until 1993 were agricultural income tax, wealth tax, development cess, mosque fund, district council rate and local rate. Both wealth tax and agricultural income tax are, however, now collected as separate taxes which accrue to Federal Government. Development cess and mosque fund are levied at the respective rates of 35% and 2% of the land revenue and accrue to Provincial Governments. District council rate at 55% and local rate at 50% of land revenue are retained by local Governments and are not normally the part of Provincial and Federal Government budgets. Access to local Government accounts being limited, both these cesses are normally ignored in analyses of direct agricultural taxes. A 5% collection charge retained by the village headmen (Numberdars) is also excluded from the agricultural tax studies. In addition, local Governments are also empowered to collect marketing fees on agricultural commodities and animals, and minor taxes such as hearth tax, and birth and marriage registration fees, within their respective jurisdictions.

Different types of direct taxes levied on agriculture have been included in this section. However, due to their insignificant share in the total agricultural taxes detail has been avoided. Therefore, for the purpose of analysis, done elsewhere, only total amount of direct taxes – inclusive of all its constituents, is used.

2.2. Indirect and Implicit taxes

A variety of indirect taxes are levied by the Federal and Provincial Governments. The most common heads among them are custom, excise duties, sales taxes and other minor heads of tax and non-tax revenues. While indirect taxes are collected from consumers, a part or whole of their burden is shifted implicitly to the producers i.e., the growers generally as a result of government intervention in agricultural commodity, farm input and foreign exchange markets. In Pakistan, Government interventions in agricultural produce market has most of the time resulted in implicit taxes on agriculture through underpricing of agricultural commodities measured as the difference between world prices (import/export parity prices) and procurement/actual producer prices. These implicit taxes accrue largely to private traders, industrialists, urban consumers and the government.

The rising resource needs have been accompanied by increasing efforts at resource mobilization from agriculture. By the end of 1980's rates of implicit taxes went up, partly because the nominal protection for most commodities had been falling and partly because most of the subsidies on agricultural inputs diminished overtime [Chaudhry and Kayani (1991)]. However, implicit taxes in the recent years have fallen as a result of falling international prices as is clear from Annexes-I and II.

3. Tax Incidence and Taxes Paid by Agriculture

The estimates of this section have been made on the basis of incidence analysis. The analysis proceeds from transfers of farm incomes due to direct taxes, indirect taxes, taxes due to low farm prices and non-tax revenues of Federal and Provincial Governments, with emphasis on recent years. Taxes accruing to local governments and municipalities have been excluded due to non availability of published and consistent time-series data.

Empirical studies are in agreement in showing that direct taxes are hard to shift. Harberger (1962) and Cragg, Harbinger and Meiszkomri (1967) in the studies of United States on income and Corporate tax have stated that the relevant elasticities all yield results which indicate that income and corporate tax is not shifted at all and is borne entirely by capital owners. The same conclusion follows from studies in India [Gandhi (1966)]. With regard to land taxes, Due (1968) and Joshi (1968) are in agreement that the burden of a land tax squarely rests on the land owners themselves, because of inability of the farm sector to manipulate prices.

The experience with the indirect tax shifting suggests quite an opposite picture. There is unanimity of opinion among the economists both within and outside Pakistan that indirect taxes like excise, sales and customs duties are fully shifted on to consumers of taxable commodities [Brownlee and Perry (1967), Due (1968) and World Bank (1969)]. However, a 100 per cent tax shifting does not mean that 100 per cent of the indirect taxes are borne by the agriculture sector. Depending upon the consumption patterns of taxable commodities, World Bank (1969) predicted that nearly 27 per cent of the indirect taxes in Pakistan were ultimately paid by the agricultural sector. A later study by [Qureshi (1986)] indicates that agricultural share of indirect taxes varied between 37.4 per cent in 1980-81 and 41.7 in 1983-84 with an average of 38.05 per cent for the period. Being it more recent than that of the World Bank study, we will use 38 per cent to quantify the impact of indirect taxes on agriculture.

The most important indirect tax on agricultural commodities is the sales tax on cotton and sales tax and excise duty on sugar. Implicit taxes are generally reflected in the price structure of agricultural commodities, farm inputs and foreign exchange due to government intervention. The available empirical evidence in Pakistan [Longmire and Debord (1993) and Mellor (1993)] points to the fact that implicit tax rates in Pakistan in the four major commodities wheat, rice, cotton and sugarcane could be as high as 40-50 per cent. Basing our calculations on comparisons of parity prices with producer market and support prices, probable magnitude of implicit taxes arising out of under pricing of these agricultural commodities is estimated in Annexes-I and II and summarized in Table-1 below:

Table-1: Burden of Taxes on Agriculture, 1995-96 Through 1998-99

Kind of Taxes	1995-96	1996-97	1997-98	1998-99
--Per cent of value added by agriculture--				
1. Direct taxes	0.25	0.22	0.56	0.61
2. Indirect taxes	22.27	19.00	12.81	21.08
3. Implicit taxes				
3.1 Based on producer market prices	12.67	7.23	7.41	3.02
3.2 Based on support prices	26.39	16.32	12.22	9.38
4. Total taxes:				
4.1 Based on producer market prices (1+2+3.1)	35.18	26.44	20.78	24.71
4.2 Based on support prices (1+2+3.2)	48.91	35.54	25.59	31.07

Source: Annexes-I & II.

Many conclusions follow from data in Table-1. For one thing, there seems to be little evidence that agriculture pays no taxes or that its contribution to taxes has been small compared to farm incomes. Quite to the contrary, contribution of different type of taxes to the value added by agriculture went as high as 26 per cent during the course of 1995-96 to 1998-99.

Secondly, it is a myth that agriculture in Pakistan was under taxed relative to other sectors of the economy. The conclusion could be supported only if one ignores indirect and hidden taxation of agriculture resulting respectively from fiscal and price/exchange rate policies. Inclusive of all taxes levied by Provincial and Federal Governments, there can be no escape from the conclusion that agriculture was taxed rather heavily compared to non-farm sectors. As data in Table-1 reveal, agriculture surrendered nearly 21 to 35 per cent of its income in taxes on the basis of producer market prices and 26 to 49 per cent on the basis of support prices of agricultural commodities. These rates compared with overall revenue – GDP ratio of 15 – 16 per cent for the Pakistan's economy, it follows that agriculture's tax burden on an average is nearly double of that in the non-agriculture sector. However, as agriculture accounts for more than 70 per cent of Pakistan's population and contribute 23 per cent to national income, agriculture's real tax burden in terms of per capita income should be more than six times that in the non-agricultural sector.

Thirdly, as a matter of principle, heavy reliance on implicit and indirect taxes may be assumed to be regressive with relatively heavier burdens on small farmers than larger ones. However, as implicit taxes are a function of marketed surplus and marketed surplus directly varies with farm size, the high regressiveness of indirect taxes, paid by the farm sector as consumers, would be considerably dampened and the overall tax structure in agriculture would only be mildly regressive. Thus, although the small farmers would be subject to higher taxes relative to their taxable capacity, the differences in average tax rates by farm size are unlikely to be large.

Finally, although the proposition that agriculture enjoys huge subsidies on agricultural inputs is widely acclaimed as protection to agriculture, subsidies form only a small fraction of the value added by agriculture. Compared to outflow of nearly Rs 150 billion per year from agriculture, subsidies in this sector have hardly exceeded Rs 5-8 billion depending on the period under consideration [Chaudhry and Sahibzada (1995)].

4. Implications for Development and Policy

It has been convincingly argued in the literature that transfer of resources from agriculture is a pre-requisite for rapid transformation and progressive modernization of the world's developing economies. Yet, it is equally appealing that an indiscriminate use of such a policy may lead to greater impoverishment of agriculture and slow down the process of agricultural and general economic development. In Pakistan, as revealed from previous section, agriculture has been under heavy burden of resource transfers resulting into widespread implications for economic development and Government policy towards agriculture. To capture the full impact of such resource transfer based policy on economic development, it is imperative to analyze its effect on output, employment and income distribution. Policy implications of resource transfer from agriculture will be undertaken subsequently towards the end of this section.

Outflow of resources from agriculture may be associated with losses in output due to a number of reasons. Firstly, large amounts of resource transfers impinge directly on private saving and investment potential of the agriculture sector. Secondly, an indiscriminate use of policy is one of the most inefficient ways of resource mobilization and promotes inefficiencies in agriculture. Thirdly, heavy reliance on indirect and implicit taxes implies under pricing of agricultural commodities, declining profits and receding incentives to investment in agriculture which ultimately adversely affects agricultural production and output of the national economy [Bale (1985) and Krueger et al (1988)]. Fourthly, policy of withdrawal of subsidies on key agricultural inputs discourages their use, intensive land cultivation and productivity of agriculture. Fifthly, under pricing of agricultural outputs undermines agriculture's contribution to national income and results in serious flaws in planning, management and allocation of public funds to agricultural development. Finally, low agricultural production tends to limit production potential of other sectors of the economy as their performance depends on availability of raw material and purchasing power of agriculture sector. Although it is difficult to estimate the loss of production in agriculture due to each of the above factors, the adverse effect of low prices of agricultural commodities is quantifiable and could be brought to bear on the additive significance of each of the above factors. The available estimates of aggregate price elasticity of 0.6 with respect to output [Ali (1992)] coupled with the current level of under pricing of agricultural commodities in Pakistan relative to world market [Chaudhry and Kiani (1991)] suggests a loss of agricultural production of nearly 10-15 per cent per year depending on the commodity under consideration. As losses due to

investment shortfalls and production losses of other sectors add multiplicatively to the above loss, tremendous recurring losses in national output may be anticipated.

One of the direct outcomes of huge losses of national output appears in the form of limited opportunities of productive employment within and outside agriculture. Low incomes level in agriculture relative to the rest of the economy due to low agricultural commodity prices continues to act as a push factor for exodus of rural labour and cause serious problems in urban locations. Lack of productive employment opportunities alongwith resource transfer policy tends to accentuate the problem further. It is an established fact that indiscriminate use of price and exchange rate policies and dependence on indirect taxes for resource mobilization could lead to magnification of inter-farm income inequalities because of their regressive impact of incomes and investment availability of small farmers. Agricultural incomes being small fraction of urban incomes, large resource transfers from agriculture to urban areas would accentuate urban-rural income differentials. The same is likely to happen within urban localities as some sections of urban population – as industrialists/traders are likely to benefit doubly from low agricultural output prices – once as users of raw materials from agriculture and second time as consumers of food and food products.

It follows from the foregoing discussion that Pakistan's resource mobilization policy in agriculture has been in opposition to the goals of economic development and necessitates rectification to accelerate growth, expand employment and improve on income distribution and poverty. The most efficient way to do this task is to switch from indirect to direct taxes and ensure agricultural commodity prices at par with import/export parity prices.

In the pursuit of this corrective measure, aside from political commitment, rapid changes in international prices of agricultural commodities may be another hindrance in ensuring domestic prices at par with international prices. To dampen the effects of wide fluctuations in world prices and stabilize domestic farm prices, domestic agricultural commodity prices may be aligned with trend lines. This should ensure higher than world prices during recessions and lower than world prices during inflationary periods for the domestic farm sector. As the fluctuations around the trend line would cancel out overtime, the prices so fixed would be consistent with zero implicit taxes on domestic farm sector in the long run.

It has been noted above that indirect and implicit taxes represent one of the regressive and inequitable systems of agricultural taxation. It is commonly recommended in Pakistan that the general income tax system should be extended immediately to agriculture for the redressal of the problem. The recommendation is often made without emphasis on repeal of implicit and indirect taxation of agriculture. Taken at its face, such a recommendation is likely to make the already onerous tax system of agriculture even more burdensome. Since implicit and indirect taxes in agriculture involve huge amounts, the extension of general income tax to agriculture, despite its desirability, would accomplish little in promoting progressive rates of taxation in agriculture without repeal of the current system. Even if the current system of taxation in agriculture is repealed, the practicability of extending general income tax to agriculture need to be weighed carefully against costs before implementation. Not only that we have little knowledge of incomes in agriculture, the progressive rate structure of income tax may set into motion excessive fragmentation of agricultural holdings both real and fictitious, for tax avoidance with devastating consequences for progressively falling Government revenues.

Given the immense size of resource transfers from agriculture, is there any legitimate reason for the government to indulge in institutional credit? Being self evident, one need not say that there is none. While agricultural sector is deprived of its legitimate income for good in the name of resource transfer policy, injecting small amounts of institutional credit repayable with interest can never repair the loss of investible funds in agriculture. While the fundamental solution lies in the repeal of heavy taxation of agriculture and restoration of right agricultural commodity and input prices, it would also obviate the need for elaborate arrangement of institutional credit for agriculture. As special arrangements for agricultural credit are associated with huge social costs in terms of institutional fees, establishment costs and service charges, their discontinuation will save billions of rupees each year for productive investment elsewhere. Although some farmers may still be in real need of credit after withdrawal of special arrangements, they should better be served by commercial banks at nominal costs to society.

How and what amount of resources could then be realized from agriculture? The straightforward answer is through direct taxes and in amounts that are compatible with the taxable capacity of the agriculture sector vis-a-vis that of the non-agricultural sector. If agricultural sector has only one-fifth the taxable capacity of that of the non-agricultural sector [Qureshi (1986)], there seems to be no justification for the tax rates in

agriculture to be higher than one-fifth the tax rates in non-agricultural sector. Agriculture, being no more prosperous than the non-agricultural sector, the strict adherence to the principle of horizontal equity would only be compatible with greater justice to agriculture.

Although progressive rate structure of agricultural taxation is a desirable trait, direct progression either in the form of extension of general income tax or an introduction of a graduated land tax suffers from formidable practical problems of implementation and are likely to generate progressively declining state revenues with the passage of time due to excessive subdivision of agricultural holdings induced either by inheritance laws or by tax avoidance efforts [Chaudhry (1999)]. This being so, progression in agricultural taxes can be introduced only indirectly through relatively heavier market entry taxes and the proportional land tax currently in vogue. This two-tier system of agricultural taxation has all the desirable characteristics of a rational tax policy. For example, as the marketed surplus of agricultural commodities varies directly with farm size, a uniform but a somewhat heavier market entry tax would automatically endorse progression in the tax rates collected from agriculture. Again, as marketed surplus is likely to grow at a faster pace than agricultural output itself [Johnston and Kilby (1975)], there is a strong case for the rapid growth of tax revenues from agriculture with passage of time. This tax system should also be fairly responsive to price increases in agriculture. While proportional but heavier land tax ensures efficient resource use in agriculture, it could be made more so if it is levied also on barren and uncultivated land to discourage speculative land grabbing. What is more important to note is the fact that the system could be operated quite efficiently by the existing revenue and municipal administration.

5. Summary and Conclusions

The paper purported to quantify the magnitude of agricultural taxation, to discuss its implications for economic development and agricultural policy in Pakistan since 1995-96 through 1998-99. Agriculture being subjected to direct, indirect and implicit taxes, its contribution to total tax revenues must be based on the incidence analysis of all three kinds of taxes. The exercise results in huge amount of taxes realized from agriculture contrary to the conclusions of a large number of studies. In terms of tax burdens, taxes were the heaviest in agriculture. Due to large and growing dependence on indirect and implicit taxes, agriculture taxation has become increasingly regressive with oppressive tax burdens for the small farmers. Low agriculture commodity prices resulting from indirect

and implicit taxes, have tended to impair resource use efficiency in agriculture, curtail growth and employment and accentuate existing income inequalities. As these trends are directly opposed to desired goals of economic development, this policy of resource transfers needs to be modified in favor of direct taxes.

While increasing dependence on direct taxes would be highly desirable, progression in agricultural taxation cannot be introduced by the introduction of a general income tax or a graduated land tax. If equitable taxation of agriculture is at all desirable, progression in land taxes has to be achieved in an indirect way. For this purpose, a two tier system of agricultural taxation, based on land and market entry taxes can be recommended. Devised in a proper manner, the two tier system would be equitable, responsive to changes in incomes and inflation and easy to implement, manage and operate even with current administrative set-up.

REFERENCES

- Ahmad, Ehtisham and Nicholas Stern (1989) "Taxation for Developing Countries". In Hollis B. Chenery and T.N. Srinivasan (eds) *Handbook of Development Economics*. Amsterdam: North-Holland.
- APCom (1996) *Support Price Policies for Wheat, Rice, Cotton and Sugarcane, Islamabad.*
- APCom (1997) *Support Price Policies for Wheat, Rice, Cotton and Sugarcane, Islamabad.*
- APCom (1998) *Support Price Policies for Wheat, Rice, Cotton and Sugarcane, Islamabad.*
- APCom (1999) *Support Price Policies for Wheat, Rice, Cotton and Sugarcane, Islamabad.*
- APCom (2000) *Support Price Policy for Sugarcane, Islamabad.*
- Appleyard, Dannis R. (1987) "Report on Comparative Advantage." Islamabad: Agricultural Prices Commission, APCom Series No.61.
- Bale, Malcolm D. (1985) "Agricultural Trade and Food Policy: The Experience of Five Developing Countries." Washington D.C: (World Bank Staff Working Paper No. 724).
- Bird, Richard M (1974) *Taxing Agricultural Land in Developing Countries*, Cambridge, Massachusetts.
- Brownlee, O and G. L. Perry (1967) "The Effects of the 1965 Federal Excise Tax Reduction on Prices." *National Tax Journal*, Vol. 20, September.

- Chaudhry, M. Ghaffar (1973) "The Problem of Agricultural Taxation in West Pakistan and an Alternative Solution." *Pakistan Development Review*. Vol. 12, No. 2.
- Chaudhry, M. Ghaffar and Nighat Naheed Kayani (1991) "Commodity Taxation and Input Subsidies in Pakistan's Agriculture." A paper presented at the Seventh Annual General Meeting of the Pakistan Society of Development Economists, held in Islamabad on January 8-10.
- Chaudhry, M. Ghaffar and A.H. Maan (1993) "Taxation of Agriculture in Pakistan: Structure, Magnitude and Economic Implications." in *Agha Sajjad Haider et. Al (eds) Agricultural Strategies in the 1990s Issues and Policies*. Islamabad: Pakistan Association of Agricultural Social Scientists.
- Chaudhry M. Ghaffar (1995) "Recent Input-Output Price Policy in Pakistan's Agriculture: Effects on Producers and Consumers," *Pakistan Development Review*, Vol.34, No.1, (Spring).
- Chaudhry and Sahibzada (1995) "Agricultural Input Subsidies in Pakistan: Nature and Impacts." *Pakistan Development Review*, Vol. 34, No.4 (Winter).
- Chaudhry, M. Ghaffar (1999) "Theory and Practice of Agricultural Income Tax in Pakistan and a Viable Solution." *Pakistan Development Review*, Volume 38, No.4 (forthcoming).
- Chowdhury, A.H.M.N (1971) "a Proposal for Agricultural Tax Reform." *Pakistan Economist Incorporating Finance and Industry*, Vol. 10, February.
- Cragg, J. G. A. C. H. Harberger and Meiskowski (1967) "Empirical Evidence on the Incidence of Corporate Income Tax." *Journal of Political Economy*, Vol. 75, December.
- Due, J. F. (1968) "Government Finance: Economics of the Public Sector." Homewood: Irwin inc.
- Ender, Gary (1989) "Producer and Consumer Subsidy Equivalents for Important Crops and Livestock Products in Pakistan: Report of Work Completed for USAID." Islamabad.
- Gandhi, V. P. (1966) "Tax Burden on Indian Agriculture." Cambridge: The Law School of Harvard University.
- Gold, Harold and Edward Foster (1972) "Measuring Equity in the taxation of Agricultural Land: A Case Study of Nepal." *Land Economics*. Vol. 48, No.3, August.
- Hamid, J. (1970) "Suggested Approach to Agricultural Taxation Policy in West Pakistan." *Pakistan Development Review*, Vol. 10, No.4, (Winter).

- Harberger, A.C. (1962) "The Incidence of Corporate Income Tax." *Journal of Political Economy*, Vol. 70, June.
- Herring, Ronald and M. Ghaffar Chaudhry (1974) "The 1972 Land Reforms in Pakistan and their Economic Implications: A Preliminary Analysis." *Pakistan Development Review*. Vol.13, No.3 (Autumn).
- Jhonston, B.F. and Peter Kilby (1975) "Agriculture and Structural Transformation: Economic Strategies in Late Developing Countries." New York: Oxford University Press.
- Joshi, T. M. (1968) "Studies in the Taxation of Agricultural Land and Income in India." New York: Asia Publishing House.
- Khan, Mahmood Hasan (1991) "Resource Mobilization from Agriculture in Pakistan." *Pakistan Development Review*, Vol. 30, No.4 (Winter).
- Krueger, Anne O. et al (1988) "Agricultural Incentives in Developing Countries: Measuring the Effects of Sectoral and Economy Wide Policies." *World Bank Economic Review*, Vol.2, No.3 (September).
- Longmire, Jim, and Pascale Debord (1993) "Agricultural Pricing and Comparative Advantage in Pakistan: An Update to 1991-92." Report Prepared for the South Asian division of the World Bank, Washington, D. C.
- Mellor, John W. (1993) "Commodity Price Policy Priority for Change, in Pervaiz Amir and Mazhar Hussain (eds) Summary Report: *Seminars on Policy Issues for Enhancing Agricultural Productivity in Pakistan*. Islamabad: Asianics Agro-Dev International (Pvt.) Ltd and Washington, D.C. John Mellor Associates, Inc.
- Newbery. David (1987) "Agricultural Taxation: The Main Issues" in David Newbery and Nicholas Stern (eds) *The Theory of Taxation for Developing Countries*. New York: Oxford University Press.
- Oliver Oldman (1990) *Taxation in Developing Countries*. Baltimore: Johns Hopkins University Press.
- Pakistan (1959) *Report of the Food and Agriculture Commission*, Karachi.
- (1960) *Taxation Enquiry Committee Report*, Karachi.
- (1963) *Report of Fact-Finding Committee on Agricultural Taxation*, Karachi.
- (1964) *Report of the Commission on Taxation and Tariff*, Rawalpindi.
- (1970) *Report of the Study Group on Agricultural Policy*, Rawalpindi.
- (1975) *Pakistan Census of Agriculture: All Pakistan Report*, Vol. 1, Lahore.

- (1986) *Report of the National Taxation Reform Commission*, Islamabad.
- (1988) *Report of the National Commission on Agriculture*, Islamabad.
- (1989) *Report of the Committee of Experts on Taxation of Agricultural Incomes*, Islamabad.
- (1993a) *1990 Census of Agriculture: All Pakistan Report*, Vol.1, Lahore.
- (1993b) *Report of Prime Minister's Task Force on Agriculture*, Islamabad. Ministry of Finance, Revenue and Economic Affairs.
- (1999) *Economic Survey 1998-99*, Islamabad: Finance Division.
- Provincial Governments (n.d.) *Annual Budget Statements of Punjab, Sindh, NWFP and Balochistan for Various Years*.
- Qureshi, M. L. (1986) "Incidence of Taxation in Pakistan." a Report prepared for the National Taxation Reforms Commission, Lahore.
- Surrey, S.S. (1975) "The Administration in Underdeveloped Countries." In Richard M. Bird and Oliber Oldman (eds) *Readings on Taxation in Developing Countries*, Baltimore: The Johns Hopkins Press.
- Timmer, Peter C (1988) "The Agricultural Transformation." In Hollis Chenery and T.N. Srinivasan (eds). *Handbook of Economic Development*, Vol. 1, Amsterdam: North Holland.
- Wald, M. P (1959) *Taxation of Agricultural Land in Underdeveloped Economies*. Cambridge, Massachusetts: Harvard University Press.
- World Bank (1969) "An Analysis of Capital Flows Between the Agricultural and Non-Agricultural Sectors of West Pakistan." (Working Paper No. 41) Washington.
- World Bank (1988) *World Development Report 1988*. Washington, D.C. The World Bank.
- World Bank (1999) *Agricultural Taxation in Pakistan*. report No. 18935-Pak. Washington. D.C. The World Bank.
- Yaqub. M. (1971) "Need and Scope for additional Taxation with Special Reference to Agricultural Taxation." *Pakistan economist Incorporating Finance and Industry*, Vol. 10, February.

