SOME ASPECTS OF AGRICULTURAL PRICE
AND
TAXATION POLICIES IN PAKISTAN

SARFRAZ KHAN QURESHI
SOHAIL JEHANGIR MALIK
AHMED NAEEM SIDDIQUI

Kalbe Abbas, Ejaz Ghani and Zeb-un-Nisa

September 1985

CONVENOR, RESEARCH REPORT COMMITTEE

Dr. M. Ghaffar Chaudhry

C O N T E N T S

LIST OF TEXT TABLES

Chapter I

I N T R O D U C T I O N

Despite theoretical arguments against government intervention
in the pricing of agricultural commodities and inputs, most developing
countries actively distort agricultural prices and maintain a wide
divergence between relative domestic and relative world market prices.
This distortion almost invariably involves the taxation or subsidization
of one or more agricultural commodities and/or agricultural inputs. Since
the commodities and inputs affected by government price intervention
are often of great importance to a country's production, consumption,
income and trade flows, the impact of the price intervention can be
large and pervasive and may have important implications for public resource
mobilization, incentives to farmers, efficiency in resource allocation,
equity in the system and the rate of economic growth. A clear understanding
of the nature and the magnitude of the manifold effects of agricultural
price policy is of paramount importance to the policy-makers.

Like most other developing countries, Pakistan also has a complex
system of agricultural taxes, input subsidies, government monopoly trading
and price-setting arrangements. The objectives behind this wide array of
policy instruments and the impact that these policy instruments may have
had on the economy is an important area of enquiry. Despite the importance
of this subject, not many studies have emerged.[1]   The main purpose of the

---

[1] The most well known studies on this subject are:1) Gotsch, C. and G.Brown,
   Prices, Taxes and Subsidies in Pakistan Agriculture, 1960-70, World Bank
   Staff Working Paper No. 387, April 1980 and 2) Cheong Kee-Cheok and
   Emmanuel H.D'Silva, Prices, Terms of Trade, and the Role of Government in
   Pakistan's Agriculture, World Bank Staff Working Paper No. 643.

present study is to elucidate some of the effects of the agricultural pri
policy, provide an empirical basis for further work in this important fie
of research and   suggest a package of changes required in the mix of
existing levies on agriculture to achieve the ends of public policy.

Organization of the Study

An important objective of the price policy is to achieve a desir
pattern of income distribution and to reduce the incidence of poverty to
level deemed desirable by the policy-makers. The discussion begins with
brief overview of the performance of Pakistan's economy as it has affecte
the incidence of poverty and relative inequalities of income in the rural
areas. Because of the complex nature of the relationship between public
policies and the distributional parameters, it was not possible to measur
the contribution of different policies on distribution of income. Never-
theless the crucial role of agricultural policies in bringing about a
certain pattern of income distribution deemed desirable is clearly
brought out.

Chapter III presents an extended discussion of changes in the
domestic incentives facing farmers in Pakistan since mid 1950s. Barter,
single factoral and income terms of trade for the period 1951/52 to 1983/
are computed and analysed. The impact of changing incentives on aggregat
farm output, intersectoral distribution of income and resource use
efficiency is also briefly traced. Chapter IV deals with the changing
levels of prices, costs and income from different agricultural crops.

In a situation where a government sets specific targets of production for different crops, empirical knowledge about the relationship between costs, prices and income accruing from different crops is an essential piece of information for a policy-maker. Chapter V reviews the evidence in Pakistan regarding the responsiveness of farmers to changes in relative prices between different agricultural commodities and between agricultural and non-agricultural commodities.

Chapter VI examines the issue of intersectoral tax equity and presents the estimates and analysis of relative tax burden on the agricultural and non-agricultural sector. The broad objective is to test the hypothesis that the farm sector in Pakistan is under-taxed.

Chapter VII raises the question as to whether the price and tax policies that are consistent (or inconsistent) with resource use efficiency and equity are also consistent with the government objective of raising resources for financing development. Net fiscal burden of the plethora of taxes and subsidies on farmer-producers are estimated. The results indicate growing difficulties for resource mobilization through the prevailing system of taxes and subsidies. Chapter VIII evaluates the existing land tax system and indicates the possible improvements in the design of the tax that would simultaneously generate revenue and promote agricultural development. The policy implications are indicated in each chapter but are summarized again in the concluding chapter.

CHAPTER II

RURAL INCOME DISTRIBUTION AND POVERTY:
A REVIEW OF EMPIRICAL EVIDENCE

1. INTRODUCTION

It is a commonly held b_.ief following Simon Kuznets and other scholars, that economic growth in its initial stages leads to greater inequalities in income distribution. Empirical verification for this can be found amongst other sources in the work of Ahluwalia $\underline{/}$ 3 $\underline{/}$. This chapter presents a survey of existing evidence on rural income distributic and poverty in Pakistan. The analysis is aimed at highlighting the changes in rural income distribution and poverty over time. The following section presents an appraisal of the data used in studies on income distribution and poverty. The third section presents a review of evidence on rural income distribution while the fourth section is concerned with evidence on rural poverty. The fifth section presents the main conclusions of this survey.

2. A REVIEW OF DATA

Most of the studies on Income Distribution and Poverty in Pakistan are based on the periodic Household Income and Expenditure Survey conducted by the Statistics Division of the Government of Pakistan. The results of the first major survey available in printed form pertain to the year 1963-64. Survey results are also available in printed form for the years 1966-67, 1968-69, 1969-70, 1970-71, 1971-72 and 1979. Surveys were also conducted for the years 1959-60, 1964-65, 1965-66 and 1967-68. However, these pertained to either the rural sector or the

urban sector only or covered only the income and expenditure for a portion of the year. The results of the 1967-68 survey were not compiled. The published statistics from these surveys provide information on the incomes and expenditures of households within various income categories. The three major inadequacies of the Household Income and Expenditure Survey data as summarized by Kemal ·/ 44_/ are listed below.

The small sample size makes the measurement of income inequalities imprecise, especially in view of the large sampling errors associated with thinly populated income groups. This problem particularly affects the upper income groups where the number of observations is very small and thus the incomes of the highest income categories are understated. This problem was first highlighted by Bergan /̄ 11 _/ and is clear from a comparison of blown up figures for gross national product based upon these surveys and the national accounts data. The figures from the Household Income and Expenditure Surveys are consistently smaller.

The second major problem is that of non-response and this problem is severest in the highest and lowest income categories. Thus measures of income inequality based on these data would understate the true reality. The incomes of the highest income groups are further understated because corporate savings (retained earnings) are not defined as earnings in these surveys.

Azfar /̄ 9 _/ tried to adjust for the understatement of incomes of the highest income groups by splicing the survey data with information on the size distribution of farms by types of

irrigation and tenure. He did this because income tax data are no available for the rural sector as agricultural incomes are not taxed in Pakistan. Even if income tax data were available, as is the case for the urban sector, the problems of tax avoidance and tax evasion would render such an exercise ineffectual. This fact and the restrictive assumptions used by Azfar $\int$ 9 $\int$ led Ayub $\int$ 7 $\int$ to conclude that not much could be gained through the splicing of the survey with other data.

These inadequacies of the Household Income and Expenditure Survey need to be borne in mind when evaluating the evidence on rural income inequalities and poverty.

3.   RURAL INCOME INEQUALITIES:

There have been a number of studies done to-date to estimate rural income inequalities in Pakistan. The studies by Bergan $\int$ 11 $\int$, Azfar $\int$ 9 $\int$, Suleman $\int$ 85 $\int$, Khandekar $\int$ 47 $\int$, Nasim $\int$ 62 $\int$, Allauddin $\int$ 5 $\int$, Ayub $\int$ 7 $\int$, Sadiq $\int$ 81 $\int$ and Faiz $\int$ 22 $\int$ present estimates of the gini-coefficients for the rural sector in Pakistan.

Bergan's $\int$ 11 $\int$ study is based upon the 1963-64 Household Income and Expenditure Survey Data. He rearranged the data by deciles and computed gini-coefficients for both the rural and urban sectors of Pakistan. He estimated the value of the gini-coefficient for the rural areas to be 0.357. The estimated gini coefficient for the urban areas was higher at 0.430 while the value of the rural and urban areas combined was

0.381. These values Bergan $/^-$ 11 $_J$ found to be smaller than **those** for other developing countries but noted that these could be the result of errors in the data that could have biased the inequality measure downwards.

Azfar $/_$ 9 $_J$ adjusted the 1966-67 Household Income Expenditure Survey data by computing the incomes in the highest income groups from alternative sources. He found the gini-coeffici for personal income in the rural areas to be 0.334, which shows a decline in income inequality when compared with Bergan's results fi 1963-64. However since the data used in the two studies are not completely comparable, it is difficult to state categorically that there was a decline in rural income inequality. There is contrary evidence in the study by Suleman $/^-$ 85 $_J$,that shows an increase ir income inequalities over the period 1963-64 to 1968-69. Suleman $/^-$ 85 $_J$ aggregated the income categories reported in the Household Income and Expenditure Surveys into six major groups. level of aggregation does not seem ideal for studying changes in income inequalities.

The study by Khandekar $/^-$ 47 $_J$ presents gini coefficient for household income, income per capita and per earner for the ye 1963-64, 1966-67 and 1968-69. The estimates of the gini-coeffici for the rural sector show a decline in rural income inequalities the basis of all three ratios over this period. These results ca serious doubt on the results of Suleman's $/^-$ 85 $_J$ study and indicate that the increase in rural income inequality reported b. him could be due to the aggregation of data into a limited number categories.

The studies by Ayub $\begin{bmatrix} 7 \end{bmatrix}$, Sadiq $\begin{bmatrix} 81 \end{bmatrix}$ and Allauddin $\begin{bmatrix} 5 \end{bmatrix}$
extended the period of analysis of the earlier studies and reported
gini-coefficients for the years 1963-64, 1966-67, 1968-69, 1969-70, 1970-71
and 1971-72. The gini-coefficients for the income of rural areas show
a consistent decline during the 1960s right up to 1970-71. However the gini-
coefficients for the 1971-72 in all three studies show an increase over the
previous period.

In all the studies reviewed, urban income inequalities are higher than
rural income inequalities. An interesting feature of these studies is that t
computed values of the gini-coefficients based upon the same data differ fro
study to study. Kemal $\begin{bmatrix} 44 \end{bmatrix}$ asserts that this could be due to the use of
different formulae by these authors.

There are studies, for example Naseem $\begin{bmatrix} 62 \end{bmatrix}$ and Allauddin $\begin{bmatrix} 5 \end{bmatrix}$
that present inequality measures for expenditure also. The trends in
expenditure inequalities are however, similar to those for incomes. However,
it is noticed that expenditures are more equally distributed than incomes.

Faiz $\begin{bmatrix} 22 \end{bmatrix}$ in a recent unpublished study presents rural income
concentration ratios for a number of years from 1959 to 1979 based upon the
same Household Income and Expenditure Survey data. These are reproduced in
Table 1. A perusal of this table confirms the results of earlier studies.
Rural income inequalities declined both on a per household and per capita
basis upto 1970-71. However rural income inequality appears to have increase
in the 1970s.

The decline in the rural income inequalities during the period of

TABLE II.1

RURAL INCOME CONCENTRATION RATIOS FOR VARIOUS YEARS

YEARS	Income Concentration Ratio Based on	
	Household Income	Per Capita Income
1959	0.348	0.228
1961	0.357	0.203
1963-64	0.348	0.223
1966-67	0.319	0.186
1968-69	0.294	0.161
1969-70	0.295	0.161
1970-71	0.291	0.146
1971-72	0.308	0.164
1979	0.318	0.184

SOURCE: /̲ 22 ̲/ estimates based on Household Income and Survey.

the 1960s coincides with the green revolution period in Pakistan, which
marked a period of remarkable growth in the agriculture sector from the mid
to late years of that decade. A review of literature connected to the green
revolution phenomenon in Pakistan reveals a lack of concensus amongst
researchers as to how the gains from this growth were distributed. A
considerable body of researchers have maintained that the green revolution
led, in one way or another, to a worsening of income inequalities. This
view is in direct contrast to the evidence of a reduction of income inequalities
in the rural sector presented by the studies of income distribution revie-
wed above. The studies by Gotsch $/\ 33\ 7$, Falcon $/\ 23\ 7$, Pearse $/\ 76\ 7$,
Alavi $/\ 6\ 7$, Griffin $/\ 34\ 7$ and Khan $/\ 46\ 7$ however, maintain
that the green revolution in one way or another, led to a worsening of income
inequalities. The arguments put forward by these studies are based upon
the premise that the green revolution technology is indivisible and hence only
the large and financially secure farmers could employ it and partake of
the gains from it. It is maintained that the increased profitability in
agriculture led the large farmers to increase the size of their holdings
and take up self cultivation. This not only increased the incomes of the
richest classes but also reduced the incomes of the poorest tenant farmers
who were evicted in the process. However none of these studies has presented
any substantive empirical evidence to support their arguments.

The studies by Kaneda $/\ 41\ 7$ and Chaudhry $/\ 16\ 7$ have argued
that the green revolution technology is divisible because the small farmer
can use the services from tubewells and tractors without having to make the
capital outlay to acquire them. Moreover, because the small farmers are more
productive than the larger farmers, the green revolution technology should
decrease income inequality. Chaudhry $/\ 16\ 7$ has hypothesised that the
green revolution can affect income distribution in three ways. It can lead
to a change in the composition of the size structure of farms, it can have

a differential impact upon productivity across different farm sizes and it
can effect income distribution via the demand for labour. Chaudhry /¯16_7
has presented evidence from a number of sources on each of these aspects to
substantiate his hypothesis that the green revolution led to a reduction
in rural sector income inequalities in Pakistan.

Chaudhry /¯16_7 has used data from the Agricultural Censuses to
show that land concentration actually declined over the 1960s based upon a
comparison of land concentration ratios from the 1960 and 1972 censuses.
Faiz /¯22_7 has recently extended the analysis by Chaudhry to include
evidence from the 1980 census. Table II.2 presents cumulative land shares
and land concentration ratios based upon the three agricultural censuses . A
perusal of Table II.2 reveals that while Chaudhry's /¯16_7 contention of
a decline in land concentration is borne out by a comparison of the ratios
for 1960 and 1972, the data show an increase in land concentration when
comparing 1972 with 1980. This is in line with the evidence of an increase
in the 1970s presented earlier.

There is evidence, for example the Planning and Development
Statistical Surveys /¯68_7 and Azam /¯8_7, to show that fertilizer use in
particular and modern input use in general was quite common amongst small
farmers as a result of the green revolution. Chaudhry /¯16_7 has
presented evidence to show that while the utilization of tractors, tubewells
and fertilizers etc., was higher in large farms, the growth in the utiliza-
tion of these inputs was much higher in the small farm sector. This had its
effect on the growth of incomes in small farm sector. Chaudhry /¯16_7
finds a strong inverse relationship between farm size and productivity, and
that productivity differences between small and large farms widened over
time. Using Family Accounts and Farm Budgets data for cultivators in the
Punjab collected by the then Punjab Board of Economic Enquiry to compute

TABLE II.2

PERCENTAGE LAND SHARES IN PAKISTAN FOR SELECTED YEARS

Percentage of Farms	Cumulative Land Shares for:		
	1960	1972	1980
Lowest 10 percent	0.46	0.88	0.72
" 20 "	1.44	3.02	2.38
" 30 "	3.00	6.07	5.32
" 40 "	6.00	10.60	9.68
" 50 "	9.72	16.09	14.97
" 60 "	15.79	24.41	22.78
" 70 "	24.91	32.75	30.86
" 80 "	36.68	44.88	42.88
" 90 "	53.76	59.14	57.52
ALL FARMS	100.-	100.-	100.-

Land Concentration Ratios			
1) Farm Area basis	0.62	0.54	0.55
2) Cultivated Area basis	0.58	0.47	0.50
3) Cropland Area basis	0.53	0.42	0.45

Sources: / 22 / estimates based on data from Pakistan Censuses of
Agriculture, 1960, 1972, 1980.

farm incomes on the basis of revenues per acre, Chaudhry $\boxed{16}$ has shown that incomes on smaller farms increased more rapidly during the period of the green revolution. He has also shown, on the basis of the same data source that the incomes of tenant farmers grew at the much faster rate of 19.3 per cent per annum as compared to 15.2 per cent per annum for landlords and 13.3 per cent per annum for peasant proprietors.

Chaudhry $\boxed{16}$ has also presented evidence to show that the demand for labour actually increased during this period. He has presented data to show that real wages increased appreciably in the rural sector during this period. Although the reliability of this evidence cannot be directly tested because of the absence of data from other sources, given the higher intensity of labour use in the small farms and the higher rates of growth of output reported for this sector, it may be concluded that labour use would have increased over this period.

The evidence reviewed so far suggests that rural income inequalities declined during the 1960s. However, there was an increase in income inequalities during the 1970s. In a study of survey data of 750 households in 8 villages of the Punjab, Sind and NWFP, published in 1984, Ercelawn $\boxed{21}$ has attempted to determine the sources of rural income inequality. He finds that the dominant source of income inequality was generally crop income. Wage employment, nonfarm enterprise and livestock were inequality-mitigating sources, and in two sample villages with substantial overseas migration, remittances accounted for the dominant share of overall income inequality. The study found that the major contributor to income inequality was unequal access to land and this accounted for the worsened relative income position of the landless. Poverty in the sample villages was found to be primarily borne by those with disadvantaged access to land.

4.   RURAL POVERTY

The review of studies on rural income inequalities reveals a declining trend during the 1960s and an increase in income inequalities during the 1970s. However, it should be borne in mind that the studies based upon the Household Income and Expenditure Surveys suffer from the data problems associated with the large sampling errors in the highest income category arising out of the small coverage of this category in the surveys. Moreover, a decline in income inequality measured in terms of the gini-coefficients does not necessarily imply a decline in poverty as well. There have been a few studies done in Pakistan that focussed directly on the problem of poverty. The studies by Naseem $\underline{/}$ 62 $\underline{/}$, Allauddin $\underline{/}$ 5 $\underline{/}$, Mujahid $\underline{/}$ 60 $\underline{/}$, Wasay $\underline{/}$ 88 $\underline{/}$, Naseem $\underline{/}$ 63 $\underline{/}$, Irfan and Amjad $\underline{/}$ 37 $\underline{/}$ and Cheema $\underline{/}$ 17 $\underline{/}$ analyse the problem of poverty in Pakistan. The study by Wasay $\underline{/}$ 88 $\underline{/}$ was directed only at attempting to estimate a poverty line for the urban sector while the other studies evaluated the problem for both the urban and rural sectors or specifically for the rural sector and are therefore of direct interest to us.

The pioneering study by Naseem $\underline{/}$ 62 $\underline{/}$, on the basis of arbitrarily assumed poverty lines in terms of per capita annual expenditures of Rs.250 and Rs. 300 at 1959-60 prices, estimated the incidence of rural poverty in Pakistan for the years 1963-64 to 1969-70. The study by Allauddin $\underline{/}$ 5 $\underline{/}$ extended Naseem's work to the year 1971-72 and also presented estimates based upon a poverty line computed on the basis of per capita income as well as per capita expenditure. In addition to presenting estimates of rural poor on the basis of the two poverty levels arbitrarily determined by Naseem, Allauddin also presented estimates based upon poverty lines on the basis of Rs.225 and Rs.350 per capita expenditure and income. Since these poverty lines are arbitrarily determined, setting lines below and above those considered by

Naseem enables one to get an idea of the sensitivity of the results to the definition of the poverty criteria. Naseem found that the number of rural poor according to the lower poverty level decreased significantly, however, according to the upper level of poverty the numbers increased during the period of his study. In terms of the number of households his results indicated a decrease in poverty in terms of the lower criterion and nearly constant proportions in terms of the upper criterion. Allauddin came to similar conclusions. However, she has shown that the estimates of the poor are sensitive to the determination of the poverty criterion. For example, although rural poverty seems to have declined on the basis of the Rs.250 per capita per annum consideration of the Rs. 350 criterion indicates an increase in rural poverty. The estimates from Allauddin's study in terms of real expenditure and real incomes are presented in Tables II.3 and II.4. A perusal of these tables reveals that the poverty problem is much more severe when considered in terms of real income. It can be seen that the percentage of rural population classified as poor is greater at the lower defined levels of poverty in terms of real income as compared to real expenditures in nearly all cases. Allauddin also computed calorie intakes for the urban and rural sectors. She found that while calorie intake in the rural sector was higher it declined over the period of her study from an average of about 1988 calories to 1898 calories. The calorie intake in the urban sector, however, remained constant at about 1700 calories.

The implicit assumption underlying the studies by Naseem and Allauddin that the income or expenditure of each individual in each income category is equal to the average for that category has been seriously challenged by Mujahid /̄ 60 _/. He uses linear interpolation of the grouped data to come up with results that are in complete contrast to those obtained by Naseem and Allauddin. For example he finds that the incidence of poverty is comparatively

TABLE II.3

INCIDENCE OF POVERTY IN RURAL AREAS IN TERMS OF REAL EXPENDITURE

Numbers in Millions

Years	Number of Poor Persons Corresponding to Poverty Lines of				Percentage of Rural Population Classified as Poor Corresponding to Poverty Lines of			
	Rs.225	Rs.250	Rs.300	Rs.350	Rs.225	Rs.250	Rs.300	Rs
1963/64	9.97	16.53	23.20	31.83	26.0	43.1	60.50	83.
1966/67	6.15	13.13	24.49	32.86	15.0	32.0	59.7	80.
1968/69	4.19	10.76	26.37	31.66	10.0	25.1	61.5	75.
1969/70	-	11.40	26.18	32.14	-	26.0	59.7	73.
1970/71	-	4.15	24.59	36.70	-	9.3	54.8	81.
1971/72	0.09	8.82	26.83	40.16	0.2	19.1	58.4	87.

Source: Allauddin /⁻5 /.

TABLE II.4

INCIDENCE OF POVERTY IN RURAL AREAS IN TERMS OF REAL INCOME

Numbers in Millions

Years	Number of Poor Persons Corresponding to Poverty Lines of				Percentage of Rural Population Classified as Poor Corresponding to Poverty Lines of			
	Rs.225	Rs.250	Rs.300	Rs.350	Rs.225	Rs.250	Rs.300	Rs.350
1963/64	12.86	21.66	25.83	30.69	33.5	56.5	67.4	80.0
1966/67	6.93	12.65	20.01	25.19	15.6	30.8	48.8	61.4
1968/69	9.97	15.81	27.37	32.84	23.2	36.9	63.8	76.6
1969/70	9.19	15.62	26.79	35.89	21.0	35.6	61.1	81.8
1970/71	5.22	12.82	26.99	35.53	11.6	28.6	60.1	79.2
1971/72	8.87	19.10	29.77	39.99	19.3	41.6	64.8	87.0

Source: Allauddin / 5 /.

lower in the earlier years than reported by the previous studies. Also the earlier studies reported a decrease in rural poverty over time. Mujahid found that rural poverty had in fact increased. A comparison of Mujahids results with those of Allauddin on the basis of per capita income are presented in Table II.5.