ANNEX-I**IMPLICIT TAX IN PAKISTAN'S AGRICULTURE
FROM 1995-96 THROUGH 1998-99**

Year And Commodity	Commodity Prices (Rs per tonne)			Marketed output million tonnes	Total Implicit Tax (billion rupees)	
	Parity price	Producer market price	Support price		Based on producer market prices	Based on support prices
1	2	3	4	5	2-3x5/1000	2-4x5/1000
1995-96						
Wheat	9,850	4,325	4,325	10.144	56.05	56.05
Sugarcane	1,050	1,050	538	36.184	0.00	18.53
Basmati paddy	7,775	5,850	5,550	1.593	3.07	3.54
IRRI paddy	3,525	4,637	2,800	2.870	-3.19	2.08
Seed cotton	21,264	18,712	10,287	5.133	13.10	56.34
Total					69.02	136.54
1996-97						
Wheat	9,490	6,000	6,000	9.990	34.87	34.87
Sugarcane	1,146	1,000	600	33.598	4.91	18.34
Basmati paddy	8,494	7,075	6,382	1.672	2.37	3.53
IRRI paddy	3,672	4,175	3,220	3.170	-1.59	1.43
Seed cotton	23,019	21,025	13,000	4.542	9.06	45.51
Total					49.61	103.68
1997-98						
Wheat	9,774	6,000	6,000	11.216	42.33	42.33
Sugarcane	1,089	750	875	42.483	14.40	9.09
Basmati paddy	8,967	7,250	7,750	1.511	2.59	1.84
IRRI paddy	3,867	4,862	3,825	3.355	-3.34	0.14
Seed cotton	21,094	20,825	13,000	4.450	1.20	36.02
Total					57.18	89.42
1998-99						
Wheat	8,485	6,000	6,000	10.786	26.80	26.80
Sugarcane	900	800	875	44.153	4.42	1.10
Basmati paddy	10,524	9,250	8,250	1.781	2.27	4.05
IRRI paddy	4,724	6,100	4,375	3.472	-4.78	1.21
Seed cotton	22,808	22,670	13,000	4.259	0.59	41.77
Total					29.30	74.94

Notes:

1. Parity prices are import parity prices in case of wheat and sugarcane and export parity prices in the case of rice and cotton. Parity prices were calculated at market/procurement centre level by adding/subtracting transport and other costs from import and export prices as the case may be given in the source. Marketed output is the marketable surplus which is 95 per cent of total production in case of cotton, 80 per cent for sugarcane, 60 per cent for wheat and 75 per cent for rice paddy.
2. In case of wheat producer market and support prices are the same as during post harvest period market operate at support prices due to massive purchases made by the government at the support prices through restrictions.
3. Producer market prices are the post-harvest market prices prevailing in the producer areas.

Source: [APCom (1996, 1997, 1998, 1999, 2000 and various other issues) and Pakistan (1999)].

ANNEX-II**MAGNITUDE AND BURDEN OF TAXES PAID BY AGRICULTURE**

Kind of Taxes	Amount (billion rupees) of taxes involved for:			
	1995-96	1996-97	1997-98	1998-99
A. Direct Taxes Paid by Agriculture				
1. Land revenue	1.22	1.30	1.71	1.87
2. Agricultural income tax	0.00	0.00	2.02	2.48
3. Total direct taxes	1.22	1.30	3.73	4.35
B. Indirect Taxes and Non-tax Revenue				
1. Total indirect taxes	225.53	237.58	151.31	289.78
2. Non-tax revenue	62.68	59.69	74.92	108.27
3. Total	288.21	297.27	226.23	398.05
4. Agriculture's share (38% of total)	109.52	112.96	85.97	151.26
C. Implicit Taxes in Agriculture				
1. Based on producer market prices	69.02	49.61	57.18	29.30
2. Based on support prices	136.54	103.68	89.42	74.94
D. Sales tax and excise duty				
1. Sales tax on cotton (already included in B4)	5.19	5.03	7.47	7.44
2. Sales tax/excise duty on sugar (included in B4)	12.53	12.46	12.09	12.59
3. Total indirect taxes on cotton and sugar (D1+D2)	17.72	17.49	19.56	20.03
4. 38% of total indirect taxes on cotton and sugar	6.73	6.65	7.43	7.61
E. Net implicit taxes on agriculture				
1. Based on producer market prices (C1 - D4)	62.29	42.96	49.75	21.69
2. Based on support prices (C2 - D4)	129.81	97.03	81.99	67.33
F. Total Taxes on Agriculture				
1. Based on producer market prices (A3+B4+E1)	173.03	157.22	139.45	177.30
2. Based on support prices (A3+B4+E2)	240.55	211.29	171.69	222.94
G. Value Added by Agriculture	491.79	594.55	671.01	717.50
H. Tax Burden on agriculture				
1. Direct taxes (A3 as % of G)	0.25	0.22	0.56	0.61
2. Indirect taxes (B4 as % of G)	22.27	19.00	12.81	21.08
3. Implicit taxes (E1 as % of G)	12.67	7.23	7.41	3.02
(E2 as % of G)	26.39	16.32	12.22	9.38
4. All taxes (F1 as % of G)	35.18	26.44	20.78	24.71
(F2 as % of G)	48.91	35.54	25.59	31.07

Notes:

1. Indirect taxes on wheat and rice are almost non-existent. However, cotton and sugarcane involved sales tax and excise duty. But sales tax on cotton and sale tax/excise duty on sugar is included in indirect taxes under B and also reflected in implicit taxes under C as these depress the producer prices, thus, to account for this double-counting, these taxes have been subtracted from the implicit taxes to get net implicit tax on these crops.
2. Sales tax on cotton has been calculated @ 15 per cent of the value of marketed cotton and in case of sugarcane, sales tax/excise duty @ Rs 2,100 per tonne of sugar manufactured during the year.

Source: [Provincial Governments (n.d.): Pakistan (1999) and Annex-I].

IMPLEMENTATION OF SUPPORT PRICE POLICIES IN PAKISTAN

By
Mian Muhammad Mukhtar*

"The concept of support prices for agricultural products in Pakistan denotes the minimum prices guaranteed to the producers of those commodities. The government is obliged to purchase the produce at announced support prices, mostly in the post harvest period when the market prices tend to fall below the fixed levels. If the market prices are higher than the support prices, the growers are free to sell their produce in the open market. The experience about support prices in Pakistan has shown that implementation side has been weak particularly during 1990's. Lack of a strong will both on the part of the government and implementing agencies, non-availability of sufficient funds on time for the procurement, uncertainty about the picking of genuine loss of the procurement agencies by the government, insufficient storage and logistic arrangements with procurement agencies and non-availability of defined system for disposal of the procured quantities have been the main reasons for ineffective implementation. Now the growers have lost their confidence in government support price programmes which needs to be revived if these programmes are expected to contribute towards the development of agriculture sector."

1. Introduction

Neither the programme for fixation of support prices for all crops nor its implementation arrangements have emerged at a single point of time. It has been under the process of evolution which started for some commodities such as, wheat and sugarcane just after the emergence of Pakistan in 1947. Later on the paddy/rice, cotton, gram, onions, potatoes and non-traditional oilseeds (sunflower, soyabean, safflower and canola) were also covered gradually but sometimes on ad hoc basis. It was in early

• Deputy Chief in Agricultural Prices Commission, Islamabad.

1980's when after the establishment of Agricultural Prices Commission (APCom), the support prices for most of these commodities were started to be fixed regularly on the basis of objective economic and financial analysis and implemented as and when the need arose.

To implement the support price policy for different crops, the government overtime established various organizations in the public sector, such as Provincial Food Departments, Pakistan Agricultural Storage and Services Corporation (PASSCO), Rice Export Corporation of Pakistan (RECP), Cotton Export Corporation (CEC), Agricultural Marketing and Storage Limited (AM&SL), and Ghee Corporation of Pakistan (GCP). The support prices of sugarcane are, by and large, implemented through the sugarmills of private sector. Because of in-consistency in the government policies during the last two decades, a number of changes have taken place in the structure and performance of support price implementing agencies eventually resulting into abolition of some of agencies, badly affecting the support price implementation programme of various crops. The paper has delineated numerous reasons for inadequate implementation and its adverse impact on the farmers. A number of remedial measures have also been suggested.

2. Support Price Implementation

The fixation of support prices of various crops alongwith status of their implementation during the past two decades is discussed below.

2.1 Wheat

The Provincial Food Departments and PASSCO are the implementing agencies for the support price of wheat. These government agencies purchased wheat to the tune of 2.3 million tonnes (in 1983-84) to 5 millions (in 1985-86) per annum during the last two decades which constituted 21 to 36 per cent of the total production of wheat in respective years. Alongwith implementing the support price, another main purpose for purchasing such huge quantities of wheat has been the maintenance of food security reserves and supply of food to urban population regularly at low and subsidized price. The concept of support price does not require to impose any restriction in the movement of a commodity. However, district administration imposes restrictions on movement of wheat during the post harvest months to facilitate fulfillment of procurement targets assigned to these agencies by the Government. This action depresses the prices of wheat in the open market in the surplus producing areas which is against

the interest of the growers. They want free movement of wheat so that open market prices are not affected. Moreover, they rightly demand as provided in the support price policy that in case the market prices are above the support price level, then the government or its agencies should not compel them to sell wheat at support price. Since the support price programme is volunteer for the growers, the food security programme should not be mixed with it. Any purchases required to be made for food security reserves be made at market prices of wheat. No doubt, the government is performing gigantic task by procuring around 4 million tonnes of wheat every year to fulfill the objectives of food security for the population of the country as well as to implement the support price programme, but it results in considerable transfer of resources from growers to urban consumers.

2.2 Paddy/cleaned rice

In early 1970's the Federal Government established an organization, namely, Rice Export Corporation of Pakistan (RECP) to perform two functions i.e. export of rice and implementing the support price of cleaned rice. The RECP had sole rights of rice exports. It enjoyed this monopoly for more than a decade. However, the private sector was also inducted in rice exports in 1985-86, although in the beginning under some restrictions which were removed later on.

Out of normal annual production of 3.5 to over 4 million tonnes of milled rice of basmati and other varieties, the RECP used to procure about 1.2 million tonnes or around 35 per cent of the total production. However, after induction of private sector in rice exports, the RECP's procurements started shrinking in 1990-91 and onward. Till mid nineties, the purchases of cleaned rice by RECP dropped to nearly 5 per cent of the total production or even lower than that.

The RECP was abolished in 1997 in accordance with the global environment of deregulation. After that, there has been no procurement of cleaned rice by any public sector agency. The growers are facing the vagaries of free market functioning under an environment of imperfect competition. For the last two years i.e. since the crop of 1997-98, the government has not fixed the support prices of cleaned rice which at least used to serve as a reference point in the market even if there was no effective implementation of that price. Consequently, the interests of the growers are left un-attended.

As far as the implementation of support price for paddy is concerned, it has always been very weak and unsatisfactory because the RECP having the monopoly in rice exports, was a prominent buyer of cleaned rice from private rice husking units which purchased paddy at support price. Thus, it was indirectly implementing the support price of paddy at a large scale. The RECP also used to purchase some quantities of paddy on support price to run its half a dozen modern rice mills and a few hired units while for rest of the paddy the implementation of its support price was indirect. Thus, the prices of paddy received by growers were based on the relationship between support prices of paddy and rice as well as international prices of rice prevailing at harvest season and also on size of the domestic rice stocks.

It was in 1986-87 when the monopoly procurement scheme of rice was abolished by permitting the private exporters and the implementation of support price programme for paddy was assigned to PASSCO. During the last 13 years, although PASSCO remained in the field for 9 years, yet it could purchase just meager quantities of paddy against the huge production which had simply a little psychological impact to push up the market prices. For example, its highest purchases of paddy were up to 25 and 21 thousand tonnes in 1989-90 and 1994-95 which were just less than 5 per cent of the total production of paddy in those years. In 1995-96, the procurement was merely 120 tonnes of paddy and after that in the last three years there has been no procurement at all. Reportedly, it happened due to: (a) non-availability of funds from the government at the time of procurement; (b) lack of permission to PASSCO for export of rice obtained from procured paddy; and (c) unwillingness of the government to pick up the financial losses if PASSCO would have incurred in a year of depressed market prices of the produce.

Actually, the implementation of the support prices of paddy/cleaned rice is now out of the picture. Even the government has not fixed the minimum guaranteed prices of cleaned rice for the crops of 1997-98 and 1998-99, then what to think about implementation!

2.3 Sugarcane

The sugarcane crop is procured by the sugarmills for processing into sugar which are mostly in the private sector. Purchase of sugarcane by the sugarmills has been regulated under the Sugar Factories Control Act, 1950. For about 35 years, the sugarmills enjoyed the opportunity of monopoly procurement of sugarcane within their respective zones. The

growers within the mill zone were required to supply 85 per cent of their cane produce to the sugarmill located in that area while remaining 15 per cent could be used by them for seed and domestic requirement. They were not allowed to convert sugarcane into gur, shakkar and khandsari except from the cane meant for domestic use. They could not sell sugarcane to the mills situated out of their own mill zone, whereas the mills were allowed to purchase cane from the assigned areas adjoining to respective zones or even managed to buy from outside the assigned areas to fulfill the requirement of raw material.

The mills under the Act were obliged to make timely payments and provide certain facilities to the farmers of the mill zones, such as credit for inputs and transport for the haulage of cane to sugarmills, yet on the whole it created a scenario of 'buyers market' against the 'sellers market'. Owners of the sugarmills being influential persons managed to avoid their obligations but the farming community had to comply with the provisions of the Act, sometimes at the cost of their honour and respect. They had to deliver their produce at support price which was a minimum guaranteed price and in fact the monopoly price. As they were not allowed to sell their produce to any other sugarmills, they were unable to get higher price than the support/minimum guaranteed price. The farmers had to harvest the sugarcane crop according to the requirement of the mill and face a number of difficulties in procuring indents for delivery of cane as well as loss in weight of cane, longer occupation of land and use of additional water due to late harvesting and quite often delays in payment of dues. Virtually, the farmers were captive of the zoning system.

On the recommendation of APCoM, the government abolished the mill zones since 1987-88 sugarcane crop. Under the new policy, the growers were allowed to sell their produce to any mill and at any price equal to or higher than the support price. Similarly, the mills were free to buy sugarcane from anywhere at support price or higher than that but in no case at lower than the support price. The system of dezoning of sugarmills was expected to increase the efficiency of sugarmills due to competition among them. However, contrary to it the incidence of cross transportation of sugarcane has increased and long queues of trolleys and trucks of cane of growers belonging to former mill zone areas are seen in front of mill gates. The cane coming from outside the former mill zones are given preference and there are separate rows for carriers of such cane. In the years of bumper crop, the situation further accentuates as happened in 1997-98 and 1998-99 when the mills procured cane from far flung areas at cheaper rates and farmers of the former mill zones suffered greatly in supplying cane to

the nearest mills. Since the government has not managed to buy sugar from the mills at ex-mill cost of sugar, a number of sugar factories having high manufacturing cost of sugar faced serious problems of sugar disposal, especially, when the market prices of sugar were depressed. It provided excuse to the sugarmills for making delayed payments to growers and tempted them to purchase sugarcane at lower than the support price through their sponsored middlemen because the growers were under compulsion to harvest and dispose of the crop for vacating the fields early.

The production of sugarcane as well as sugar have increased substantially over time in Pakistan. It produced 33 million tonnes of sugarcane in 1982-83, 36 millions in 1992-93 and 55 millions in 1998-99. Accordingly, the quantities of cane crushed in the sugarmills have increased which stood at 13 million tonnes in 1982-83, 27 millions in 1992-93 and over 43 millions in 1998-99. The crushed quantities in relation to total production stood at 38 per cent in 1982-83, 72 per cent in 1992-93 and about 79 per cent in 1998-99.

In spite of the fact that number of sugarmills and their crushing capacity has increased tremendously in the country, still there are a lot of problems in marketing of sugarcane. The sugarmills which were 36 in 1982-83 have gone more than double to 77 in 1998-99 which can manufacture more than 4.5 million tonnes of sugar every year. But during the last two seasons (1997-98 and 1998-99) when sugarcane crop was to the tune of 55 million tonnes, both the partners of sugar sub-sector -- farmers and sugarmills -- faced serious difficulties. Due to defective cane purchase system, the supplies to sugarmills were much more than the requirements of the mills. Long queues and waiting time were involved in delivery of cane at millgates. Complaints of underweighment of cane and illegal discounts both on weight and prices made by the sugarmills were wide-spread. Payments of cane proceeds were delayed for months or even for more than a year. The sugarmills reportedly encouraged middlemen who purchased cane from growers at lower than the support price. In the process, there has been no concept of paying the price of cane according to its quality i.e. sucrose contents.

On the other hand, the sugarmills have faced a serious problem of liquidity in the absence of any system of procurement of sugar by the government under support price system. Consequently, huge stocks of sugar were built up. The abundant supply of sugar kept its market prices depressed. The situation improved lately when the government subsidized the exports of sugar but its benefits accrued to sugarmills and not to the

farming community. There is a dire need of devising a system for regulating the supplies of cane to sugarmills, assuring timely procurement of cane at support price and payment of dues to the growers in accordance with the provisions of Sugar Factories Control Act, 1950 as well as introducing payment of cane price according to its quality i.e. sugar recovery. The government should also consider to design a policy of purchase of sugar at its ex-mill cost from the sugar manufacturers, if they offer for sale.

2.4 Cotton

The government started fixing the support prices of seedcotton (phutti) and cotton lint in mid 1970's. To implement these support prices, an organization, namely, Cotton Export Corporation (CEC) was established in 1974 which had also monopoly for cotton exports. It was in late 1980's when the private sector was also allowed to export cotton. The implementation of support prices by CEC was mainly through procurement of cotton lint from the ginneries of private sector which purchased seedcotton on or above the support prices fixed by the government. The CEC, in the beginning however, also purchased small quantities of seedcotton to run its owned or hired ginneries.

For about a period of two decades, the CEC performed well in disposing of its both the functions of support price implementation and exports of cotton which proved to be conflictive in the years of bumper crops. As an exporting body, the CEC had to function on commercial lines to maximize its profit but sometimes due to excessive production of cotton and or low international prices, the market prices tended to fall below the support price level. However, still the CEC had to procure cotton lint on fixed support prices and incur various costs such as handling, storage, transportation, wastage and mark up on borrowed finances. In case the prices in world market were also depressed, the CEC had to bear financial losses on cotton exports. In certain years the CEC performed a gigantic task. For example, in 1984-85 the CEC procured 3.25 million bales of cotton which were about 55 per cent of the total production in that year. In the next year, it purchased highest ever quantity of cotton lint i.e. 4.37 million bales or 61 per cent of the total production.

The CEC worked efficiently till 1991-92 but afterwards due to failure of cotton crop for a number of years, it purchased just nominal quantities of cotton. Practically in those slag years, the CEC had nothing to do but only caused huge expenses to maintain its various offices, stores and

quite a large staff. As the private sector had already been allowed to export cotton in late 1980's, therefore, the CEC was wound up in 1997. The government did not fix the support prices of cotton lint since 1997-98. Also no public sector organization was nominated to intervene in the market if the need arose. It looked that the government had abandoned the support price programme all together, atleast in case of cotton crop. But good crop of 1999-00 obliged the government to revise its policy and hurriedly fixed the support price of seed cotton and asked the Trading Corporation of Pakistan (TCP) to implement it. However the TCP's purchases were too late and followed the disposal by growers of their produce at low prices. As the country's economy heavily depends upon cotton and its made ups, therefore, the government took timely action in fixing the support prices for 2000-01 crop and entrusted the responsibility to TCP for its implementation.

2.5 Gram

For the purpose of implementation of support price, the gram crop falls in the domain of PASSCO. As it is mainly sown in the rain fed (unirrigated) areas, its production has experienced frequent fluctuations. For example, its production in the country during 1977-78 was 614 thousand tonnes while in 1979-80 it was only 313 thousand tonnes. The growers have no choice other than to sow gram crop, especially in the main producing areas of Thal. In the years of moisture stress or attack of gram wilt, blight and pod borer, the crop fails and the growers have nothing to harvest and sell in the market. On the other hand in the years of good harvest, the market prices fall and adversely affect the income of the poor farmers. In principle, the PASSCO should step forward and purchase gram at the fixed support prices but in fact it happens rarely.

During the past two decades or so, the PASSCO has not procured gram crop more than 3 or 4 times. Its latest procurement was in 1990-91 when it bought a meager quantity of 8 thousand tonnes which was only 1.5 per cent of the total production of gram in that year. Afterwards, the PASSCO has not purchased even a single grain from bumper crops of 1995-96, 1996-97, 1997-98 and 1998-99 when the production was recorded at 680 thousand tonnes, 594 thousands, 767 thousands and 698 thousands respectively. Reportedly, the PASSCO could not enter the market either because of non provision of funds for procurement of gram or non assurance by the government for payment of losses to PASSCO likely to incur on the procurement operation. In these circumstances the gram growers have been left without any support from the government.

2.6 Oilseeds

Traditionally, there were two main sources of edible oils i.e. cottonseed and rapeseed & mustard which did not suffice the domestic requirements and huge quantities of edible oils had to be imported. To make up the deficiency, since mid 1960's the government has tried to promote the production of non-traditional oilseeds, such as sunflower, safflower and soyabean. A Seed Division was specifically created in March, 1979 in the Ghee Corporation of Pakistan (GCP) to perform the functions of, inter-alia, development and procurement of non-traditional oilseeds. Despite some technological problems in the cultivation of sunflower, its production that was less than 20 thousand tonnes in early 1980's increased to 83 thousand tonnes in 1991-92. But the production of soyabean and safflower which hovered around merely 2 thousand tonnes and one thousand tonnes per annum, respectively, did not show any significant improvement due to poor introduction of their technology as well as inadequate procurement programme. During the period of 1982-83 to 1991-92, the yearly procurement of non-traditional oilseeds varied between 9 thousand tonnes to 33 thousand tonnes.

Under the process of de-regulation and de-nationalization of different enterprises in the public sector, the Seed Division of GCP remained suspended for about 3 years (i.e. 1992-93 to 1994-95) and the task of procurement of non-traditional oilseeds was assigned to PASSCO from 1992-93 onward. However, this decision did not produce any tangible results as the PASSCO did not show any interest in procuring oilseeds at the fixed support prices. It purchased only a nominal quantity of 174 tonnes of sunflower in 1993-94. Reportedly, the main reasons were non-availability of necessary financial resources and assurance about picking up of any losses by the government which the procurement agency might have incurred during the process of implementation of support prices.

In February 1995, the government established a new body, namely Pakistan Oilseeds Development Board (PODB) and merged the Seed Division of GCP into it. However, the terms of reference of new organization are restricted to promotional activities and do not provide obligation for procurement of oilseeds. Although, support prices are still being fixed and announced for non-traditional oilseeds (including canola since 1996-97), yet the responsibility of their implementation is not assigned to any agency. The growers have to dispose of their produce in the open market whether on or above the support prices or at lower than those.

Thus, the fixation of support prices has little impact on production or development of these crops.

In recent years, the production of non-traditional oilseeds has spurred. For example, in 1998-99, the production of sunflower was recorded at 188 thousand tonnes and of canola at 88 thousand tonnes. It is a matter of concern that in absence of suitable procurement arrangements, the rising production of non-traditional oilseeds can meet an unfortunate outcome and the nation's dream of attaining self-sufficiency in edible oils will not be fulfilled.

2.7 Onions and potatoes

To regulate the supply of perishable commodities, the government had established an organization, namely, Agricultural Marketing & Storage Limited (AM&SL) in 1980-81. It was also assigned the work of procurement of onions and potatoes under support price programme. Since its inception, till the time of its winding up in 1993, the AM&SL had entered the onions market for 5 times and purchased as low as only 100 tonnes of onions in 1987-88 and as high as 32 thousand tonnes in 1991-92. These quantities in relation to respective production of those years ranged between just negligible to the highest level of 4 per cent. For other 3 years of onions procurement, the purchased quantities were around one per cent of the total production of those years. In most of these procurement operations, the AM&SL incurred heavy financial losses. Later on, the function of procurement of onions was assigned to the PASSCO which purchased 3,382 tonnes or 0.3 per cent of the total production of 1,098 thousand tonnes in 1995-96. After that year, the PASSCO has not entered the market due to one or the other reason.

As far as the potatoes are concerned, the situation from procurement point of view has been more or less similar to that of onions, however, with much more financial losses. In 1982-83, the AM&SL purchased 64.5 thousand tonnes of potatoes at support price which was 12.5 per cent of the total production. It was unfortunate that in absence of necessary cold storage and transportation facilities and due to lack of adequate management experience, the AM&SL could not timely export the purchased potatoes, and large quantities were spoiled at the port. Thus, the organization had to suffer huge financial losses. The whole exercise turned into debacle which caused suspension of its procurement process for next 3 years.

For the crop of 1985-86, the PASSCO was assigned the task of implementing the support price. It purchased 11.5 thousand tonnes of potatoes in that year which were about 2 per cent of the total production. In 1986-87, the AM&SL purchased 14.6 thousand tonnes or 2.5 per cent of the total production of potatoes. In this regard, the most prominent exercise was performed in 1989-90 by procuring 105.6 thousand tonnes of potatoes which were 12.7 per cent of the total production. Unfortunately, again it became a losing proposition of Rs 146.6 millions. After its abolition in 1993, the function of procurement of potatoes under support price programme was also transferred to PASSCO but it remained idle except in 1994-95 when a small quantity of 2.7 thousand tonnes was purchased. This meager procurement did not show positive impact on the wholesale prices of potatoes in the open market. In the last two years, the country has harvested 1,426 thousand tonnes and 1,810 thousand tonnes of potatoes in 1997-98 and 1998-99. Despite producing such bumper crops, the growers suffered serious financial losses because open market prices crashed and procurement agency did not come to their rescue.

3. Problems Encountered in the Process

While reviewing the performance of support price programme in Pakistan during the last two decades, it has emerged that the most important central point to the whole programme is implementation of the fixed support prices. The non implementation of the decisions not only makes the exercise for fixing the support prices as futile but also shakes the confidence of growers on government policies/decisions. Although the performance during early 1980's on the whole cannot be claimed as a story of profound success, yet the implementation of support price policy at that time was relatively better as compared to 1990's period. With the passage of time, the implementation has weakened year by year.

Out of 5 public sector agencies meant for implementing the support price policy, 4 prominent organizations namely AM&SL, GCP, RECP and CEC have been wound up. Consequently, out of 13 crops/commodities included in the support price programme, now 9 crops are to be procured by PASSCO only. Naturally, to perform such a gigantic task is beyond the capacity of any single department. It neither has expertise in procuring these crops except wheat nor possesses infrastructure to store, process and export these commodities, particularly the perishable products. Therefore, at present, the implementation of the support price policy for rice (paddy), gram, potatoes, onions and the non-traditional oilseeds i.e. sunflower,

soyabean, safflower and canola crops looks to be on the paper. Purchases of wheat by PASSCO and the provincial Food Departments seem to be prompted more by the objective of food security and less to encourage production by the farming community. As stated earlier, the minimum guaranteed prices of sugarcane are implemented through sugarmills of private sector under the dictations of Sugar Factories Control Act 1950. Unfortunately, the state of affairs in case of sugarcane is also not satisfactory. During the last two crushing seasons (1997-98 and 1998-99 crops) the growers have faced a number of hardships in disposing of their produce and in receiving its proceeds from the sugarmills. Wide spread complaints are found regarding underweighting, long waiting times, delayed payments and disrespectful behaviour of the sugarmill functionaries with the growers. The sugarmills especially in the Punjab are not ready to pay the quality premium for the cane having higher sucrose contents than the provincial base recovery.

This bleak picture concerning the support price programme has been due to the following reasons:

- i) Lack of a strong political will of government in implementing its decisions/policies.
- ii) Uncertainty about the picking of genuine losses by the government, if incurred in a procurement operation by the relevant organization.
- iii) Insufficient capacity available with a procurement agency in terms of management experience, logistic arrangements, adequate and proper storage facilities etc.
- iv) Problems in disposing of the procured quantities of perishable commodities in the domestic market from where the surplus produce was mopped up, particularly when the prices were still depressed and suitable outlets in the world market could not be found out. Mostly, it happened due to lack of information and experience on the part of procurement agency.
- v) Adoption of political influence and such tactics and practices by private sector which help to crash prices and delay implementation of government decisions or make them ineffective.

4. Future Options and Recommendations

It is beyond exaggeration that agriculture is the mainstay of our national economy which rises or falls along with the positive or negative developments in this sector. Being an open-air industry, the agriculture is prone to both the vagaries as well as bounties of nature. Therefore, it calls for specific attention of the planners and policy-makers. No doubt, the current global economic environment advocates for de-regulation and denationalization of public sector enterprises but at this stage of development, Pakistan cannot afford to follow the unbridled policies of free market economy, especially the policies relating to its agriculture sector. In fact all countries of the world are providing support to agriculture as there is no other way of expanding agricultural production, though each country is using different nomenclature for such support.

Similarly, the agriculture sector as most important contributor in Pakistan's GDP (i.e. 24 per cent) deserves every support. But contrarily, the dismantling of a number of support price implementing organizations can adversely affect the growth of agriculture and well-being of farmers. Actually, this vital sector needs for building up of such institutions which are capable to strengthen it and promote its growth. The government should devise a long-term policy for agricultural development, including the support price programme backed with adequate and regular arrangements for its implementation so as to revive the confidence of growers on such programmes. In this regard, the following measures are suggested:

- Under a strong political will, the support price policy for agriculture should be revitalized and implemented in letter and spirit, so that the credibility of government policies in the eyes of the farming community is revived.
- Procurement of nine crops under the support price programme by a single agency, like PASSCO, is hardly possible. Some of its work load may be assigned to Pakistan Oilseeds Development Board, Trading Corporation of Pakistan, and such other organizations.
- Adequate funds should be provided to the procurement agency at the proper time by the government along with assurance for picking up any genuine losses incurred in the process.

- The organization responsible for implementing the support price policy should have working freedom to build up required infrastructure/storage capacity, to make logistic arrangements including the purchase of trucks with refrigeration, and other specific instruments and disposing of the procured produce in the domestic or international markets through suitable channels.
- A revolving fund should be established to regulate the finances required for procurement and for adjustment of profits and losses met during the process.
- Sugar Factories Control Act 1950, needs to be amended to introduce the system of payment of sugarcane price on the basis of quality as well as to make other provisions considered important under changed circumstances of de-zoning system.

REFERENCES

- APCom, "Support Price Policies" – on relevant crops, Islamabad – various reports.
- Finance Division, Government of Pakistan, "Economic Survey, 1998-99", Islamabad.
- Ministry of Food, Agriculture and Livestock, Government of Pakistan, "Agricultural Statistics of Pakistan", Islamabad – various issues.
- M. Shafi Niaz, (1995) "Pricing of Farm Produce in Pakistan", Print Associates International, Islamabad.

FARMERS' RESPONSE TO SUPPORT PRICES OF WHEAT IN PAKISTAN

By
Muhammad Ikram*

"Consumer biased agricultural policy aiming to provide cheap food has been the root cause of mounting shortages of wheat – the main staple food. These shortages led to huge import bill which in turn disturbed the balance of payment of the country. The adverse implications of the above policy forced the planners to recognize that "producer favoured" prices, particularly of wheat, may help reduce the import bill through enhanced domestic production. The present study has established that growers of wheat respond positively to increase in support prices. The numerics of the quantitative analysis estimated through Nerlovian Adjustment Model indicate that both short as well as long-run elasticities are sizeable for production and yield while for area these are not significant but are positive. This implies that there is a large scope of increasing yield and production through incentive support prices but possibilities of enhancing production through expansion in area are limited. On inputs front, water coefficient has been found positive and significant and that of fertilizer price negative, implying that water availability and fertilizer prices are crucial factors in achieving self-sufficiency in wheat."

1. Introduction

Agricultural prices play an important role in achieving efficient allocation of country's resources within agriculture, between agriculture and non-agriculture sectors and between domestic production and imports. Agricultural policy is based largely on managed prices, one aspect of which is that an increase in producer prices encourages investment in the agricultural sector and consequently a rise in output. Increased producers income encourages savings and leads to even greater investment and the

* Assistant Chief in Agricultural Prices Commission, Islamabad.

adoption of more modern techniques. But agricultural price policy in Pakistan has long been rather favourable to the urban consumers and other non-agricultural sectors. During the period 1950-65, the objectives of the price policy were to provide low cost food to the urban consumers, cheap raw material to domestic agro-based industry, and to keep wages of industrial workers low by supplying cheap food (NCAR, 1988). This policy resulted in the transfer of resources out of agriculture. In the later periods also, successive governments fixed the retail price of food grains at low levels which had the effect of depressing market prices for producers. Inter-district and inter-province restrictions on the movement of agricultural commodities were imposed, with the result that producer prices were depressed in the surplus producing areas.

The process of industrialization, with its impact on transfer of resources out of agriculture weakened the agricultural base of the economy. The mounting shortages of food and other products and the accompanying balance of payment problem forced a reconsideration of government policy in favour of agriculture. Gradually, it was recognized that agriculture had to be developed to sustain the industrial development of the country and to meet the requirements for food. It was also recognized by the planners/policy makers that agricultural production was indeed responsive to price incentives. Thus, as a result of this recognition, a need was felt to fix the support prices on some scientific basis and the Agricultural Prices Commission was established for this purpose in 1981. Since then the procurement/support prices for most crops are announced on the recommendation of the Commission.

The support prices are generally announced before sowing time and in principle the government has to buy, as a buyer of last resort, all the produce offered for sale at this price. These prices guarantee to the farmers, that in the event of excessive production leading to a glut in the market, wholesale prices of their produce will not be allowed to fall below the level of support prices announced by the Government. However, the support price programme is volunteer from the growers' point of view, at least in principle.

The present study intends to quantify the impact of the support prices, a major component of national agricultural policy, on the production of wheat crop in Pakistan. As a pre-requisite for this analysis, the historic trends in prices, production and farmers' responsiveness during the period from 1965-66 to 1998-99 have been discussed below.

2. Trends in Prices and Production

The nominal support prices of wheat in Pakistan have increased from Rs 14.46 to Rs 240 per 40 kgs i.e. 16 times during the period: 1965-66 to 1998-99. The average annual increase was over 9 per cent which looks quite reasonable in view of inflation rate in the economy. However, in real terms, the growers were the losers as the real support price of Rs 14.46 per 40 kgs in 1965-66 declined to Rs 13.08 at the end of the period which shows a decline of 10 per cent.

Production of wheat increased from 3.92 million tonnes in 1965-66 to 17.95 millions in 1998-99. The annual average rate of increase in production has been 5.1 per cent during the period. The area under wheat crop increased from 5.16 million hectares in 1965-66 to 8.27 millions in 1998-99, while the yield increased from 760 kgs to 2,171 kgs per hectare during the period. The annual average growth rates for area and yield were 1.5 and 3.5 per cent respectively. During the whole period, the increase in yield accounted for about 69 per cent of the growth of wheat production.

3. Farmers' Responsiveness

To find out the farmers' responsiveness to support prices of wheat, the data for 34 years (i.e. 1965-66 to 1998-99) have been analysed using a Nerlovian supply response model. In the model, deflated prices have been used to account for the impact of inflation in prices over time. Although it is true that farmers may be unaware of the concept of inflation, they are well able to judge the relative increments in input and output prices in terms of rupees. Positive response on wheat production, area and yield can be seen in Table-1 as a result of significant enhancement in its real price. For 1967-68, nominal support price was increased by 26 per cent, as a result real price increased by 22 per cent which induced the growers to increase wheat production by 48 per cent. For 1997-98, 29 per cent enhancement in real price induced 12 per cent increase in wheat production. Thus, when the growers have sufficient increase in the support prices, they allocate more area and apply more inputs to increase the yield.

Table-1: Impact of Positive Changes in Support Prices on Production, Area and Yield

Year	Support/procurement prices		Production	Area	Yield
	Nominal	Real			
----- Per cent increase over the previous year-----					
1967-68	25.9	21.6	48.1	12.0	32.3
1969-70	13.4	8.9	10.2	1.1	9.0
1978-79	21.6	14.1	18.9	5.1	13.1
1982-83	10.3	5.4	9.8	2.4	7.2
1985-86	14.3	9.5	19.0	2.0	16.7
1997-98	38.7	28.8	12.3	3.0	9.0

Source: Calculated on the basis of data reported by MINFAL in various issues of Agricultural Statistics of Pakistan.

In order to test more accurately the farmers' responsiveness to the support price for wheat production in Pakistan, the Nerlovian Adjustment Model has been used which is a very popular supply response model in case of annual crops. As the increase or decrease in production depends upon the changes in area and yield, the area and yield equations are also estimated separately. The basic estimating equations used are:

$$Q_t = a_0 + a_1 SP_t + a_2 W_t + a_3 FP_{t-1} + a_4 Q_{t-1} + V_t \quad (1)$$

$$Y_t = b_0 + b_1 SP_t + b_2 W_t + b_3 FP_{t-1} + b_4 Y_{t-1} + V_t \quad (2)$$

$$A_t = c_0 + c_1 SP_t + c_2 W_t + c_3 FP_{t-1} + c_4 A_{t-1} + V_t \quad (3)$$

Where

- Q_t = Wheat production in year t.
- Y_t = Per hectare yield of wheat in year t.
- A_t = Cultivated area under wheat crop in year t.
- SP_t = Support price of wheat deflated by CPI in year t.

W_t	=	Irrigation water for winter (Rabi) season in year t
FP_{t-1}	=	Fertilizer price lagged one year deflated by CPI
Q_{t-1}	=	Wheat production lagged one year
A_{t-1}	=	Area lagged one year
Y_{t-1}	=	Yield lagged one year
V_t	=	The error term in year t.

Using ordinary least squares techniques, regressions were run for each model. The variables W and FP were included in the estimating equations as shifter variables. Both linear and logarithmic versions of the models have been estimated. The logarithmic versions are given as follows:

$$\log Q_t = \log a_0 + a_1 \log SP_t + a_2 \log W_t + a_3 \log FP_{t-1} + a_4 \log Q_{t-1} + \log V_t \quad (4)$$

$$\log Y_t = \log b_0 + b_1 \log SP_t + b_2 \log W_t + b_3 \log FP_{t-1} + b_4 \log Q_{t-1} + \log V_t \quad (5)$$

$$\log A_t = \log c_0 + c_1 \log SP_t + c_2 \log W_t + c_3 \log FP_{t-1} + c_4 \log Q_{t-1} + \log V_t \quad (6)$$

The results of the analysis are presented in Table-2 and 3. Table-2 shows the regression coefficients alongwith their standard errors, t-ratios and the coefficients of determination (R^2). Table-3 shows the adjustment coefficients, and the short-run and long-run price and other elasticities of supply for linear and log-linear models. The adjustment coefficient β is derived by subtracting the coefficient of lagged variable from unity. In the logarithmic models, regression coefficients also represent the short-run elasticities. However, in linear version, short-run elasticities have been calculated at average values. Long-run elasticities have been derived by dividing the short-run elasticities by the adjustment co-efficient (β).

Table-2: Linear and Log-Linear Response Functions for Wheat Crop in Pakistan

Dependent variable	Regression coefficients						
	SP _t	W _t	FP _t	Q _{t-1}	Y _{t-1}	A _{t-1}	R ²
Linear Response Functions							
Q	306.96	263.86	-2440.84	0.36	-	-	0.96
S. Error	149.64	60.04	3871.39	0.16	-	-	
T. Ratio	2.05	4.39	-0.63	2.27	-	-	
Y	45.18	31.99	-227.55	-	0.17	-	0.94
S. Error	17.93	6.62	462.71	-	0.18	-	
T. Ratio	2.52	4.83	-0.49	-	0.96	-	
A	30.28	57.44	-2236.52	-	-	0.41	0.97
S. Error	31.60	10.49	835.46	-	-	0.11	
T. Ratio	0.96	5.48	-2.68	-	-	3.75	
Log Linear Response Functions							
Q	0.52	0.92	-0.14	0.40	-	-	0.96
S. Error	0.19	0.17	0.11	0.12	-	-	
T. Ratio	2.79	5.35	-1.25	3.36	-	-	
Y	0.49	0.71	-0.05	-	0.31	-	0.94
S. Error	0.16	0.14	0.09	-	0.15	-	
T. Ratio	3.00	4.95	-0.54	-	2.07	-	
A	0.05	0.26	-0.07	-	-	0.49	0.97
S. Error	0.06	0.05	0.04	-	-	0.09	
T. Ratio	0.76	5.46	-2.01	-	-	5.13	

Q = Production, Y = Yield, A = Area, SP = Real Support Price, W = Irrigation Water, and FP = Real Fertilizer Price

Table-3: Adjustment Coefficients and Short and Long-run Elasticities for Linear and Log Linear Equations

Dependent variable	Adjustment coefficient (β)	Price elasticity		Other elasticities	
		Short-run	Long-run	Short-run	Long-run
1. For Linear Equations					
Q	0.64	0.37	0.57	W 0.93 FP -0.07	1.45 -0.10
Y	0.83	0.39	0.47	W 0.82 FP -0.04	0.99 -0.06
A	0.59	0.06	0.10	W 0.33 FP -0.10	0.55 -0.17
2. For Log-Linear Equations					
Q	0.60	0.52	0.88	W 0.92 FP -0.14	1.55 -0.23
Y	0.69	0.49	0.70	W 0.71 FP -0.05	1.03 -0.07
A	0.51	0.05	0.10	W 0.26 FP -0.07	0.51 -0.15

Regression estimates reveal positive and significant coefficients for SP_1 in production and yield (both in linear and logarithmic) equations whereas in area equations (both linear and logarithmic), the SP_1 regression coefficients were not significant but still positive. The size of R^2 that range from 0.94 to 0.97 both in linear and log-linear models is sufficiently large to show the overall fitness of the estimated equations. The short-run price elasticities have been 0.06, 0.39 and 0.37 for area, yield and production respectively in the linear models. The long-run price elasticities for these models are estimated at 0.10, 0.47 and 0.57 for area, yield and production respectively. This shows the high influence of support prices on wheat production in Pakistan particularly through increase in yield.

The regression coefficients for water (Wt) variable in all cases and in both linear and log-linear models are quite good and highly significant. The result shows the high influence of irrigation water on wheat production, as can be seen from the elasticities for irrigation water in Table-3. The regression coefficients of fertilizer price (FP_1) for all regression equations have negative signs and are insignificant.

Using logarithmic formulations, all supply models yielded similar but a bit better results than the linear ones. The short and long-run price elasticities of supply are high for production and yield i.e. 0.52 and 0.49 in the short-run and 0.88 and 0.70 in the long-run. However, for area, low elasticities have been observed i.e. 0.05 in the short-run and 0.10 in the long-run, as was the case in linear models.

The overall performance of the supply response models in explaining variations are quite good. The results show a clear pattern of changes during the period, 1965-66 to 1998-99. The evidence indicates more influence of price on yield than on area as price elasticities both in short and long-run are sizeable for production and yield, while for area these are insignificant. The R^2 values are highly significant which explain the high percentage of the total variation covered in the dependent variables. The farmers show positive price response in wheat production. Moreover, the values of β estimated suggest that growers were relatively quick to adjust rationally to change in their economic environment.

4. Recommendations

- The results suggest that it is possible to increase wheat production by increasing the support prices of wheat. Therefore, the support price programme should be continued with the objective of attaining self sufficiency in wheat crop.
- It was also found that the greater production response to price was achieved by increasing yield rather than area. In Pakistan per hectare yield of wheat is low in comparison to many other wheat producing countries. According to the report of NCA (1988), the wheat yield potential in Pakistan is 6.4 tonnes per hectare. By contrast, the actual yield was only 2.17 tonnes per hectare in 1998-99. To enhance wheat production there is a great need to mobilize the inputs and machinery necessary to increase the level of yield.
- Irrigation water is a crucial input in Pakistan agriculture. Water coefficients for all models were found positive and highly significant. Therefore, enlarging irrigation capacity will represent a powerful instrument for increasing production.
- Fertilizer is another important input which influences wheat production through increasing yield. The coefficient of fertilizer price has been found negatively related to area, yield and production. Thus, favourable fertilizer prices can also help achieve self-sufficiency in wheat production.
- Production increases depend critically on adequacy of the whole agricultural infrastructure. Price incentive in itself is necessary but not sufficient. Technologies to raise yield must be available and made known to the farmers. Inputs of the right kind must be available when required.

REFERENCES

- Afzal, M. (1977), Parity Pricing as an Approach to Price Support Programme: A Policy Analysis, in Pakistan Development Review, Islamabad.
- Askari, H. & Cummings, J.T. (1976), Agricultural Supply Response: A Survey of the Econometric Evidence, Praeger Publishers.
- Behrman, J.R. (1968), Supply Response in Underdeveloped Agriculture: A Case Study of four Major Annual Crops in Thailand, 1937-63, North-Holland Publishing Company Amsterdam.
- Brown, G.T. (1978), Agricultural Pricing Policies in Developing Countries, in Distortion of Agricultural Incentives, T.H. Schultz ed.
- F.A.O. (1987) Agricultural Price Policies: Issues and Proposals, printed in Italy.
- Government of Pakistan, Ministry of Food & Agriculture, Agricultural Statistics of Pakistan, various issues.
- Government of Pakistan, Ministry of Food & Agriculture, Report of the National Commission on Agriculture.
- Government of Pakistan, Finance Division, Economic Survey, various issues.
- Khan, M.H. (1984), Agricultural Policy Issues in Pakistan, in Pakistan Development Review, Islamabad.
- Koutsoyiannis, A. (1977), Theory of Econometrics, (2nd ed.), Published by Macmillan, Education Ltd., London.
- Lim Lin Shu, D (1975), Supply Responses of Primary Producers, Penerbit University Malaya, Kualalumpur.
- Miller, J.W. & Ahmed, R. (1988), Agricultural Price Policy for Developing Countries, the Johns Hopkins University Press.
- Schuh, G. Edward (1978), Approaches to "Basic Needs" and to "Equity" that Distort Incentives in Agriculture, Distortion of Agricultural Incentives, T.H. Schultz ed.
- Streeten, p. (1987), What Price Food? Agricultural Price Policies in Developing Countries, Macmillan Press.
- Thobani, M. (1979), The Effect of Change in Wheat Prices on Incomes, in Pakistan Development Review, Islamabad.
- Tomek, W.G. & Robinson, K.L. (1981), Agricultural Product Prices, (2nd ed) Cornell University Press.