In a later study into rural poverty Naseem $\underline{/}$ 62 $\underline{/}$ has estimated the poverty line on the basis of pooling cross-section and time-series data for five years for which data were available and regressing average per head calorie intake on average per head total monthly expenditure. Two types of problems arising out of this method have been highlighted by Irfan and Amjad $\underline{/}$ 37 $\underline{/}$. The first relates to the implicit assumption that the intercept and slope are constant across different cross-sections and the second to the fact that to the extent that the share of food in total expenditure varies inversely with the income of the household the regression equation embracing all households would tend to overestimate the poverty line. Naseem's estimates of rural poverty based upon three lines of 95 percent of minimum, 92 percent of minimum and 90 percent of minimum requirements of 2100 calories are presented in Table II.6. An important feature of the data in Table II.6 is that it shows an increase in rural poverty during the 1970s.

In a recent study of rural poverty in Pakistan, Irfan and Amjad $\underline{/}$ 37 $\underline{/}$ have used the basic caloric requirement of 2550 calories per day per adult computed by Khan and Khan $\underline{/}$ 49 $\underline{/}$ for determination of the poverty line. They converted household size by membership into adult equivalents on the basis of nutritional scales

TABLE II.5

RURAL POVERTY ESTIMATES BASED ON PER CAPITA INCOME PER ANNUM

(Per Cent)

Year	Below Rs.225	Below Rs.250		Below Rs.300		Below Rs.350
	(Talat,1975)	(Talat, 1975)	(Mujahid, 1978)	(Talat, 1975)	Mujahid, 1978)	Talat,1975
1963/64	33.5	56.5	29.2	67.4	41.6	60.0
1966/67	15.6	30.8	40.6	48.8	55.8	61.4
1968/69	23.2	36.9	-	63.8	-	76.6
1969/70	21.0	35.6	39.5	61.1	52.6	81.8
1970/71	11.6	28.6	-	60.1	-	79.2
1971/72	19.3	41.6	-	64.8	-	87.0

Sources: Talat Allauddin /‾ 5 ‾/ and Mujahid /‾ 60 ‾/.

TABLE II.6

ESTIMATES OF RURAL POVERTY BASED ON MINIMUM NUTRITIONAL REQUIREMENTS

(Per Cent)

Year	Below Poverty Line I (95% of minimum of 2,100 calories)		Below Poverty Line II (92% of minimum of 2,100 calories)		Below Poverty Line III (90% of minimum of 2,100 calories)	
	House-holds	Popu-lation	House-holds	Popu-lation	House-holds	Popu-lation
1963/64	79	72	62	54	54	45
1966/67	73	64	63	52	55	44
1968/68	74	64	63	53	56	46
1969/70	76	68	56	46	45	36
1970/71	79	71	58	47	48	38
1971/72	82	74	65	55	54	43

Source: Naseem /‾ 63 ‾/.

depicting caloric requirements of different age groups. The authors
have used the 1979 Household Income and Expenditure Survey. Their
study, however, suffers from a deficiency. Because of the non-
availability at the time of analysis, of data on quantities of food
items consumed in 1979, they have used the 1971-72 survey data to
arrive at food expenditures per adult. Cheema $\underline{/}$ 17 $\underline{\_/}$ has
in a recent unpublished paper adjusted for this deficiency by using
data on quantities of food items consumed based on the 1979 survey.
These data were made available after the study by Irfan and Amjad.
The main results of Cheema's $\underline{/}$ 17 $\underline{\_/}$ study are reproduced in
Table II.7. It is difficult to compare these results with those
obtained by the earlier studies because of the differences in the
methodology employed to construct the poverty line. Cheema's
estimates show that nearly 39 percent of the rural population and
over 35 percent of the rural households can be classified as poor.
The percentage distribution of poor population by provinces reveals
that over 62 percent of the poor reside in the Punjab Province. It
should be borne in mind that the Household Income and Expenditure
Survey of 1979 did not cover a major portion of the NWFP. This would
lead to a serious under estimation of the poor in NWFP in particular
and the country in general.

5. CONCLUSIONS

There are serious data problems and differences in
methodologies that make the comparison of results across studies
difficult. The general patterns that emerge are a tendency
towards a reduction in income inequalities during the green

TABLE II.7

INCIDENCE OF RURAL POVERTY BASED ON HOUSEHOLD AND POPULATION -1979

Provinces	Incidence of Poverty Based on Rural Households			Incidence of Poverty Based on Rural Population		
	Percentage Distribu- tion of All Households	Poor House- holds as Per- centage of Total	Percentage Distribu- tion of Poor Households	Percentage Distribu- tion of Population	Poor Popula- tion as Per- centage of Total	Percentage Distribu- tion of Poor Population
Punjab	60.67	36.95	63.82	59.70	40.60	62.29
Sind	17.64	33.66	16.91	18.54	39.48	18.81
N.W.F.P	15.64	29.94	13.32	15.90	31.71	12.96
Baluchistan	6.05	34.55	5.95	5.86	39.47	5.94
ALL PROVINCES	100	35.13	100	100	38.91	100

Source: $\underline{/}$ 17 $\underline{/}$ Based on data from Household Income and Expenditure Survey 1979 $\underline{/}$ 68 $\underline{/}$.

revolution period followed by an increase in income inequalities during the 1970's. The patterns in rural poverty reveal an increase during the 1960's followed by a decrease during the 1970's. It should be borne in mind that Mujahid's study $/^- 60 \_/$which revealed an increase in poverty,was based upon an adjustment of the basic data. Moreover the determination of the poverty line is crucial to the estimates of the numbers of poor.

The dominant source of income inequality was generally found to be crop income. Wage employment, non-farm enterprise and livestock were found to be inequality-mitigating factors. Remittances from overseas migrants were responsible for some alleviation of poverty. However, these could also have been serious contributors to income inequality.

CHAPTER III

**DOMESTIC TERMS OF TRADE AND PUBLIC POLICY
FOR AGRICULTURE IN PAKISTAN**

Despite the critical role of intersectoral terms of trade for a
host of public policy issues, the official statistical system in Pakistan
is not designed to generate a statistical series of the terms of trade of
the agricultural sector on a regular basis. A number of views expressed
on Pakistan's agriculture appear to be based either on results of diverse
studies that are now outdated or on a complete neglect of empirical
evidence. This chapter analyses existing data that could be processed to
calculate the terms-of-trade indices. An attempt is made to bring
together the existing information on the movement of terms of trade for
the agricultural sector for the period 1951/52 to 1983/84. The impact of
changes in terms of trade on farm output, distribution of income and the
efficient use of resources is also traced.

2.   BRIEF REVIEW OF PREVIOUS STUDIES

A number of studies have been conducted in Pakistan about move-
ments in terms of trade of the agricultural sector $\underline{/}$18,31,43,54,55 $\underline{/}$.
Since there are considerable methodological differences, it would be
useful to briefly review these studies. Two distinct categories of
studies can be identified: (a) those studies which examine the movements
in intersectoral terms of trade by computing implicit price indices from
the national accounts data; and (b) those studies which evolve a set of

weignts for different items traded between the agricultural and non-agricultural sectors. The study by Cheong and D'Silva /18/ falls in the first category while all the remaining studies belong to the second category.

Studies belonging to the first group are not demanding regarding the basic data. Publ hed National accounts data and/or published indices of wholesale prices for agricultural and industrial goods are used to discern the trends in terms of trade. Cheong and D'Silva work out the terms of trade by using the estimates of GDP at factor costs at current prices originating in the agricultural and manufacturing sectors and their corresponding estimates at constant prices[1]. The terms of trade worked out from GDP deflators suffer from serious limitations. The weights attached to different commodities are on the basis of production and not on the basis of marketed quantities of intersectoral sales and purchases. Furthermore, the commodities included in the analysis are not the ones actually traded between the agricultural and non-agricultural sector but are inclusive of many commodities which are in fact not traded between the two sectors. On these grounds, the findings regarding the terms of trade may be biased and may not reflect trends in relative prices.

The second group of studies attempts to rectify the limitations inherent in the study by Cheong. The pattern of trade is identified to include most major products and weights are estimated on the basis of the best available information regarding the sales and purchases of a

[1] The net barter terms of trade of the agriculture sector are computed by dividing the GDP deflator of the agricultural sector by the GDP deflator of the manufacturing sector.

sector for which terms of trade are computed. The studies by Lewis and
Hussain $\underline{/}$ 55$\underline{/}$, Lewis $\underline{/}$54$\underline{/}$ and Gotsch and Brown $\underline{/}$31$\underline{/}$ are identical in resp
of the   selection of commodities, choice of weights and use of prices.
The study by Kazi $\underline{/}$43$\underline{/}$ uses the same concept of prices but differs in
the way weights are assigned to different commodities and in the coverage
of commodities in the intersectoral trade.

The commodity coverage of the prices paid indices computed by
Lewis was spread over three functional groups of consumption goods,
intermediate and related goods and investment and related goods. The
number of items in groups identified above were respectively 14, 7 and 6.
Since no information on intersectoral trade was available, Lewis
estimated the value of intersectoral transactions through an indirect
method. He derived the value of intersectoral transaction by estimating
the availability of different commodities and apportioning it between
the two sectors on the basis of different assumptions about the absorption
of different commodities in two sectors. The net availability was
defined as domestic supply plus imports minus exports. The absorption of
consumption goods in the agricultural and non-agricultural sectors was
determined by different assumptions about the consumption pattern of
agricultural and non-agricultural population. The alternative assumptions
were equal per capita expenditure, 10%, 25% and 40% less expenditure on
non-agricultural consumption goods in the rural areas as compared with
urban areas. For the intermediate and investment goods, a smaller share
was allocated to the agricultural sector as bulk of such goods is assumed
to be absorbed in the urban industrial sector and in public projects.

The weights computed by Lewis were based on estimated production, sales and purchases for 1959/60. All terms of trade indices are thus representative of trends of relative prices of bundles of good transacted in 1959/60. Lewis had computed the terms of trade indices on the basis of of a number of alternative weighting schemes and found that the results were robust and the basic trends were insensitive to substantial variations in the weights[2]. This finding is extremely important as a fixed base index with base year weights soon runs into difficulty as it does not capture the effects of the changing composition of trade on the price indices.

Kazi finds three problems with Lewis's method of analysis. First, she argues that Lewis's weighting schemes were based on arbitrary assumptions about the absorption of goods in different sectors. Second, she objects to the inclusion of some investment and investment related goods on the ground that they are unlikely items for purchase by agriculture. Third, she points out that Lewis ignores items purchased by agriculture from the non-agricultural sector that are not produced by the large scale industrial sector. Expenditure on gas and electricity are cited by her in this regard.

---

[2] The robustness found by Lewis for his method of analysis also obtains for the extended period of analysis to 1983/84. For details, the reader is referred to the Annexure to this chapter. For a ready reference on this point in the case of two alternative weighting schemes, the reader may see Table 3.1. It would be extremely useful to extend the analysis using a recent year's pattern of intersectoral sales and purchases as weights for the terms of trade. Unavailability of basic data is the main factor explaining our decision not to pursue the ideal course but to stick to Lewis's weights. The assumption that rural per capita expenditure on most commodities is 25% less as compared to urban per capita expenditure is supported by the evidence for 1979 from the Household Income and Expenditure Survey. However, the important point to remember is that a wide variation in the weighting scheme does not change the pattern of movement of terms of trade for the agricultural sector.

Before we examine the contribution made by Kazi, it must be pointed out that she has correctly identified the problems with Lewis's analysis but has not dealt with these problems very adequately. Using the Household Income and Expenditure Survey data on consumer expenditure and National Accounts data on the value of production of some agricultural and non-agricultural intermediate goods, she estimates the weights for different items for 1967/70. Like Lewis, she uses index numbers of wholesale prices as price indicators.

Derivation of weights on the basis of consumer expenditure entails a bias as has been shown in the case of India by Kahlon and Tyagi $/40\_7$. Such data are based on retail prices. The weights derived on the basis of final consumption estimates tend to over-estimate the share of those commodities where the difference between the retail and wholesale prices is large.

Kazi also faults by ignoring items of capital formation which were included, though in a somewhat crude manner, by Lewis in his computations. Since investment goods are becoming increasingly important in modernizing agriculture, this omission by Kazi is a serious one. The coverage of commodities for final use by agriculture was also narrower in Kazi's study. Our interest in the computation of terms of trade of agriculture is to get an idea of changing domestic incentives for the sector and in analysing the impact such incentives have on the agricultural economy. Inclusion of a large number of items for final consumption, intermediate use and capital formation in the prices paid indices is an absolute necessity. Since Lewis has an edge in this regard and his method of analysis was found to be

robust to a wide variation in weights, we use weights constructed by him for 1959/60 in the next section to trace the movements in relative prices for the agricultural sector for the period 1951/52 to 1983/84.

3. MOVEMENTS IN AGRICULTURE'S TERMS OF TRADE

The terms of trade of agriculture relative to the industrial sector are an indicator of the profitability of agriculture and of the purchasing power of agricultural income. The intersectoral terms of trade are determined jointly by changes in the supply and demand for goods and services entering in the intersectoral trade, by changes in a whole array of macro policies in areas of taxation, trade and monetary economics and by commodity-specific incentive price policies. In this section, we present information on trends in domestic terms of trade and give a brief account of the factors that may have influenced the rural-urban terms of trade.

There are many different concepts of terms of trade. Table 3.1 presents information on three types of terms of trade[3/]. All numbers are three-year moving averages that attempt to smooth the series from yearly fluctuations. Net barter terms of trade are measured in two alternative ways. For the prices paid by agriculture, estimated purchases are used in both alternatives while for the prices received by agriculture, alternative weights are based on marketings and gross output of different agricultural goods. The use of different weights changes the magnitude of movements but does not alter the general pattern of movements in terms of trade.

[3/] The reader is referred to the Annexure to this chapter, for details regarding the method of analysis.

TABLE III.1

TERMS OF TRADE FOR AGRICULTURE

Three Years Moving Average: 1951/52 — 1983/84

Years	Net Barter Terms of Trade		Income Terms of Trade	Single Factoral terms of Trade	Prices Received Relative to Prices Paid by Agricultural Sector of			Food Crops Relative to Cash Crops	Index of Agricultural Output (Base 1959/60)
	Alternative 1	Alternative 2			Consumption goods	Intermediate goods	Investment goods		
	1	2	3	4	5	6	7	8	9
1951-54	99.34	96.64	83.60	109.21	100.30	99.75	90.85	87.16	87.00
1952-55	91.60	91.59	81.86	102.07	90.78	95.62	92.93	94.88	89.67
1953-56	90.12	87.97	79.42	96.55	89.70	92.73	94.65	87.02	90.33
1954-57	94.16	91.17	82.78	95.83	96.08	92.12	92.74	84.62	90.67
1955-58	98.56	95.14	87.34	96.83	101.75	93.83	93.90	87.41	91.67
1956-59	100.64	98.16	92.25	97.18	104.63	97.29	95.45	92.22	94.00
1957-60	100.88	99.37	94.74	98.56	103.29	99.46	98.61	96.01	95.33
1958-61	103.44	103.11	102.44	99.39	105.23	102.21	104.06	98.43	99.33
1959-62	106.11	105.71	111.73	101.02	106.98	105.13	106.24	96.98	105.67
1960-63	107.99	106.80	116.60	102.20	109.66	106.66	105.39	93.44	109.33
1961-64	106.91	105.37	120.49	104.04	109.82	104.41	100.79	95.41	114.33
1962-65	105.93	106.98	126.40	107.58	109.14	104.34	98.00	96.44	118.00
1963-66	104.55	108.43	133.74	108.60	107.94	103.76	96.49	97.11	123.33
1964-67	104.46	113.60	146.01	115.47	107.51	105.71	96.11	106.33	128.33
1965-68	101.69	113.78	158.98	121.63	105.12	103.44	90.57	124.69	139.67
1966-69	99.37	113.02	172.41	128.09	103.39	100.50	85.11	137.00	153.33
1967-70	96.61	109.33	186.16	138.25	103.13	96.26	78.63	136.25	170.33
1968-71	97.74	108.56	191.44	141.84	106.26	95.85	76.54	126.31	176.00
1969-72	99.42	110.38	199.79	146.46	109.05	96.07	77.67	123.56	181.00
1970-73	102.38	112.26	204.05	147.03	112.10	99.30	80.34	120.73	181.67
1971-74	108.67	118.56	224.50	156.33	117.52	109.52	83.81	121.16	189.00
1972-75	109.72	121.17	230.84	156.79	117.96	119.59	77.48	127.64	190.33
1973-76	106.98	118.04	228.86	151.58	114.46	120.55	72.22	129.42	194.00
1974-77	108.84	114.77	225.23	145.85	108.92	124.77	68.71	126.06	196.33
1975-78	109.23	119.54	243.90	153.95	111.54	134.26	76.33	123.45	203.66
1976-79	111.69	119.12	257.38	150.96	113.65	140.11	75.56	118.90	210.33
1977-80	105.57	115.84	255.86	145.01	111.99	123.84	71.86	121.94	222.33
1978-81	95.87	103.98	244.03	131.87	108.20	100.01	63.86	117.53	235.66
1979-82	91.45	99.82	247.60	136.56	107.09	86.30	62.36	121.44	248.00
1980-83	92.36	99.41	256.81	134.69	107.60	84.22	66.07	83.15	258.33

FOOT NOTES:

1. Weights for prices received by agricultural sector are the marketings and gross value of output of each of the commodities for Alternative 1 and Alternative 2 respectively. Weights for prices paid by the sector are estimated purchase of non-agricultural commodities by the agricultural sector. The absorption of consumption is determined on the assumption that per capita consumption in agriculture is 25 per cent less than the non-agricultural sector. For the years 1951-54 to 1961-64, data series have been taken from Lewis and Mushtaq /_55_/. For the remaining years the series were updated using Lewis-Mushtaq methodology.

2. Income terms of trade were obtained by multiplying net barter terms of trade (Alternative 1) with an index of agricultural output. The index of agricultural output is published by the Federal Bureau of Statistics in its Monthly Statistical Bulletins.

3. Single Factoral terms of trade were obtained by multiplying net barter terms of trade (Alternative 1) with the Factor Productivity Index. The productivity index is taken from Wizarat /_91_/. An aggregate input index was calculated by weighting the labour index, livestock index and land index. The productivity index is obtained by dividing weighted input index by index of value added in agriculture.

4. Weights for prices received and prices paid are the same as given in note (1) for net barter terms of trade (alternative 1).

5. Weights for agricultural prices are the marketings of each of the commodities. Food crops consist of Rice, Wheat, Maize, Barley, Sorghum, Pulses, Potatoes and Onions whereas cash crops consist of Oilseeds, Cotton, Sugarcane and Tobacco.

Five distinct periods in the movements in the net barter terms of trade can be distinguished[4]. The first period from the year 1951/52 to the years 1954/57 was that of deterioration in the terms of trade when these terms declined by about 9 per cent. The partition of the subcontinent in 1947 had disrupted the pattern of trade of agricultural and manufactured goods. The areas that constituted Pakistan were surplus in agricultural goods and had exchanged these goods for manufactured goods from areas that became India. A relative glut of agricultural goods and scarcity of manufactured goods explain to a large extent the downward movement of terms of trade for the agricultural sector in this period. Trade policy, adopted in Pakistan to deal with the foreign exchange crisis, was an additional important factor for the movement of terms of trade against agriculture.

The second period from 1954/57 to 1965/68 was one of rising relative prices for the agricultural sector as the terms of trade showed an improvement of about 29 per cent over this period. The spurt in the agricultural output and a relative slow-down of the manufacturing sector output were responsible for an improvement in the terms of trade. The introduction of subsidies on some selected farm inputs and the fixation of support prices for a few major crops in the early 1960s were responsible for effecting an improvement in the barter terms of trade.

Increases in wheat and rice output as a result of the green revolution and the mounting bill for the treasury, on account of subsidy for farm inputs, had convinced the government of the need to moderate the price

[4] For a detailed analysis, see / 53.54,55,31/.

increases for crops and to reduce the level of subsidies on farm inputs. The slight downward trend in the net barter terms of trade noticed for the period 1965/68 to 1968/71 is a consequence of the government's efforts to force agriculture to share its productivity gains with the rest of the society.

The devaluation of the rupee in 1972 and increases in the rate of subsidies on farm input in the early 1970s had imparted an upward trend to the indices of the terms of trade. The improvement in the terms of trade,of about 10 per cent,between 1968/71 and 1975/78 can be explained

in terms of the changes in the rate of foreign exchange as well as adjustment of sectoral prices of agricultural inputs and outputs in response to changes in world prices. A deliberate policy of the removal of subsidies on farm inputs accompanied by an increase in the support prices for major crops has been in force since the late 1970s. The downward trend in the terms of trade since 1979 is, in part, a result of this deliberate policy choice. The examples given above,from the economic history of Pakistan illustrate the crucial role played by both macro economic policies and sectoral policy initiatives in the determination of trends in terms of trade.

Estimates of terms of trade at a more disaggregated level point to considerable differences in the pattern of price changes between consumption goods, intermediate goods and investment goods[5]. The prices of investment goods have risen relatively and, for most years, the terms of trade are adverse relative to 1959/60. The trends in

---

[5] It may be useful to note that the terms of trade for an entire sector, for selected groups of commodities, and intra-sectoral transactions address different analytical and policy issues.

terms of trade for intermediate goods and consumption goods are parallel to the overall sectoral terms of trade. The improvement in terms of trade for intermediate goods is higher than for consumption goods. The prices of food crops relative to those of cash crops show considerable variation through time. Relative food prices were low till 1965/68, rose and then again fell to a low level in 1976/79. A sharp rise in relative profitability for production of one type of crop relative to another category is also noted.

The trends in single factoral terms of trade are more or less parallel to the trends noted for the net barter terms of trade. The only difference is that the rise in single factoral terms was much sharper from 1963/66 to 1972/75.