CROP PRODUCTION STATISTICS: AN ANALYSIS

By
M.B. Siddiqui*

"Availability of reliable and timely agricultural statistics plays a key role in formulating agricultural development programmes inter alia aimed at improving the productivity of the cultivable land, making plans for food sufficiency and finding trade outlets. In case of short crop production, government has to make arrangements for timely import to safeguard consumers from high prices and in case of excess crop production, government has to clear the domestic market to protect producers from falling prices and to arrange exports to earn foreign exchange. Agri-businesses also need market information with special reference to location, type, quality and conditions of commodities. Agricultural statistics just like any other statistics must be relevant, comprehensive, of good quality, timely and unbiased. In this article, a number of issues encountered in the collection of crop statistics and discrepancies observed in the estimates of various concerned agencies have been pointed out which need to be redressed."

1. Introduction

In modern agriculture, problems of a farmer are two fold. He has not only to produce the crops but has to market them. So he has to fight at two fronts. Simply producing a crop is satisfactory only if there is readily available market for it. Markets respond according to the interplay of supply and demand. In case of bumper harvest there is a buyer's market and in case of short crop production there is seller's market. Markets disappear when there is no demand of the produce. In situations of market failures resulting from bumper crop harvests, particularly of perishable commodities, farmer sometimes prefers to plough back his produce rather than incurring extra expenditure on its harvesting and marketing. Bumper crops of potatoes and onions in 1989-90 are the living examples when their prices collapsed.

* Chief in Agricultural Prices Commission, Islamabad.

has happened on the production front. Reliable and relevant prices are the key input to make true market analysis.

Since it is the farmer who produces and markets agricultural crops, therefore, he needs information on the type and quality of commodity he might best produce and the income he might expect to derive from his production. To stabilise production and prices and to safeguard farmers' income government initiated its support price programme in 1970's and established the Agricultural Prices Commission for their determination on scientific lines in 1981. The efficient running of the system depends on the quality and timeliness of the production and price statistics. Based on the pricing policy experience, issues relating to the collection of statistics for various crops are discussed in the forthcoming paragraphs.

Crop statistics contain area, yield and production data. These statistics are generated by Provincial Agricultural Departments. They survey the area and yield of crops and prepare their estimates. Provincial Agriculture Departments send their crop estimates for approval to the Federal Bureau of Statistics from where these are sent to MINFAL for their release. MINFAL releases three crop estimates. First estimate provides area under the crop. Second estimate provides both area and production. It is prepared after performing crop cutting experiments or conducting growers opinion surveys. Final Estimate also contains both area and production. However, in this estimate acreage is arrived at by reconciling with the record of the Revenue Departments and production is updated using ancillary information from processing industries e.g. sugarmills for sugarcane, ginneries for cotton and rice mills for paddy.

2. Issues in Crop Statistics

Various issues involved in the assessment of production and acreage of important crops are highlighted below:

2.1 Sugarcane

Sugarcane is generally used as a raw material for the sugar industry. It is also used for Gur making and animal feed. A considerable amount of sugarcane crop is retained for seed for the next year crop. In the Punjab, and NWFP considerable proportion of sugarcane is used for Gur making. Sindh produces 11 per cent (1994-95 to 1996-97 average) of the total Gur production. Keeping all these non mill uses (which altogether form 15 to 20 per cent of production) in view, sugarcane crushing should not exceed 80-85

per cent of cane produced. But the proportion of sugarcane crushed in 1985-86, 1986-87, 1987-88, 1988-89 and 1992-93 was 97, 98, 98, 91 and 94 per cent respectively in Sindh province (Annex-I). In 1998-99 this proportion was 89 per cent. These high proportions of cane crushed reflect under estimation of sugarcane production in Sindh. Thus, Agriculture Department, Sindh needs to keep in view sugarcane crushing while finalizing its production estimates.

2.2 Cotton

Cotton is an important cash crop of the country. Its production estimates set the direction in prices in the domestic and international market. There are many players in cotton business like PCGA, APTMA and KCA. Besides Provincial Agricultural Departments, cotton production estimates are prepared by these agencies as well. Every agency develops the estimate suited to its own interest and twists them accordingly. These multi directional estimates create confusion in the market. Farmer is the ultimate effectee in this situation. On the recommendation of APCOM, Government had set up Cotton Crop Assessment Committee representing in addition to the above agencies, provincial agriculture departments and progressive growers. The Committee meets regularly from the time when the cotton starts arriving in the market. In the end it issues consensus estimates of cotton after taking into account the provincial production estimates (ex-farm), arrival at the ginneries and tentative consumption by the un-organized sector. These estimates have helped in reducing speculation in the market by providing impartial statistics.

Comparison of MINFAL and PCGA estimates is made in Annex-II. PCGA estimates are not based on complete coverage of ginneries. Moreover, with promulgation of GST on cotton @ 15 per cent, the arrivals to the ginneries are being under reported. The year 1999-00 is the living example. The cotton crop Assessment Committee is questioning the whereabouts of one million bales which have neither crossed the border nor could have possibly been evaporated in the air. It is dreaded by the Committee that one million cotton bales are missing because of an attempt to avoid the payment of 15 percent GST levied at the ginning stage. If it is taken as true then national exchequer has been deprived of Rs 900 million GST at the ginning stage and Rs 2 billion at the spinning stage. Similar scenario was observed in 1998-99.

2.3 Rice

The country earns valuable foreign exchange by exporting rice. In 1999-00 it has produced a record rice crop of 5.15 million tonnes. Market

prices supplied by the concerned agencies in the Punjab and Sindh were not depicting the true picture. They were generally ruling above support prices. The participants of the APCom's Standing Committee meeting on Rice showed their concern that market prices of rice (paddy) were not in line with production of rice. They were of the view that price statistics is not reliable. The concerned agencies should be requested to provide reliable price statistics. It was also mentioned that production estimates of rice should be split up by variety as certain varieties like IRRI-9 are in demand in export market. Its production statistics and procurement specifications are not known which are pre-requisite for its exports. Therefore, Provincial Agriculture Departments need to prepare separate estimates of such varieties of rice which are in demand in the export market.

2.4 Potatoes

Three crops of potatoes are raised in the country i.e. autumn, spring and summer crops. Production from autumn crop is 72 per cent, from spring crop 17 per cent and from summer crop 11 per cent which reach the market in different seasons and regulate its supply round the year and over different locations in the country. Potatoes are consumed locally as well as exported to the foreign countries. Pakistan has emerged as a regular exporter of potatoes during the recent years.

MINFAL releases three estimates of potato crops. First estimate provides area under potatoes and is released on 15th December. The second estimate released on 1st May contains area and production of potatoes. After reconciliation with the Revenue Departments, final estimates on area and production are made available on 1st August. By August it is too late to plan for exports as the main crop of autumn is almost consumed upto that time. Adequate information on area and expected production should be available by the end of December each year for proper planning for exports in January – March period, particularly, in the years of surplus production. Since production estimates are not available in time, a large exportable surplus is wasted instead of exporting. In 1997-98 we had a bumper crop of 1,466 thousand tonnes which was 50 per cent higher than the previous year. But we could not export more than 6.4 thousand tonnes in that year because we did not have any idea of exportable surplus at right time and when estimate confirmed at later stage, the exports were not possible because of rise in temperature. As a result, all the exportable surplus was wasted. And also PASSCO -- the implementing agency did not intervene, leaving growers at the mercy of the cruel market forces, probably due to its ignorance about the magnitude of production. Thus, it is essential that Provincial Agriculture

Departments should issue some tentative estimates of potatoes production somewhere in January.

2.5 Gram

Gram production is concentrated in 'Thal' areas of Punjab, barani regions of NWFP and the zones where it is sown as a dobari crop after rice in Sindh and Balochistan. Production of gram fluctuates due to attack of wilt, blight and pod borer and moisture stress. Gram is of two types i.e. black and white. Their demand is also segregated. The consumers treat them different commodities altogether. Thus, there is need to know their separate production. But separate estimates for these two types are not available. Separate estimates of white gram would help the government in assessing its import requirements. Moreover, support price is fixed for black gram, separate estimates would also help in implementing it effectively. Therefore, Provincial Agriculture Departments should provide estimates of gram by variety.

2.6 Wheat

Wheat is an important food crop. It is grown in all the four provinces of Pakistan. Generally, its indigenous production is not sufficient to meet the domestic demand, therefore, country is a regular importer of wheat. Imported quantities vary from year to year. Country also maintains Food Security Reserves of Wheat. Therefore, production estimates of wheat should be timely and reliable. Assessment of sufficiency level in wheat depends upon the quality of wheat production statistics. Some past experiences are discussed below:

In 1977-78 it was expected that country would not only meet the domestic requirements of wheat but it would also be able to export it. Unfortunately at the end wheat was imported. This reflected weakness in the production statistics. Government had to set up a Commission to investigate the reasons for wheat shortages in a year when apparently a bumper crop was harvested..

In 1988-89 Area Frame Sampling (AFS) project was launched with the help of US AID. The project through its own methodology of different plot sizes with a sample size of 70, estimated wheat yield in the Punjab at 2,779 kgs per hectare (Annex-III).

Against this estimate, Department of Agriculture using Village Master Sample (VMS) estimated yield at 2,096 kgs per hectare based on 1,074.15 x 20 foot plots. The AFS project yield was 32 per cent higher than the yield estimated by VMS. In fact the level of 2,779 kgs per hectare has not yet been attained as yield in 1999-00 is estimated at 2329 kgs per ha by the VMS. The difference between the two yield levels is significant and substantial which reflects inaccuracies in statistics.

An official document on National Food Security Plan in 1997 quotes an intelligence report according to which "more than 100 trucks of wheat move daily into Afghanistan illegally". The movement of wheat takes place over the metalled roads where anti-smuggling forces of several agencies including paramilitary forces exist. The report revealed the volume of the illegal wheat movement at 300 thousand tonnes in a year. Illegal wheat movement is also observed across the borders to India and Iran.

The Provincial Agriculture Departments should provide reliable estimates of wheat production. The method of crop cutting experiments should be suitably improved and extensively used to avoid any inaccuracies.

2.7 Non-traditional oilseeds (NTO's)

Non-traditional oilseed crops include sunflower, safflower, soyabean and canola. Provincial Agriculture Departments collect statistics on area, yield and production of these oilseeds. However, statistics of canola is not reported separately. It is included in the estimates of rapeseed and mustard. Pakistan Oilseeds Development Board (PODB) also provides the statistics on these oilseeds including canola. When statistics provided by the two agencies are compared, there comes a marked difference between the two. In case of sunflower MINFAL's production estimates (1994-95 to 1998-99) are 23 to 4 per cent less than the estimates of PODB. In case of soyabean and safflower there is a mixed trend. In some years PODB estimates are higher and in other years MINFAL estimates take lead. The estimates of canola provided by PODB are not firm. Consensus estimates of NTO's are needed to be prepared at national level. The agencies concerned should coordinate in this respect.

2.8 Onions

Like potatoes, onions are also grown in all the four provinces of Pakistan and are harvested at different times which help regulate its supply round the year over different locations of the country. A simple analysis of production, trade and price statistics points out imbalances. In 1995-96 and

1996-97, the country produced 1,098 and 1,131 thousand tonnes of onions respectively. Production of 1996-97 was 3 per cent higher than the production in 1995-96 but the prices in 1996-97 were 34 per cent higher than the prices in 1995-96. Country exported 12 and 19 thousand tonnes of onions in 1995-96 and 1996-97 but later on 29 and 21 thousand tonnes of onions were imported in these years. This situation points to the fact that crop statistics is not correctly reported as trade and price statistics do not support it.

2.9 Other crops

Currently agricultural statistics cover about 40 crops. But for some items such as spices, cumin seed, seed poppy, raw wool, natural honey and mushrooms statistics are not reported at national level. The importance of these items stems from the fact that country is a regular exporter of these items and earns considerable foreign exchange. How better can we plan for their exports if we do not know their indigenous production. It is a national requirement that the statistics on such items should be collected and reported at country level on some more scientific basis.

4. Recommendations

Based on the discussion made on various crops in this paper following recommendations are made.

- Agricultural Departments of Sindh, Balochistan and NWFP should establish Crop Reporting Services on the pattern of Agricultural Department, Punjab.
- Crop cutting experiments should also be performed for minor crops as is being done for major crops.
- For major crops sample design should be suitably revised on the basis of current data and number of villages may be enhanced to have estimates at acceptable level.
- Provincial Agricultural Departments should expand their net of crops and commodities and also include such commodities which are produced in the country and are regularly exported. Federal Bureau of Statistics should provide advisory service to provinces in executing these assignments.

REFERENCES

- Agricultural Prices Commission (1996) "Support Price Policy for Cotton", Islamabad.
- (1998) "Support Price Policies for Potatoes and Onions", Islamabad.
- (1994) "Support Price Policies for various crops", Islamabad.
- The Dawn, Economic and Business Review, May 01, 2000.
- Federal Inspection Commission, Pakistan (1978) "A Report on wheat shortage during 1977-78", Islamabad.
- Ghani, A. Chaudhry and S. M. Aslam Jafari (1999). "Horticultural Crops Area and Production" Pilot Survey - Experiences, Issues and Future Direction (un-published paper)
- Khan, H. Mati-ullah (1990) "Estimate of Wheat Crop Production in the NWFP", Peshawar (un-published report).
- Kitt R.B. Thomas, Robert L. Adlesion Jr. (1990) "Pakistan Wheat Plot Size Study: An Investigation into How Yields Vary Across Pakistan Wheat Fields" -- A Report for Ministry of Food and Agriculture, Islamabad.
- Ministry of Food, Agriculture and Livestock , "Agricultural Statistics of Pakistan", Islamabad – Various Issues.
- S.M.Aslam Jafri (1998) "Organization of Agricultural Production Surveys, Conventional and Control Methods" (un-published report).

ANNEX-I

**SUGARCANE PRODUCED AND CRUSHED IN SINDH:
1980-81 TO 1999-00**

Year	Production	Crushing	Crushing - production ratio	Year	Production	Crushing	Crushing - production ratio
	Million tonnes		Per cent		Million tonnes		Per cent
1980-81	5.01	3.55	71	1990-91	11.82	9.60	81
1981-82	7.46	6.45	86	1991-92	14.24	11.96	84
1982-83	7.55	6.28	83	1992-93	13.56	12.73	94
1983-84	7.36	5.63	76	1993-94	15.42	13.04	85
1984-85	7.43	6.08	82	1994-95	14.31	12.04	84
1985-86	7.53	7.27	97	1995-96	13.74	10.34	75
1986-87	7.91	7.79	98	1996-97	13.11	10.31	79
1987-88	9.57	9.40	98	1997-98	16.00	13.85	87
1988-89	13.11	11.92	91	1998-99	17.05	15.10	89
1989-90	12.36	10.46	85	1999-00	14.26	10.86	76

Sources:

- Agricultural Statistics of Pakistan – Various issues.
- MINFAL.
- PSMA.

ANNEX-II

**COMPARISON OF COTTON PRODUCTION ESTIMATES
MINFAL VS PCGA, 1981-82 TO 1999-00**

Year	MINFAL estimates	PCGA estimates	Difference	Year	MINFAL estimates	PCGA estimates	Difference
	Million bales				Million bales		
1981-82	4.40	4.10	0.30	1991-92	12.82	12.71	0.11
1982-83	4.84	4.61	0.23	1992-93	9.05	8.92	0.13
1983-84	2.91	2.55	0.36	Average	9.00	8.88	0.12
1984-85	5.93	5.63	0.30	1993-94	8.04	7.61	0.53
Average	4.52	4.22	0.30	1994-95	8.70	7.70	1.02
1985-86	7.15	7.06	0.09	1995-96	10.59	9.94	0.65
1986-87	7.76	7.64	0.12	1996-97	9.37	8.78	0.59
1987-88	8.63	8.56	0.07	1997-98	9.18	8.34	0.84
1988-89	8.39	8.20	0.19	1998-99	8.79	7.22	1.57
1989-90	8.56	8.45	0.11	1999-00	11.24	9.72	1.52
1990-91	9.63	9.47	0.16	Average	9.42	8.47	0.96

Sources:

- MINFAL.
- PCGA.

ANNEX-III

**COMPARISON OF WHEAT YIELDS IN THE
PUNJAB AS ESTIMATED THROUGH AREA FRAME
SAMPLING VERSUS VILLAGE MASTER SAMPLE**

Plot Combinations	Mean Yield
4	2682.62
4-5	2729.29
4-6	2736.09
4-7	2726.77
4-7, 2	2749.10
4-7, 2-3	2706.41
4-7,1-3	2733.24
4-7, 1-3, 8	2786.30
4-7, 1-3, 8-9	2782.89
4-7, 1-3,8-10	2768.80
4-7, 1-3, 8-11	2773.38
4-7, 1-3, 8-12	2778.54
VMS	2096.33

Note: A research plot of 14.4 x 21.6 foot is partitioned into 12 units. Units 1-3 are 3.6 x 3.6 sq.ft. units 4 -7 sq. ft. are 1.8 x 1.8 and 8 -12 are 7.2 x 7.2 sq.ft. The sum of all the partitions approximates the village master plot size of 15 x 20 sq.ft.

ECONOMIC ANALYSIS OF FERTILIZER USE ON SEED COTTON, WHEAT AND SUGARCANE CROPS

By
Sherzada Khan *

"It is an established fact that fertilizer use plays crucial role in enhancing farm production and productivity. However, its use is greatly influenced by the input output price relationship. This paper presents the economic environment for fertilizer use on important crops viz seed cotton, wheat and sugarcane grown in the country and overtime changes in the profitability level influenced by the changing prices. The relevant data were analysed for estimating (a) parity ratios and (b) the benefit cost ratios".

1. Introduction

Chemical fertilizers have contributed significantly to the expanded production of agricultural crops, both in the developed and developing countries of the world. Many researchers have empirically demonstrated that the rising trend in the productivity of crops is directly related to the judicious application of N, P and K fertilizers.

In Pakistan, nitrogenous (N) fertilizer was introduced in 1952-53, when only 1000 nutrient tonnes were used. The use of phosphatic (P) and potassic (K) fertilizers were introduced by the government in 1959-60 and 1966-67 respectively. Fertilizer use became more popular with the provision of subsidy, installation of tubewells and also with the introduction of fertilizer responsive varieties of agricultural crops. It was further encouraged by the promotional efforts of the government and the fertilizer industry.

In recent years, fertilizer prices have substantially increased which have affected the profitability of their use and, thus, the overall agricultural production. The main objective of this paper is to highlight the impact of increase in fertilizer prices on the profitability and use of fertilizer in seed cotton, wheat and sugarcane cultivation. For this purpose parity ratio

* Assistant Chief, Agricultural Prices Commission, Islamabad.

between the prices of fertilizer and farm crops and benefit cost ratio (BCR) have been estimated.

2. Parity Ratios Between Prices of Fertilizer and Farm Crops

The use of fertilizer on a crop is influenced by the changes in the purchasing power of farmers. Parity ratio indicating the relationship between the prices of farm crops and those of fertilizer, can be used as a basis for determining the incentives in fertilizer use. Rise in this ratio implies that larger quantity of the produce is required to pay for a given quantity of fertilizer and vice - versa.

In Pakistan, mostly nitrogenous and phosphatic fertilizers are used. In this section, parity ratios of fertilizer for cotton, sugarcane and wheat crops have been estimated and discussed below.

2.1 Seed cotton

Purchasing power of seed cotton in terms of fertilizers for the period 1980-81 to 1999-00 has been estimated using weighted average nutrient sale prices of N from Urea (the main source of N fertilizer) and of P from DAP and market prices of seed cotton prevailing during the harvest season in important markets of the Punjab and Sindh. The results are summarized in Table-1.

Table-1: Parity Ratios Between Seed Cotton and Fertilizer Prices

Year	Units of seed cotton needed to buy one nutrient unit of:		Year	Units of seed cotton needed to buy one nutrient unit of:	
	N	P ₂ O ₅		N	P ₂ O ₅
1980-81	0.91	0.62	1990-91	0.79	0.76
1981-82	0.87	0.58	1991-92	1.00	0.93
1982-83	0.69	0.45	1992-93	0.93	0.82
1983-84	1.06	0.69	1993-94	0.77	0.69
1984-85	1.11	0.72	1994-95	0.50	0.55
1985-86	1.05	0.69	1995-96	0.56	0.72
1986-87	0.93	0.70	1996-97	0.64	0.92
1987-88	0.93	0.80	1997-98	0.76	0.89
1988-89	0.94	0.81	1998-99	0.67	0.87
1989-90	0.82	0.83	1999-00	0.98	1.60

Note: Market prices of seed cotton, urea and DAP have been used.

The parity ratio between the prices of seed cotton and nitrogen nutrient (Table-1) has been changing invariably every year during the period under analysis. In 1980-81, 0.91 units of seed cotton were required to purchase one unit of "N" fertilizer. However, due to improved market prices of seed cotton, purchasing power of the produce improved in the following two years. The highest ratio during the period under consideration was observed in 1984-85 when 1.11 units of seed cotton were needed to buy one unit of nitrogen. This happened because nitrogen prices were increased by more than 11 per cent while that of seed cotton declined @ 31 per cent as compared with 1982-83. Thereafter, due to greater increase in market prices of seed cotton mainly resulted from short production, parity ratio declined and reached 0.79 in 1990-91. However, an increase of 26.7 per cent in the nitrogen price again depressed the purchasing power of the commodity in 1991-92. The most favourable parity ratio between the prices of seed cotton and 'N' fertilizer was achieved in 1994-95 when only 0.50 units of cotton were needed to purchase one unit of nitrogen. This crop-favoured parity was mainly resulted from high prices of lint in the international market and a big decline in the domestic production of cotton. The production was also low in 1993-94 but carryover stocks from the preceding year's bumper crop did not allow the domestic market prices to rise particularly when there was a monophonic situation in the cotton market.

In 1995-96 cotton production rose to 10.6 million bales which could result in deterioration in the parity ratio but high international prices and the better domestic market prices did not allow the parity ratio to go much against the crop. This crop-favouring parity prevailed upto 1998-99 but in 1999-00 a sharp decline in the international as well as domestic market prices inter alia ruined the purchasing power of domestic seed cotton crop and parity reached 0.98 in terms of N-fertilizer. There could be more adverse effect if N-prices had not fallen.

The parity between prices of seed cotton and phosphatic nutrient was 0.62 in 1980-81 which after improving to 0.45 in 1982-83 started moving against the crop and reached to 0.93 in 1991-92. However, from 1992-93 parity again improved in favour of crop and reached at the most profitable level of 0.55 in 1994-95. The reason behind this was not different from that narrated in the preceding paragraph. This parity shot up first to 0.92 in 1996-97 and then to 1.60 in 1999-00 when there was a record production of cotton at home facing the lowest international as well as domestic prices.

2.2 Wheat

The data presented in Table-2 indicate that to buy one nutrient unit of N fertilizer in 1980-81 and 1981-82, 2.79 units of wheat were required. In the following three years parity ratio between N fertilizer and wheat support prices moved against wheat requiring more than 3 units of wheat to buy one nutrient unit of nitrogen. The situation improved in favour of wheat in 1985-86 when government enhanced support price of wheat by about 14 per cent whereas prices of nitrogenous fertilizer in the market remained almost the same as compared with 1984-85. The most favourable parity ratio between the support price of wheat and market price of N fertilizer was observed in 1999-00 crop year when 1.92 units of wheat were needed for purchasing one unit of nitrogen. This happened due to significant increase i.e. 25 per cent in the support price of wheat for 1999-00 crop and 5.5 per cent decline in the price of nitrogenous fertilizer.

Table-2: Parity Ratios Between Wheat and Fertilizer Prices

Year	Units of wheat needed to buy one nutrient unit of:		Year	Units of wheat needed to buy one nutrient unit of:	
	N	P ₂ O ₅		N	P ₂ O ₅
1980-81	2.79	1.91	1990-91	2.48	2.40
1981-82	2.79	1.79	1991-92	2.73	2.44
1982-83	3.21	2.03	1992-93	2.81	2.54
1983-84	3.48	2.25	1993-94	2.41	2.37
1984-85	3.18	2.06	1994-95	2.55	3.13
1985-86	2.78	1.80	1995-96	2.51	3.54
1986-87	2.78	2.09	1996-97	2.42	3.18
1987-88	2.78	2.30	1997-98	2.50	3.15
1988-89	2.80	2.69	1998-99	2.54	3.43
1989-90	2.48	2.38	1999-00	1.92	2.37

Note: Support prices of wheat and market prices of urea and DAP have been used.

The analysis of phosphatic fertilizer in relation to wheat crop reveals that movement in parity ratio has not been different from that between N prices and wheat support prices. However, magnitude of change in parity ratio is higher in the case of P fertilizer as compared to N fertilizer. The parity ratio between the prices of wheat and phosphatic fertilizer increased from 1.79 in 1981-82 to 3.54 in 1995-96 the highest

during the period under review. The data further suggest that during 1994-95 to 1998-99 price of phosphatic fertilizer has increased much faster than that of the support price of wheat which reflects a significant loss in the purchasing power of wheat for P fertilizer. However, the analysis for 1999-00 suggests that purchasing power of wheat improved by about 31 per cent compared with 1998-99 because of 25 per cent enhancement in the support price of wheat and comparatively low price of phosphatic fertilizer in the market. This increased the off take of P fertilizer by 38 per cent in 'rabi' 1999-00. As a result, the N:P ratio narrowed to 2.8 compared to 3.6 during the previous year.

2.3 Sugarcane

The parity ratio between the prices of fertilizer nutrients, viz, nitrogen and phosphorus with that of the average support prices of sugarcane prevailing during that year in the Punjab, Sindh and the NWFP have been worked out from 1980-81 to 1999-00 and are given in Table-3.

Table-3: Parity Ratios Between Sugarcane and Fertilizer Prices

Year	Units of sugarcane needed to buy one nutrient unit of:		Year	Units of Sugarcane needed to buy one nutrient unit of:	
	N	P ₂ O ₅		N	P ₂ O ₅
1980-81	16.85	11.52	1990-91	16.37	16.52
1981-82	16.85	10.81	1991-92	19.10	19.38
1982-83	21.38	13.55	1992-93	19.27	17.16
1983-84	23.19	15.02	1993-94	19.24	18.63
1984-85	23.19	15.02	1994-95	19.70	21.56
1985-86	23.19	15.02	1995-96	19.19	24.50
1986-87	18.93	14.18	1996-97	22.31	32.30
1987-88	19.52	16.17	1997-98	17.56	21.19
1988-89	18.91	17.31	1998-99	17.15	21.36
1989-90	18.33	18.49	1999-00	17.24	28.21

Note: Provincial Average support prices of sugarcane and market prices of urea and DAP have been used.

The data suggest that the parity ratio has fluctuated very widely over the period under review. During 1980-81 and 1981-82, 16.85 units of cane were required to purchase one nutrient unit of nitrogen. But in the

following years these ratios moved against the sugarcane as more than 23 units of cane were needed to purchase one nutrient unit of N fertilizer. However, 22.5 per cent average increase in the support price of sugarcane in 1986-87 improved its purchasing power by 18.4 per cent. The situation remained almost the same upto 1989-90. The most favourable ratio between support price of sugarcane and N fertilizer during the period under review was observed in 1990-91 when 16.37 units of cane were required to buy one unit of nitrogen. However, in 1991-92, the purchasing power of cane again declined and farmers had to exchange 19.10 units of sugarcane for one unit of N. This ratio with minor variations prevailed upto 1995-96 but jumped to 22.31 in 1996-97, thereby lowering the purchasing power of cane by more than 16 per cent compared to 1995-96. Although prices of nitrogenous fertilizers further rose by 15 per cent from Rs. 13478 per nutrient tonne in 1996-97 to Rs. 15510 in 1997-98, but a quantum increase in the support price of sugarcane in 1997-98 improved the parity ratio in favour of the crop as only 17.56 tonnes of cane were sufficient to pay for one nutrient tonne of nitrogen.

The parity ratio between the prices of cane and P fertilizer slightly improved in favour of the crop in 1981-82 as compared to the previous year. However, as the programme of phasing out of the subsidy on phosphatic fertilizer progressed the ratio started rising against sugarcane and reached to 21.56 in 1994-95. It continued to rise and reached its peak in 1996-97 when 32.30 tonnes of sugarcane were required to purchase one nutrient tonne of phosphatic (P_2O_5) fertilizer. The purchasing power of sugarcane in terms of P fertilizer again improved in 1997-98 due to a fall of Rs. 799 per tonne in the prices of phosphatic fertilizer and a quantum increase in the support price of sugarcane. This change in prices lowered the parity ratio in favour of the crop and only 21.19 units of cane were required to be sold for buying one unit of P_2O_5 . This position could not be sustained in the following years because of further rise in the prices of phosphatic fertilizers and without any adjustment in the support price of sugarcane. This has lowered the purchasing power of sugarcane as 28.21 units are needed to buy one unit of P_2O_5 in 1999-00.

3. Benefit Cost Ratio (BCR)

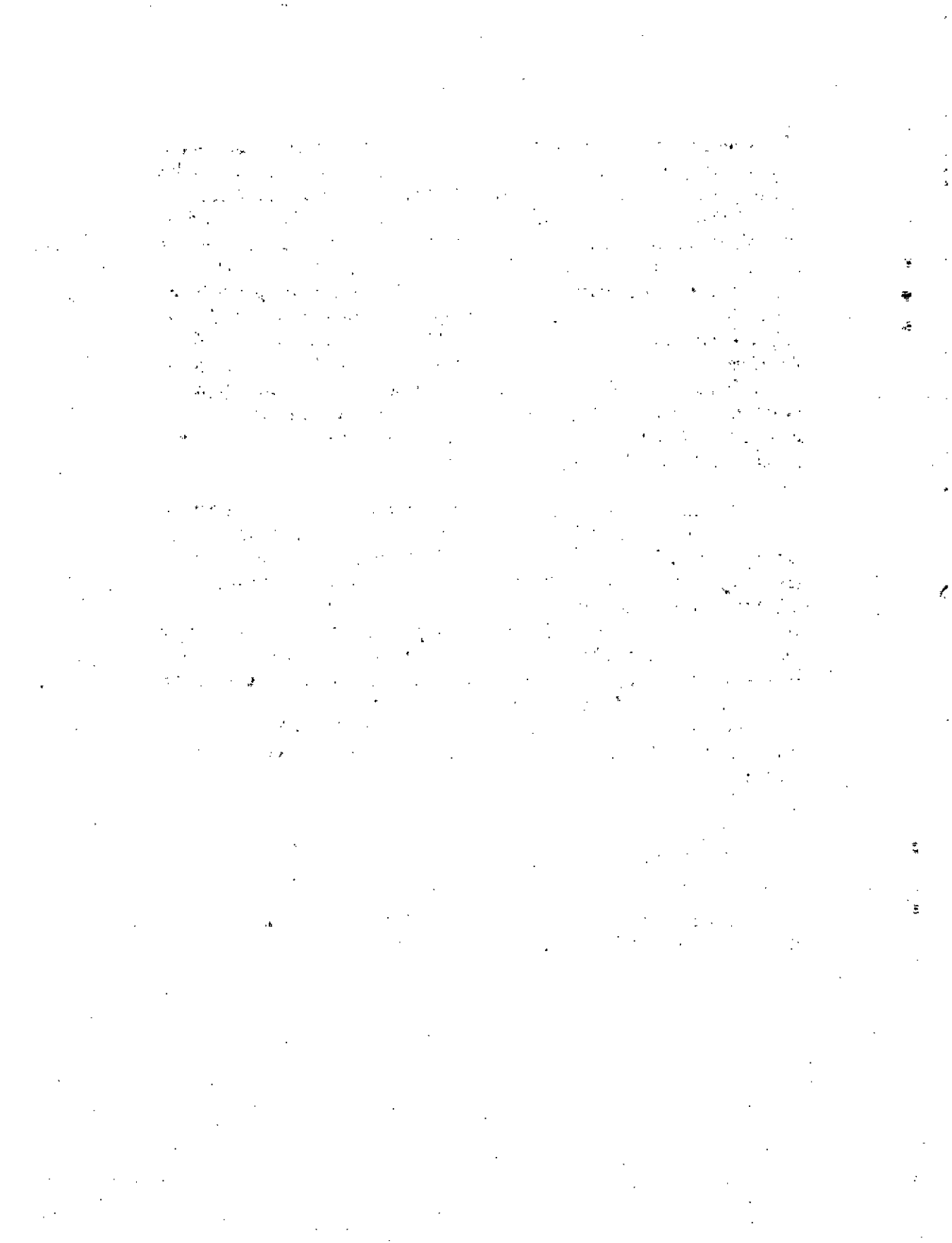
An other important economic indicator for assessing the profitability level of fertilizer use on a crop is the benefit cost ratio. It is a ratio between the gross value of additional produce inclusive of its by-product and the gross costs comprising cost of fertilizer dose including, its handling, application and marketing costs for the additional produce

alongwith the mark up on the cost of fertilizer used. The gross value of the additional produce depends on the response of the crop to fertilizer and the output price. Moreover, crop response to fertilizer may be influenced by many factors like soil type, crop rotation, variety grown, dose of fertilizer applied, irrigation practices, plant protection measures and all other cultural operations. Therefore, instead of computing the benefit cost ratio for a single response ratio which may not be applicable to all farming situations, the analysis has been extended to a range of response ratios i.e. 3.00:1, 3.75:1, 4.50:1 and 5.25:1 for seed cotton, 8.0:1, 7.5:1, 7.0:1, 6.5:1 and 6.0:1 for wheat and 50:1, 70:1, 90:1 and 110:1 for sugarcane. BCR when equal to one indicates that all the costs are just recovered and the produce gives no profit. As the value of BCR increases, the economics of fertilizer use tends to improve. Therefore, a favourable proposition for fertilizer use would generally require a BCR of greater than one.

To examine the profitability level of fertilizer use on seed cotton, wheat and sugarcane their benefit cost ratios have been calculated and discussed. In this exercise the cost of fertilizer has been computed by assuming the use of NPK in the ratio of 2:1:1 for cotton and sugarcane and 3:2:0 for wheat and taking the average prices of urea, DAP, SOP as used in estimating the cost of production of each crop in its support price policy for that particular year. The value of outputs have been computed at the support price of wheat, average support price of sugarcane, and market price of seed cotton during harvest season. The average expenses on other direct and indirect cost items have been adopted from the COP estimates of each crop as used in the support price policy of respective crop by APCom for that year.

3.1 Seed Cotton

The benefit cost ratios worked out for the decade ending 1999-00 at different response ratios of seed cotton are given in Table-4.



3.2 Wheat

The benefit cost ratios of fertilizer use in the production of wheat have been worked out at the response ratios ranging from 6.0:1 to 8.0:1, to cover the variability in soils, climatic conditions, farm technology and other agronomic practices. The benefit cost ratios for the period 1990-91 to 1999-00 are detailed in Table-5.

Table-5: Benefit Cost Ratios of Fertilizer use on Wheat

Year	BCRs at response ratio of:				
	6.0:1	6.5:1	7.0:1	7.5:1	8.0:1
1990-91	1.39	1.46	1.53	1.60	1.66
1991-92	1.48	1.56	1.63	1.69	1.76
1992-93	1.50	1.57	1.65	1.72	1.78
1993-94	1.52	1.60	1.68	1.75	1.81
1994-95	1.41	1.52	1.60	1.68	1.75
1995-96	1.49	1.57	1.65	1.72	1.80
1996-97	1.55	1.63	1.70	1.76	1.82
1997-98	1.52	1.64	1.69	1.76	1.80
1998-99	1.49	1.56	1.63	1.70	1.76
1999-00	1.52	1.60	1.68	1.75	1.81

Note: Support prices of wheat and the average expenses on direct and indirect cost items and market prices of urea and DAP have been adopted from the cost of production estimates as used in the support price policy reports on wheat by APCoM for each year.

The data show that BCRs were low during 1990-91 and relatively high during the subsequent period upto 1993-94. However, due to increase in the prices of fertilizer without any adjustment in the support price of wheat, BCRs showed a decline of 3.3 to 7.2 per cent at different response ratios in 1994-95. The situation improved in the following two years i.e. 1995-96 and 1996-97 but the significant increase in the prices of different fertilizers in 1997-98 and 1998-99 and constant price of wheat in these years lowered the profitability level of fertilizer use in wheat production. However, 25 per cent enhancement in the support price of wheat in 1999-00 and relatively low prices of nitrogenous and phosphatic fertilizers from the previous year had given support to the profitability level of fertilizer in wheat production.

3.3 Sugarcane

The benefit cost ratios (BCRs) for sugarcane on country basis for different response ratios have been worked out for the period 1990-00 and are given in Table-6.

Table-6: Benefit Cost Ratios of Fertilizer Use on Sugarcane

Year	BCRs at response ratio of:			
	50:1	70:1	90:1	110:1
1990-91	1.31	1.56	1.75	1.91
1991-92	1.63	1.98	2.24	2.45
1992-93	1.45	1.73	1.94	2.11
1993-94	1.36	1.65	1.86	2.03
1994-95	1.39	1.69	1.93	2.12
1995-96	1.26	1.56	1.79	1.98
1996-97	1.19	1.47	1.70	1.89
1997-98	1.48	1.85	2.15	2.40
1998-99	1.47	1.84	2.14	2.39
1999-00	1.38	1.74	2.03	2.28

Note: Provincial average support prices of sugarcane and the average expenses on direct and indirect cost items and market prices of urea, DAP and SOP have been adopted from the cost of production estimates as used in the support price policy reports on sugarcane by APCoM for each year.

These ratios reveal that BCRs starting declining from 1992-93 and the level of profitability in fertilizer use on sugarcane at various response ratios went down to the lowest level in 1996-97. After de-regulation and elimination of subsidy, there is a rising trend in the prices of fertilizer. The prices of various fertilizers have significantly increased during the decade resulting a wide fluctuation in the profitability level of fertilizer use on sugarcane. At the latest prevailing rates of fertilizers and holding other factors constant, the BCRs for 1999-00 compared to previous year are estimated to have declined by 4.60 to 6.12 per cent at different response ratios.

4. Conclusion and Recommendations

The foregoing discussion concludes that the economic environment for using fertilizer on major crops has generally a declining trend. The purchasing power of all crops under consideration has been declining particularly in terms of phosphatic fertilizer after its deregulation. This trend has discouraged the use of phosphatic fertilizer and has further widened the NP ratio. However, the upward revision of wheat price for 1999-00 crop has improved its purchasing power for fertilizer as well its profitability in the use of fertilizer.

To maintain incentives in the use of fertilizer at the level where growers can be rewarded for their investment, the prices of crops may be adjusted in general in proportion to the changes in fertilizer prices and in particular keeping in view the changes in direct and indirect cost items. However, the upward revision of support prices of crops is simply not possible in certain crops such as sugarcane as it can lead to uneconomic production of the final product (sugar) in the country which will induce inefficient use of farm resources. Therefore, alongwith adopting prices as corrective measures, productivity issues should also be addressed. The logical approach would therefore be to identify non-price measures which could help improve the production efficiency, improve the crop response ratio and thereby lower the production costs. To achieve this objective, the efficiency of land, water and fertilizer use has to be enhanced through application of balanced doses of fertilizers at the right time in combination with organic matter. Availability and adoption of quality seed of desired varieties alongwith timely supply of fertilizers may be ensured.

REFERENCES

- Agricultural Prices Commission. Various Issues of the Support Price Policies for Wheat, Sugarcane and Seed Cotton.
- National Fertilizer Development Centre (1986). Pakistan Fertilizer Statistics, Statistical Bulletin, Planning and Development Division, Government of Pakistan, Islamabad
- Niaz, M.S. (1984). Fertilizer Pricing System in Pakistan, Agricultural Prices Commission, Series No. 23, Ministry of Food, Agriculture and Cooperatives, Government of Pakistan, Islamabad.
- Sherzada, (1986). Economic Analysis of the Impact of Fertilizer Subsidy on Wheat Production in Pakistan. Unpublished Dissertation Submitted for M.Sc. Degree in Agricultural Economics at the University of Aberdeen (U.K)

COST OF PRODUCTION OF MAJOR CROPS

By

M.B. Malik and Sardar Ali Khan*

"Empirical estimation of cost of production (COP) of various crops is fraught with many conceptual problems and practical difficulties. APCom has overtime endeavoured to evolve a sound methodological framework for empirically working out the COP of crops in the country. Cost of production estimates are prepared annually and are used as a determinant of support prices for various crops. The present paper presents the cost of production and contribution of various cost items in the cultivation of wheat, rice, cotton and sugarcane crops in the Punjab and Sindh during 1995-96 to 1999-2000. The paper portrays the differences of COP among various crops and provinces because of varying agro-climatic conditions required for their cultivation. Overall COP of these crops were higher in the Punjab than in Sindh. Major items which contributed to the COP during the said period both in the Punjab and Sindh were cultural operations, chemical fertilizers, harvesting threshing and land rentals. The support prices fixed by the Government moved in sympathy with their COP during the said period. However, support prices fixed by the government were mostly the same as were recommended by APCom."

Introduction

The cost of production (COP) of field crops is one of the important determinants for considering the level of their support prices. However, in view of the great variations practised in raising the field crops under diversified farming and different ecological conditions, as is the case in Pakistan, empirical estimation of COP is fraught with many conceptual problems and practical difficulties. Given the importance of the subject in its work programme, APCom has over time endeavoured to evolve a sound methodological framework for empirically working out the cost of production of major crops grown in the country. In this connection, the commission convenes a number of expert group meetings, and

* M.B. Malik is Chief and Sardar Ali Khan is Assistant Chief in the Agricultural Prices Commission, Islamabad.

solicits the advice of subject matter specialists both from within and outside the country. To provide empirical foundations for the analysis in this context, APCom has been also organizing a number of field surveys to collect the requisite micro data for major crops i.e. wheat, rice, cotton and sugarcane in the major growing areas of the Punjab and Sindh. The COP estimates are prepared annually and are used as a determinant of support prices of concerned crop.

2. Cost of Production

The farm level cost of cultivation per acre and COP per 40 kgs at farm/market for sugarcane, cotton, paddy and wheat crops during 1995-96 to 1999-00 are given in Table-1. These cost estimates for major crops relate to an 'average' farmer. These farmers as defined by APCom are those who stand in between the 'progressive' and the 'traditional' farmers. They might be considered as being in a transitory stage for upgrading themselves from the 'traditional' to the progressive category, thus depicting some characteristics of both the categories.

Table-1: Cost of Production of Major Crops in the Punjab and Sindh

Year	Sugarcane		Paddy				Seed Cotton		Wheat	
	Rs/ acre	Rs/40 kgs	Basmati		IRRI		Rs/ acre	Rs/40 kgs	Rs/ acre	Rs/40 kgs
			Rs/ acre	Rs/40 kgs	Rs/ acre	Rs/40 kgs				
Punjab										
1995-96	8733	20.20	4404	233	3938	144	6494	369	3633	172
1996-97	9650	22.26	5007	265	4563	167	7346	419	4147	196
1997-98	11452	26.06	6638	305	6085	190	9125	554	5333	252
1998-99	12943	29.26	6919	318	6324	197	9746	591	5546	263
1999-00	13534	30.4	7340	337	6838	212	10157	616	5862	279
Sindh										
1995-96	9955	20.26	-	-	3427	119	4126	378	3413	175
1996-97	10903	22.23	-	-	3893	136	4696	432	3854	198
1997-98	13167	26.05	-	-	5350	152	7811	529	4848	249
1998-99	14564	28.48	-	-	5849	166	8387	567	4970	256
1999-00	15101	29.38	-	-	6198	175	8768	592	5240	271

Source: Various support price policy reports for different crops.

Table-1 indicates that overall COP of cotton and wheat were higher in Sindh than in the Punjab during 1995-96 to 1996-97 while these were higher in the former during the last three years of decade. The cost of production for sugarcane was generally higher in the Punjab during the

period under review. Higher COP of these crops in the Punjab were mostly because of high land rental and tubewell irrigation in the Punjab as compared to those in Sindh. Higher yields of sugarcane and IRRI paddy in Sindh were also the main cause of lower COP than in the Punjab. Cost of production (COP) of sugarcane has increased @ 11 per cent per annum in the Punjab and 10 per cent per annum in Sindh province during 1995-96 to 1999-00. COP of basmati and IRRI paddy in the Punjab and IRRI paddy in Sindh has increased by 10 per cent per annum during the said period. The cost of production of cotton has shown an increase of 14 and 12 per cent per annum in the Punjab and Sindh province during 1995-96 to 1999-00. Similarly COP of wheat crop has increased @ 13 and 12 per cent per annum in the Punjab and Sindh. It may be noted that changes in COP during the said period were observed at higher rate in case of seed cotton and wheat in both the provinces.

3. Components of Cost of Production

The expenses incurred on various items constitute the cost of cultivation per unit of land in totality. If any income is derived from the sale or uses of by-products (like straw in case of wheat and rice or tops in case of sugarcane), it is deducted from the gross cost of cultivation. This gives the net cost per unit of land (acre or hectare) at the farm gate. In order to arrive at the cost of production per unit of weight, the cultivation cost is divided by the yield per unit of land. Transportation and other incidentals are added up to the mandi (market) level, this would be cost at that level. The data on relative shares of various component in the cost of cultivation per acre of sugarcane, basmati paddy, IRRI paddy, cotton and wheat crops in the Punjab and Sindh during the last five years (Table-2) indicate that the major items which contribute to the COP both in the Punjab and Sindh are pre-sowing and sowing operations chemical fertilizer, harvesting, threshing and land rent. However, in the Punjab an additional item is the cost of irrigation by private tubewell because in Sindh the tubewell irrigation is used less as compared to the Punjab because of brackish nature of sub-soil water. In the Punjab, the cost of these items constitute about 60 to 81 % while in Sindh these items contribute about 60 to 87 % during 1995-96 to 1999-00.