The net barter terms of trade of the agricultural sector and of the food crop producers indicate incentives for agriculture and the food sub-sector respectively. The barter terms indicate that one group's benefits are the other group's losses and the extent of the loss/benefit is measured by the deviation from the unit level. The income terms of trade measure the purchasing power of a sector. The deviation from the unit level in the case of income terms of trade of a sector does not necessarily imply a worsening of the purchasing power of the rival sector.

The income terms of trade are defined as the ratio of value of sales by a sector to its average import price. Since no data series exist for the marketed surplus, we have measured the income terms as a product of net barter terms of trade and an index of agricultural output. The income terms of trade remained depressed till 1957/60 and show an

increasing trend afterwards. In fact, these terms register a decline for the period 1951/52 to 1955/56. The explanation of the trends observed in the income terms of trade lies in the movements of its two components, the net barter terms of trade and physical agricultural output. An increase in out.ut with no change in relative prices increases income terms, while a movement of the internal terms of trade against agriculture ceteris paribus reduces the income terms of trade. The agricultural sector was squeezed through the declining internal terms of trade during the 1950s. For the later years , the purchasing power of agriculture shows an increasing trend. This is mainly due to productivity gains of agriculture. Increases in physical agricultural output more than offset the impact of declining barter terms on the income terms of trade,for years identified above,when barter terms showed some declines.

4. SELECTED ASPECTS OF THE IMPACT ON RURAL ECONOMY

Active price intervention showing variation in form and intensity generates many critical policy issues. Some of these issues are: impact and role of price incentives on farm production, efficiency of resource use and distribution of income.

4.1 Price Incentives and Aggregate Farm Output

High prices, in theory, may have implications not only for efficient use of resources but can shift the production function upwards by price-induced technological and institutional innovations and infrastructural investment in rural areas. In order to examine the impact of terms of trade on farm output, the generally used linear

relation between the index of agricultural output, net barter terms of trade lagged by a year and supply shifter variables was estimated. The equation estimated for the period 1951/52 to 1983/84 is as follows:

$$Q_t = -13.72 + .75\ Q_{t-1} + .28\ P_{t-1} + 0.07\ Z_t + 1.12\ T$$
$$(-0.63)\quad (6.05)^{**}\quad (1.55)^*\quad\quad (2.80)^*\quad (1.40)^{**}$$

$$\overline{R} = 0.92$$

Where Q, P, Z and T are respectively an index of agricultural output, terms of trade, percentage of net sown area irrigated and time trend.

(Figures in the parenthesis are t-values of regression coefficients and (**) and (*) indicate coefficient significant at 1 and 10 percent level respectively).

The terms of trade have a positive effect on output. By the conventional significance criterion, the price coefficient is marginally significant. The short-run price elasticity of .18 and the long-run price elasticity of .72 calculated at mean values are in the range found for other developing countries.

The first shifter variable, the proportion of net sown area irrigated, captures the impact of price-induced technical change on farm output. The spurt in the installation of private tubewells, which began around 1959/60, has been attributed by some analysts to the profitability of additional water $\underline{/}$ 59 $\underline{/}$. The profitability of water was, in turn, linked with the pricing policy regarding both output and inputs of the agricultural sectors. Some analysts have demonstrated the link between the farm prices and public investment in agriculture $\underline{/}$ 14 $\underline{/}$. Higher prices for the agricultural produce increase the financial rate of return

on agricultural projects and justify increased allocations for the agricultural sector. The significant positive coefficient of the irrigation variable shows the importance of price-induced innovations.

The coefficient of the time-trend variable measures the impact of autonomous technical change on farm output. Without minimizing the role of price-induced innovations, it can be argued that basic scientific knowledge is weakly related with prices and has its own growth momentum. Its beneficial impact on farm output is evident from the significance of the coefficient of the time-trend variable in the estimated equation.

4.2. Trade Policy and Resource Use

The implication with respect to the allocation efficiency from the society's vantage point can be spelled out after we know the extent of correspondence of private signals transmitted to farmers with the short and long run social economic benefits and costs as measured by world border prices.

Gotsch and Brown /̄31_7 have documented the pervasive impact of trade interventions in distortions of incentives for the agricultural producers in Pakistan. The nominal and effective protection coefficients for major crops show domestic prices of most crops as being lower than the world prices. In the case of most industrial goods, the domestic prices are higher than the world prices. In this sense, Pakistani policy-makers have undervalued agricultural production. The disaggregated analysis by crops and by different time periods shows that incentives vary

rop and, for different crops, over time. The food crops were
d while export crops were taxed. Sugarcane, wheat and maize
ided considerable protection till about early 1970. Consider-
food self-sufficiency seem to have determined this policy
There is also a distinct break in the pattern of incentives
it 1972/73. The devaluation of the rupee in May 1972 had
the border prices. Abrupt and wide fluctuations in world commodity
ring the   1970s and 1980s have imparted instability to
of protection coefficients. Despite the instability observed,
movement of the protection coefficients of most crops
e value of one is evident during the last few years.

e evidence on the presence or absence of distortions arising
policy is only the starting point in the evaluation of
implications. The measurement of the cost of distortions in
conomic welfare is the next logical step. Research on
: is totally lacking in Pakistan. The estimation of demand
curves as a basic input in the measurement of consumer and
irpluses is the first requirement. The question of whether
much increased agricu˙ ural incomes and employment would
ed if world prices had been adequately reflected in
centives deserves a high priority for research.

ct on Distribution of Income

relationship between agricultural pricing policies and
n is complex and has neither been modelled adequately nor
ojected to detailed empirical enquiry. Some attention has

been given to the relative sectoral distribution issue and
of personal incomes while none or very little attention ha
to the impact of pricing policies on the regional distribu
income.

Agricultural prices determine the income of the f
affect the living standards of the people engaged in farmi
professions as agricultural commodities form an important
wage goods. A controversy rages among economists as to w
transfer of income takes place between sectors or between
agricultural producers and low-income urban and rural cons
Tyagi $\underline{/}$ 86 $\underline{/}$ has argued that in India high farm prices ha
income from urban areas to rural areas and that all groups
areas have benefitted from high farm prices. Ashok Mitra
believes that transfer has taken place from low-income urb
consumers to high-income agricultural producers. The limi
that we present for Pakistan provides some support to the
that the pricing policy has primarily resulted in intersec
of income.

The notion that high farm prices benefit the larc
hurt the landless labour and small farmers is based on two
(1) labourers depend on the market to purchase the wage gc
incomes of the wage labour and small farmers are independe
prices. The evidence we present below indicates that thes
do not hold in their pure form.

Table 3.2 shows sources from which rural households obtain wheat flour. The reliance on the market for wheat and wheat flour shows considerable variation between provinces and, within each province, between farm and non-farm households. Own farming and wages in kind are the dominant sources for wheat flour for farm households and for all households. Even in the case of non-farm households these two sources are important. High farm prices imply an automatic increase in income for the component accounted for by wages in kind and own farming. The assumption that income and farm prices are independent is clearly violated. The fact that percentage of flour obtained through market for all rural households is 25 per cent in Punjab, 24 per cent in Sind and 48 per cent in N.W.F.P. shows that dependence on market is not high.

TABLE III.2

PERCENTAGE DISTRIBUTION OF WHEAT FLOUR BY SOURCES
FOR TYPE OF HOUSEHOLD AND PROVINCE

Province	Type of Household	SOURCES OF WHEAT FLOUR				
		Own Farming	Wages in Kind	Open Market Wheat	Ration Flour	Open Market Flour
Punjab	All Households	55	12	18	8	7
	Farm Households	82	2	6	6	4
	Non-Farm Households	20	26	34	10	10
Sind	All Households	73	2	6	1	18
	Farm Households	89	–	4	1	7
	Non-Farm Households	7	9	16	–	68
N.W.F.P	All Households	42	11	1	–	47
	Farm Households	50	9	–	–	41
	Non-Farm Households	31	13	1	–	54

Source: The Survey of Wheat Markets conducted in 1982 by Pakistan Institut of Development Economics, Islamabad, and Centre for Development Planning, Erasmus University, Rotterdam.

The data on trends in rural real wages further casts doubt on
the hypothesis that landless labourers may loose as a result of high farm
prices. Guisinger and Hicks / 35/ and Irfan and Ahmed / 38/ have
provided a series of rural wages for selected years between 1952 and 1973
and for each year between 1973 and 1984. There was a pronounced upward
trend in real wages between ,1952 and 1973. Real wages
for casual workers in 1973 were higher by about 60% over the benchmark
year of 1952. The series constructed by Irfan and Ahmad show declines in
real wages between 1974-76, an upward level for years 1976 to 1981 and a
slight downward trend since 1981. The close correspondence between real
wages and net barter terms of trade for agriculture again shows the
salutary effect of high prices for the rural income of landless labour in
the agricultural sector. The conclusion that we reach then is that the
interests of large farmers, small farmers and landless wage labour in rural
areas are more or less identical as far as farm prices are concerned. It
must, however, be noted that the similarity in interests of these groups
obtains in the long-run after the price incentives have had their impact
on the income of the poor through increased job opportunities. In the
short-run high food prices impose a burden on the poor consumers. A role
for targetted food subsidies for the benefit of the poor is obvious.

The incidence of high farm prices on urban income distribution
has also aroused a controversy. Some believe that high food prices hurt
mainly the low-income urban consumers. Brown / 14/ has shown that in the
case of Pakistan urban wage levels have responded fairly quickly to the prices
of wage goods. If Brown is correct, high food prices may have more impact
on urban profits than on real incomes of wage earners. In any case, the

analysis of high food prices needs to take account of the national food
subsidy schemes that have a dual pricing system and funnel the bulk of
rationed food to urban areas. Naqvi and Cornelisse /⁻61_/ in their
study of wheat marketing have shown that the rationing system as it
has operated has discriminated against rural areas, especially rural
N.W.F.P., Sind and Baluchistan. They have further shown that wheat-
market actors (millers, ration shop-keepers and the Food Department
officials — all belonging to high or middle income classes) appropriate
for themselves a part of benefits intended for the rural and urban poor.
The difference between the domestic producers prices and consumer prices
and the public expenditure on the administration of the rationing system
require huge budgetary subsidies. The financing of these subsidies is
generally regressive. The intervention by the government in the public
distribution of wheat may have been beneficial to the middle and upper
income consumers in the urban areas.

The impact of input pricing on income distribution and
agricultural development has not been discussed so far. The case for
the introduction of subsidies on modern inputs (fertilizer, pesticides,
water) in early 1960s was built to familiarize farmers with the new
innovations and to encourage them to use these inputs on a large-scale.
There is a growing literature in Pakistan that shows that input
subsidies may have outlived their original justification. Gotsch and
Brown /⁻31/ and Cheong et. al /⁻18/ have pointed out that subsidies
on water may encourage wasteful use of the scarce water supply.
Subsidies on machines tend to displace labour and provide wrong signals
to farmers for the use of capital-intensive technology. Since access

tO inputs is largely determined by the size of holding, it i
prising that farm subsidies benefit mostly the large and pro
farmers in Pakistan. Since large farmers are not necessaril
users of modern inputs, a policy that diverts inputs to smal
would maintain or increase the output. Research on the iden
of institutional interventions that ensures larger supplies
inputs to smaller farmers is of high priority. However, the
point that needs to be stressed is the need for a reduction
subsidies to encourage both farm production and improve incc
bution in the farm sector. Subsidized input prices at this s
providing an element of rent to large farmers. Small farmer
already paying high market clearing prices for the subsidize
which are in short supply.

5. CONCLUSIONS AND POLICY IMPLICATIONS

We can be very brief in conclusion. Basic data or
sales and marketings of goods and services entering in the
trade need an improvement. Notwithstanding the weaknesses
data, the preceding analysis sheds light on various policy-i
issues and has several interesting implications. These are
summarized below:

1. The barter terms of trade of the agricultural sec
shown an upward trend over the entire period from 1951/52 t
However, this trend conceals in it periods of considerable
considerable increase and large fluctuations in the net bar
of trade. There was a declining trend in 1950s, a sharp up

during most of the 1960s, large fluctuations in the decade of the 1970s
and a declining trend since 1977/78.

2.   The efficacy of price instruments as a source of agricultural
development was noted. The aggregate farm output was positively
related with the net barter terms of trade, irrigation ratio and the
time-trend. Notwithstanding the importance of a positive price policy
for agriculture, a case can be made for an active technology policy
and an expanded programme of public investment benefitting the
agricultural sector. The long-run viability and productivity of the
Indus Basin implies vast public investments in agriculture. It should
be noted that it is easier to extract surplus out of increased
production than out of stagnant output. Increasing farm output requires
a provision of gross resources in the form of irrigation, research,
credit and other modern inputs. Starving agriculture of resources too
soon may mean a large amount of foregone farm output.

3. A public investment programme of the type needed requires
increased resource mobilization from the agriculture sector. The
extent of improvement in the purchasing power of agriculture since 1953/56
is large. The farmers' ability to pay taxes and their capacity
to pay for modern inputs has improved considerably. This fact should
be clearly noted in debates on reducing farm subsidies or increasing the
tax burden on agriculture. The agricultural sector in Pakistan has
been taxed mainly by the trade policy. Direct taxes have been too low
to be a major force. The farm subsidies on inputs have shown

considerable increases mainly due to explosive increase in the quantity of inputs used. Very little support can be marshalled for input subsidies from the vantage point of efficiency and agricultural development. Taxation of the agricultural sector via the trade policy is inefficient. There is a strong case for increased taxation of the agricultural sector through direct taxes on land and/or agricultural income and reduced levels or withdrawal of input subsidies.

4. The impact of agricultural price policies on both the output and input sides on income distribution has   interesting and useful policy implications. That high farm prices benefit large producers is obvious. We had also found some support for the notion that high farm prices also benefit small farmers and landless labour.The farmers' capacity to hire labour is a function of the farm prices. Benefits from subsidized inputs tend to accrue in large measure to large producers. Reducing input subsidies would not harm the small farmer greatly but could release public resources that could finance investments for the benefit of small farmers. In this sense remunerative farm prices and low or no subsidies on farm inputs should increase the efficiency of resource use and the welfare position of the small farmer and the rural poor.

5. Incentives to producers could be given through attractive produce prices, subsidized prices for inputs, technological innovations and through investment in complimentary sectors. Detailed specific research on the relative benefits and costs of providing incentives through these policies are required. The theoretical and empirical aspects of determination of support prices for different crops that

provide just the right amount of incentives and maintain appropriate
price relatives for different crops should be given a high priority
in the research agenda. Incentives, measured by the rural-urban
terms of trade, are the outcome of a host of interacting sectoral
and macro policies. It is important to ensure that the commodity-
specific price policies and the macro-economic policies are a
consistent policy set in their impact on farm incentives.

ANNEXURE

This annexure provides the complete data-series from 1951-52 to 1983-84, that was used to construct the domestic terms of trade indices. An attempt has been made not only to update the Lewis and Musthaq $\underline{/}$ 55$\underline{/}$ estimates, which covered the period 1951-52 to 1963-64, to 1983-84 but also to provide alternative measures that incorporate some of the criticisms levelled against the use of the net barter terms of trade index. Data for the period 1964-65 to 1983-84 are obtained from the published statistics of the Federal Bureau of Statistics and the Planning Unit of the Ministry of Agriculture.

There are twenty-two tables in this annexure. The last eleven tables (Table 12 to 22) provide the background information on price indices and alternative weighting schemes used to construct the terms of trade indices.

It should be noted that the Lewis and Mushtaq $\underline{/}$ 55$\underline{/}$ study did not present indices for income and single factoral terms of trade. Moreover the study $\underline{/}$ 55$\underline{/}$ provided only one measure, each, of the intrasectoral terms of trade for the agricultural sectors.

The general form and the specific weights of the price indices are obtained following Lewis and Mushtaq $\underline{/}$ 55$\underline{/}$ and their methodology is reproduced here.

The symbols used are defined below, and 1959/60 is used as base 100 for all individual price indices. The weights can be varied by letting s and b vary, i.e., by defining a different

weighting for the sale and purchase of each good by a sector in the

base year, or by changing the base year.

DEFINITION OF VARIABLES

P_{dij}^{m} is the index number of the domestic (d) price (P) manufactures (m) of sector i in year j.

P_{dkj}^{a} is the index number of the domestic (d) price (P) of agricultural products (a) of sector k in year j.

W_{si}^{m} is the percentage weight of manufactured goods sold by sector i in the base year.

W_{bi}^{m} is the percentage weight of manufactured goods of sector i bought by the agricultural sector in the base year.

W_{sk}^{a} is the percentage weight of agricultural goods (produced or sold, depending on specifications) of sector k in the base year.

W_{bk}^{a} is the percentage weight of agricultural goods of sector k bought by the Non-Agriculture sector in the base year.

If the weights and prices are defined as in the Table above, then the weighted price indices for each year are as follows:

Index of prices of agricultural goods sold by the agricultural sector:

$$= \sum_{k} P_{dkj}^{a} \cdot W_{sk}^{a} \quad \text{for each year j.}$$

Index of prices of manufactured goods sold by the industrial sector:

$$\sum_{i} P_{dij}^{m} \cdot W_{si}^{m} \quad \text{for each year j.}$$

Index of prices of manufactured goods bought by the agricultural

sector:

$$= \sum_i P^m_{dij} \cdot W^m_{bi} \text{ for each year.}$$

Index of prices of agricultural goods bought by the manufacturing

sector:

$$= \sum_k P^a_{dkj} \cdot W^a_{bk} \text{ for each year } j.$$

The domestic terms of trade of the agricultural sector for

any year j, with the base year equal to 100, would be written

$$\frac{\sum_k P^a_{dkj} \cdot W^a_{sk}}{\sum_i P^m_{dij} \cdot W^m_{bi}}$$

and the domestic terms of trade of the manufacturing sector for any

year j, with the base year equal to 100, would be written

$$\frac{\sum_i P^m_{dij} \cdot W^m_{si}}{\sum_k P^a_{dkj} \cdot W^a_{bk}}$$

It is obvious from the above expressions for the terms of
trade of each sector that even using the same (wholesale) price
indices for each good whether bought or sold by a sector, that the
Agriculture sector's terms of trade will not be the reciprocal of
the Non-Agriculture sector's terms of trade, as long as there are
leakages out of the intersectoral trade in the form of sales to

other domestic sectors or to or from the foreign sector. One further problem must be mentioned. Actual purchases by one sector of the other sector's output have not been used in computing the b weights, since data on such flows are unavailable. Instead we have divided the available supplies of each type of good on the basis of a reasonable proportion that would have been used in each sector, and calculated the percentage weights for purchases of each good on the basis of this estimated share of the total availability.

The present study in the absence of alternative data uses the same weights as used by Lewis and Mushtaq /‾55‾/. Like the earlier study, we also found that substantial variations of weights for the purchases of different commodities made little difference to the behaviour of the price indices.

An explanation of some of the major concepts is outlined below, followed by the Appendix tables.

1.   The net barter terms of trade of the agriculture sector is computed by dividing the GDP deflator of the agricultural sector by the GDP deflator of the manufacturing sector.

2.   The income terms of trade are computed by multiplying the net barter terms of trade by the quantum index of agricultural output.

3.   The single factoral terms of trade are computed by multiplying the net barter terms of trade by the factor productivity index. In this case cropped area is the aggregate input index.

4.   Intra sectoral terms of trade for manufacturing refers to the index of consumption goods relative to intermediate and investment goods.