Table-2: Share of Various Components in the Average Cost of Cultivation per acre of Major Crops in the Punjab and Sindh During 1995-96 to 1999-00

Crops/operations/inputs	Sugar-cane	Paddy		Seed cotton	Wheat
		Basmati	IRRI		
----- Per cent -----					
Punjab					
1. Land preparation	9	13	13	7	10
2. Seed and sowing operations	12	11	11	4	10
3. Interculture/earthing up/weeding	4	3	4	6	*
4. Plant protection	1	2	3	18	*
5. Farm yard manure	5	1	1	1	*
6. Chemical fertilizers	13	12	16	11	15
7. Irrigation	8	26	22	10	12
8. Mark-up	7	5	5	5	3
9. Harvesting/threshing/stripping/picking	12	8	9	10	22
10. Management charges+land revenue	3	3	3	3	3
11. Land rent	24	16	13	23	25
Sindh					
1. Land preparation	11	-	14	11	18
2. Seed and sowing operations	19	-	19	7	9
3. Interculture/earthing up/weeding	5	-	3	8	*
4. Plant protection	1	-	3	15	-
5. Farm yard manure	5	-	*	1	1
6. Chemical fertilizers	15	-	18	15	18
7. Irrigation	4	-	10	6	6
8. Mark-up	8	-	5	6	4
9. Harvesting/threshing/stripping/picking	13	-	15	10	24
10. Management charges+land revenue	3	-	3	3	3
11. Land rent	13	-	10	15	17

* Figures less than one

Source: Worked out from respective support price policy reports.

According to analysis the major item is the land rent which contributed about 16 to 25 % to the COP of major crops of the Punjab. However in case of Sindh it contributed only 10 to 17 % to the COP indicating higher land rentals in the Punjab than in Sindh. Plant protection was an important item in case of cotton crop contributing about 18 % and 15 % to the COP for Punjab and Sindh respectively. Harvesting was observed as the most important item in case of wheat crop contributing about 22 % and 24 % to COP of wheat in the Punjab and Sindh. Use of chemical fertilizers contributed greater to the COP of major crops of Sindh from 15 to 18 % as compared to the Punjab from 11 to 15 %.

Cost for land preparation and sowing of seed especially in case of sugarcane and paddy crops contributed more in their COP in Sindh than in the Punjab because soils of Sindh are hard, therefore, use of heavy tractors is common in that province.

4. Relationship Between Cost of Production and Support Prices

One of the objectives of support prices is to provide incentive for raising the production and productivity of crops. The extent of incentive depends on the need and urgency for accelerating the production level of a given crop which is generally related to its production cost as well as its comparative benefit with other competing crops. The APCom while recommending the support prices, considered COP as an important determinant. The support prices of sugarcane and paddy are fixed separately for the Punjab and Sindh provinces. However support prices fixed for seed cotton and wheat crops are same for the Punjab and Sindh. The cost of production and support prices of major crops during 1995-96 to 1999-00 for the Punjab and Sindh are given at Table-3.

Table-3: Cost of Production and Support Prices of Major Crops in the Punjab and Sindh: 1995-96 to 1999-00

Crop/year	Cost of production		Support price fixed by Government		Support price higher (+) or lower(-) than COP by	
	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
----- Rs/40 kgs -----			--- Per cent ---			
Sugarcane						
1995-96	20.20	20.26	21.50	21.75	(+) 6	(+) 7
1996-97	22.26	22.23	24.00	24.50	(+) 8	(+) 10
1997-98	26.06	26.05	35.00	36.00	(+) 34	(+) 38
1998-99	29.26	28.48	35.00	36.00	(+) 20	(+) 26
1999-00	30.40	29.38	35.00	36.00	(+) 15	(+) 23
Basmati (paddy)						
1995-96	233	-	222	-	(-) 5	-
1996-97	265	-	255	-	(-) 4	-
1997-98	305	-	310	-	(+) 2	-
1998-99	318	-	330	-	(+) 4	-
1999-00	337	-	350	-	(+) 4	-
IRRI (paddy)						
1995-96	144	119	112	112	(-) 22	(-) 6
1996-97	167	136	128	128	(-) 23	(-) 6
1997-98	190	152	153	153	(-) 19	(+) 1
1998-99	197	166	175	175	(-) 11	(+) 5
1999-00	212	175	185	185	(-) 13	(+) 6
Seed cotton (phutti)						
1995-96	369	378	400	400	(+) 8	(+) 6
1996-97	419	432	500	500	(+) 19	(+) 16
1997-98	554	529	500	500	(-) 10	(-) 5
1998-99	591	567	-	-	-	-
1999-00	616	592	-	-	-	-
Wheat						
1995-96	172	175	173	173	(+) 1	(-) 1
1996-97	196	198	240	240	(+) 22	(+) 21
1997-98	252	249	240	240	(-) 5	(-) 4
1998-99	263	256	240	240	(-) 9	(-) 6
1999-00	279	271	300	300	(+) 8	(+) 10

Source: Support price policy reports of different crops for relevant years.

The support prices of major crops during 1995-96 to 1999-00 moved with sympathy to their cost of production. However, the support prices of IRRI paddy in the Punjab and Sindh during 1995-96 to 1997-98 were unable to cover their COP and were observed about 11 to 23 per cent less than COP in the Punjab and 1 to 6 per cent in Sindh. Similarly support prices of basmati paddy in the Punjab were 4 to 5 per cent less than COP during 1995-96 and 1996-97 while these were marginally i.e. 2 to 4 per cent higher than COP during 1997-98 to 1999-00. In case of wheat support

prices were 4 to 9 per cent less than COP in both the provinces during 1997-98 and 1998-99, while these were higher about 8 to 22 per cent than COP for the years 1996-97 and 1999-00. As regards the cotton crop, the support prices were higher about 16 to 19 per cent than COP during 1996-97 and 1997-98. However, these were 5 to 10 per cent less than COP in the Punjab and Sindh during 1998-99. The support prices of cotton were not fixed by the government for 1998-99 and 1999-00 crop. A high jump in the support prices of sugarcane was observed during 1995-96 to 1999-00 where these were higher about 6 to 38 per cent than their COP in the Punjab and Sindh during the period under review.

5. Recommendations

- APCom has overtime endeavoured to evolve a sound methodological framework for empirically estimation of COP of various crops grown in the county. In this respect, there is need for further research work at the Agriculture Universities and other research organizations for developing scientific methodology in costing agricultural produce and analysis of the farm management data.
- There is need to strengthen APCom by providing financial and technical training to field staff in costing agriculture produce and techniques of farm management data.
- Support prices should be announced well before sowing time and implemented effectively.

REFERENCES

- Agricultural Prices Commission, support price policy reports for major crops, Islamabad.
- Agricultural Prices Commission, (1996) "Cost of Production of Sugarcane: Methodology and Empirical Results", APCom Series No.76.
- Agricultural Prices Commission, April (1991) "Cost of Production of Field Crops: Methodology and Empirical Results (Rice, Cotton and Wheat)", APCom Series No.52.
- Government of Pakistan, (1999), Economic Survey of Pakistan, 1998-99 Islamabad.
- Niaz, M.S. (1995) "Pricing of Farm Produce in Pakistan, Objectives Practices and Experiences", Print Associates International, Islamabad.

A NOTE ON SUPPORT PRICE SYSTEM

By
Syed Shahid Husain*

The APCom was established in 1981 during the period when government intervention was not considered a taboo. The end of the cold war and abolition of ideological frontiers have ushered in an era of unprecedented cooperation between North & South and East & West. The international political climate has never known such potential or promise. The emphasis has now shifted towards unshackling the economies through globalization and interplay of market forces. The process has spawned phenomenal growth in international trade yielding prosperity all around. Under the circumstances the support price policy has become an anachronism. APCom has been following the ritual of writing voluminous support price reports for the following commodities:

Sugarcane	Seed Cotton
Wheat	Rice (Paddy)
Potatoes	Onions
Gram	Oilseed Crops (Non-traditional)

A serious dispassionate view of our commitment to an outdated set of policies is in order. Following paras contain an analysis of impact of support price on various commodities. In case of paddy, gram, oilseeds, potatoes and onions the support price is only notional because of absence of implementation mechanism. For oilseeds, there is need to focus only on sunflower and canola and their support prices to be protected through variable import duty mechanism. For paddy and gram, the ritual of writing the annual reports and indicating a notional price may continue which would help the growers in bargaining with the market intermediaries and hence getting a better market price of their produce. But for onions and potatoes which are perishable commodities, some arrangements for implementing their support prices need to be put in place to save the growers from total collapse, even if that involves a deviation from the general thrust of a policy based on global market economy.

* **Chairman, Agricultural Prices Commission, Islamabad.**

As for the sugarcane, the support price is totally irrelevant because the cane price is determined by the forces of demand and supply. Sugar mills which have an excess capacity vie with each other in paying higher prices quite out of tune from the support price. Support price at best becomes the point for the growers to start bargaining from. Instead of stressing upon the implementation of support price for sugarcane, the emphasis should be on payment of cane price according to quality (sucrose contents) of the cane. As a matter of fact sugarcane crop has not much future and should be discouraged because this crop uses 22% of irrigation water. Besides, sugar manufacturing is uneconomical and adds less value than cotton. However, the Provincial Sugarcane Commissioners may improve implementation of provisions of Sugar Factories Control Act.

As for cotton, the ECC had decided in 1999 that 'no support prices of seed cotton may be fixed and let the free market work'. But in view of great pressure from growers' lobby, the Government was forced in 1999 to adopt ad hoc measures and ask the TCP to purchase lint cotton with funds borrowed from the banks. Obviously, the effort cost money and at the end of the day may not have helped the growers, because it was too little and too late. Besides, the support price does not help the growers to the desired levels, as the purchase is made of lint and not of seed cotton, thereby benefiting the ginners more than the growers. The price paid to the ginners sometimes does not necessarily translate into a corresponding payment to the growers.

That leaves wheat which is unique in view of the fact that the colonial hangover of rationing continues in the form of Provincial Food Departments, which are involved in wheat procurement and its issue to flour mills. Provincial Food Departments indulge in massive trading -- buying from the growers and selling it to the millers at a huge annual cost of approximately Rs 17 billion to the exchequer. The policy serves neither the urban consumers nor the rural growers. The money saved as a result of abrogation of this policy could better be spent on EDUCATION. Wheat support price was until last year usually a punishment price because the Provincial Governments imposed quota-driven procurement campaign and used coercive methods on growers to sell fresh wheat crop at support price which was generally lower than the prevailing market price. This year (1999-00) was a different as the support price was given a quantum raise from Rs 240 to Rs 300 per 40 kgs. Evidence is aplenty that in view of a bumper crop, market prices ruled much lower than the support price and the difference between the support price and the market price was pocketed by the middlemen and the government functionaries entrusted with the

responsibility of buying wheat from the growers. So much procurement has been made in Punjab that the storage capacity is bursting at the seams and it is no more possible for Punjab to store it except out in the open exposing it to elements.

Under pressure from the World Bank, the Ministry of Food and Agriculture has been making appropriate noises with regard to eventual withdrawal of the government from this losing game but no serious attempt has yet been made. Governments of Balochistan and Sindh at various times tried to withdraw subsidies but under pressure from the Federal Government reverted to the old regime. Obviously, there are vested interests of the flour mills and the Provincial Food Departments who rule the roost in the name of the consumers in the urban areas and the growers in the rural areas.

Farming is one of the most distorted sectors of the world economy. Despite promises to liberalize domestic support policies, import barriers and export subsidies in many industrialized countries remain formidable hurdles to the free flow of goods. Tariffs on agricultural goods still run at an average rate of 40% compared with well under 10% for manufacturing, and import quotas remain high. This hurts farmers in the developing world as well as the consumers in protected markets. Only a few industrial countries, forming a loose organization known as the CAIRNS Group, have stripped their farmers of most of their subsidies. Some countries are far more generous than others. For much of the 1990s, domestic farm support in the industrialized world was on the wane, but it has ballooned since 1998 in response to over supply and collapse in commodity prices and farm incomes. And progress on agricultural policy reform and trade liberalization reversed when market pressures emerged. Similar trend continued in the OECD countries over the last decade towards lower support, fewer trade distortions and greater market orientation. Responding to pressure on farm incomes, agricultural policies in 1998 were marked in many OECD countries by a resort to additional measures of support and protection, which were not always consistent with the longer-term directions of Reforms. These countries during this year alone paid out \$ 360 billion in agricultural support. The highest rates of support were paid to rice, milk and sugar producers -- the biggest generally getting the most. Policy-makers gave higher priority to addressing public concerns over food safety and quality, through regulatory measures and information programmes.

Indirect measures such as price supports are a crude and inefficient way of rescuing the commodity prices from collapse. Better to acknowledge these aims openly and pay directly to the target groups. In 1999, Balochistan had a bumper crop of onions having produced 0.7 million tonnes. The prices crashed to Re 1 per kg against the notional support price of Rs 3.5 per kg. Pressure from the Government of Balochistan resulted in purchase of 4,822 tonnes, merely 0.7% of the crop, by PASSCO. The purchase was made at Rs 120 per 40 kgs against the support price of Rs 140 and involved total expenditure of Rs 14.5 million. After adding their incidentals, PASSCO claimed from the Government, reimbursement of a loss of Rs 13.1 million or Rs 2.72 per kg. By the time PASSCO sells this crop much of it must have perished. It would make far more sense to transfer the subsidy in cash to the growers.

Research by Kym Anderson of the University of Adelaide, suggests that stripping the distortions from the OECD's agricultural policies would boost global agricultural trade by more than double making the OECD and the developing world better off by \$ 160 billion between them. In order to benefit from the gains from free trade, we have to play by new rules. There is a need for re-defining the agricultural support mechanism and re-shaping our farm policies. Thus, a serious review of *raison d'etre* of APCom is long overdue. APCom has a number of experts who can provide a valuable intellectual input to the framing of agricultural policy, so as to focus on more important issues especially the non price measures for achieving higher productivity. This also necessitates the change of name of Agricultural Prices Commission to the Agricultural Policies and Prices Commission (APPCom).

STATISTICAL APPENDIX

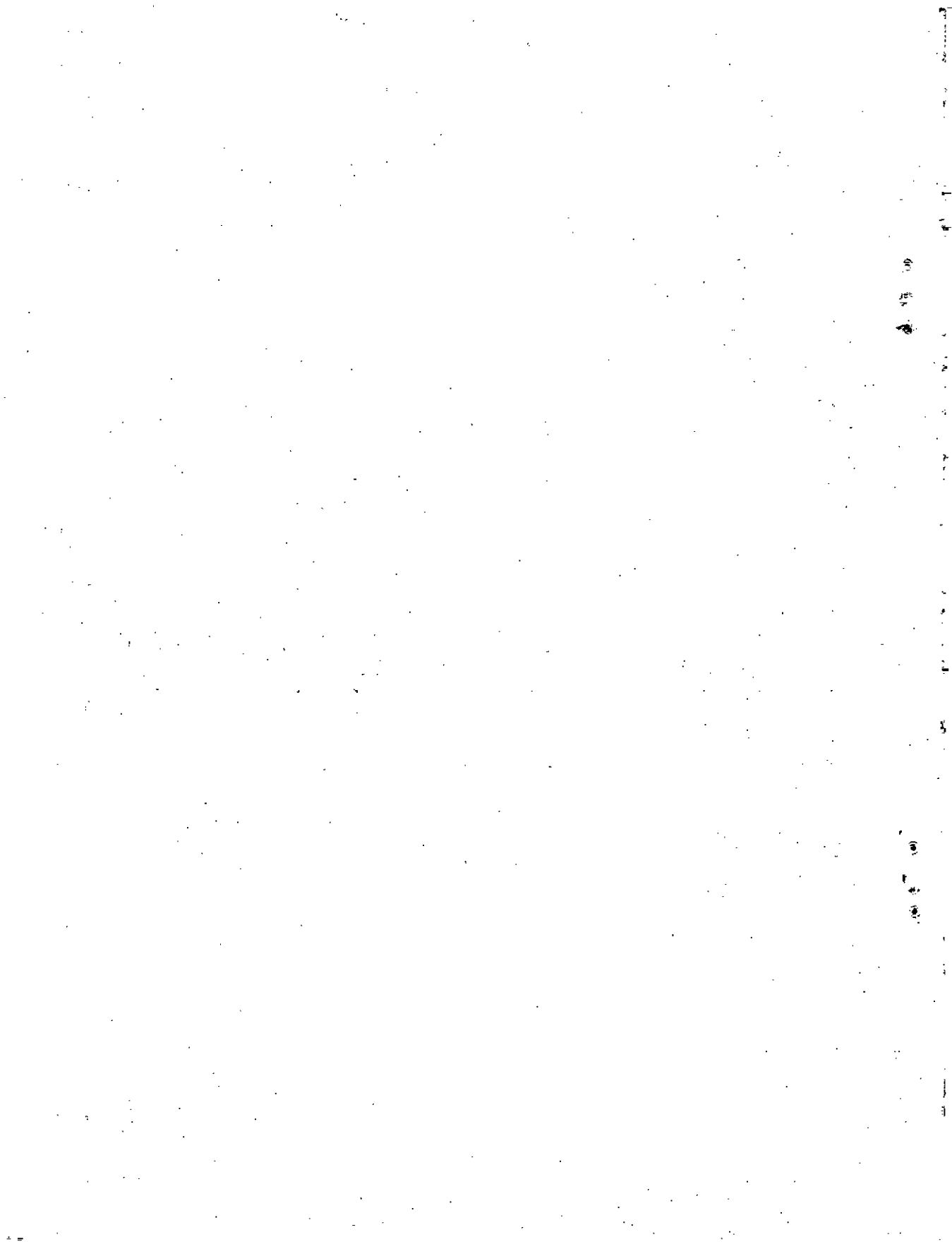


Table-1: Growth Rates of Major Crops in Pakistan 1947-48 Through 1998-99

Period	Parameter	Crops				
		Wheat	Rice	Maize	Sugarcane	Cotton
----- Per cent per annum -----						
1947-48 to 1959-60						
Area		1.53	2.74	2.10	7.61	1.79
Yield		-1.18	-0.19	0.66	-1.53	2.09
Production		0.33	2.54	2.62	6.12	3.86
1959-60 to 1969-70						
Area		2.85	3.22	3.41	4.24	3.39
Yield		3.37	4.44	0.98	3.67	3.23
Production		6.32	7.80	4.42	8.06	6.48
1969-70 to 1979-80						
Area		1.27	3.31	0.43	3.19	0.80
Yield		3.18	0.59	1.79	-0.46	-1.54
Production		4.49	3.92	2.24	2.72	-0.76
1979-80 to 1989-90						
Area		1.06	0.36	1.85	0.24	2.48
Yield		1.52	-0.52	1.01	0.79	6.96
Production		2.60	-0.16	2.88	1.03	9.61
1989-90 to 1998-99						
Area		0.71	1.53	0.39	2.35	1.49
Yield		1.97	3.04	0.73	2.40	-2.11
Production		2.69	4.61	1.12	4.81	-0.67
1947-48 to 1998-99						
Area		1.51	2.07	1.92	3.22	2.00
Yield		2.37	2.37	0.88	0.93	2.44
Production		3.99	3.92	2.81	4.16	4.50

Note:

The above growth rates are trend growth rates and have been calculated through Ordinary Least Squares (OLS) Method.

Table-2: Distribution of Farm Size in Punjab and Sindh by Management Categories

Province/ Category	Average Farm Size				Distribution of Farmers				
	Wheat	Rice	Cotton	Sugar- cane	Wheat	Rice	Cotton	Sugar- cane	
----- Acres -----				----- Per cent -----					
Punjab									
Progressive	27	7	30	24	25	29	25	21	
Average	20	11	22	16	50	48	49	49	
Traditional	16	9	17	11	25	23	26	30	
Combined	21	10	23	16	100	100	100	100	
Sindh									
Progressive	35	6	49	20	26	35	30	39	
Average	46	8	28	29	46	42	47	36	
Traditional	28	5	17	14	28	24	23	25	
Combined	38	7	31	22	100	100	100	100	

Note:

The farmers have been post stratified into management categories using following criteria:

Progressive: Enlightened farmers who use recommended doses of certified seed, adopt the latest technology and crop husbandry practices, use optimum plant protection measures and supplement irrigation water if required.

Traditional: Farmers who are using age old conventional farming practices, have not adopted available farm management technology, use their own seed and are erratic about plant protection measures.

Average: Farmers who are in the transitional stage from traditional to progressive are termed as average farmers.

Source: APCOM Field Surveys.

Crop	Conducted in	
	Punjab	Sindh
Wheat	1997-98	1996-97
Rice	1994-95	1995-96
Cotton	1994-95	1995-96
Sugarcane	1990-91	1990-91

Table-3: Farm Level Cost of Production of Major Crops Covered Under Support Price Programme

Crop/ Year	Wheat		Seed Cotton		Rice Paddy			Sugarcane		
	Punjab	Sindh	Punjab	Sindh	Basmati	IRRI	IRRI	Punjab	Sindh	NWFP
					Punjab		Sindh			
----- Rupees per 40 kgs -----										
1982-83	65	54	-	-	93	55	56	-	-	-
1983-84	73	64	166	-	85	56	37	-	-	-
1984-85	70	64	176	107	85	57	37	7.10	7.10	7.10
1985-86	72	66	182	112	88	59	40	7.17	7.17	7.17
1986-87	77	70	170	163	104	68	52	7.73	6.92	7.67
1987-88	77	77	175	167	109	69	53	7.60	7.15	7.86
1988-89	81	80	175	167	114	73	56	8.21	7.60	8.36
1989-90	81	79	185	175	114	73	56	9.14	8.34	9.31
1990-91	93	94	214	211	136	82	67	10.53	9.39	10.90
1991-92	109	108	248	247	165	101	75	12.55	10.86	12.18
1992-93	123	121	278	273	174	106	83	13.23	12.72	13.57
1993-94	133	136	294	288	189	114	88	14.75	13.88	15.23
1994-95	153	155	328	330	213	128	103	16.13	15.81	16.39
1995-96	167	170	364	373	228	139	114	16.94	16.80	17.40
1996-97	204	201	412	425	259	161	130	18.72	18.40	18.79
1997-98	244	241	544	519	297	182	144	22.21	22.22	22.18
1998-99	254	247	581	557	310	189	158	25.11	24.57	24.57
1999-00	269	261	606	582	329	204	167	26.25	25.48	25.58

Source: APCom, Support Price Policies – Various issues.

Table-4: Farm Level Cost of Production of Minor Crops Covered Under Support Price Programme

Crop/ Year	Non-traditional Oilseeds				Potatoes	Gram	Onions	
	Sunflower	Soyabean	Safflower	Canola			Punjab, Sindh & NWFP	Baloch- Istan
----- Rupees per 40 kgs -----								
1982-83	127	111	112	-	38	141	23	23
1983-84	139	116	118	-	-	-	-	-
1984-85	139	118	114	-	41	138	-	-
1985-86	144	121	118	-	44	139	29	29
1986-87	146	121	119	-	43	149	29	29
1987-88	152	126	123	-	41	149	31	31
1988-89	165	133	128	-	47	157	34	34
1989-90	165	133	128	-	49	172	37	37
1990-91	186	164	140	-	49	173	43	43
1991-92	203	183	165	-	58	176	50	42
1992-93	218	195	175	-	61	192	55	48
1993-94	238	209	-	-	68	225	61	52
1994-95	282	247	204	-	73	263	67	59
1995-96	318	282	241	-	79	298	72	64
1996-97	377	336	280	371	98	313	82	73
1997-98	412	372	308	397	123	347	91	84
1998-99	434	388	328	421	125	323	102	93
1999-00	448	412	337	455	123	376	108	106

Source: ACom, Support Price Policies – Various issues.