5.   Intra sectoral terms of trade for agriculture refers to the index of food crops relative to cash crops.

TABLE-A 3.1

DOMESTIC TERMS OF TRADE FOR MANUFACTURING SECTOR

	Prices paid are weighted by Marketing and prices received are weighed by							Prices paid are weighed by GVO and prices received are weighed by						
	Value added	Gross value of output	Net avail-ability	Purchase by Agriculture				Value added	Gross value of output	Net avail-ability	Purchase by Agriculture			
				Alt.1	Alt.2	Alt.3	Alt.4				Alt.1	Alt.2	Alt.3	Alt.4
1951-52	90.48	89.03	91.14	87.05	88.80	88.53	88.57	99.88	98.28	100.61	96.09	98.02	97.72	97.77
1952-53	103.07	101.03	101.93	100.38	101.82	101.29	102.03	100.39	98.40	99.28	97.77	99.17	98.66	99.38
1953-54	117.98	116.57	110.77	115.96	114.69	114.91	115.00	118.55	117.13	111.13	116.52	115.24	115.46	115.56
1954-55	112.93	113.15	111.20	114.26	111.86	113.62	111.26	115.83	116.06	114.05	117.19	114.73	116.53	114.12
1955-56	105.04	104.48	105.33	105.55	106.65	105.27	107.19	109.46	108.88	109.76	109.99	111.14	109.70	111.70
1956-57	99.75	99.56	102.90	99.02	100.69	100.44	100.38	102.80	102.60	106.04	102.05	103.77	103.51	103.45
1957-58	98.48	99.19	100.12	97.37	97.47	98.18	96.74	101.98	102.71	103.67	100.82	100.93	100.66	100.17
1958-59	100.23	100.46	100.80	99.89	99.97	99.69	100.00	101.25	101.48	101.82	100.91	100.98	100.71	101.02
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	90.65	90.50	90.43	90.47	90.68	90.39	90.81	90.85	90.70	90.63	90.67	90.88	90.59	91.01
1961-62	91.58	91.36	91.2t	90.39	91.89	90.44	92.29	93.05	92.82	92.72	9.84	93.37	91.89	93.77
1962-63	93.60	93.37	96.06	92.49	94.66	93.53	94.65	95.75	95.53	98.28	94.62	96.84	95.69	96.83
1963-64	92.56	92.11	95.42	90.68	93.43	91.88	93.50	93.68	93.23	96.57	91.78	94.56	92.99	94.63
1964-65	94.35	94.55	95.70	93.21	95.13	93.59	94.98	88.61	88.79	89.87	87.53	89.34	87.89	89.19
1965-66	97.98	98.51	100.54	96.57	98.54	97.26	98.31	92.42	91.92	94.84	91.10	92.95	91.75	92.73
1966-67	93.86	94.58	96.68	91.76	93.65	92.69	93.38	82.64	83.27	85.12	80.79	82.45	81.61	82.22
1967-68	105.04	105.65	108.17	100.55	103.30	102.44	102.71	90.42	90.94	93.11	86.55	88.92	88.18	88.41
1968-69	106.88	107.16	111.81	101.69	105.80	104.49	105.26	95.92	96.17	100.35	91.26	94.95	93.77	94.46
1969-70	103.28	103.62	108.22	96.65	101.51	99.71	98.49	92.32	92.63	96.74	86.39	90.74	89.13	88.04
1970-71	101.31	101.57	107.58	94.03	99.80	97.64	103.30	92.14	92.39	97.85	85.53	90.77	88.81	93.96
1971-72	100.29	100.23	106.03	94.10	100.45	96.84	100.49	90.13	90.08	95.29	84.57	90.27	87.03	90.32
1972-73	95.21	95.66	98.94	86.60	93.12	88.65	93.51	88.26	87.75	91.72	80.28	86.33	82.18	86.69
1973-74	89.92	89.17	92.47	79.06	83.98	81.90	83.56	82.94	82.25	85.30	72.93	77.44	75.55	77.08
1974-75	108.77	107.20	116.03	91.50	97.36	98.11	95.03	94.21	92.86	100.50	79.25	84.33	84.98	82.31
1975-76	113.10	112.77	112.71	94.38	100.81	98.22	100.31	105.40	105.09	105.03	87.96	93.94	91.53	93.48
1976-77	105.86	105.37	102.99	88.39	91.21	91.63	89.89	97.30	96.85	94.67	81.25	83.84	84.22	82.62
1977-78	97.80	97.11	94.64	81.86	84.11	84.68	82.99	87.49	86.88	24.66	73.23	75.25	75.76	77.25
1978-79	108.38	105.64	105.94	88.44	93.86	89.72	93.58	100.25	97.72	87.60	81.81	86.82	82.99	86.56
1979-80	123.00	118.47	121.80	96.50	109.55	98.61	109.63	112.89	108.74	111.80				
1980-81	127.00	121.45	126.75					110.20	105.49	108.67	88.05	97.35	87.06	99.91

Table-A 3.1 Continued

YEARS	Prices paid are weighed by Net Availability and Prices received are weighed by						
	Value added	Gross value of output	Net avail-ability	Purchase by Agriculture			
				Alt. 1	Alt. 2	Alt. 3	Alt. 4
1951-52	106.62	104.90	107.40	102.58	104.64	104.32	104.38
1952-53	100.19	98.21	99.09	97.58	98.98	98.47	99.19
1953-54	119.05	117.63	111.78	117.01	115.73	115.95	116.05
1954-55	117.41	117.64	115.60	118.78	116.29	118.12	115.67
1955-56	112.81	112.22	113.13	113.36	114.54	113.06	115.12
1956-57	105.77	105.57	109.11	105.00	106.77	106.51	106.44
1957-58	104.73	111.49	106.46	103.54	103.64	104.40	102.87
1958-59	103.06	103.30	103.65	102.72	102.79	102.51	102.83
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	91.10	90.95	90.88	90.93	91.13	90.84	91.26
1961-62	94.85	94.63	94.52	93.62	95.18	93.67	95.59
1962-63	98.31	98.08	100.90	97.15	99.43	98.24	99.42
1963-64	95.03	94.57	97.96	93.10	95.92	94.33	95.99
1964-65	90.21	90.39	91.50	89.11	90.95	89.48	90.80
1965-66	94.29	94.80	96.76	92.94	94.83	93.61	94.61
1966-67	80.88	81.50	83.31	79.07	80.70	79.87	80.47
1967-68	87.89	88.40	90.51	84.14	86.44	85.72	85.94
1968-69	93.00	93.24	97.29	88.48	92.06	90.92	91.59
1969-70	89.56	89.85	93.84	83.81	88.02	86.46	85.40
1970-71	89.39	89.62	94.92	82.97	88.05	86.15	91.15
1971-72	87.74	87.70	92.77	82.33	87.88	84.73	87.92
1972-73	86.27	85.77	89.65	78.47	84.38	80.33	84.73
1973-74	81.29	80.61	83.60	71.48	75.92	74.04	75.54
1974-75	90.27	88.98	96.31	75.94	80.81	81.43	78.87
1975-76	101.12	100.82	100.76	84.38	90.13	87.81	89.68
1976-77	95.21	94.77	92.63	79.50	82.03	82.41	80.84
1977-78	83.57	82.98	80.87	69.95	71.87	72.36	70.92
1978-79	97.17	94.72	94.98	79.30	84.15	80.44	83.91
1979-80	108.47	104.47	107.41	85.10	96.61	86.96	96.67
1980-81	112.91	107.98	112.69	86.14	99.03	88.33	101.30
1981-82	107.07	102.43	105.53	85.50	94.53	84.54	97.02
1982-83	107.26	102.40	102.09	83.40	93.01	84.09	96.24
1983-84	106.29	101.23	99.74	82.60	90.76	83.29	93.69

Table A-3.2

DOMESTIC TERMS OF TRADE FOR MANUFACTURING SECTOR
(Three Years Moving Average)

| YEARS | Prices paid are weighed by Marketing and Prices received are weighed by | | | | | | | Prices paid are weighed by GVO and Prices received are weighed by | | | | | | |
	Value added	Gross value of output	Net availability	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Value added	Gross value of output	Net availability	Alt. 1	Alt. 2	Alt. 3	Alt. 4
1951-54	103.54	102.21	101.28	101.13	101.77	101.58	101.87	106.27	104.60	103.73	103.47	104.14	103.95	104.24
1952-55	111.33	108.25	107.97	110.20	109.46	109.94	109.43	111.59	110.53	108.21	110.49	109.71	110.22	109.69
1953-56	111.98	111.40	109.10	111.92	111.07	111.27	111.15	114.61	114.02	111.70	114.57	113.70	113.90	113.79
1954-57	105.91	105.73	106.48	106.28	106.40	106.44	106.28	109.36	109.18	109.95	109.74	109.87	109.91	109.76
1955-58	101.09	101.08	102.78	100.65	101.60	101.30	101.44	104.75	104.73	106.49	104.29	105.28	104.96	105.11
1956-59	99.49	99.74	101.27	98.76	99.38	99.45	99.04	102.01	102.26	103.84	101.26	101.89	102.29	101.55
1957-60	99.57	99.88	100.31	99.09	99.15	99.29	98.91	101.08	101.40	101.83	100.58	100.64	100.79	100.40
1958-61	96.96	96.99	97.08	96.89	96.88	96.69	96.94	97.37	97.39	97.48	97.19	97.29	97.10	97.34
1959-62	94.08	93.95	93.90	93.72	94.19	93.61	94.37	94.63	94.51	94.45	94.17	94.75	94.16	94.93
1960-63	91.94	91.74	92.58	91.22	92.41	91.45	92.58	93.22	93.02	93.88	92.38	93.70	92.72	93.87
1961-64	92.58	92.28	94.2?	91.19	93.33	91.95	93.48	94.16	93.86	95.86	.2.75	94.92	93.53	95.08
1962-65	93.50	93.34	95.73	92.13	94.41	93.00	94.38	92.68	92.52	94.91	91.31	93.58	92.19	93.55
1963-66	94.96	95.06	97.22	93.49	95.70	94.24	95.60	91.57	91.65	93.76	90.14	92.28	90.88	92.18
1964-67	95.40	95.88	97.64	93.85	95.77	94.51	95.56	87.89	88.33	89.94	86.47	88.25	87.08	88.06
1965-68	98.96	99.58	101.80	96.29	98.50	97.46	98.13	88.49	89.04	91.02	86.15	88.12	87.18	87.79
1966-69	101.92	102.46	105.55	98.00	100.92	99.87	100.45	89.66	90.13	92.86	86.20	88.77	87.85	88.20
1967-70	105.07	105.48	109.40	99.63	103.54	102.21	102.15	92.89	93.25	96.73	88.07	91.54	90.36	90.30
1968-71	103.82	104.12	109.20	97.46	102.37	100.61	102.35	93.46	93.73	98.31	87.73	92.15	90.57	92.15
1969-72	101.63	101.81	107.28	94.93	100.58	98.06	100.76	91.53	91.70	96.63	85.50	90.59	88.32	90.77
1970-73	98.92	99.15	104.18	91.58	97.79	94.38	99.10	90.18	90.07	94.95	83.46	89.12	86.01	90.32
1971-74	95.14	95.02	99.15	86.59	92.52	89.13	92.52	87.11	86.69	90.77	79.23	84.68	81.59	84.70
1972-75	97.97	97.34	102.48	85.72	91.49	89.55	90.70	88.47	87.62	92.51	77.49	82.70	80.90	82.03
1973-76	103.93	103.05	107.07	88.31	94.05	92.74	92.97	94.18	93.40	96.94	80.05	85.24	84.02	84.29
1974-77	109.24	108.45	110.58	91.42	96.46	95.99	95.08	98.97	98.27	100.07	82.82	87.37	86.91	86.14
1975-78	105.59	105.08	103.45	88.21	92.04	91.51	91.06	96.73	96.27	94.79	80.81	84.34	83.84	84.45
1976-79	104.01	102.71	101.19	86.23	89.73	88.68	88.82	95.16	93.82	88.98	78.76	81.97	80.99	82.14
1977-80	109.73	107.07	107.47	88.93	95.84	90.98	95.40	100.21	97.78	94.69	81.21	87.54	83.09	88.14
1978-81	119.46	115.18	118.16	90.36	104.93	95.89	105.71	110.11	106.18	105.45	86.60	96.71	88.39	97.43
1979-82	123.81	118.69	122.74	89.38	109.37	97.94	111.19	113.45	108.77	112.48	88.68	100.22	89.75	101.89
1980-83	123.67	118.21	121.03	85.01	108.29	97.12	111.31	112.77	107.80	110.39	87.88	98.76	88.55	101.55
1981-84	120.77	115.29	115.79	83.83	104.84	94.90	108.10	110.25	105.25	105.69	86.48	95.71	86.63	98.67

Table-A 3.2 Continued

| YEARS | Prices paid are weighed by Net Availability and Prices received are weighed by | | | | | | |
	Value added	Gross value of output	Net availability	Alt. 1	Alt. 2	Alt. 3	Alt.4
1951-54	108.62	106.91	106.09	105.72	106.45	106.25	106.54
1952-55	112.22	111.16	108.82	111.12	110.33	110.85	110.30
1953-56	116.42	115.83	113.50	116.38	115.52	115.71	115.61
1954-57	112.00	111.81	112.61	112.38	112.53	111.56	112.41
1955-58	107.77	109.76	109.57	107.30	108.32	107.99	108.13
1956-59	104.52	106.79	106.41	103.75	104.40	104.47	104.05
1957-60	102.60	104.93	103.37	102.09	102.14	102.30	101.90
1958-61	98.05	98.08	98.18	97.88	97.97	97.78	98.03
1959-62	95.32	95.19	95.13	94.85	95.44	94.84	95.61
1960-62	94.75	94.55	95.43	93.50	95.25	94.25	95.42
1961-64	96.06	95.76	97.79	94.60	96.84	95.41	97.00
1962-65	94.52	94.35	96.79	93.12	95.43	94.02	95.40
1963-66	93.18	93.25	95.41	91.72	93.90	92.47	93.83
1964-67	88.46	88.89	90.52	87.04	88.83	87.65	88.63
1965-68	87.69	88.23	90.19	85.38	87.32	86.40	87.01
1966-69	87.26	87.71	90.37	83.90	86.40	85.50	86.00
1967-70	90.15	90.50	93.88	85.48	88.84	87.70	87.64
1968-71	90.65	90.90	95.35	85.09	89.38	87.84	89.38
1969-72	88.90	89.06	93.84	83.04	87.98	85.78	88.16
1970-73	87.80	87.70	92.45	81.26	86.77	83.74	87.93
1971-74	85.10	84.69	88.67	77.43	82.73	79.70	82.73
1972-75	85.94	85.12	89.85	75.30	80.37	78.60	79.71
1973-76	90.89	90.14	93.56	77.27	82.29	81.09	81.36
1974-77	95.53	94.86	96.57	79.94	84.32	83.88	83.13
1975-78	93.30	92.86	91.42	77.94	81.34	80.86	80.48
1976-79	91.98	90.82	89.49	76.25	79.35	78.40	78.56
1977-80	96.40	94.06	94.42	78.12	84.21	79.92	83.83
1978-81	106.18	102.39	105.03	83.51	93.26	85.25	93.96
1979-82	109.48	104.96	108.54	85.58	96.73	86.61	98.33
1980-83	109.08	104.27	106.77	85.01	95.52	85.65	98.19
1981-84	106.87	102.02	102.45	83.83	92.77	83.97	95.65

DOMESTIC TERMS OF TRADE FOR AGRICULTURE (ABSOLUTE)

Years	Gross Value of output in Agriculture Relative to							Net Availability in Agriculture Relative to						
	Value Added	GVO	Net Avail-ability	Alt.1	Alt.2	Alt.3	Alt.4	Value Added	GVO in Manuf-actur-ing	Net Avail-ability	Alt.1	Alt.2	Alt.3	Alt.4
1951-52	100.00	101.75	99.39	104.07	102.02	102.33	102.28	93.79	95.32	93.11	97.49	95.57	95.86	95.82
1952-53	99.61	101.62	100.72	102.28	100.83	101.35	100.62	99.81	101.82	100.92	102.48	101.03	101.55	100.82
1953-54	84.35	85.37	89.84	85.82	86.78	86.61	86.54	84.00	85.01	89.46	85.46	86.41	86.24	84.13
1954-55	86.33	86.16	87.68	85.33	87.16	85.81	87.63	85.17	85.01	86.50	84.19	85.99	84.66	86.45
1955-56	91.36	91.84	91.11	90.92	89.98	91.16	89.52	88.64	89.11	88.40	88.21	87.30	88.45	86.86
1956-57	97.28	97.47	94.30	97.99	96.37	96.61	96.67	94.54	94.73	91.65	95.23	93.66	93.89	93.95
1957-58	98.06	97.36	96.46	99.18	99.08	98.37	99.82	95.49	94.81	93.93	96.58	96.48	95.79	97.21
1958-59	98.76	98.54	98.21	99.10	99.02	99.29	99.99	97.03	96.80	96.48	97.35	97.28	97.55	97.25
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	110.07	110.25	110.34	110.28	110.04	110.38	109.88	109.77	109.94	110.03	109.98	109.73	110.08	109.58
1961-62	107.47	107.73	107.85	108.89	107.10	108.82	106.65	105.42	105.68	105.80	106.82	105.07	106.75	104.62
1962-63	104.43	104.68	101.75	105.68	103.26	104.51	103.27	101.72	101.96	99.11	102.94	100.58	101.79	102.59
1963-64	106.75	107.26	103.55	108.96	105.76	107.54	105.67	105.23	105.74	102.08	107.41	104.25	106.01	104.17
1964-65	112.86	112.63	111.27	114.25	111.93	113.78	112.12	110.85	110.63	109.29	112.22	109.95	111.76	110.13
1965-66	108.20	107.62	105.55	109.78	107.59	108.99	107.84	106.05	105.48	103.35	107.60	105.45	106.83	105.70
1966-67	121.01	120.08	117.48	123.78	121.28	122.53	121.62	123.55	122.61	119.95	126.38	123.83	125.11	124.14
1967-68	110.60	109.96	107.41	115.53	112.46	113.41	113.11	113.76	113.12	110.49	118.85	115.69	116.67	116.35
1968-69	104.26	103.98	99.65	109.57	105.32	106.64	105.86	107.53	107.25	102.78	113.02	108.63	109.99	109.19
1969-70	108.32	107.96	103.37	115.75	110.20	112.20	113.59	111.66	111.29	106.56	119.32	113.60	115.66	117.09
1970-71	108.52	108.24	102.20	116.92	110.17	112.60	106.43	111.87	111.58	105.35	120.53	113.55	116.07	109.71
1971-72	110.95	111.01	104.94	118.24	110.77	114.90	110.72	113.97	114.03	107.79	126.40	113.79	118.03	113.73
1972-73	113.29	113.95	109.02	124.56	115.83	121.68	115.35	115.91	116.59	111.54	127.44	118.51	124.49	118.92
1973-74	120.56	121.58	117.23	137.11	129.09	132.37	129.74	123.02	124.05	119.62	139.90	131.71	135.06	132.37
1974-75	106.14	107.69	99.50	126.17	118.58	117.68	121.49	110.77	112.39	103.84	131.63	123.75	122.81	126.79
1975-76	94.88	95.15	95.21	113.69	106.44	109.25	106.97	98.90	99.19	99.24	118.51	110.95	113.86	111.50
1976-77	102.77	103.25	105.63	123.08	119.28	118.73	121.03	105.03	105.52	107.95	125.79	121.90	121.34	123.69
1977-78	114.30	115.10	118.11	136.55	132.90	131.99	134.69	119.65	120.51	103.66	132.96	129.14	136.19	141.00
1978-79	99.83	102.33	102.05	122.24	115.18	120.50	115.52	102.91	105.57	105.28	126.11	118.63	124.31	113.18
1979-80	88.58	91.96	89.45	112.90	99.45	90.51	99.38	92.19	95.72	93.03	117.50	103.51	114.99	105.44
1980-81	85.33	89.23	85.50	111.85	97.30	109.08	95.12	88.56	92.60	88.74	116.09	100.99	113.21	99.72
1981-82	90.69	94.80	92.02	113.57	102.72	114.86	100.09	93.40	97.62	94.76	116.95	105.78	118.29	103.67
1982-83	90.19	89.22	89.49	109.55	98.22	108.64	94.94	93.23	97.66	97.95	119.90	107.71	118.51	107.1

Table-A 3.3 Continued

Marketing in Agricultural Sector Relative to

Value Added	GVO	Net Availability	Alt.1	Alt.2	Alt.3	Alt.4
110.52	112.33	109.72	114.88	112.52	112.96	112.91
97.02	98.98	99.62	99.21	98.72	98.01	98.01
94.76	85.79	90.27	86.24	87.19	87.02	86.95
88.55	88.37	89.93	89.40	88.01	89.88	89.98
95.20	95.71	87.52	94.74	93.77	93.29	93.29
100.25	100.45	94.94	100.98	99.56	99.52	99.62
101.54	100.81	100.98	102.60	101.86	101.37	103.37
99.77	99.54	99.21	100.11	100.31	100.00	100.00
100.00	100.00	100.00	100.00	100.00	100.00	100.00
110.31	110.49	110.58	110.53	110.28	110.12	110.12
109.19	109.46	109.58	110.64	110.05	110.57	110.36
106.84	107.10	104.10	108.05	105.92	105.84	105.36
108.04	109.62	104.80	110.23	106.92	106.95	106.95
106.55	105.77	104.49	105.14	108.84	105.65	105.65
101.98	99.46	107.29	107.04	108.45	101.72	101.72
102.06	101.51	110.27	105.11	110.57	102.81	102.81
95.20	99.44	103.55	101.49	102.45	101.86	101.86
93.56	94.65	103.44	107.89	106.84	106.29	106.29
96.82	93.32	108.98	106.78	106.95	105.65	105.65
98.71	89.43	103.55	107.89	105.36	105.36	105.36
99.71	92.40	98.34	98.51	99.55	99.00	99.00
105.03	92.95	99.45	94.52	100.20	95.00	95.71
111.21	106.34	100.20	103.47	103.27	97.35	97.35
91.94	98.14	99.55	102.41	102.41	97.35	97.89
88.42	108.14	119.08	102.71	112.80	106.94	101.81
94.47	86.18	109.29	101.93	106.27	99.51	99.69
102.25	93.28	102.71	101.81	103.27	105.23	105.23
92.25	112.15	101.93	105.95	118.89	99.16	101.25
31.30	84.41	82.09	91.28	106.54	111.46	112.49
78.74	82.23	76.90	89.79	91.22	101.40	106.35
61.36	86.08	83.36	100.66	100.66	87.77	90.72
51.52	85.39	103.21	94.31	104.31	90.59	96.35
84.52	88.52	98.36	96.98	102.97	95.88	95.88

Table-A 3.4

DOMESTIC TERMS OF TRADE FOR AGRICULTURE (3 YEARS MOVING AVERAGE)

Years	Gross Value of Output in Agriculture Relative to:							Net Availability in Agriculture Relative to:						
	Value Added	GVO	Net Availability	Alt.1	Alt.2	Alt.3	Alt.4	Value Added	GVO in Manufacturing	Net Availability	Alt.1	Alt.2	Alt.3	Alt.4
1951-54	94.65	96.25	96.65	97.39	96.64	96.76	96.48	92.53	94.05	94.50	95.19	94.34	94.55	93.59
1952-55	90.10	91.05	92.74	91.14	91.59	91.26	91.60	89.66	90.61	92.29	90.71	91.14	90.82	90.47
1953-56	87.39	87.79	89.54	87.36	87.97	87.86	87.90	85.94	86.38	88.12	85.95	86.57	86.45	85.81
1954-57	91.66	91.82	91.03	91.14	91.17	91.19	91.27	89.45	89.62	88.95	89.21	88.98	89.00	89.09
1955-58	95.57	95.56	93.96	96.03	95.14	95.38	95.34	92.89	92.88	91.33	93.34	92.48	92.71	92.67
1956-59	98.03	97.79	96.32	98.76	98.16	98.09	98.49	95.69	95.45	94.02	96.39	95.81	95.74	96.14
1957-60	98.94	98.63	98.22	99.43	99.37	99.22	99.60	97.51	97.20	96.80	97.98	97.92	97.78	98.15
1958-61	102.94	102.93	102.85	103.13	103.11	103.22	102.96	102.27	102.25	102.17	102.44	102.34	102.54	102.28
1959-62	105.85	105.99	106.06	106.39	105.71	106.40	105.51	105.06	105.21	105.24	105.60	104.93	105.61	104.73
1960-63	107.32	107.55	106.65	108.28	106.80	107.90	106.60	105.64	105.86	104.98	106.58	105.13	106.21	105.60
1961-64	106.22	106.56	104.38	107.84	105.37	106.96	105.20	104.12	104.46	102.33	105.72	103.3	104.85	103.79
1962-65	108.01	108.19	105.52	109.63	106.98	108.61	107.02	105.93	106.11	103.49	107.52	104.93	106.52	106.31
1963-66	109.27	109.17	106.79	111.00	108.43	110.10	108.54	107.38	107.28	104.91	109.08	106.55	108.2	106.67
1964-67	114.02	113.44	111.43	115.94	113.60	115.10	113.86	113.49	112.91	110.86	115.40	113.08	114.57	113.34
1965-68	113.27	112.55	110.15	116.36	113.78	114.98	114.19	114.46	113.74	111.26	117.61	114.99	116.20	115.41
1966-69	111.96	111.34	108.18	116.29	113.02	114.19	113.53	114.95	114.33	111.07	119.42	116.05	117.26	116.57
1967-70	107.73	107.30	103.48	113.62	109.33	110.75	110.85	110.98	105.55	106.61	117.06	112.64	114.12	114.21
1968-71	107.03	106.73	101.74	114.08	108.56	110.48	108.63	110.35	110.04	104.90	117.62	111.93	113.91	111.99
1969-72	109.26	109.07	103.50	116.97	110.38	113.23	110.25	112.50	112.30	106.57	122.10	113.65	116.89	113.51
1970-73	110.92	111.07	105.39	119.91	112.26	116.39	110.83	113.92	114.07	108.23	124.81	115.29	119.33	113.82
1971-74	114.93	115.51	110.40	126.64	118.56	122.98	118.60	117.81	118.22	112.98	131.27	121.34	125.86	121.37
1972-75	113.33	114.41	108.58	129.28	121.17	123.91	122.19	116.57	117.68	111.67	133.01	124.66	127.45	125.73
1973-76	107.19	108.14	103.98	125.66	118.04	119.77	119.40	110.90	111.86	107.57	130.03	122.14	123.94	127.05
1974-77	101.26	102.03	100.11	120.98	114.77	115.22	116.50	104.90	105.70	103.68	125.33	118.67	119.34	122.11
1975-78	104.02	104.50	106.32	124.44	119.54	119.99	120.90	107.86	108.41	110.28	129.09	124.60	124.47	123.40
1976-79	105.63	106.89	108.60	127.29	119.12	123.74	123.75	109.20	110.53	112.30	131.62	123.62	127.98	127.90
1977-80	100.90	103.13	103.20	123.90	115.84	114.33	116.53	104.92	107.27	107.34	128.86	120.43	121.83	122.21
1978-81	91.25	94.51	92.33	115.66	103.98	106.70	103.34	94.55	97.96	95.70	119.90	107.78	117.50	107.11
1979-82	88.20	92.00	88.99	112.77	99.82	104.82	98.20	91.38	95.31	92.20	116.85	103.43	115.59	101.74
1980-83	88.74	91.08	89.00	111.66	99.41	110.86	96.72	91.73	95.96	93.52	117.65	104.76	116.82	101.90
1981-84	90.70	93.27	92.91	113.50	102.59	113.31	99.51	93.57	98.78	97.66	119.30	107.82	119.02	104.57

Continued.....

TABLE-A 3.4 (Continued)

MARKETING IN AGRICULTURAL SECTOR PURCHASE RELATIVE TO:

Value added	GVO	Net availability	Alt.1	Alt.2	Alt.3	Alt.4
97.43	99.03	99.36	100.25	99.34	99.57	99.29
90.11	91.04	92.77	91.13	91.60	91.25	91.61
89.50	89.96	91.71	89.50	90.12	90.01	90.04
94.67	94.84	94.02	94.41	94.16	94.19	94.26
98.99	98.99	97.33	99.47	98.56	98.80	98.76
100.52	100.27	98.76	101.26	100.64	100.58	100.99
100.44	100.12	99.70	100.94	100.88	100.72	101.13
103.36	103.34	103.26	103.55	103.44	102.82	103.37
104.86	104.34	102.46	106.61	106.16	105.85	104.70
105.36	105.63	102.92	107.04	104.55	104.65	104.65
106.95	107.50	104.46	108.56	105.93	107.53	105.96
108.02	108.73	106.16	109.68	106.91	106.99	106.16
108.78	108.98	108.09	109.76	107.99	108.85	108.78	108.04
106.50	106.65	106.72	106.11	106.24	106.16	106.16
103.36	103.34	103.26	103.55	103.44	102.82	103.37
100.44	100.12	99.70	100.94	100.88	100.72	101.13
100.52	100.27	98.76	101.26	100.64	100.58	100.99
98.99	98.99	97.33	99.47	98.56	98.80	98.76
94.67	94.84	94.02	94.41	94.16	94.19	94.26
89.50	89.96	91.71	89.50	90.12	90.01	90.04
90.11	91.04	92.77	91.13	91.60	91.25	91.61
97.19	98.03	94.35	98.67	99.72	108.61	108.20
91.61	92.28	90.67	94.35	106.98	104.29	105.39
95.05	95.51	97.16	95.51	109.23	109.68	110.48
96.33	97.16	99.05	97.16	111.69	112.89	112.86
91.94	94.01	94.05	94.05	112.95	110.31	106.19
84.10	87.13	85.13	85.13	116.12	112.89	112.86
80.80	84.27	81.52	82.70	102.12	102.98	89.84
80.87	84.60	82.70	103.32	102.12	102.98	89.84
32.80	36.74	86.42	105.57	95.42	105.38	92.54

Table-A 3.5

INCOME TERMS OF TRADE FOR AGRICULTURE
(3 YEARS MOVING AVERAGE)

YEARS	Agri. Price Indices Weighted by Marketing Relative to Manufacturing Price Weighted by							Agri. Price Indices Weighted by GVO Relative to Manufacturing Price Indices Weighted by						
	Value added	Gross value of output	Net avail-ability	Purchase by Agriculture				Value added	Gross value of output	Net avail-ability	Purchase by Agriculture			
				Alt.1	Alt.2	Alt.3	Alt.4				Alt.1	Alt.2	Alt.3	Alt.4
1951-54	81.93	83.30	83.30	84.26	83.60	83.82	83.53	80.18	81.48	82.04	82.40	81.77	81.94	81.06
1952-55	80.5	81.33	82.95	81.41	81.86	81.55	81.87	80.10	80.93	82.54	81.01	81.45	81.14	80.80
1953-56	78.8	79.21	80.87	78.84	79.42	79.30	79.36	77.56	77.97	79.62	77.61	78.19	78.06	77.47
1954-57	83.22	83.36	82.60	83.02	82.78	82.79	82.89	81.21	81.36	80.62	81.02	80.79	80.80	80.90
1955-58	87.72	87.70	86.20	88.17	87.34	87.54	87.54	85.26	85.25	83.78	85.70	84.91	85.10	85.10
1956-59	92.14	91.92	90.52	92.82	92.25	92.18	92.56	89.93	89.71	88.35	90.59	90.04	89.98	90.34
1957-60	94.34	94.06	93.68	94.80	94.74	94.60	94.96	93.01	92.73	92.36	93.45	93.40	93.27	93.61
1958-61	102.47	102.47	102.40	102.65	102.44	102.74	102.48	101.83	101.82	101.75	102.00	101.90	102.78	101.83
1959-62	111.98	112.14	112.22	112.58	111.73	112.59	111.61	111.11	111.27	111.34	111.71	110.97	111.71	110.74
1960-63	117.29	117.54	116.53	118.35	116.60	117.93	116.48	115.41	115.66	114.68	116.46	114.85	116.04	115.37
1961-64	121.46	121.85	119.33	123.34	120.49	122.31	120.29	119.08	118.81	117.00	120.93	118.14	119.92	118.68
1962-65	127.61	127.81	124.69	129.53	126.40	128.33	126.45	125.18	125.38	122.31	127.06	123.99	125.88	124.78
1963-66	134.78	134.61	131.72	136.90	133.74	136.14	133.89	132.44	132.31	129.39	134.52	131.42	133.45	131.57
1964-67	146.53	145.77	143.00	149.02	146.01	148.26	146.35	145.95	145.18	142.54	148.43	145.44	147.34	145.78
1965-68	158.14	157.14	153.59	162.63	158.98	160.96	159.57	160.70	159.03	155.55	164.62	160.91	162.56	161.52
1966-69	170.72	169.81	164.71	177.52	172.41	174.21	173.20	175.42	174.43	169.35	182.36	177.1	178.93	177.91
1967-70	183.42	182.71	176.10	193.58	186.16	188.69	188.90	189.04	188.26	181.44	199.46	191.81	194.34	194.63
1968-71	188.48	187.94	179.17	200.94	191.44	194.59	191.44	194.39	193.77	184.73	207.17	197.13	200.62	197.03
1969-72	197.78	197.43	187.38	211.70	199.79	204.96	199.70	203.63	203.27	192.92	221.02	205.71	211.03	205.60
1970-73	201.61	201.91	191.61	218.00	204.05	211.65	201.56	207.04	207.34	196.75	226.91	209.54	217.33	206.96
1971-74	217.44	218.56	208.92	239.76	224.50	232.82	224.59	222.53	223.67	213.89	248.40	229.73	238.25	244.33
1972-75	215.92	217.97	206.93	245.66	230.84	236.09	232.78	222.06	224.17	212.77	253.34	237.45	242.80	239.47
1973-76	207.86	209.68	201.77	243.01	228.86	232.30	231.45	215.02	216.9	208.71	252.09	236.78	243.68	239.47
1974-77	198.64	200.11	196.66	236.72	225.23	226.16	228.58	205.72	207.25	203.60	245.81	233.22	237.51	236.69
1975-78	211.81	213.17	216.92	253.83	243.90	244.76	246.69	220.03	221.15	211.09	256.36	246.05	257.24	255.89
1976-79	221.38	224.75	228.26	267.65	257.38	260.26	260.06	229.55	232.42	222.12	269.81	259.20	269.12	268.93
1977-80	222.41	228.15	228.04	274.31	255.86	256.80	257.34	231.92	237.28	223.23	278.30	259.18	278.62	267.64
1978-81	213.90	222.02	216.72	272.01	244.03	255.41	242.45	222.07	230.18	224.67	282.02	253.03	276.31	251.34
1979-82	218.78	228.22	220.75	279.69	247.60	265.46	243.53	226.65	236.42	228.67	289.76	256.55	286.51	252.30
1980-83	229.38	235.25	230.03	288.34	256.81	286.35	249.81	237.11	248.05	242.67	304.06	270.85	302.96	265.95
1981-84	245.23	252.18	251.42	307.02	277.55	306.38	269.17	252.98	265.04	264.26	322.71	291.70	323.07	285.40

Table-A 3.5 Continued

AGRICULTURE PRICE INDICES WEIGHTED BY VALUE ADDED RELATIVE TO MANUFACTURING PRICE INDICES WEIGHTED BY

YEARS	Value added	Gross value of output	Net avail-ability	PURCHASE BY AGRICULTURE			
				Alt. 1	Alt. 2	Alt. 3	Alt. 4
1951-54	84.18	85.58	86.04	86.60	85.89	87.07	85.83
1952-55	80.54	81.39	83.03	81.46	81.93	81.60	81.94
1953-56	80.69	81.11	82.78	80.72	81.31	81.19	81.24
1954-57	85.93	86.09	85.29	85.73	85.48	85.49	85.58
1955-58	90.84	90.83	89.27	91.31	90.46	90.66	90.66
1956-59	94.48	94.25	92.81	95.18	94.59	94.51	94.92
1957-60	95.74	95.44	95.05	96.20	96.15	96.00	96.37
1958-61	102.87	102.86	102.79	103.05	102.94	102.38	102.87
1959-62	112.70	112.87	112.94	113.32	112.27	112.57	112.33
1960-63	118.90	119.16	118.13	119.99	118.02	118.79	118.08
1961-64	123.51	124.34	121.34	125.42	122.24	124.37	122.32
1962-65	126.19	126.84	123.27	128.10	124.99	126.90	125.04
1963-66	129.87	130.18	126.86	131.93	128.87	130.86	129.01
1964-67	134.60	133.91	131.49	136.86	134.10	135.87	134.42
1965-68	140.97	140.08	137.03	144.92	141.67	143.16	142.20
1966-69	150.16	149.37	145.01	156.15	151.64	153.23	152.34
1967-70	162.24	161.62	155.75	171.26	164.67	166.86	167.10
1968-71	169.67	169.19	161.27	180.89	172.12	175.17	172.29
1969-72	178.10	177.79	168.72	190.65	179.92	184.57	179.79
1970-73	183.89	184.16	175.17	198.86	186.13	193.07	183.86
1971-74	199.30	200.33	191.91	219.82	205.82	213.45	205.90
1972-75	195.78	197.61	188.10	223.12	209.11	213.99	210.79
1973-76	188.61	190.23	183.22	221.03	207.60	210.84	209.90
1974-77	179.88	181.17	178.27	214.95	203.99	204.74	207.00
1975-78	193.80	194.77	198.16	231.93	222.79	223.64	219.77
1976-79	202.50	205.05	208.21	244.18	234.79	237.48	231.64
1977-80	203.05	208.06	207.91	250.18	233.32	244.41	229.04
1978-81	197.47	204.68	199.79	250.74	225.02	245.69	223.52
1979-82	200.40	209.03	202.19	256.21	226.84	253.34	223.08
1980-83	209.00	218.68	213.86	271.54	238.72	266.13	232.17
1981-84	223.94	234.39	223.93	289.19	258.23	285.05	250.41

Note: Income terms of trade have been calculated by multiplying net barter terms of trade with an index of agricultural output.

Table-A 3.6

SINGLE FACTORAL TERMS OF TRADE FOR AGRICULTURE
(Three Years Moving Average)

YEARS	Agri. Price Indices Weighted by Marketing Relative to Manufacturing Price Weighted by							Agri. Price Indices Weighted by GVO Relative to Manufacturing Price Indices Weighted by						
	Value added	Gross value of output	Net avail-ability	Purchase of Agriculture				Value added	Gross value of output	Net avail-ability	Purchase of Agriculture			
				Alt. 1	Alt.2	Alt. 3	Alt. 4				Alt. 1	Alt. 2	Alt. 3	Alt.4
1951-54	107.07	108.87	109.32	110.17	109.21	109.46	109.13	104.67	106.38	106.88	107.62	106.70	106.95	105.86
1952-55	107.39	101.48	103.37	101.60	102.07	101.72	102.07	99.92	101.00	102.87	101.12	101.58	101.23	100.81
1953-56	95.83	96.33	98.3	95.87	96.55	96.43	96.46	94.30	94.79	96.75	94.34	95.02	94.89	94.17
1954-57	96.33	96.51	95.74	96.05	95.83	95.85	95.94	94.03	94.20	93.46	93.75	93.72	93.55	93.65
1955-58	97.29	97.30	95.69	97.74	96.83	97.10	97.00	94.56	94.57	93.12	94.99	94.28	94.37	94.28
1956-59	97.07	96.82	95.37	97.77	97.18	97.11	97.51	94.73	94.50	93.20	95.43	95.02	94.79	95.17
1957-60	98.15	97.84	97.44	98.62	98.56	98.42	98.79	96.73	96.43	96.16	97.19	97.14	97.00	97.36
1958-61	99.32	99.29	99.21	99.49	99.39	99.58	99.33	98.65	98.62	98.55	98.82	98.72	98.91	97.36
1959-62	101.15	101.29	101.35	101.67	101.02	101.68	100.83	100.40	100.54	100.60	100.92	100.27	100.92	100.09
1960-63	102.72	102.94	102.03	103.66	102.2	103.27	102.01	101.06	101.28	100.40	101.09	100.56	101.61	101.04
1961-64	104.88	105.22	103.05	106.49	104.04	105.60	103.87	102.81	103.15	101.02	104.40	101.90	103.52	102.50
1962-65	108.61	108.79	106.12	110.23	107.58	109.21	107.62	106.52	106.69	104.08	108.12	105.51	107.11	106.22
1963-66	109.44	109.34	115.97	111.17	108.6	110.28	108.72	107.55	107.45	105.08	109.25	106.72	108.38	106.84
1964-67	115.89	115.30	113.26	117.84	115.47	116.99	115.73	115.38	114.79	112.71	117.33	114.97	116.49	115.24
1965-68	121.01	120.24	117.66	124.42	121.63	122.9	122.09	122.42	121.65	119.00	125.91	123.07	124.36	123.54
1966-69	126.84	126.15	122.53	131.85	128.09	129.42	128.67	130.27	129.57	125.85	135.43	131.55	132.93	132.16
1967-70	136.21	135.68	130.78	143.77	138.25	140.10	140.32	140.33	139.79	134.74	148.14	142.45	144.35	144.58
1968-71	139.82	139.41	132.9	149.09	141.84	144.37	142.04	144.15	143.74	137.02	153.72	146.24	148.84	146.44
1969-72	146.93	146.66	139.21	157.28	146.46	152.26	148.41	151.28	151.01	143.34	164.14	152.86	156.78	152.81
1970-73	145.23	145.48	138.03	157.05	147.03	152.45	145.17	149.20	149.4	141.75	163.48	150.99	156.55	149.08
1971-74	151.52	152.30	145.54	166.96	156.33	162.14	156.38	155.08	155.86	148.95	173.06	159.98	165.93	160.03
1972-75	146.76	148.16	140.68	167.29	156.79	160.43	158.08	150.91	152.33	144.63	172.07	161.26	164.97	162.60
1973-76	137.51	138.95	133.65	161.36	151.58	153.86	153.30	142.45	143.70	138.23	166.94	156.81	161.28	158.60
1974-77	128.45	129.64	127.29	153.72	145.85	146.44	148.04	133.27	134.27	131.81	159.05	153.80	153.80	153.31
1975-78	133.70	134.59	136.92	160.26	153.95	154.52	155.70	138.90	139.61	133.43	161.94	155.39	162.43	161.5
1976-79	135.69	137.66	139.86	163.93	150.96	149.10	150.77	136.05	138.14	130.81	161.52	152.23	160.79	158.07
1977-80	130.72	135.21	135.24	162.09	145.01	142.06	142.23	132.94	136.43	126.85	161.03	147.02	161.06	152.06
1978-81	120.16	126.07	123.12	153.96	131.87	134.64	127.33	121.54	126.49	122.42	156.36	137.17	152.84	136.06
1979-82	119.50	125.87	121.76	153.87	136.56	146.14	132.48	125.03	130.41	126.15	159.85	141.50	158.02	139.20
1980-83	120.19	123.42	120.58	151.28	134.69	150.22	131.01	124.25	129.98	127.05	159.33	141.88	158.21	138.02
1981-84	121.14	124.58	124.04	151.56	136.99	151.34	132.84	124.97	130.91	130.37				

Table-A 3.6 Continued

	AGRICULTURAL PRICE INDICES WEIGHTED BY VALUE ADDED RELATIVE TO MANUFACTURING PRICE INDICES WEIGHTED BY						
	Value added	Gross value of output	Net avail-ability	PURCHASE BY AGRICULTURE			
				Alt. 1	Alt. 2	Alt. 3	Alt. 4
1951-54	110.22	112.03	112.40	113.41	112.38	112.63	112.32
1952-55	100.37	101.43	103.35	101.54	102.05	101.67	102.05
1953-56	98.17	98.68	100.65	98.19	98.88	98.75	98.79
1954-57	99.50	99.68	98.89	99.21	98.98	99.00	99.08
1955-58	100.80	100.80	100.14	101.25	100.32	100.60	100.50
1956-59	99.51	99.26	97.77	100.24	99.63	99.57	99.98
1957-60	99.61	99.30	98.89	100.10	100.05	99.90	100.29
1958-61	99.71	99.69	99.61	99.89	99.79	99.33	99.74
1959-62	96.03	101.91	101.98	102.31	101.40	101.66	101.45
1960-63	98.41	104.37	103.44	105.11	103.37	104.06	103.42
1961-64	100.92	107.36	104.80	108.30	105.57	107.40	105.64
1962-65	107.50	108.04	105.01	109.12	106.48	108.09	106.51
1963-66	105.50	105.77	103.07	107.18	104.69	106.31	104.80
1964-67	106.52	105.98	104.08	108.30	106.12	107.53	106.36
1965-68	107.93	107.24	104.91	110.93	108.45	109.59	108.85
1966-69	111.52	110.92	107.72	115.94	112.62	113.79	113.13
1967-70	120.45	119.99	115.64	127.18	122.27	123.91	124.11
1968-71	125.86	125.50	119.63	134.22	127.69	129.96	127.84
1969-72	132.31	132.07	125.35	141.64	133.69	137.11	133.62
1970-73	132.48	132.66	126.16	143.24	134.09	139.04	132.40
1971-74	138.84	139.52	133.66	153.04	143.29	148.62	143.33
1972-75	133.17	134.41	127.97	151.68	142.14	145.52	143.25
1973-76	124.99	126.07	121.38	146.41	137.52	139.66	139.05
1974-77							

Table-A 3.7

DOMESTIC TERMS OF TRADE FOR AGRICULTURE: ALTERNATE METHOD
(Three Years Moving Average)

(Using Marketings as Weight for Agriculture Prices)