Table-5: Mandi/Procurement Centre Level Cost of Production of Major Crops Covered Under Support Price Programme

Crop/ Year	Wheat		Seed Cotton		Rice Paddy			Sugarcane		
	Punjab	Sindh	Punjab	Sindh	Basm- ati	IRRI	IRRI	Punjab	Sindh	NWFP
					Punjab		Sindh			
1982-83	67	-	-	-	93	55	56	-	-	-
1983-84	75	64	169	-	85	56	37	-	-	-
1984-85	70	64	176	107	85	57	37	7.10	7.10	7.10
1985-86	72	66	182	112	88	59	40	7.17	7.17	7.17
1986-87	77	70	170	163	104	68	52	7.73	6.92	7.67
1987-88	77	77	175	167	109	69	53	7.60	7.15	7.86
1988-89	81	80	175	167	114	73	56	8.21	7.60	8.36
1989-90	81	79	185	175	114	73	56	11.08	10.31	11.17
1990-91	96	96	214	211	136	82	67	13.23	11.89	12.90
1991-92	112	111	253	252	168	104	78	15.35	13.46	14.28
1992-93	126	124	283	278	177	109	86	16.40	16.10	15.92
1993-94	137	140	299	293	192	117	91	17.93	17.26	17.58
1994-95	158	160	335	335	218	133	108	19.33	19.19	18.74
1995-96	172	175	369	378	233	144	119	20.20	20.28	19.75
1996-97	212	209	419	432	265	167	136	22.26	22.23	21.31
1997-98	252	249	554	529	305	190	152	26.06	26.06	24.95
1998-99	263	256	591	567	318	197	166	29.26	28.48	27.37
1999-00	279	271	616	592	337	212	175	30.40	29.38	28.38

Source: APCom, Support Price Policies – Various issues.

Table-6: Mandi/Procurement Centre Level Cost of Production of Minor Crops Covered Under Support Price Programme

Crop/ Year	Non-traditional Oilseeds				Potatoes	Gram	Onions	
	Sunflower	Soyabean	Safflower	Canola			Punjab, Sindh & NWFP	Baloch- Istan
1982-83	127	111	112	-	40	141	25	25
1983-84	139	116	118	-	-	-	-	-
1984-85	139	118	114	-	44	138	-	-
1985-86	144	121	118	-	44	139	31	31
1986-87	146	121	119	-	43	149	32	32
1987-88	152	126	123	-	41	149	33	33
1988-89	165	133	128	-	47	157	36	36
1989-90	165	133	128	-	52	172	39	39
1990-91	186	164	140	-	53	176	46	46
1991-92	208	188	170	-	63	179	53	45
1992-93	223	200	180	-	66	196	58	51
1993-94	243	214	-	-	73	228	66	55
1994-95	287	252	209	-	79	268	72	64
1995-96	323	288	246	-	85	303	78	70
1996-97	384	343	286	378	106	319	89	79
1997-98	420	380	316	405	133	355	98	91
1998-99	443	397	337	430	135	333	112	100
1999-00	458	422	347	465	133	387	119	118

Source: APCom, Support Price Policies – Various issues.

**Table-7: Nominal and Real Support Prices* of Food Crops
1980-81 to 1999-2000**

Year	Wheat		Rice Paddy			
	Nominal	Real	Basmati		IRRI (FAQ)	
			Nominal	Real	Nominal	Real
1	2	3	4	5	6	7
----- Rupees per 40 kgs -----						
1980-81	58	116	75	150	39	77
1981-82	58	104	85	153	45	81
1982-83	64	110	88	151	49	84
1983-84	64	102	90	144	51	82
1984-85	70	106	90	136	51	77
1985-86	80	116	93	135	53	77
1986-87	80	112	102	143	53	74
1987-88	83	109	130	171	55	72
1988-89	85	102	125	149	60	72
1989-90	96	108	144	162	66	74
1990-91	112	112	144	144	73	73
1991-92	124	112	155	140	78	71
1992-93	130	107	175	144	85	70
1993-94	160	118	185	137	91	67
1994-95	160	105	210	137	103	67
1995-96	173	102	222	131	112	66
1996-97	240	127	255	135	128	68
1997-98	240	118	310	152	153	75
1998-99	240	111	330	153	175	81
1999-00	300	128	350	150	185	79

Source: APro, Support Price Policies – Various issues.

* Deflated by CPI and expressed in 1990-91 rupees.

Table-8: Nominal and Real Support Prices* of Cash Crops: 1980-81 to 1999-2000

Year	Seed Cotton		Sugarcane			
	MNH-93		Punjab		Sindh	
	Nominal	Real	Nominal	Real	Nominal	Real
1	2	3	4	5	6	7
----- Rupees per 40 kgs -----						
1980-81	182	363	9.65	19.26	9.81	19.58
1981-82	192	345	9.65	17.35	9.81	17.62
1982-83	197	338	9.65	16.56	9.81	16.84
1983-84	200	320	9.65	15.44	9.81	15.70
1984-85	203	307	9.65	14.61	9.81	14.85
1985-86	207	300	9.65	14.00	9.81	14.23
1986-87	207	290	11.79	16.51	11.95	16.74
1987-88	207	273	11.79	15.53	11.95	15.74
1988-89	210	251	12.59	15.04	12.86	15.36
1989-90	225	253	13.75	15.49	14.00	15.77
1990-91	260	260	15.25	15.25	15.75	15.75
1991-92	290	262	16.75	15.15	17.00	15.37
1992-93	310	255	17.50	14.41	17.75	14.62
1993-94	325	240	18.00	13.32	18.25	13.50
1994-95	423	277	20.50	13.42	20.75	13.59
1995-96	423	250	21.50	12.71	21.75	12.85
1996-97	540	285	24.00	12.69	24.50	12.95
1997-98	540	265	35.00	17.16	36.00	17.65
1998-99	825**	383	35.00	16.23	36.00	16.69
1999-00	725	310	35.00	14.96	36.00	15.39

Source: APCom, Support Price Policies – Various issues.

* Deflated by CPI and expressed in 1990-91 rupees.

** At the start of picking season, Rs 825 per 40 kgs was fixed as a result of mutual understanding between the growers, spinners and the Government. But it could not be implemented.

Table-9: Nominal and Real Support Prices* of Non-traditional Oilseeds 1980-81 to 1999-2000

Year	Sunflower		Soybean		Safflower		Canola	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
1	2	3	4	5	6	7	8	9
----- Rupees per 40 kgs -----								
1980-81	118	235	107	214	96	193	**	**
1981-82	133	239	117	210	122	219	**	**
1982-83	140	240	122	209	120	206	**	**
1983-84	150	240	140	224	125	200	**	**
1984-85	170	257	160	242	140	212	**	**
1985-86	170	247	160	232	140	203	**	**
1986-87	170	238	160	224	140	196	**	**
1987-88	170	224	160	211	140	184	**	**
1988-89	177	211	165	197	143	171	**	**
1989-90	205	231	185	208	165	186	**	**
1990-91	225	225	200	200	180	180	**	**
1991-92	250	226	230	208	220	199	**	**
1992-93	280	231	250	206	220	181	**	**
1993-94	315	233	275	203	270	200	**	**
1994-95	315	206	275	180	270	177	**	**
1995-96	315	186	275	163	270	160	**	**
1996-97	450	238	345	182	300	159	450	238
1997-98	450	221	345	169	300	147	450	221
1998-99	500	232	410	190	350	162	500	232
1999-00	500	214	450	192	400	171	500	214

Source: APCom, Support Price Policies – Various issues.

* Deflated by CPI and expressed in 1990-91 rupees.

** Not fixed.

Table-10: Nominal and Real Support Prices* of Kitchen Crops: 1980-81 to 1999-2000

Year	Potatoes		Gram		Onions	
	Nominal	Real	Nominal	Real	Nominal	Real
1	2	3	4	5	6	7
----- Rupees per 40 kgs -----						
1980-81	27	53	**	**	19	39
1981-82	27	48	**	**	19	35
1982-83	41	70	**	**	25	43
1983-84	41	65	153	245	30	48
1984-85	42	64	153	232	30	45
1985-86	42	61	153	222	33	47
1986-87	45	62	161	225	35	48
1987-88	45	59	161	211	37	48
1988-89	50	60	180	215	40	48
1989-90	55	62	200	225	42	47
1990-91	55	55	210	210	52	52
1991-92	65	59	230	208	60	54
1992-93	67	55	235	193	65	54
1993-94	77	57	275	203	78	58
1994-95	84	55	315	206	78	51
1995-96	84	50	330	195	85	50
1996-97	115	61	400	211	100	53
1997-98	145	71	425	208	125	61
1998-99	145	67	425	197	140	65
1999-00	145	62	450	192	**	**

Source: APro, Support Price Policies – Various issues.

* Deflated by CPI and expressed in 1990-91 rupees.

** Not fixed.

Table-11: International Prices of Major Agricultural Commodities

Year	Cotton cif (North Europe)		Wheat	Rice	Sugar		Edible oils				
	Sindh/ Punjab Afzal 1-1/32"	Index-B Cottons	Fob (pacifte) US Western white	100% second grade fob (Bangkok)	Raw sugar ISA price fob & (stowed caribbean) port in bulk	White sugar fob & stowed (London)	Soybean oil fob (Decature)	Palm oil fob (Malay sia)	Sun- flower fob (NW Europ- ean ports)		
-- US cents/lb.--			----- US \$ per tonne -----								
1980-81	-	-	N.A	N.A	-	-	519	588	N.A.		
1981-82	64.96	63.96	N.A	N.A	203	284	464	571	N.A.		
1982-83	65.95	67.25	165	272	174	243	405	445	N.A.		
1983-84	74.13	79.68	145	267	139	190	520	502	N.A.		
1984-85	54.00	57.55	140	217	139	146	681	742	N.A.		
1985-86	36.13	39.25	134	188	133	185	572	498	N.A.		
1986-87	59.84	59.59	108	186	139	187	343	283	N.A.		
1987-88	63.94	64.97	119	220	206	246	349	344	N.A.		
1988-89	61.42	63.50	168	284	263	351	519	443	476		
1989-90	76.51	77.27	158	296	301	402	417	328	482		
1990-91	76.32	77.22	117	292	203	303	458	317	480		
1991-92	56.67	57.06	154	290	202	280	417	365	459		
1992-93	53.99	53.25	150	253	211	274	471	379	492		
1993-94	61.45	69.39	133	297	248	323	596	448	627		
1994-95	75.89	75.44	163	282	302	397	605	647	691		
1995-96	80.95	80.48	200	365	270	384	550	523	617		
1996-97	76.23	75.27	163	342	245	319	504	525	545		
1997-98	72.23	68.00	139	308	218	272	571	605	726		
1998-99	51.28	68.00	115	290	174	233	616	608	725		

Sources:

- For wheat: International Grain council – Various reports.
- For cotton: Cotton Outlook – Various issues.
- For rice: Food Outlook – Various issues.
- For sugar: International Sugar Organization (ISO), London – Various reports.
- For edible oils: Oil world – Various issues.

Table-12: Actual Export Prices (fob Karachi) of Agricultural Commodities

Year	Export Prices (fob Karachi)					
	Cotton	Rice		Sugar	Onions	Potatoes
		Basmati	IRRI			
Rs/bale*		----- Rupees per tonne -----				
1980-81	2,719	7,029	3,168	-	1,580	1,820
1981-82	2,158	7,599	3,061	2,887	1,830	1,800
1982-83	2,599	8,005	2,668	2,619	1,220	1,940
1983-84	3,067	8,090	2,697	3,341	1,240	1,850
1984-85	2,824	9,394	3,030	-	1,460	2,270
1985-86	6,422	10,813	2,582	-	1,290	1,640
1986-87	2,036	12,369	2,577	-	1,140	1,500
1987-88	3,643	12,672	3,520	-	1,260	1,800
1988-89	3,648	13,259	4,420	5,820	2,260	2,140
1989-90	5,512	14,583	3,860	9,699	1,850	1,380
1990-91	5,765	10,494	3,881	-	3,460	2,400
1991-92	4,834	10,261	4,825	-	2,080	1,980
1992-93	4,527	11,189	5,364	-	2,190	2,140
1993-94	5,409	12,427	5,166	9,912	4,170	2,580
1994-95	10,550	12,526	5,961	11,936	3,900	2,540
1995-96	9,525	13,830	7,923	12,015	3,840	1,770
1996-97	10,053	17,469	7,847	-	4,250	3,820
1997-98	10,514	19,827	8,676	13,757	5,930	5,420
1998-99	11,316	24,050	10,450	12,739	17,710	6,960

Note: * Per bale of 170 kgs.

Source: Federal Bureau of Statistics, Karachi.

Table-13: Actual Import Prices (cif Karachi) of Agricultural Commodities

Year	Import Prices (cif Karachi)							
	Wheat	Gram	Sugar	Onions	Potatoes	Edible oils		
						Soyabean	Palm	Sun-flower
	----- Rupees per tonne -----							
1980-81	2,076	-	6,704	8,760	1,710	5,770	5,450	-
1981-82	2,224	-	5,873	5,530	1,640	5,450	5,370	-
1982-83	2,204	-	4,248	5,280	5,420	5,760	2,270	-
1983-84	2,952	-	4,265	3,900	2,170	8,620	5,270	-
1984-85	2,807	-	-	-	-	12,470	8,640	-
1985-86	2,472	-	3,601	-	-	9,830	9,480	-
1986-87	3,132	-	3,686	-	-	6,830	6,490	-
1987-88	3,079	-	3,815	-	1,220	8,060	4,910	-
1988-89	3,229	-	4,708	-	-	11,560	6,960	-
1989-90	4,197	10,580	9,102	-	-	10,410	6,890	-
1990-91	3,208	8,360	8,269	3,730	1,070	13,733	8,340	-
1991-92	4,205	11,960	7,832	-	4,410	12,599	9,098	-
1992-93	4,212	8,730	7,357	2,560	3,900	11,494	11,296	18,234
1993-94	3,804	8,870	9,335	1,100	1,110	15,848	12,549	19,816
1994-95	4,874	12,450	13,228	2,070	1,030	21,394	22,214	22,683
1995-96	7,718	13,430	15,606	1,170	2,900	24,599	25,170	23,100
1996-97	7,570	10,860	14,480	2,360	2,560	23,489	22,420	24,400
1997-98	7,413	11,370	15,189	5,990	2,620	33,964	28,244	32,793
1998-99	5,886	17,420	15,122	3,800	1,570	30,881	30,488	36,378

Sources:

- Ministry of Finance - Economic Survey - Various issues.
- Federal Bureau of Statistics, Karachi.

Table-14: Import Parity Prices of Agricultural Commodities

Years	Wheat based on fob (Pacific) price of US western white		Sugarcane based on fob (London) price of white sugar		Onions	Potatoes	Edible oils		
	If consumed at Karachi	If consumed at Lahore	Punjab & NWFP	Sindh	Based on actual import prices		Soyabean	Sunflower	Canola
							Based on their respective quoted price		
----- Rupees per 40 kgs -----									
1980-81	-	-	-	-	-	-	-	-	-
1981-82	-	-	-	-	-	-	-	-	-
1982-83	-	-	-	-	-	-	-	-	-
1983-84	-	-	-	-	-	-	138	140	-
1984-85	-	-	-	-	-	-	145	157	-
1985-86	-	-	-	-	-	-	142	118	-
1986-87	-	-	7	7	-	-	-	-	-
1987-88	-	-	-	-	-	-	139	106	-
1988-89	-	-	19	19	-	-	171	176	-
1989-90	171	-	20	20	-	-	130	130	-
1990-91	-	-	19	19	-	70	180	138	-
1991-92	170	200	20	20	-	223	121	149	-
1992-93	190	240	24	25	-	-	120	182	-
1993-94	175	227	-	-	-	-	121	222	-
1994-95	236	293	-	-	-	-	338	367	-
1995-96	323	397	46	47	-	280	455	368	482
1996-97	280	368	-	-	115	256	446	392	416
1997-98	265	357	-	-	151	-	541	546	530
1998-99	280	357	-	-	-	-	428	531	530

Source: Support Price Policies of APCOM.

Table-15: Export Parity Prices of Agricultural Commodities

Years	Seed cotton based on Afzal 1-1/32" cif (North Europe) price	Rice (paddy) based on actual export prices		Sugarcane based on fob (London) price of white sugar		Onions	Potatoes
		Basmati	IRRI	Punjab & NWFP	Sindh	Based on actual exports prices	
----- Rupees per 40 kgs -----							
1980-81	-	-	-	-	-	-	-
1981-82	-	-	-	-	-	-	-
1982-83	-	-	-	-	-	-	-
1983-84	-	-	-	-	-	-	-
1984-85	-	-	-	-	-	-	-
1985-86	-	169	30	-	-	39	-
1986-87	191	229	46	-	-	-	-
1987-88	352	229	46	-	-	-	-
1988-89	279	228	66	-	-	20	9
1989-90	426	237	94	-	-	164	87
1990-91	477	134	40	-	-	49	39
1991-92	-	155	84	-	-	52	112
1992-93	391	167	82	-	-	33	136
1993-94	539	201	70	19	19	169	121
1994-95	711	162	74	27	26	127	79
1995-96	851	168	110	-	-	117	87
1996-97	903	244	129	33*	34*	125	105
1997-98	844	359	155	34*	34*	190	118
1998-99	514	421	189	22	22		223

Note: * Based on previous three years average prices.

Source: APCom Support Price Policies of APCom various crops - various issues.

Table-16: Support and Market Prices of Wheat and Quantities Procured: 1980-81 To 1998-99

Year	Support price	Market price *	Difference between market and support prices	Procurement by government agency	Government agency
	Rs per 40 kgs		Per cent	Million tonnes	
1980-81	58	60	3	3.99	PASSCO and Provincial Food Departments
1981-82	58	62	6	3.13	
1982-83	64	67	4	3.82	
1983-84	64	71	10	2.28	
1984-85	70	77	9	2.53	
1985-86	80	82	2	5.04	
1986-87	80	80	-	3.98	
1987-88	83	85	3	3.49	
1988-89	85	93	8.60	4.13	
1989-90	96	102	5.88	4.41	
1990-91	112	121	7.44	3.16	
1991-92	124	134	7.46	3.25	
1992-93	130	139	6.47	4.12	
1993-94	160	170	5.88	3.64	
1994-95	160	176	9.09	3.74	
1995-96	173	185	6.49	3.45	
1996-97	240	273	12.09	2.72	
1997-98	240	259	7.34	3.98	
1998-99	240	261	8.05	4.07	

Note: * Average market price of Multan, Okara and Hyderabad during post harvest period: April – July.

Sources:

- MINFAL, Islamabad.
- ALMA, Karachi.
- Directorate of Agriculture (E&M), Punjab, Lahore.
- PASSCO, Lahore.
- Provincial Food Departments.

Table-17: Support And Market Prices of Basmati (Paddy) and Quantities Procured: 1980-81 To 1998-99

Year	Support price*	Market price**	Difference between market and support prices	Procurement by government agency	Government agency
	Rs per 40 kgs		Per cent	000 tonnes	
1980-81	75	N.A	N.A	-	
1981-82	85	N.A	N.A	-	
1982-83	88	90	2	-	
1983-84	90	92	2	-	
1984-85	90	92	2	-	
1985-86	93	114	23	-	
1986-87	102	113	11	-	
1987-88	130	141	8	-	
1988-89	135	135	-	-	
1989-90	143	136	-5	21.52	PASSCO
1990-91	143	143	-	18.06	
1991-92	155	158	2	5.70	
1992-93	175	190	9	5.57	
1993-94	185	194	5	78.00	
1994-95	211	192	-9	21.00	
1995-96	222	231	4	0.12	
1996-97	255	296	16	0.01	
1997-98	310	297	-4	Nil	
1998-99	330	362	10	Nil	

Notes:

- * Support price of Basmati-385
 ** Average prices of Rice paddy (Basmati) in the main producing area markets of the Punjab during post-harvest period : November to January.

N.A Not available

- Sources: - MINFAL, Islamabad.
 - Directorate of Agriculture (E&M), Punjab, Lahore.
 - PASSCO, Lahore.

Table-18: Support and Market Prices of IRRI (Paddy) and Quantities Procured: 1980-81 To 1998-99

Year	Support price*	Market price**	Difference between market and support prices	Procurement by government agency	Government agency
	Rs per 40 kgs		Per cent	000 tonnes	
1980-81	39	N.A	N.A	N.A	PASSCO
1981-82	45	N.A	N.A	N.A	
1982-83	49	N.A	N.A	0.25	
1983-84	51	N.A	N.A	Nil	
1984-85	51	N.A	N.A	Nil	
1985-86	53	59	11	Nil	
1986-87	53	53	-	Nil	
1987-88	55	70	27	2.00	
1988-89	60	73	22	Nil	
1989-90	66	69	4	3.89	
1990-91	73	78	7	17.00	
1991-92	78	98	26	Nil	
1992-93	85	112	32	2.93	
1993-94	90	98	9	Nil	
1994-95	103	137	33	Nil	
1995-96	112	181	62	Nil	
1996-97	129	164	27	Nil	
1997-98	153	205	34	Nil	
1998-99	175	234	34	Nil	

Notes: * Support price of IRRI-6 (FAQ)

** Average market prices of rice paddy (IRRI-6) in the main producing areas of Sindh during post-harvest period: October-December

N.A Not available

Sources:

- MINFAL, Islamabad.
- ALMA, Karachi.
- Bureau of Supply and Prices, Government of Sindh, Karachi.
- PASSCO, Lahore.

Table-19: Support and Market Prices of Basmati (Rice Cleaned) And Quantities Procured: 1980-81 to 1998-99

Crop year	Support price*	Market price**	Difference between market & support price	Procurement by government agency	Government agency	Remarks
	<u>Rs per 40 kgs</u>		<u>Per cent</u>	<u>000 tonnes</u>		
1980-81	137	188	37	320	RECP	-
1981-82	150	213	42	388	RECP	-
1982-83	154	208	35	337	RECP	-
1983-84	160	206	29	265	RECP	-
1984-85	160	200	25	265	RECP	-
1985-86	166	227	37	226	RECP	-
1986-87	230	221	-4	236	RECP	-
1987-88	250	272	9	220	RECP	-
1988-89	258	271	5	500	RECP	-
1989-90	276	271	-2	541	RECP	-
1990-91	276	326	18	143	RECP	-
1991-92	300	321	7	122	RECP	-
1992-93	330	470	42	500	RECP	-
1993-94	350	500	43	145	RECP	-
1994-95	378	396	5	284	RECP	-
1995-96	408	442	8	51	RECP	-
1996-97	449	559	25	-	-	-
1997-98	449	563	25	-	-	-
1998-99	-	767	-	-	-	No support price was fixed

Notes:

- * From 1980-81 to 1989-90: The prices of Basmati-370 are taken for FAQ and since 1990-91 onward these are in case of Basmati-385 for 10% broken.
- ** Market prices are the average wholesale prices during post harvest period i.e. November to January in Gujranwala market.