YEARS	Agricultural Price Indices Relative to Manufacturing Price Indices Weighted Value Added of						Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by GVO of						Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Net Availability of					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1951-54	96.03	117.78	93.90	97.81	95.61	102.47	97.23	122.93	94.58	99.54	97.08	104.47	101.06	107.94	90.77	102.31	97.91	96.83
1952-55	87.51	109.58	94.14	89.99	88.39	99.18	88.26	114.36	95.18	90.87	89.14	100.62	91.13	101.39	92.76	93.76	91.40	95.54
1953-56	87.56	102.49	93.79	89.28	88.45	96.63	87.69	106.03	94.95	89.55	88.67	97.71	89.56	97.05	94.48	91.49	91.04	95.13
1954-57	94.86	98.96	93.25	95.66	94.42	95.12	94.60	101.44	93.81	95.61	94.30	96.49	95.40	95.26	92.67	95.69	93.99	92.90
1955-58	100.21	97.99	95.68	99.68	99.14	96.39	99.63	100.45	95.82	99.68	98.78	95.67	100.80	95.48	93.92	99.24	97.75	93.67
1956-59	101.52	99.31	98.23	101.10	100.71	98.59	100.62	101.99	98.14	100.83	100.04	97.46	102.06	96.98	95.50	100.62	99.16	95.45
1957-60	100.67	100.05	99.94	100.59	100.52	99.99	99.86	101.98	100.00	100.17	99.89	99.57	100.93	98.68	98.62	100.39	99.96	98.66
1958-61	103.18	103.48	103.94	103.24	103.44	103.57	102.85	104.55	104.43	102.97	103.26	100.73	103.35	102.25	103.72	103.14	103.60	103.16
1959-62	106.15	108.74	104.40	106.46	106.30	106.76	106.23	108.79	106.39	106.39	106.45	107.15	106.63	107.60	106.38	106.93	106.65	106.63
1960-63	109.13	112.12	103.99	109.46	108.53	107.50	109.22	112.42	106.53	109.45	108.79	108.03	109.19	110.33	105.57	109.55	107.81	106.89
1961-64	109.66	110.28	99.93	109.59	107.98	104.19	109.80	110.90	102.30	109.88	108.30	104.84	109.24	108.19	101.26	109.08	105.86	103.26
1962-65	110.72	106.87	100.15	108.71	107.07	102.43	110.62	108.35	100.13	108.85	107.06	102.97	108.40	106.71	98.30	107.50	104.22	101.29
1963-66	110.96	102.16	99.09	106.95	105.75	100.69	109.30	104.20	98.90	106.83	105.32	101.09	106.90	104.30	97.03	105.21	102.96	100.10
1964-67	112.61	98.52	98.61	106.42	105.50	99.87	109.69	100.85	98.18	104.75	104.54	99.10	106.21	103.47	96.94	103.78	102.78	100.24
1965-68	110.26	93.81	92.13	103.74	102.01	94.33	107.22	95.56	91.48	101.93	100.97	93.16	103.65	99.23	91.40	100.77	98.74	95.13
1966-69	108.96	90.26	86.17	102.00	99.24	89.31	106.06	91.47	85.44	100.23	98.38	87.91	102.54	95.74	91.40	100.77	98.74	95.13
1967-70	107.60	87.26	79.12	100.27	96.09	83.65	104.93	87.80	78.39	99.59	95.55	82.86	101.65	92.64	79.41	97.29	91.07	84.75
1968-71	111.08	87.22	76.82	102.93	97.52	81.99	108.43	87.74	76.20	102.25	97.15	81.20	104.65	92.61	77.34	99.22	91.26	83.17
1969-72	114.47	88.26	77.18	105.40	99.83	82.30	111.90	88.79	76.66	105.08	99.56	81.64	107.29	93.42	78.52	100.68	93.04	84.11
1970-73	119.09	91.49	77.65	108.51	102.04	82.97	116.18	92.23	77.67	108.34	102.10	82.79	110.51	96.13	81.22	102.96	95.80	86.18
1971-74	124.45	100.39	78.69	114.24	105.57	86.41	121.50	100.97	79.20	104.75	106.10	86.75	116.24	103.39	84.72	109.11	100.60	91.16
1972-75	123.31	103.69	71.89	114.76	101.76	82.70	120.90	105.04	72.57	105.33	102.75	83.13	116.96	105.84	78.34	110.99	96.72	86.95
1973-76	116.58	100.07	66.98	109.86	96.37	78.95	115.10	100.65	67.66	100.76	97.80	79.28	113.87	103.14	73.03	108.81	93.19	83.33
1974-77	108.79	95.28	63.60	103.25	90.36	75.30	108.34	95.15	64.39	104.04	92.27	75.32	109.04	102.05	69.48	105.28	88.96	80.04
1975-78	109.62	98.28	69.76	104.58	93.81	81.18	109.44	96.55	70.91	105.59	96.16	81.09	112.49	108.41	77.15	107.40	95.55	87.90
1976-79	112.92	103.05	67.86	108.11	94.39	80.53	113.35	100.32	69.49	109.03	97.23	80.67	115.03	114.46	77.33	110.98	96.34	89.06
1977-80	112.99	94.57	61.21	105.96	90.86	72.85	113.47	91.90	63.30	107.06	94.23	73.47	113.56	104.01	72.53	106.34	94.40	85.65
1978-81	111.16	90.64	51.00	100.78	84.37	60.95	111.57	78.78	53.60	102.98	89.26	62.12	109.71	87.32	64.68	99.66	87.45	71.94

Continued Table -A 3.7

YEARS	ALTERNATIVE - 1 Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Alternative - 1 of						ALTERNATIVE - 2 Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Alternative - 2 of					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods
	19	20	21	22	23	24	25	26	27	28	29	30
1951-54	100.61	97.35	90.68	100.64	99.41	95.72	100.30	99.75	90.85	100.24	99.29	95.46
1952-55	90.95	96.13	92.68	92.03	90.12	94.49	90.78	95.62	92.93	92.36	90.95	94.49
1953-56	89.68	91.29	94.44	90.18	89.04	92.05	89.70	92.73	94.65	90.87	90.27	93.16
1954-57	95.74	88.73	92.56	95.49	95.55	90.11	96.08	92.12	92.74	95.76	95.33	92.06
1955-58	101.35	89.21	93.74	99.75	100.79	91.18	101.75	93.83	93.90	99.76	100.27	93.53
1956-59	102.86	93.55	95.34	101.67	102.35	94.89	104.63	97.29	95.45	101.04	101.97	96.61
1957-60	101.61	97.38	98.55	101.18	101.48	98.14	103.29	99.46	98.61	100.85	101.51	99.11
1958-61	103.68	102.59	103.72	103.67	103.85	102.82	105.23	102.21	104.06	103.05	104.04	102.68
1959-62	106.68	110.17	106.38	107.14	106.85	107.79	106.98	105.13	106.24	106.27	106.94	105.52
1960-63	109.21	116.36	105.55	110.09	109.29	110.60	109.66	106.66	105.79	109.19	108.98	106.23
1961-64	109.27	117.62	101.23	110.24	108.84	109.09	109.82	104.41	100.79	109.14	108.32	103.28
1962-65	102.22	120.11	97.26	109.15	108.28	107.81	109.14	104.34	98.00	108.18	107.12	101.70
1963-66	97.56	121.95	95.06	107.50	107.34	106.65	107.94	103.76	96.49	105.99	105.90	100.35
1964-67	93.23	126.62	94.01	106.76	106.99	107.82	107.51	105.71	96.11	105.14	105.48	101.06
1965-68	93.46	123.50	88.68	104.31	103.70	104.35	105.12	103.44	90.57	102.84	102.40	97.70
1966-69	92.33	119.16	83.40	102.83	101.55	100.18	103.99	100.50	85.11	101.13	100.23	93.88
1967-70	91.40	113.98	77.11	101.50	100.64	94.89	103.13	96.26	78.63	99.16	98.01	88.84
1968-71	94.18	115.25	75.09	104.19	103.08	94.37	106.26	95.85	76.54	101.03	99.78	87.66
1969-72	96.21	120.56	76.22	106.92	105.72	96.70	109.05	96.07	77.67	102.79	102.07	88.09
1970-73	98.53	137.43	78.85	110.05	107.58	103.76	112.10	99.30	80.34	105.06	104.48	90.59
1971-74	102.77	159.77	82.22	116.98	112.39	115.31	117.52	109.52	83.81	111.93	109.07	97.98
1972-75	102.94	172.92	76.01	118.79	119.91	117.87	117.96	119.59	77.48	115.36	107.21	99.70
1973-76	100.33	172.52	70.82	116.85	108.93	115.97	114.46	120.55	72.22	114.09	103.86	98.45
1974-77	96.15	176.58	67.36	112.37	103.80	115.24	108.92	124.77	68.71	111.15	99.23	98.28
1975-78	98.97	192.17	74.78	116.17	108.78	126.39	111.54	134.26	76.33	115.33	103.73	107.45
1976-79	100.95	199.15	74.93	118.80	109.96	128.97	113.65	140.11	75.56	118.39	105.09	110.07
1977-80	99.70	182.84	70.26	115.94	108.34	118.50	111.99	123.84	71.86	112.65	102.85	99.54
1978-81	96.38	155.28	62.35	110.06	101.54	101.43	108.20	100.01	63.86	102.92	97.48	83.59
1979-82	95.18	138.68	60.83	107.52	99.04	93.72	107.09	86.30	62.36	97.72	96.15	75.94
1980-83	95.32	134.13	64.44	107.71	100.23	94.50	107.60	84.22	66.07	97.09	97.14	76.47
1981-84	95.77	137.88	70.26	108.90	102.90	100.08	108.23	88.29	72.06	99.12	99.61	81.42

Continued ....

ALTERNATIVE - 3 / ALTERNATIVE - 4

Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Alternative - 3 / Alternative - 4 of

YEARS	Consumpt-tion Goods	Intermed-iate Goods	Investment Goods	Consump-tion and Intermed-iate Goods	Consump-tion and Investment Goods	Intermed-iate and Investment Goods	Consump-tion Goods	Intermed-iate Goods	Investment Goods	Consump-tion and Intermed-iate Goods	Consump-tion and Investment Goods	Intermed-iate and Investment Goods
	31	32	33	34	35	36	37	38	39	40	41	42
1951-54	100.50	101.52	90.50	100.69	99.47	93.54	100.20	98.14	90.66	100.07	99.34	95.98
1952-55	90.84	97.55	93.45	91.85	91.85	94.20	90.76	94.16	91.75	92.48	90.79	94.16
1953-56	89.68	93.26	95.80	89.86	99.35	93.42	89.81	91.61	92.80	90.59	90.08	92.58
1954-57	95.42	90.35	93.22	95.17	95.28	91.03	96.29	92.25	92.05	95.29	95.53	92.14
1955-58	101.52	90.82	127.62	99.79	100.08	92.00	102.10	94.09	93.87	99.22	100.85	93.93
1956-59	103.14	94.89	95.03	101.75	101.65	94.93	103.98	97.45	95.93	101.59	102.83	97.10
1957-60	101.87	98.14	98.50	101.28	101.25	98.30	102.56	99.52	98.69	101.47	102.14	99.31
1958-61	104.08	102.44	104.11	103.71	103.97	103.31	104.29	102.13	103.20	103.51	104.27	102.36
1959-62	107.07	108.17	106.90	107.15	107.12	107.49	107.04	104.87	105.72	106.25	106.98	105.06
1960-63	109.75	112.47	106.16	110.10	109.14	108.90	109.71	106.19	104.90	108.45	109.15	105.88
1961-64	109.99	112.40	101.72	110.40	108.32	106.35	109.89	103.82	100.74	107.69	108.72	103.11
1962-65	108.93	111.46	99.30	109.41	106.79	103.59	109.09	102.43	99.38	106.67	107.76	101.73
1963-66	107.35	110.00	98.77	107.83	105.43	102.70	107.85	100.58	99.27	105.20	106.70	100.30
1964-67	106.27	111.06	99.56	107.06	105.02	103.54	107.29	101.17	100.38	105.07	106.35	101.01
1965-68	103.79	108.45	93.82	104.52	101.86	100.06	104.93	98.99	94.75	102.77	103.46	98.13
1966-69	102.60	104.77	88.16	102.94	99.63	95.11	103.73	96.15	89.10	100.92	101.49	94.59
1967-70	101.71	100.10	81.56	101.47	97.40	89.24	102.86	92.03	82.29	98.76	99.53	89.81
1968-71	104.80	100.55	79.45	104.12	99.01	88.03	106.20	91.48	79.89	100.41	101.58	88.67
1969-72	107.54	103.53	80.77	106.88	101.40	89.99	108.82	91.41	80.59	102.00	103.97	88.81
1970-73	110.19	114.06	83.70	110.13	104.15	95.47	111.33	93.99	81.40	104.17	106.21	90.88
1971-74	115.53	130.91	88.94	117.13	109.20	104.34	116.67	103.30	83.21	111.06	110.36	98.70
1972-75	115.92	143.04	96.90	119.04	107.49	102.47	116.94	112.76	84.21	114.80	108.73	102.61
1973-76	112.96	143.53	92.99	116.99	104.24	99.53	113.84	113.72	81.07	113.65	105.19	102.10
1974-77	107.70	147.66	89.03	112.47	99.77	97.11	108.05	117.94	76.76	111.10	100.41	102.86
1975-78	126.51	160.22	83.72	116.17	104.59	107.59	110.47	127.06	72.65	115.46	104.22	111.69
1976-79	129.22	156.59	84.74	118.76	106.45	109.89	112.38	132.72	76.06	118.63	105.21	114.50
1977-80	127.66	150.75	81.27	115.77	104.26	103.34	110.72	117.04	74.58	112.12	102.10	102.19
1978-81	107.91	125.63	74.66	109.66	99.59	91.81	106.99	94.18	68.44	101.39	96.36	83.73
1979-82	106.26	111.15	74.03	106.98	96.82	87.55	105.84	81.02	58.66	95.48	94.77	74.43
1980-83	106.78	108.33	79.89	107.04	100.60	90.86	106.16	79.08	56.36	94.74	95.76	73.85
1981-84	107.12	112.46	88.50	108.22	103.38	98.12	106.66	83.14	62.96	97.25	97.61	77.99

-64-

Table-A 3.8

DOMESTIC TERMS OF TRADE FOR AGRICULTURE: ALTERNATE METHOD
(Three Years Moving Average)

(Using GVO as Weight for Agricultural Prices)

YEARS	Agricultural Price Indices Relative to Manf. Price Indices Weighted by Value Added of						Agri. Price Indices Relative to Manf. Price Indices Weighted by GVO of						Agri. Price Indices Relative to Manf. Price Indices Weighted by Net Availability of					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate & Investment Goods
1951-54	93.26	114.53	91.71	94.98	92.92	99.84	94.58	119.60	92.40	96.68	94.36	101.77	98.17	104.93	88.72	99.39	95.25	94.41
1952-55	87.51	109.54	94.05	89.98	88.38	99.10	90.10	114.34	95.09	90.88	89.14	100.55	91.17	101.32	92.64	93.76	91.38	95.43
1953-56	85.41	100.18	91.61	87.11	86.30	94.41	87.22	103.66	92.75	87.38	86.52	95.47	87.41	94.84	92.27	89.31	88.87	92.93
1954-57	91.83	90.29	92.62	92.62	91.41	92.12	93.25	98.26	90.83	92.90	91.29	93.46	92.36	92.27	89.72	92.66	91.00	89.56
1955-58	96.73	94.43	95.35	96.22	95.70	93.04	96.18	96.97	92.49	96.56	95.36	94.09	97.31	92.17	90.65	95.81	94.35	90.41
1956-59	99.01	96.68	95.81	98.59	98.22	96.02	98.13	99.46	95.74	98.66	97.57	97.12	99.52	94.57	93.18	98.12	96.72	93.11
1957-60	99.17	98.55	98.47	99.09	99.13	98.50	98.37	100.43	98.53	98.70	98.42	99.23	99.42	97.21	97.20	98.89	98.49	97.21
1958-61	102.76	103.07	103.52	102.82	103.02	103.15	102.44	104.13	104.00	102.56	102.85	103.80	102.93	101.85	103.30	102.73	103.17	102.74
1959-62	105.49	108.06	103.78	105.81	105.65	106.10	105.57	108.11	106.28	105.74	105.80	106.49	105.98	106.93	105.73	106.27	105.99	105.97
1960-63	107.65	110.61	102.63	107.99	107.07	105.07	107.75	110.91	110.14	107.33	107.97	107.73	108.85	104.18	108.08	106.37	105.48	
1961-64	107.82	110.43	98.26	107.75	106.17	102.44	107.97	109.04	100.60	108.04	106.49	103.09	107.41	106.37	99.56	107.17	104.09	101.53
1962-65	111.88	107.83	101.22	109.76	108.13	103.49	111.14	109.36	101.20	109.89	108.11	104.03	109.48	107.78	99.33	108.45	105.28	102.35
1963-66	115.14	105.87	102.83	110.90	109.67	104.46	113.38	108.01	102.62	110.75	109.20	104.87	110.85	108.21	100.67	109.00	106.90	103.88
1964-67	122.49	107.05		117.15	114.73	108.54	119.30	109.58	106.70	113.86	113.67	107.66	115.49	112.45	105.39	112.83	111.74	108.96
1965-68	123.38	104.89	102.95	116.07	114.10	105.45	119.97	106.83	102.21	114.01	112.93	104.10	115.98	110.98	102.16	112.74	110.42	106.35
1966-69	123.91	102.67	98.03	116.00	112.86	101.60	120.61	104.04	97.20	113.98	111.89	100.00	116.61	108.91	97.73	112.49	108.44	102.65
1967-70	121.72	98.76	89.59	113.43	108.73	94.71	118.70	99.38	88.78	112.67	108.11	93.80	115.00	104.85	89.91	110.08	103.07	95.95
1968-71	123.37	96.87	85.34	114.32	108.31	91.08	120.43	97.45	84.65	113.57	107.91	90.19	116.24	102.86	85.92	110.20	101.37	92.40
1969-72	127.34	97.99	85.70	117.01	110.84	91.38	124.23	98.58	85.12	116.66	110.53	90.65	119.12	103.72	89.19	111.77	103.30	93.49
1970-73	130.58	100.30	85.18	118.99	111.92	91.01	127.40	101.11	85.12	118.81	111.97	90.80	121.18	105.39	89.06	112.90	105.06	94.51
1971-74	135.80	109.50	85.92	124.65	115.22	94.32	132.58	110.13	86.47	114.59	115.79	94.68	126.83	112.79	92.46	119.04	109.79	99.48
1972-75	136.11	114.65	79.17	126.73	112.24	91.18	133.47	116.08	79.90	116.75	113.34	91.65	129.17	116.91	86.22	122.60	106.63	95.81
1973-76	128.66	110.49	73.75	121.26	106.26	87.01	127.02	111.18	74.48	111.64	107.83	87.36	125.64	113.83	80.36	120.06	102.66	91.76
1974-77	120.35	105.42	70.16	114.23	99.87	83.15	119.84	105.35	71.03	115.11	101.95	83.17	120.55	112.79	76.60	116.37	98.19	88.30
1975-78	119.89	107.56	76.33	114.40	102.62	88.85	120.25	105.67	77.61	115.51	105.19	88.75	123.06	118.67	84.42	117.46	104.53	95.20
1976-79	123.74	112.95	74.43	118.48	103.48	88.34	124.22	109.98	76.25	119.49	106.60	88.48	126.08	125.46	84.81	121.60	105.63	97.66
1977-80	123.87	103.76	67.24	116.19	99.68	80.01	124.40	100.85	69.53	117.40	103.37	80.68	124.54	114.14	79.62	116.60	103.57	90.72
1978-81	120.55	87.45	55.31	109.31	91.51	66.09	121.02	85.00	58.14	110.73	95.83	67.44	119.00	94.70	70.16	108.08	94.83	77.99
1979-82	119.87	76.85	53.20	105.96	89.86	61.81	120.72	75.63	56.30	108.01	94.63	63.56	118.64	81.35	68.90	102.74	93.80	73.58
1980-83	119.83	73.90	55.08	105.02	91.04	62.61	121.34	73.41	58.73	107.80	96.31	64.76	120.21	77.42	73.25	101.81	95.11	75.33
1981-84	119.41	75.35	53.44	105.35	92.95	65.70	121.20	74.87	62.65	108.31	98.53	68.13	121.11	79.08	79.22	103.18	99.72	80.12

(Continued......)

YEARS	ALTERNATIVE - 1 Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Alternative - 1 of						ALTERNATIVE - 2 Agricultural Price Indices Relative to Manufacturing Price Indices Weighted by Alternative - 2 of					
	Consumption Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate and Investment Goods	Consumption Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate and Investment Goods
1951-54	97.73	97.93	88.64	97.74	96.54	93.30	97.41	97.02	88.82	97.36	96.48	93.05
1952-55	90.98	96.03	92.57	92.02	90.14	94.37	90.80	95.50	92.82	93.35	90.95	94.36
1953-56	87.62	89.24	92.24	88.02	86.87	89.95	87.54	90.61	92.44	88.69	88.29	91.03
1954-57	92.79	85.96	89.62	92.46	92.51	87.28	92.02	89.23	89.79	92.73	92.50	89.14
1955-58	97.95	86.12	90.48	96.30	97.29	88.02	98.23	91.71	90.59	96.30	96.99	90.29
1956-59	100.31	91.24	93.02	99.15	99.82	92.55	102.05	96.01	93.13	98.53	99.45	94.23
1957-60	100.09	95.95	97.12	99.66	99.96	96.70	101.74	99.09	97.19	99.34	99.99	97.65
1958-61	103.26	102.19	103.30	103.25	103.43	102.41	104.79	101.81	103.6?	102.63	103.62	102.28
1959-62	106.04	109.47	105.73	106.48	106.19	107.12	106.31	104.49	105.59	105.62	106.28	104.89
1960-63	107.76	114.77	104.16	108.61	107.83	109.11	108.18	105.24	104.02	107.72	107.53	104.83
1961-64	107.45	115.64	99.54	108.40	107.01	107.26	107.98	102.66	99.10	107.31	106.51	101.55
1962-65	102.89	122.45	98.22	110.21	109.39	108.89	110.23	105.42	99.01	109.20	108.20	102.72
1963-66	100.91	126.66	98.58	111.46	111.35	110.65	111.94	107.68	100.09	109.88	109.82	104.11
1964-67	101.42	137.74	102.20	116.09	116.32	117.27	116.91	114.98	104.48	114.35	114.69	109.90
1965-68	104.56	138.13	99.12	116.71	115.99	116.71	117.64	115.74	101.24	115.08	114.56	109.28
1966-69	104.99	135.54	94.88	116.95	115.49	113.96	118.27	114.32	96.83	115.02	114.00	106.80
1967-70	103.40	129.00	87.30	114.84	113.86	107.41	116.68	108.96	89.03	112.21	110.90	100.56
1968-71	104.60	128.00	83.42	115.72	114.49	104.83	118.02	106.47	85.03	112.21	110.83	97.37
1969-72	106.81	133.84	84.63	118.70	117.24	107.36	121.06	106.65	86.24	114.12	113.32	97.80
1970-73	108.04	150.49	86.46	120.67	117.97	113.71	122.93	108.85	88.09	115.20	114.58	99.32
1971-74	112.15	174.10	89.73	127.63	122.64	125.74	128.24	119.44	91.47	122.12	119.03	106.88
1972-75	113.69	191.07	83.65	131.22	123.57	130.08	130.27	132.38	85.27	127.50	118.32	110.10
1973-76	110.70	190.33	77.92	128.92	120.15	127.83	126.29	133.21	79.46	125.94	114.51	108.57
1974-77	106.28	194.99	74.27	124.22	114.73	127.20	120.43	137.97	75.76	122.80	109.63	108.53
1975-78	108.25	210.38	81.84	127.09	119.02	138.36	122.00	147.05	83.54	126.20	113.47	117.64
1976-79	110.64	218.36	82.19	130.22	120.57	141.44	124.57	153.66	83.97	129.79	115.20	120.72
1977-80	109.33	200.70	77.13	127.16	118.86	130.10	122.82	136.01	78.79	123.59	112.81	109.42
1978-81	104.54	168.41	67.62	119.38	110.14	110.01	117.37	108.45	69.27	111.63	105.72	90.65
1979-82	103.89	151.38	66.41	117.36	108.09	102.30	116.89	94.19	68.06	106.66	104.95	82.90
1980-83	104.55	147.15	70.72	118.14	109.95	103.69	118.02	92.39	72.52	106.50	106.56	82.90
1981-84	104.89	151.00	26.93	119.28	112.68	109.56						