Sources:

1. ALMA, Karachi.
2. Directorate of Agriculture (E&M), Punjab, Lahore.
3. Economic Survey, 1998-99, Finance Division, Economic Adviser's Wing, Government of Pakistan, Islamabad.
4. Rice Export Corporation of Pakistan (RECP), Karachi.

**Table-20: Support and Market Prices of IRRI-6 (Rice Cleaned)
And Quantities Procured: 1980-81 to 1998-99**

Crop year	Support price*	Market price**	Difference between market & support price	Procurement by government agency	Government agency	Remarks
	Rs per 40 kgs		Per cent	000 tonnes		
1980-81	63	70	11	702	RECP	-
1981-82	73	82	13	706	RECP	-
1982-83	80	78	-2	890	RECP	-
1983-84	83	98	18	883	RECP	-
1984-85	83	120	47	959	RECP	-
1985-86	87	108	25	986	RECP	-
1986-87	87	95	10	1049	RECP	-
1987-88	89	95	7	614	RECP	-
1988-89	100	114	14	579	RECP	-
1989-90	113	120	6	793	RECP	-
1990-91	127	130	2	674	RECP	-
1991-92	140	159	14	370	RECP	-
1992-93	150	192	28	454	RECP	-
1993-94	157	197	25	681	RECP	-
1994-95	170	200	18	-	RECP	-
1995-96	183	251	37	155	RECP	-
1996-97	210	360	71	-	-	-
1997-98	252	323	28	-	-	-
1998-99	-	403	-	-	-	No support price was fixed

Notes:

- * For FAQ.
 ** Market prices are the average wholesale prices during post harvest period i.e. October to January in Sukkur market.

Sources:

1. Economic Survey, 1998-99, Finance Division, Economic Adviser's Wing, Government of Pakistan, Islamabad.
2. Agricultural Statistics of Pakistan, 1998-99: MINFAL, Islamabad.
3. Rice Export Corporation of Pakistan (RECP), Karachi.

Table-21: Support and Market Prices of Seed Cotton and Quantities Procured: 1980-81 to 1998-99

Year	Support price*	Market price**	Difference between market and support prices	Procurement by Government agency***	Remarks
	Rs per 40 kgs		Per cent		
1980-81	182	174	-5	Nil	
1981-82	192	193	1	Nil	
1982-83	197	188	-5	Nil	
1983-84	200	336	40	Nil	
1984-85	203	182	-12	Nil	
1985-86	207	196	-6	Nil	
1986-87	207	211	2	Nil	
1987-88	207	234	12	Nil	
1988-89	210	238	12	Nil	
1989-90	225	279	19	Nil	
1990-91	260	334	22	Nil	
1991-92	290	337	14	Nil	
1992-93	310	382	19	Nil	
1993-94	325	475	32	Nil	
1994-95	423	794	47	Nil	
1995-96	423	739	27	Nil	
1996-97	540	840	26	Nil	
1997-98	540	808	23	Nil	
1998-99	-	876	-	Nil	No support price fixed for 1998-99 crop by the Govt.

Notes:

- Support price of Sarmast, Qalandri, CIM-70, Deltapine, MS-84, K-68/69, MNH-93, MNH-129, K-68/69, MNH-93, MNH-129.
- ** Average market prices of seed cotton (phutti) in the main producing areas of the Punjab and Sindh.
- *** Seed cotton was not purchased by the procurement agency. Instead, its support price was implemented indirectly by procuring cotton lint from the ginneries.

Sources:

- MINFAL, Islamabad.
- Pakistan Central Cotton Committee (PCCC), Karachi.
- ALMA, Karachi.
- Directorate of Agriculture (E&M), Punjab, Lahore.

Table-22: Support and Annual Average Spot Prices of Cotton (Lint) at Karachi and Quantities Procured: 1980-81 to 1998-99

Crop year	Support price*	Market price**	Difference between market & support price	Procurement by government agency	Government agency	Remarks
	<u>Rs per 40 kgs</u>		<u>Per cent</u>	<u>000 tonnes</u>		
1980-81	476	482	1	1881	CEC	-
1981-82	473	453	-4	1698	CEC	-
1982-83	473	496	5	1793	CEC	-
1983-84	496	824	66	269	CEC	-
1984-85	500	549	10	3245	CEC	-
1985-86	500	509	2	4371	CEC	-
1986-87	500	538	8	3616	CEC	-
1987-88	504	610	21	3693	CEC	-
1988-89	507	617	22	1660	CEC	-
1989-90	539	732	36	610	CEC	-
1990-91	645	840	30	1002	CEC	-
1991-92	715	883	23	2851	CEC	-
1992-93	770	982	28	36	CEC	-
1993-94	801	1232	54	159	CEC	-
1994-95	986	2060	109	-	-	-
1995-96	986	1962	99	-	-	-
1996-97	-	2575	-	-	-	No support price was fixed
1997-98	-	2525	-	-	-	
1998-99	-	2722	-	-	-	

Notes:

- * B-557 and NIAB-78 group
 ** From 1980-81 to 1989-90, the prices of B-557 are taken and since 1990-91 onward these are in case of NIAB-78.

Sources:

- Economic Survey, 1998-99, Finance Division, Economic Advisor's Wing, Government of Pakistan, Islamabad.
 - Pakistan Central Cotton Committee, Karachi.
 - Cotton Export Corporation (CEC), Karachi.

Table-23: Support and Market Prices of Gram and Quantities Procured: 1980-81 to 1998-99

Year	Support price	Market price*	Difference between market and support prices	Procurement by Government agencies	Government agency
	Rs per 40 kgs		Per cent	000 tonnes	
1980-81	-	186	-	-	-
1981-82	-	249	-	18.00	PASSCO
1982-83	-	189	-	-	-
1983-84	153	149	-3	-	-
1984-85	153	169	9	-	-
1985-86	153	151	-6	-	-
1986-87	161	131	-22	7.00	PASSCO
1987-88	161	242	26	-	-
1988-89	180	245	18	-	-
1989-90	200	182	-10	-	-
1990-91	210	177	-19	8.07	PASSCO
1991-92	230	267	14	-	-
1992-93	235	338	30	-	-
1993-94	275	479	43	-	-
1994-95	315	632	50	-	-
1995-96	330	332	1	-	-
1996-97	400	423	5	-	-
1997-98	425	401	-6	-	-
1998-99	425	628	32	-	-

Note:

- * Average market prices of Mianwali, Bhakar, Sargodha & Jacobabad during post harvest season: April to June.

Sources:

- MINFAL, Islamabad.
- ALMA, Karachi.
- Directorate of Agriculture (E&M), Punjab, Lahore.
- Bureau of Supply & Prices, Government of Sindh, Karachi.
- Market Committees of Mianwali and Bhakkar.
- PASSCO, Lahore.

Table-24: Support and Market Prices of Onions and Quantities Procured: 1980-81 to 1998-99

Crop/ Year	Support price*	Market price**	Difference between market and support prices	Procurement by government agencies	Government Agency
	Rs per 40 kgs		Per cent	000 tonnes	
1980-81	19.30	27	40	Nil	-
1981-82	19.30	77	299	Nil	-
1982-83	25.00	49	96	Nil	-
1983-84	30.00	82	173	Nil	-
1984-85	30.00	62	107	Nil	-
1985-86	32.50	36	11	13.00	PASSCO, AM&SL
1986-87	34.50	76	120	5.00	AM&SL
1987-88	36.50	66	81	0.13	AM&SL
1988-89	40.00	94	135	Nil	-
1989-90	44.00	76	73	7.88	AM&SL
1990-91	54.50	123	126	Nil	-
1991-92	65.00	85	31	32.0	AM&SL
1992-93	70.00	156	123	Nil	-
1993-94	84.00	136	62	Nil	-
1994-95	84.00	168	100	Nil	-
1995-96	92.00	125	36	3.38	PASSCO
1996-97	106.00	201	90	Nil	-
1997-98	125.00	234	87	Nil	-
1998-99	140.00	257	84	Nil	-

Notes:

- * Support price of size above 50 mm upto 1988-89 and 40-50 mm afterward.
- ** Average market prices of Huderabad (Jan-Feb) and Multan during post harvest season: May to June.

Sources:

- MINFAL, Islamabad.
- ALMA, Karachi.
- Directorate of Agriculture (E&M), Punjab, Lahore.
- Bureau of Supply & Prices, Government of Sindh, Karachi.

Table-25: Support and Market Prices of Potatoes and Quantities Procured: 1980-81 to 1998-99

Crop/ Year	Support price*	Market price**	Difference between market and support prices	Procurement by government agencies	Government Agency
	Rs per	40 kgs	Per cent	000 tonnes	
1980-81	26.80	61	56	Nil	-
1981-82	26.80	53	49	Nil	-
1982-83	40.50	35	-16	64.50	AM&SL
1983-84	40.50	60	33	Nil	-
1984-85	40.50	61	34	65.00	PASSCO
1985-86	42.00	45	7	11.50	PASSCO
1986-87	44.50	47	5	15.00	AM&SL
1987-88	44.50	94	53	Nil	-
1988-89	50.00	85	41	2.49	AM&SL
1989-90	55.00	38	-45	0.11	AM&SL
1990-91	55.00	104	47	Nil	-
1991-92	65.00	81	20	1.14	AM&SL
1992-93	67.00	82	18	2.00	AM&SL
1993-94	77.00	77	0.0	Nil	-
1994-95	84.00	103	18	2.70	PASSCO
1995-96	84.00	238	65	Nil	-
1996-97	115.00	288	60	Nil	-
1997-98	145.00	116	-25	1.00	PASSCO
1998-99	145.00	106	-37	Nil	-

Notes:

- * Support price for the size of 40-55 mm.
 ** Average market prices of Lahore, Faisalabad and Okara during post harvest season: January to April.

Sources:

- Various Price Policy Reports of APCOM.
- AM&SL.
- PASSCO.
- MINFAL.
- ALMA, Karachi.

Table-26: Support Prices and Procurement of Non-traditional Oilseeds: 1980-81 to 1998-99

Crop year	Sunflower		Soybean		Safflower		Procurement agency
	Support price*	Procurement	Support price*	Procurement	Support price*	Procurement	
	Rs/40 kgs	000 tonnes	Rs/40 kgs	000 tonnes	Rs/40 kgs	000 tonnes	
1980-81	117.90	-	107.18	-	96.46	-	GCP
1981-82	133	5.7	117	0.7	112	1.4	GCP
1982-83	140	7.7	122	1.0	120	1.0	GCP
1983-84	150	7.7	140	0.5	125	0.7	GCP
1984-85	170	9.2	160	0.3	140	0.3	GCP
1985-86	170	-	160	-	140	-	-
1986-87	170	32.6**	160	-	140	-	-
1987-88	170	32.3	160	0.3	140	0.3	GCP
1988-89	177	21.6	165	0.3	143	0.2	GCP
1989-90	205	16.3	185	0.2	165	0.1	GCP
1990-91	225	29.6	200	0.3	180	-	-
1991-92	250	29.8	230	-	220	-	-
1992-93	280	28.7	250	-	-	-	-
1993-94	315	0.1	275	-	270	-	-
1994-95	315	-	275	-	270	-	-
1995-96	315	-	275	-	270	-	-
1996-97	450	1.00	345	-	300	-	PASSCO
1997-98	450	-	345	-	300	-	-
1998-99	500	-	-	-	-	-	-

Notes:

- * Market prices of non-traditional oilseeds are not available.
 ** Sunflower + Soybean

Sources:

- Agricultural Statistics of Pakistan 1998-99.
- Various price policy reports, APCOM.

Table-27: Estimated Requirements and Distribution of Improved Seed: 1993-94 to 1997-98

Crop	Year	Estimated Seed Requirement	Improved Seed Distribution	Improved Seed as % of Requirement
----- Metric tonnes -----				
Wheat	1993-94	706,824	56,045	7.93
	1994-95	733,545	80,840	11.02
	1995-96	733,545	85,383	11.64
	1996-97	739,000	77,023	10.42
	1997-98	739,000	78,544	10.63
Cotton	1993-94	67,806	26,499	39.08
	1994-95	58,298	28,453	48.81
	1995-96	66,000	31,295	47.42
	1996-97	66,000	26,635	40.36
	1997-98	67,000	23,128	34.52
Rice	1993-94	44,000	2,170	4.93
	1994-95	43,000	2,662	6.19
	1995-96	49,000	3,517	7.18
	1996-97	43,000	1,751	4.07
	1997-98	43,000	1,734	4.03
Maize	1993-94	35,900	1,631	4.54
	1994-95	35,600	2,201	6.18
	1995-96	35,000	2,032	5.81
	1996-97	35,000	2,011	5.75
	1997-98	35,000	1,674	4.78
Sunflower	1993-94	410	271	66.10
	1994-95	525	359	68.38
	1995-96	808	586	72.52
	1996-97	1,750	807	46.11
	1997-98	1,000	571	57.10
Vegetables (excluding potatoes)	1993-94	4,000	N.A	-
	1994-95	4,000	N.A	-
	1995-96	4,900	4,052	82.69
	1996-97	5,000	4,603	92.06
	1997-98	5,000	3,181	63.62

Source: Federal Seed Certification and Registration Department.

Table-28: Average Prices of Fertilizer: 1980-81 to 1998-99

(Rs per nutrient kg)

Year	Nitrogen (N)	Phosphorus (P)	Potash (K)
1980-81	4.04	2.70	1.97
1981-82	4.14	2.66	1.48
1982-83	5.00	3.15	1.37
1983-84	5.45	3.94	1.60
1984-85	5.44	3.85	1.90
1985-86	5.46	3.86	1.52
1986-87	5.66	4.09	1.82
1987-88	5.68	4.68	2.21
1988-89	5.79	6.56	2.82
1989-90	6.64	6.47	3.59
1990-91	7.47	8.21	5.47
1991-92	7.91	8.27	6.20
1992-93	9.05	8.71	7.31
1993-94	10.47	12.69	10.79
1994-95	11.45	13.85	12.06
1995-96	11.95	16.14	13.22
1996-97	15.05	17.21	16.10
1997-98	15.39	17.94	20.81
1998-99 (E)	15.73	18.70	26.89

Sources:

- i) From 1980-81 to 1984-85 = Fertilizer Related Statistics, October 1989, NFDC, Islamabad.
- ii) From 1985-86 to 1997-98 = Pakistan Fertilizer Related Statistics September 1998, NFDC, Islamabad.
- iii) For 1998-99 (Estimated) = NFDC, Islamabad.

Table-29: Fertilizer Use Per Cropped Hectare: 1980-81 to 1988-89

Year	Nitrogen (N)	Phosphorus (P)	Potash (K)	All Nutrients (N+P+K)	N : P
----- Nutrient kgs per hectare -----					
1980-81	43.6	11.7	0.5	55.8	3.73:1
1981-82	42.0	11.4	1.1	54.5	3.68:1
1982-83	47.3	13.2	1.3	61.8	3.58:1
1983-84	45.7	13.0	1.4	60.1	3.52:1
1984-85	46.9	14.7	1.2	62.8	3.19:1
1985-86	55.6	17.2	1.6	74.4	3.23:1
1986-87	63.8	19.6	2.0	85.4	3.26:1
1987-88	65.7	20.1	2.3	88.1	3.27:1
1988-89	60.7	17.9	1.1	79.7	3.39:1
1989-90	68.4	17.8	1.9	88.1	3.84:1
1990-91	67.4	17.8	1.5	86.7	3.79:1
1991-92	67.3	18.3	1.1	86.7	3.68:1
1992-93	72.9	21.8	1.1	95.8	3.34:1
1993-94	75.9	21.2	1.1	98.2	3.58:1
1994-95	78.5	19.3	0.7	98.5	4.07:1
1995-96	88.1	21.9	1.3	111.3	4.02:1
1996-97	86.6	18.3	0.4	105.3	4.73:1
1997-98	90.0	23.9	0.4	114.3	3.77:1
1998-99	91.8	19.7	0.4	111.9	4.66:1

Notes: Per hectare use of fertilizer has been worked out keeping in view the following assumptions:

- Assumed for 1980-81 to 1982-83, wheat 48%, rice 12%, cotton 16% and sugarcane 9% of the total yearly off-take as adopted in the 5th Five Year Plan.
- Assumed for 1983-84 to 1987-88, wheat 50%, rice 10%, cotton 15% and sugarcane 8% of the total yearly off-take as adopted for 6th Five Year Plan.
- Assumed for 1988-89 and onward, wheat 47%, rice 10%, cotton 20% and sugarcane 11% based on Fertilizer Use Survey, 1986 conducted by NFDC.
- Assumed for 1996-97 and 1997-98 and 1998-99, wheat 44.6%, Rice 10.5%, cotton 20.7% and sugarcane 8.1% of the total yearly off-take.

Source:

Calculated from the data given in:

- Pakistan Fertilizer Related Statistics, September 1998, NFDC, Islamabad.
- Agricultural Statistics of Pakistan, 1997-98, MINFAL, Islamabad.

**Table-30: Per Hectare Use of Fertilizer on Important Crops
1980-81 to 1988-89**

Year	Wheat	Rice	Cotton	Sugarcane	Total cropped area
----- Nutrient kgs per hectare -----					
1980-81	74.2	66.7	82.0	117.6	55.8
1981-82	71.6	65.3	77.7	102.5	54.5
1982-83	80.7	75.3	87.9	122.8	61.8
1983-84	81.8	60.0	81.1	107.1	60.2
1984-85	86.2	62.5	83.9	110.7	62.9
1985-86	102.1	81.0	96.0	155.2	74.5
1986-87	115.7	86.2	107.0	187.7	85.4
1987-88	117.7	87.6	100.5	164.0	88.1
1988-89	105.8	85.2	132.9	217.8	79.7
1989-90	113.2	89.7	145.5	243.5	92.3
1990-91	112.5	89.5	142.4	235.3	86.8
1991-92	112.3	89.6	133.0	231.0	86.7
1992-93	121.6	108.9	151.3	270.2	95.7
1993-94	125.6	97.8	153.0	245.1	98.2
1994-95	125.6	102.6	164.7	237.9	98.6
1995-96	141.1	116.1	167.8	287.6	111.3
1996-97	132.7	112.4	158.8	203.2	106.2
1997-98	140.6	119.5	184.1	201.7	114.3
1998-99	133.8	108.2	176.9	175.9	111.9

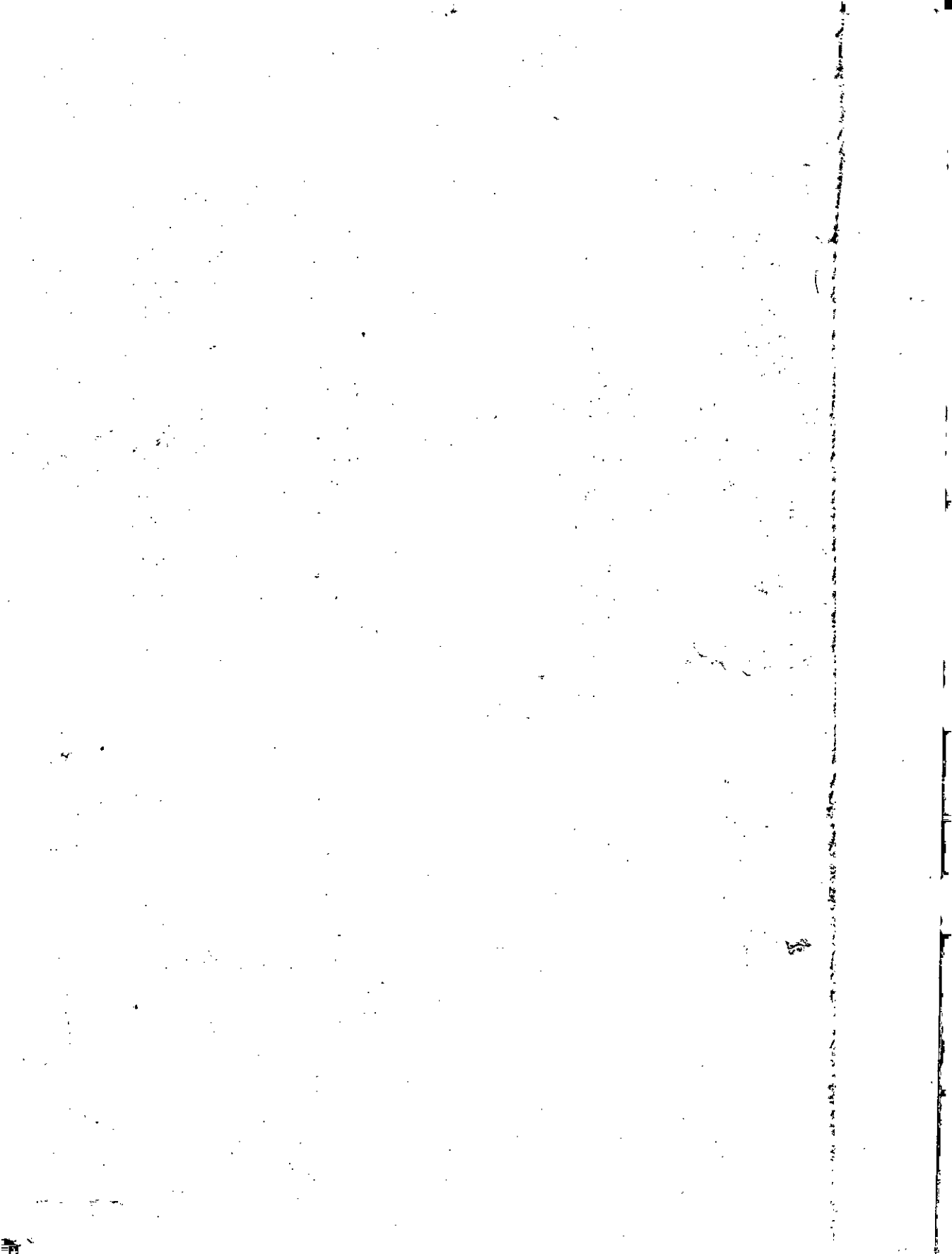
Sources:

- i) Agricultural Statistics of Pakistan, 1997-98, MINFAL, Islamabad for crop area.
- ii) Pakistan Fertilizer Related Statistics, September 1998, NFDC, Islamabad for the fertilizer off-take data.

Table-31: Use of Pesticides in Pakistan: 1980 to 1998

Year	Import	Local formulation	Total quantity	Value
1980	-	-	665	39
1981	-	-	3,677	213
1982	3,552	1,448	5,000	320
1983	4,875	1,713	6,588	629
1984	6,081	3,132	9,213	2,256
1985	8,270	4,260	12,530	2,249
1986	8,834	5,665	14,499	2,978
1987	8,019	6,829	14,848	3,259
1988	6,256	6,816	13,072	2,334
1989	6,869	7,738	14,607	3,642
1990	7,502	9,941	17,443	4,561
1991	6,157	14,056	20,213	5,535
1992	6,691	16,748	23,439	6,554
1993	6,128	14,151	20,279	5,384
1994	10,693	14,176	24,869	5,808
1995	20,134	13,239	43,373	7,273
1996	24,151	19,068	43,219	9,987
1997	24,168	13,836	38,004	8,611
1998	22,765	18,081	40,846	6,960

Sources: Department of Plant Protection, Karachi.



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1. Manuscripts of articles, comments and reviews should be in English only and sent in triplicate preferably accompanied with 1.44 MB diskette in MS Words to the Chief Editor, Pakistan Journal of Agricultural Economics. Comments and Reviews should be submitted alongwith two copies of relevant book or paper.
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