YEARS	ALTERNATIVE - 3 Agricultural Price Indices Relative to Manufacturing Price Indices Weighted						ALTERNATIVE - 4 Agricultural Price Indices Relative Weighted by Alternative - 4 of					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate and Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption & Intermediate Goods	Consumption & Investment Goods	Intermediate and Investment Goods
1951-54	97.61	98.78	88.53	97.80	96.66	91.32	97.31	95.42	88.57	97.21	96.50	93.48
1952-55	90.87	97.43	93.33	91.86	91.05	94.08	90.78	94.04	91.65	92.46	90.80	94.03
1953-56	87.52	91.09	93.56	87.70	88.18	91.28	87.65	89.50	90.63	88.44	87.91	90.45
1954-57	92.87	87.44	90.24	92.15	92.25	88.16	93.23	89.37	89.13	92.27	92.49	89.24
1955-58	98.00	87.60	90.66	96.33	96.61	88.80	98.56	90.84	90.60	95.78	97.36	90.67
1956-59	100.59	92.54	92.72	99.23	99.14	92.61	101.40	95.05	93.49	99.07	100.29	94.70
1957-60	100.35	96.69	97.08	99.76	99.75	96.86	101.01	98.03	97.26	99.94	100.61	97.83
1958-61	103.66	102.04	103.69	103.29	103.54	102.89	103.86	101.72	102.79	103.03	103.85	101.94
1959-62	106.61	107.49	106.24	106.49	106.46	106.82	106.37	104.24	105.08	105.59	106.31	104.42
1960-63	108.48	110.95	104.77	108.61	107.68	107.45	108.23	104.78	105.08	106.98	107.68	104.47
1961-64	108.35	110.51	100.02	108.55	106.50	104.57	108.05	102.08	100.61	105.88	106.90	101.38
1962-65	110.00	112.54	100.38	110.47	107.86	104.61	110.17	103.42	102.04	107.72	108.85	102.75
1963-66	111.30	114.09	102.51	111.80	109.34	106.53	111.84	104.31	103.05	109.10	110.66	104.05
1964-67	115.55	120.81	108.23	116.41	114.19	112.62	116.68	110.05	109.12	114.27	115.65	109.86
1965-68	116.15	121.31	104.87	116.95	113.95	111.88	117.43	110.77	105.90	115.00	115.75	109.78
1966-69	116.68	119.16	100.30	117.07	113.31	108.20	117.96	109.37	101.36	114.79	115.43	107.61
1967-70	115.08	113.30	92.34	114.80	110.21	101.03	116.37	104.17	93.18	111.76	112.61	101.67
1968-71	116.39	111.68	88.26	115.63	109.97	97.19	117.74	101.61	88.75	111.53	112.82	98.50
1969-72	119.39	114.95	89.69	118.66	112.57	99.92	120.80	101.49	89.49	113.24	115.42	98.60
1970-73	120.84	124.96	91.78	120.76	114.21	104.64	122.08	103.04	89.29	114.23	116.48	99.65
1971-74	126.07	142.70	97.06	127.80	119.16	113.81	127.31	112.66	91.93	121.17	120.43	107.66
1972-75	128.03	158.19	108.17	131.50	118.62	112.94	129.15	124.84	89.46	126.90	120.01	113.41
1973-76	124.64	158.46	103.80	129.08	114.92	109.58	125.60	125.67	84.67	125.45	116.01	112.67
1974-77	119.07	163.15	99.62	124.34	110.22	107.10	119.47	120.42	80.31	122.85	110.97	113.65
1975-78	138.77	175.45	91.60	127.09	114.42	117.75	120.83	129.17	83.23	126.34	114.00	122.31
1976-79	141.97	182.69	92.92	130.18	116.69	120.50	123.18	135.56	91.91	130.06	115.24	125.50

Table-A 3.9

DOMESTIC TERMS OF TRADE FOR AGRICULTURE: ALTERNATIVE METHOD
(Three years moving average)

(Using Value added as Weight for Agricultural Prices)

YEARS	Agriculture Price Indices Relative to Manufacturing Price Indices weighted by Value Added of						Agricultural Price Indices Relative to Manufacturing Price Indices weighted by GVO of						Agricultural Price Indices Relative to Manufacturing Price Indices weighted by Net Availability					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate goods	Consumption and Investment Goods	Intermediate and Investment Goods
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1951-54	91.09	111.96	89.89	92.77	92.39	97.62	92.25	116.95	90.60	93.54	93.07	99.59	95.89	102.57	87.01	97.10	93.13	92.46
1952-55	87.09	109.00	93.58	89.54	89.55	98.50	87.87	113.78	94.61	89.55	89.60	100.04	90.74	100.81	97.12	93.31	90.94	94.96
1953-56	84.61	98.67	90.20	85.70	84.90	92.97	84.15	95.97	91.32	85.96	85.11	93.99	85.99	93.40	90.82	87.88	87.45	91.50
1954-57	89.61	93.45	88.15	90.40	89.20	89.94	89.37	94.27	88.68	90.34	89.09	91.24	90.12	90.11	87.58	90.44	88.81	87.74
1955-58	94.03	91.78	89.77	93.53	93.02	90.44	93.49	97.08	89.90	93.54	92.68	91.44	94.59	89.59	88.11	93.12	91.71	87.88
1956-59	100.45	95.02	93.53	96.23	95.87	93.86	95.78	98.06	93.46	95.97	95.23	94.29	94.14	92.31	90.96	95.77	94.41	90.89
1957-60	101.54	97.78	97.05	97.65	97.59	97.08	96.95	103.44	97.11	97.27	96.99	97.79	97.98	95.81	95.81	97.46	97.07	95.82
1958-61	105.89	103.05	102.84	102.14	102.34	102.48	101.77	107.30	103.31	101.88	102.16	103.11	102.25	101.19	102.61	102.05	102.49	102.07
1959-62	104.71	73.91	103.05	105.02	104.87	105.32	104.79	109.16	105.50	104.95	105.01	72.37	105.19	106.13	104.95	105.43	105.20	105.19
1960-63	105.94	108.86	101.06	106.27	105.39	104.43	106.05	106.89	103.52	106.26	105.64	104.94	106.03	107.14	102.59	106.37	104.71	103.84
1961-64	105.70	106.29	96.32	105.63	104.08	100.43	105.84	107.25	98.50	105.91	104.39	101.05	105.30	104.22	97.61	105.15	102.04	99.52
1962-65	109.73	105.74	99.28	107.65	106.05	101.50	109.00	106.15	99.25	107.77	106.03	102.03	107.38	105.70	97.42	106.45	103.26	100.38
1963-66	113.15	104.05	101.04	108.99	107.78	100.84	111.42	109.94	100.84	108.84	107.32	103.05	108.94	106.34	98.92	107.20	104.95	102.08
1964-67	121.97	106.53	106.66	115.22	114.22	108.02	118.78	107.95	106.19	113.33	113.17	107.12	114.98	111.91	104.91	112.32	111.24	108.46
1965-68	124.73	106.00	104.00	117.33	115.33	106.55	121.29	106.85	103.25	115.24	114.14	105.17	117.26	112.16	103.23	113.97	111.68	107.47
1966-69	127.26	105.45	100.66	119.14	115.91	104.34	123.87	102.39	99.81	117.08	114.91	102.70	119.77	111.86	100.36	115.54	111.36	105.41
1967-70	125.41	101.75	92.30	116.87	112.02	97.60	122.30	100.48	91.44	116.08	111.39	96.44	118.49	108.03	92.62	113.41	106.19	98.65
1968-71	127.20	99.88	87.99	117.86	111.68	93.93	124.16	101.50	87.27	117.09	111.25	94.06	119.84	106.05	88.58	113.62	104.51	95.26
1969-72	131.12	100.90	88.23	120.48	114.12	94.11	127.90	103.84	87.64	120.12	113.79	93.33	122.65	106.79	89.77	115.08	106.36	96.15
1970-73	134.11	103.00	87.48	122.20	114.94	93.47	130.83	112.70	87.48	122.02	114.99	93.25	124.46	108.23	91.46	115.95	107.89	97.05
1971-74	138.98	112.04	87.94	127.56	117.93	96.53	135.69	119.45	88.51	117.08	118.51	96.90	129.80	115.42	94.63	121.82	112.36	101.81
1972-75	140.02	117.95	81.38	130.38	115.42	93.76	137.31	115.02	82.13	119.98	116.57	94.24	132.89	120.29	88.61	126.15	109.64	98.50
1973-76	133.12	114.30	76.27	125.46	109.92	90.00	131.43	109.13	77.03	115.42	111.55	90.35	130.01	117.78	83.10	124.26	106.19	94.90
1974-77	124.70	109.19	72.66	118.35	105.45	86.11	124.16	109.60	73.55	119.26	105.61	86.13	124.88	115.78	79.31	120.54	101.69	91.42
1975-78	373.11	111.57	79.20	118.66	106.45	92.17	124.74	113.72	80.51	119.82	109.12	92.06	127.65	123.07	87.58	121.81	108.44	99.78
1976-79	127.93	116.80	77.00	122.49	106.99	91.50	128.44	104.90	78.86	123.71	110.22	91.50	130.37	129.71	87.71	125.70	109.23	100.99
1977-80	136.81	107.92	69.97	120.82	103.68	83.25	129.37	88.59	72.35	122.09	107.52	83.94	129.32	118.70	82.83	121.25	107.73	94.37
1978-81	124.97	90.62	57.33	113.30	94.86	68.51	125.47	60.26	64.77	99.35	95.35						98.31	80.63
1979-82	124.20	75.29	55.12	109.79	93.11	64.09	125.07	75.68	58.33	111.91	98.05	65.83	122.92	84.30	71.38	104.46	97.19	79.25

YEARS	Agriculture Price Indices Relative to Manufacturing Price Indices weighted by Alternative-1 of						Agriculture Price Indices Relative to Manufacturing Price Indices weighted by Alternative-2 of						Agriculture Price Indices Relative to Mfg. Price Indices weighted by Alt.-3 of					
	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate & Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods	Consumption Goods	Intermediate Goods	Investment Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Intermediate and Investment Goods
	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
1951-54	95.46	95.76	86.93	95.48	94.30	91.36	95.14	94.86	87.11	95.12	94.28	91.12	95.33	96.60	86.86	95.53	94.44	89.49
1952-55	90.55	95.53	92.10	91.59	89.73	93.89	90.36	95.01	92.34	91.90	90.52	93.89	90.43	96.93	92.86	91.42	90.61	93.59
1953-56	86.20	87.91	90.79	86.61	85.47	88.60	86.12	89.23	90.99	87.28	86.68	89.56	86.10	89.81	92.09	86.29	86.75	89.88
1954-57	90.55	83.96	87.49	90.24	90.28	85.23	90.94	87.13	87.65	90.51	90.07	86.96	90.63	85.48	88.10	89.93	90.02	86.08
1955-58	95.20	83.72	87.55	93.61	94.57	85.56	95.48	88.05	88.08	93.61	94.08	87.68	95.51	85.23	88.12	93.64	93.90	86.32
1956-59	97.90	89.06	90.81	96.78	97.43	90.34	99.61	95.31	90.92	96.17	97.07	91.98	98.17	90.33	90.52	96.85	96.77	90.40
1957-60	98.62	101.53	98.21	98.50	98.50	95.31	100.25	96.55	95.80	97.89	98.54	96.24	98.88	95.30	95.70	98.31	98.29	95.48
1958-61	102.57	108.64	102.62	102.57	102.74	101.75	104.04	101.14	102.95	101.91	102.92	101.60	102.96	101.38	103.00	102.60	102.85	102.22
1959-62	105.25	112.93	104.95	105.69	105.40	106.32	105.52	103.73	105.09	104.84	105.49	104.12	105.61	106.69	105.46	105.69	105.66	106.03
1960-63	106.06	113.36	102.56	106.99	106.13	107.40	106.47	103.59	102.42	106.03	105.83	103.19	106.57	109.19	103.15	106.90	105.99	105.77
1961-64	105.34	119.11	97.58	106.26	104.91	106.18	105.85	100.63	97.15	105.20	104.42	99.54	106.03	108.33	98.05	106.42	104.14	102.51
1962-65	100.91	124.46	96.33	109.09	107.29	106.79	108.11	103.39	97.11	107.10	106.12	100.74	107.89	110.37	98.46	108.35	105.78	102.59
1963-66	99.18	137.17	96.88	109.53	109.43	108.74	110.00	105.82	98.36	107.99	107.93	102.31	107.37	112.12	100.74	109.87	107.45	104.69
1964-67	101.01	139.63	101.74	115.59	115.79	116.77	116.40	114.50	104.01	113.85	114.19	109.43	115.04	120.31	107.74	115.90	113.68	112.14
1965-68	105.70	139.20	100.16	118.00	117.25	117.97	118.94	117.01	102.30	116.35	115.81	110.47	117.42	122.63	105.97	118.24	115.19	113.07
1966-69	107.85	132.91	97.43	120.12	118.62	117.03	121.48	117.41	99.43	118.13	117.09	109.68	119.84	122.40	102.99	120.25	116.38	111.11
1967-70	106.54	132.04	89.95	118.32	117.31	110.66	120.22	112.26	91.72	115.61	114.26	103.61	118.56	116.73	95.14	118.28	113.55	104.09
1968-71	107.85	137.80	86.01	119.31	118.04	108.08	121.69	109.77	87.67	115.49	114.26	100.40	120.00	115.15	90.99	119.22	113.38	100.82
1969-72	109.97	154.50	87.13	122.21	120.71	110.54	124.65	109.82	88.79	117.50	116.68	100.70	122.93	118.36	92.34	122.18	115.91	102.88
1970-73	110.96	178.13	88.78	123.93	121.15	116.76	126.24	111.79	90.47	118.32	117.67	102.00	124.11	128.30	94.24	124.02	117.29	107.45
1971-74	114.77	196.61	91.83	130.61	125.51	128.66	131.24	122.22	93.62	124.97	121.82	109.38	129.02	146.00	99.33	130.78	121.95	116.46
1972-75	116.96	196.99	85.97	135.02	127.13	133.80	134.02	136.30	87.63	131.22	121.70	113.27	131.72	162.81	111.44	135.30	122.01	116.12
1973-76	114.55	201.86	80.58	133.41	124.34	132.26	130.68	137.90	82.17	130.34	118.48	112.34	128.97	164.01	107.50	133.58	118.93	113.35
1974-77	110.10	218.18	76.90	128.69	118.86	131.70	124.76	142.84	78.44	127.31	113.56	112.36	123.36	168.90	103.28	128.81	114.17	110.88
1975-78	112.29	225.79	83.89	131.83	123.49	143.52	126.55	152.50	86.65	130.91	117.70	122.02	144.12	181.96	95.03	131.83	118.69	122.14
1976-79	114.40	208.76	84.99	134.64	124.70	146.27	128.80	158.91	86.84	134.21	119.12	124.84	147.03	188.92	96.09	134.60	120.66	124.61
1977-80	113.70	174.53	80.24	132.25	123.64	135.35	127.74	141.50	82.07	128.55	117.34	113.83	146.07	172.18	92.76	132.07	118.94	117.98
1978-81	108.37	156.86	70.09	123.75	114.18	134.01	115.67	112.37	71.80	115.71	109.60	93.95	121.34	141.19	83.94	123.30	109.42	101.01
1979-82	107.64	152.10	68.80	121.60	112.01	105.97	115.11	97.61	70.53	110.52	108.74	85.90	120.17	125.72	83.74	120.99	108.88	96.83
1980-83	108.08	155.77	73.10	122.14	113.66	107.18	116.00	95.51	74.96	111.08	110.15	86.73	121.08	122.85	90.64	121.37	111.43	100.87
1981-84	108.21	153.87	79.36	123.05	116.25	113.06	122.30	99.71	81.39	111.98	112.54	91.96	121.42	127.05	99.95	122.28	116.71	110.82

Agriculture Price Indices Relative to Manufacturing Price Indices weighted by Alternative - 4 of

(38) Consumption Goods	(39) Intermediate Goods	(40) Investment Goods	(41) Consumption and Intermediate Goods	(42) Consumption and Investment Goods	(43) Intermediate & Investment Goods
95.03	93.29	86.82	94.95	94.80	91.49
90.34	93.56	91.19	91.99	90.36	93.55
86.22	88.13	93.59	87.02	86.49	89.07
90.98	87.26	91.38	90.07	90.26	87.14
95.81	88.29	92.44	93.10	94.63	88.14
98.97	92.76	91.36	96.69	97.88	92.43
99.53	96.61	95.86	98.40	99.14	96.42
103.17	101.06	102.11	102.41	103.15	101.28
105.58	103.48	104.31	104.82	105.53	103.66
106.53	103.14	101.92	105.31	105.99	102.85
105.93	100.06	97.10	103.80	104.80	99.38
108.06	101.42	98.55	105.65	105.76	100.77
109.91	102.51	101.27	107.21	108.74	102.24
116.16	109.58	108.63	113.78	115.14	109.39
118.72	111.98	107.01	116.27	117.02	110.97
121.16	112.26	104.09	117.90	118.55	110.52
119.90	107.32	96.00	115.14	116.03	104.74
121.40	104.77	91.50	114.99	116.32	101.55
124.38	104.50	92.14	116.60	118.85	101.52
125.38	105.82	91.70	117.31	119.63	102.34
130.29	115.28	94.09	123.99	123.26	110.17
132.87	128.53	92.01	130.59	123.46	116.70
129.97	130.10	87.60	129.83	120.04	116.60
123.77	135.02	83.19	127.24	114.95	117.66
125.34	144.33	86.35	131.05	118.26	126.85
127.36	150.53	84.61	134.47	119.26	129.88
126.28	133.74	78.21	127.96	116.49	116.77
130.31	105.82	65.94	111.53	105.89	92.24
118.70	91.64	63.75	105.53	104.72	82.32

Table-A 3.10

INTRA SECTORAL TERMS OF TRADE FOR MANUFACTURING SECTOR
(THREE YEARS MOVING AVERAGE)

YEARS	CONSUMPTION GOODS RELATIVE TO INTERMEDIATE AND INVESTMENT GOODS						
	Value added	GVO	Net avail-ability	Alt. 1	Alt. 2	Alt. 3	Alt. 4
1951-54	108.21	108.76	97.24	96.52	96.64	94.89	97.07
1952-55	113.92	114.55	105.49	104.51	104.70	104.37	104.32
1953-56	111.21	112.14	106.58	103.20	104.36	104.66	103.59
1954-57	100.88	102.66	97.93	94.77	96.36	95.49	96.23
1955-58	96.19	97.84	93.01	89.93	91.90	90.67	91.95
1956-59	97.12	98.99	93.58	93.27	92.33	92.07	93.39
1957-60	99.33	100.87	97.77	96.61	96.23	96.53	96.87
1958-61	100.33	101.30	99.77	99.09	97.59	99.21	98.12
1959-62	100.56	100.85	99.99	100.99	98.68	100.38	98.21
1960-63	98.50	98.90	97.86	101.25	96.86	99.19	96.49
1961-64	95.03	95.50	94.52	99.83	94.06	96.69	93.84
1962-65	92.53	93.60	93.45	106.44	95.13	95.11	93.28
1963-66	90.73	92.47	93.67	110.23	94.93	95.73	97.08
1964-67	88.71	90.39	94.38	115.77	95.92	97.45	98.21
1965-68	85.51	86.86	91.71	111.58	92.88	⁻96.32	97.54
1966-69	81.85	82.80	87.86	108.35	90.16	92.54	91.09
1967-70	77.84	79.06	83.44	103.87	86.20	87.81	87.38
1968-71	73.91	74.98	79.56	100.27	82.59	84.09	83.74
1969-72	71.77	72.98	78.40	100.52	80.80	83.70	81.63
1970-73	69.73	71.30	77.97	105.18	80.78	86.55	81.61
1971-74	69.47	71.42	78.46	111.88	83.21	90.18	84.38
1972-75	66.90	68.58	74.12	114.34	84.45	88.16	87.74
1973-76	67.65	68.75	72.99	115.51	85.99	87.98	89.72
1974-77	69.31	69.59	73.40	119.80	90.19	90.19	95.13
1975-78	73.94	73.65	78.04	127.42	96.07	87.46	95.83
1976-79	71.37	71.19	77.38	127.67	96.77	87.29	96.82
1977-80	64.24	64.51	72.47	118.29	88.44	82.50	86.69
1978-81	54.73	55.65	65.43	105.04	77.06	84.94	78.03
1979-82	51.60	52.65	2.02	98.48	70.94	82.39	70.34
1980-83	52.21	53.36	62.64	99.15	71.07	85.09	69.57
1981-84	55.05	56.23	66.17	104.49	75.22	91.31	73.11

INTRASECTORAL TERMS OF TRADE FOR AGRICULTURAL SECTOR

YEARS	FOOD CROPS RELATIVE TO CASH CROPS					
	MARKETINGS		GROSS VALUE OF OUTPUT		NET AVAILABILITY	
	Absolute	3 Years Moving Average	Absolute	3 Years Moving Average	Absolute	3 Years Moving Average
1951-52	59.57	–	61.14	–	65.15	–
1952-53	106.07	87.16	110.89	89.29	117.36	93.50
1953-54	95.84	94.88	95.83	96.33	97.98	99.28
1954-55	82.72	87.02	82.26	87.20	82.49	88.75
1955-56	82.50	84.62	83.50	84.91	85.77	87.78
1956-57	88.64	87.41	88.96	86.91	95.07	91.09
1957-58	91.09	92.22	88.27	90.92	92.42	96.32
1958-59	96.94	96.01	95.53	94.60	101.46	97.96
1959-60	100.00	98.43	100.00	98.05	100.00	103.09
1960-61	98.35	96.98	98.63	96.65	104.82	102.05
1961-62	92.58	93.44	91.32	92.46	101.34	101.20
1962-63	89.39	95.41	87.42	91.36	97.45	100.29
1963-64	104.27	96.44	95.33	89.95	102.09	97.36
1964-65	95.66	97.11	87.09	88.58	92.55	94.14
1965-66	91.40	106.33	83.31	95.84	87.78	100.23
1966-67	131.94	124.69	117.13	111.46	120.36	111.69
1967-68	150.73	137.00	133.94	121.41	126.93	118.19
1968-69	128.34	136.25	113.17	125.55	107.28	112.44
1969-70	129.67	126.31	109.55	110.85	103.10	105.40
1970-71	120.93	123.56	109.82	109.29	105.82	103.34
1971-72	120.07	120.73	108.49	108.64	101.10	102.67
1972-73	121.19	121.16	107.61	107.17	101.10	100.89
1973-74	122.21	127.64	105.41	111.96	100.47	104.51
1974-75	139.52	129.42	122.87	113.08	111.95	108.51
1975-76	126.54	126.06	110.95	111.11	113.10	106.74
1976-77	112.12	123.45	99.52	109.92	95.16	106.33
1977-78	131.70	118.90	119.28	108.70	110.72	100.52
1978-79	112.87	121.94	107.29	113.44	95.68	102.15
1979-80	121.26	117.53	113.74	109.51	100.06	97.27
1980-81	118.46	121.44	107.48	112.58	96.08	100.67
1981-82	124.60	83.15	116.53	113.97	105.87	103.17
1982-83	124.84	119.07	117.89	112.99	107.55	103.70
1983-84	107.76	–	104.56	–	97.68	–

	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63
CONSUMPTION GOODS												
Sugar Manufacturing	84.64	86.90	86.47	80.74	77.33	80.86	95.07	100.10	100.00	100.16	103.44	110.53
Edible oils	79.19	78.26	97.50	103.73	91.61	100.00	121.71	110.92	100.00	100.00	98.89	95.34
Tea Manufacturing	61.33	61.33	64.24	79.76	87.12	84.52	87.93	88.40	100.00	93.04	91.42	113.94
Food Manufacturing n.e.c.	93.66	91.88	90.36	84.01	88.83	84.01	90.36	93.66	100.00	108.28	114.30	124.47
Beverages	32.80	90.79	92.47	97.44	86.70	88.85	93.28	93.31	100.00	97.61	97.46	101.11
Tobacco Manufacturing	113.03	119.12	121.00	116.93	117.03	111.69	104.65	100.11	100.00	100.15	101.57	118.51
Cotton Textiles	86.41	95.32	112.92	89.98	84.63	90.87	102.67	96.21	100.00	99.49	100.39	96.63
Silk and artsilk textiles	55.48	61.20	72.49	57.80	54.26	58.42	50.73	66.94	100.00	101.04	101.46	91.98
Footwear	---	---	88.60	68.30	76.63	83.24	85.92	87.07	100.00	98.18	96.74	96.74
Wood and furniture	82.90	90.79	92.47	87.44	86.70	88.85	93.28	93.31	100.00	97.61	97.46	101.11
Printing and Publishing	82.80	90.79	92.47	87.44	86.70	88.85	93.28	93.31	100.00	97.61	97.46	101.11
Soap, perfume, etc.	63.76	59.09	88.41	97.06	91.27	82.07	87.94	99.00	100.00	85.59	85.51	85.34
Matches	102.69	154.03	102.69	102.69	102.69	111.47	107.93	102.69	100.00	100.87	101.58	99.40
Misc. Manufacturing Industries	---	---	---	80.88	82.32	90.24	91.21	81.36	100.00	86.91	76.81	79.23
INTERMEDIATE AND RELATED GOODS												
Paper Manufacturing	53.23	46.18	49.99	79.38	94.84	95.87	95.87	96.90	100.00	100.00	112.91	114.08
Leather Manufacturing	96.13	89.72	83.31	53.94	66.34	67.84	72.00	70.23	100.00	96.63	93.64	89.42
Rubber & Rubber Products	---	---	---	83.31	91.32	90.19	91.50	91.19	100.00	97.50	91.70	97.02
Fertilizer	---	---	---	---	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.63
Chemicals	54.10	57.74	68.01	61.56	70.52	85.87	97.76	103.49	100.00	90.29	90.76	104.82
Medicines	---	---	---	---	107.58	110.90	106.32	102.95	100.00	91.84	87.32	84.20
Petroleum and coal Products	87.20	96.28	91.70	80.59	90.37	96.67	99.07	100.28	100.00	100.34	100.35	100.54
INVESTMENT AND RELATED GOODS												
Non-metallic minerals	100.14	99.64	97.33	87.55	100.55	88.86	92.39	102.14	100.00	102.93	111.38	111.60
Basic metals	---	84.37	76.52	74.64	74.64	126.56	126.56	83.07	100.00	92.26	100.54	135.32
Metal Products	---	84.37	76.52	79.32	80.40	99.32	100.05	81.79	100.00	88.24	82.74	93.29
Machinery except electric	117.80	114.87	99.16	91.16	91.16	114.87	114.33	99.51	100.00	105.94	101.01	106.39
Electric machinery	---	---	---	---	81.07	81.07	81.07	99.83	100.00	95.17	99.83	100.10
Transport equipment	---	---	---	---	84.46	84.46	98.18	99.15	100.00	93.20	102.60	108.55

Continued

CONTINUED - TABLE-A 3.12

1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73
127.12	115.75	106.27	126.31	118.61	118.61	108.35	138.33	167.35
112.70	126.37	140.05	134.78	133.47	137.36	130.23	152.06	151.57
101.12	118.86	130.33	108.74	115.78	109.78	113.96	119.35	158.73
113.10	108.24	126.89	133.26	134.04	134.10	136.50	153.19	189.05
131.89	140.58	141.12	140.97	150.97	140.97	156.58	161.05	189.94
96.82	98.48	101.89	102.96	102.04	101.78	102.94	105.18	116.75
79.88	77.45	81.69	88.49	89.66	91.51	88.44	87.16	87.8
98.98	103.86	114.12	108.01	104.48	95.95	101.14	111.15	125.7
97.90	127.18	174.07	179.38	181.52	180.52	176.99	171.19	157.31
93.89	102.81	112.66	108.0	109.24	121.58	116.89	136.28	196.63
99.17	109.93	103.90	104.24	114.13	117.29	134.07	26.75	213.7
107.19	112.70	117.02	121.68	129.75	134.27	142.34	151.52	209.0
119.51	123.94	124.97	123.08	130.68	135.36	145.53	169.57	190.62
89.88	99.34	113.88	125.96	130.55	142.51	142.51	148.93	161.99
103.93	106.23	110.59	119.71	120.80	121.88	122.16	142.69	149.93
92.49	90.43	95.54	113.30	131.07	131.05	140.18	131.88	79.57
102.06	128.51	152.32	142.11	155.14	152.36	171.19	176.74	173.34
91.15	91.15	91.15	91.15	91.11	90.64	90.64	85.69	69.93
105.29	109.18	120.98	123.61	127.37	132.20	137.08	150.63	182.20
101.95	107.52	116.93	122.34	130.66	147.74	157.05	164.81	253.83
99.98	113.77	119.84	139.64	172.71	189.98	243.15	249.85	248.22
109.71	127.25	146.0	164.06	170.87	188.28	188.35	155.49	210.5
103.62	105.83	107.65	108.41	111.37	112.36	112.37	112.36	113.1
111.33	116.66	126.57	146.11	153.73	142.76	142.51	1.3.57	169.8
113.51	116.28	118.26	121.57	124.90	125.34	126.51	120.23	122.35

1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
184.?0	226.5?	250.?	250.4	250.?	290.14	313.33	406.67	474.78	409.94	451.98
190.77	247.04	283.1	283.1	283.1	292.92	314.44	314.44	314.44	312.63	357.95
148.59	162.14	173.9	173.2	173.2	304.57	304.53	304.53	304.53	285.96	327.77
242.65	302.38	534.?8	365.8?	393.10	405.05	424.44	477.68	551.08	597.40	639.40
201.?0	323.51	365.?	397.9	463.7	572.14	645.36	740.78	775.84	776.15	891.21
157.?5	198.20	270.7	304.3	317.7	296.67	311.53	318.15	347.39	403.69	437.05
123.?	171.1	164.7	180.8	172.4	153.59	184.00	212.33	229.51	253.98	255.24
141.?	210.8	236.4	263.8	314.0	281.17	366.84	398.10	410.01	433.06	529.89
242.?6	445.8	747.7	800.0	358.9	870.59	1252.88	1314.11	1167.37	1372.93	1394.61
196.?3	249.14	261.5	270.0	286.4	395.01	467.34	523.01	562.78	459.98	473.71
213.?	253.62	260.6	254.7	253.6	281.92	434.54	456.89	454.21	447.33	434.62
209.0	284.95	311.3?	355.29	369.94	337.73	381.57	416.02	427.09	544.17	614.07
193.15	193.15	208.9	257.6	254.5	334.26	498.9?	566.89	587.72	605.60	574.64
162.56	162.56	203.0	228.9	446.2	544.41	645.5?	706.59	717.68	716.58	643.59
171.6?	218.0	210.0	214.0	222.1	213.29	272.60	317.39	305.07	358.20	391.31
106.5?	151.99	168.0	145.8	141.2	175.96	196.98	246.21	251.93	228.18	275.44
199.2?	319.66	432.4	475.9	434.4	394.43	524.21	617.90	581.66	764.16	799.63
77.17	87.96	104.0	110.6	112.4	127.87	138.13	146.12	152.97	162.50	166.22
235.0?	314.24	370.09	337.15	379.30	412.81	618.52	844.39	879.67	970.49	1030.33
331.05	464.60	586.9	613.7	613.0	1032.70	1325.92	1605.87	1626.79	1726.47	1688.03
330.6?	637.60	516.9	552.50	577.2	576.10	680.70	700.89	590.69	482.78	474.62
301.5	431.7	427.8	457.0	473.4	589.38	693.55	730.73	616.16	593.87	643.49
162.?	242.62	268.0	286.9	296.7	364.05	423.46	453.26	476.25	390.56	391.49
174.?	261.9	284.4	279.2	279.2	282.46	280.58	307.01	355.94	496.11	478.65
188.0?	267.76	345.42	350.23	347.81	341.90	378.38	461.34	499.13	422.83	453.13

Table-A 3.13

INDICES OF AGRICULTURAL WHOLESALE DOMESTIC PRICES

(1959-60 = 100)

	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65
A. FOOD CROPS														
Rice	67.74	74.19	79.03	70.97	74.19	93.55	109.68	101.61	100.00	112.90	103.23	111.30	125.81	96.21
Wheat	76.92	115.38	89.74	69.23	79.49	94.87	94.87	94.87	100.00	115.38	107.69	102.56	112.82	122.53
Maize	65.12	113.95	69.77	51.16	67.44	86.05	79.07	90.70	100.00	115.35	83.72	81.40	83.72	96.31
Barley	64.52	112.90	70.97	51.61	67.74	77.42	83.87	96.77	100.00	103.23	93.55	83.87	83.72	117.44
Sorghum	57.14	119.05	76.19	52.38	71.43	54.76	76.19	88.10	100.00	109.52	92.86	78.57	106.45	117.44
Pulses	72.55	78.43	80.39	50.98	50.98	86.27	115.69	98.04	100.00	111.76	131.37	123.53	110.61	124.32
Potatoes	60.00	67.50	67.50	75.00	65.00	77.50	72.50	90.00	100.00	115.00	77.50	92.50	107.50	95.43
Onions	61.11	44.44	74.07	62.96	59.26	64.81	61.11	46.30	100.00	73.04	77.78	44.44	68.52	40.28
B. CASH CROPS														
Oilseeds	102.99	120.90	92.54	58.21	92.54	9?.54	129.85	130.90	100.00	100.00	102.98	10?.9?	11?.9?	136.67
Cotton	184.26	84.72	84.26	87.04	99.54	98.15	96.76	86.11	100.00	108.80	100.00	??.7?	97.??	114.01
Jute	--	--	--	--	--	--	--	----	--	--	--	--	--	---
Sugarcane	82.50	90.60	92.50	87.50	82.50	117.50	117.50	107.50	100.00	125.00	147.50	13?.??	14?.??	140.15
Tobacco	61.39	63.70	87.13	93.40	71.62	67.46	38.45	71.62	100.00	101.00	97.03	?2.??	104.??	106.10
C. LIVESTOCK														
Milk	83.33	81.67	86.67	81.67	75.00	78.33	81.67	86.67	100.00	106.67	105.00	10?.??	105.00	11?.38
Butteroil	70.20	69.11	73.01	79.10	70.67	74.88	94.23	92.36	100.00	99.68	95.94	93.60	92.51	10?.90
Meat	37.95	90.60	90.66	92.46	94.21	88.57	92.89	98.31	100.00	104.40	111.69	11?.67	117.42	119.10
Wool	55.49	67.45	77.65	80.87	166.29	99.43	89.77	84.47	100.00	96.79	98.10	9?.?2	10?.47	10?.52
Hides & Skins	56.76	46.53	47.52	62.71	66.07	72.61	74.26	78.22	100.00	86.47	76.57	9?.86	76.90	?5.16

(Contd.....)

Table-A 3.13 Continued

1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
112.66	145.65	130.22	125.44	119.61	119.64	128.54	185.56	238.36	260.10	295.3	329.10	390.83	343.57	362.48	450.07	502.57	510.78	527.26
111.66	168.48	149.10	127.78	128.96	132.48	143.55	153.62	190.55	294.20	280.8	282.6	412.41	362.34	367.48	379.53	443.02	461.61	486.79
90.55	136.36	118.30	97.02	100.66	104.72	126.72	137.88	152.21	280.30	264.7	234.4	278.12	343.13	333.81	335.77	463.24	478.76	454.65
90.48	138.41	151.99	115.47	135.11	140.41	154.19	176.56	242.90	240.10	282.0	248.7	458.16	426.29	530.64	589.22	540.40	539.95	627.96
91.92	140.86	119.77	102.66	92.49	83.54	99.76	131.85	128.01	235.30	225.5	241.2	214.83	229.06	298.26	346.44	386.35	420.67	363.33
131.05	149.32	139.01	147.29	198.83	194.56	188.73	243.01	364.19	243.2	355.6	470.0	484.75	501.31	534.06	529.12	517.84	537.0	540.29
97.78	135.19	107.28	103.23	130.97	138.23	113.11	100.55	283.75	229.9	186.1	285.9	399.33	401.27	415.37	416.02	425.35	430.16	435.02
67.07	48.66	53.68	55.13	56.20	86.15	64.86	68.29	228.05	126.7	204.1	292.0	238.76	206.12	206.12	217.35	218.94	235.64	245.24
159.61	193.07	144.36	154.56	184.45	147.04	174.24	185.76	267.08	353.2	364.1	399.4	434.27	350.49	321.99	389.10	402.5?	402.51	402.51
107.39	96.48	95.77	110.35	114.46	141.24	151.12	184.51	264.67	235.3	292.8	397.7	462.65	497.19	456.07	425.60	513.4?	?83.38	722.37
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140.15	122.55	81.14	81.14	81.14	83.74	94.15	101.87	114.21	123.1	158.5	171.0	138.75	15?.?7	19?.4?	23?.23	245.2?	25?.50	258.88
109.15	107.93	111.97	105.96	113.57	113.75	138.48	157.91	147.42	223.0	221.1	238.4	290.51	392.49	429.63	45?.54	441.72	447.83	444.79
114.24	118.55	123.97	134.94	140.08	150.65	160.00	189.61	264.61	327.9	382.0	494.4	432.88	447.14	480.41	496.46	555.71	642.92	698.07
105.07	112.98	116.06	118.36	133.38	148.13	147.42	158.18	253.03	272.1	310.7	368.6	510.45	410.65	450.95	496.68	520.32	541.45	639.45
125.70	132.69	158.13	168.82	170.06	186.65	195.79	198.93	272.72	366.5	417.1	490.4	510.05	521.86	575.05	678.93	723.02	780.33	825.98
89.23	75.55	59.78	67.66	79.81	77.24	68.04	97.93	147.51	115.2	141.8	163.4	127.86	212.50	241.76	222.97	175.27	159.67	173.04
89.86	105.55	107.17	146.58	138.29	135.97	164.41	214.86	225.37	247.6	271.1	321.9	417.88	424.10	383.67	309.58	299.39	323.56	429.09

Table-A 3.14

1959/60 WEIGHTS FOR PRODUCTION, MARKETING,
AND PURCHASES OF AGRICULTURAL COMMO-
DITIES

		GVO	Marketings	Purchases by Non-Agriculture Sector net availability
Rice				
	01 F and M	5.4	5.8	4.8
	02 Coarse	2.7	2.9	2.5
03	Wheat	23.9	13.7	32.3
04	Maize	2.6	0.9	1.2
05	Barley	0.6	0.2	0.3
06	Sorghum	1.2	1.1	1.4
07	Pulses (lentils)	4.5	4.2	5.7
08	Potatoes	0.6	0.5	0.7
09	Onions	0.7	0.6	0.8
10	Oilseeds	5.6	3.3	3.4
11	Cotton	8.6	16.3	4.4
12	Jute	0.0	0.0	0.0
13	Sugarcane	8.1	13.5	1.7
14	Tobacco	3.3	4.0	3.7
15	Milk	18.9	14.3	21.3
16	Butteroil	9.4	7.2	10.7
17	Meat	3.3	2.5	3.3
18	Wool	0.7	1.5	0.2
19	Hides and skins	0.9	1.5	1.6

1959/60 WEIGHTS FOR PRODUCTION AND PURCHASES
OF NON-AGRICULTURAL GOODS

		Value added	GVO	Net availa- bility	Purchases by	
					Alter- native 1	Alter- native 2
70	Sugar manufacturing	2.8	3.6	2.7	3.5	2.2
31	Edible oils	1.9	5.6	4.5	4.3	1.7
32	Tea manufacturing	.5	1.6	4.3	7.9	6.1
19	Food mfg.,nec.	1.2	1.4	1.0	1.8	1.4
10	Beverages	.6	.5	.5	.9	.7
10	Tobacco manufacturing	5.6	4.6	3.1	5.7	4.5
10	Cotton textiles	42.2	41.2	21.2	38.9	30.3
4	Silk and artsilk textiles	3.2	2.6	2.9	5.3	4.1
0	Footwear	2.3	2.2	1.4	2.6	2.0
0	Wood and furniture	.5	.4	.3	.5	.4
0	Printing and publi- shing	2.4	1.6	1.4	2.5	2.0
0	Soap,perfume,etc.	2.4	2.7	2.0	3.6	2.8
1	Matches	.2	.1	.7	1.4	1.1
0	Miscellaneous mfg.	1.6	1.1	1.4	2.6	2.0
3	Jute textiles		.0	1.5	2.3	2.7
3	Paper manufacturing	1.4	1.3	2.7	.0	9.8
3	Leather manufacturing	1.1	2.1	.0	.1	.1
3	Rubber and rubber pro.	.3	.3	.9	.4	1.0
4	Fertilizer	.3	.4	.8	2.4	2.9
3	Chemicals	2.2	1.7	2.6	.0	.0
3	Medicines	2.6	2.1	3.2	5.8	4.5
3	Petrol and coal	4.3	3.8	7.4	2.3	5.4
3	Non-metallic minerals	6.0	4.7	3.9	.6	1.4
3	Basic metals	2.9	3.0	6.4	1.0	2.4
3	Metal products	3.4	3.5	3.2	.5	1.2
3	Machinery excluding elec.	2.4	2.1	8.8	1.4	3.2
3	Electric machinery	2.3	2.2	4.8	.7	1.7
3	Transport equipment	3.4	3.6	6.4	1.0	2.4

TABLE-A 3.16

WEIGHTED DOMESTIC PRICE INDICES FOR NON-AGRICULTURAL COMMODITIES

Years	Value Added	GVO	Net Avail-ability	Purchases by agricultu		
				Alt. 1	Alt. 2	Alt. 3
1951-52	86.91	85.51	87.54	83.61	85.29	85.03
1952-53	92.38	90.55	91.36	89.97	91.26	90.79
1953-54	100.97	99.76	94.80	99.24	98.15	98.34
1954-55	87.14	87.31	85.30	88.16	86.31	87.67
1955-56	86.89	86.43	87.13	87.31	88.22	87.08
1956-57	92.16	91.98	95.07	91.49	93.03	92.80
1957-58	98.83	99.54	100.47	97.71	97.81	98.52
1958-59	95.51	95.73	96.05	95.19	95.26	95.00
1959-60	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	98.31	98.15	98.07	98.12	98.34	98.03
1961-62	99.74	99.50	99.39	98.44	100.08	98.50
1962-63	101.29	101.05	103.96	100.09	102.44	101.22
1963-64	102.22	101.73	105.38	100.15	103.18	101.47
1964-65	102.81	103.02	104.28	101.56	103.66	101.98
1965-66	107.08	107.66	109.88	105.54	107.69	106.30
1966-67	112.75	113.62	116.14	110.23	112.50	111.35
1967-68	115.86	116.53	119.31	110.91	113.94	112.99
1968-69	118.87	119.18	124.36	113.10	117.67	116.21
1969-70	120.85	121.25	126.63	113.09	118.78	116.67
1970-71	125.50	125.83	133.27	116.49	123.63	120.96
1971-72	132.54	132.47	140.13	124.36	132.75	127.98
1972-73	148.33	147.47	154.14	134.91	145.08	138.11
1973-74	188.86	187.29	194.23	166.07	176.39	172.02
1974-75	258.08	254.37	275.32	217.11	231.01	232.79
1975-76	315.26	314.34	314.16	263.09	281.00	273.79
1976-77	336.10	334.55	327.01	280.64	289.59	290.92
1977-78	350.97	348.51	339.63	293.78	301.84	303.91
1978-79	385.94	376.19	377.24	314.94	334.23	319.48
1979-80	451.95	435.31	447.56	354.60	402.55	362.35
1980-81	505.83	483.75	504.84	385.89	443.60	395.69
1981-82	523.19	500.55	515.67	417.82	461.94	413.11
1982-83	557.07	531.82	530.23	433.14	483.08	436.75
1983-84	600.56	572.00	563.57	466.74	512.82	470.59

Table-A 3.17

WEIGHTED DOMESTIC PRICE INDICES FOR AGRICULTURE

| YEARS | PRODUCTION | | Net Availability and Purchase by Manufac- turing Sector |
	Marketings	Gross Value of Output	
1951-52	96.05	87.01	81.51
1952-53	89.63	92.02	92.20
1953-54	85.58	85.17	84.81
1954-55	77.16	75.23	74.22
1955-56	82.72	79.38	77.02
1956-57	92.39	89.65	87.13
1957-58	100.35	96.91	94.37
1958-59	95.29	94.33	92.67
1959-60	100.00	100.00	100.00
1960-61	108.45	108.21	107.91
1961-62	108.91	107.19	105.15
1962-63	108.22	105.78	103.03
1963-64	110.44	109.12	107.57
1964-65	108.96	116.03	113.97
1965-66	109.29	115.86	113.56
1966-67	120.13	136.44	139.41
1967-68	110.30	128.14	131.82
1968-69	111.22	123.93	127.82
1969-70	117.01	130.90	134.94
1970-71	123.88	136.20	140.40
1971-72	132.16	147.05	151.05
1972-73	155.79	168.05	171.93
1973-74	210.04	227.70	232.33
1974-75	237.28	273.94	285.88
1975-76	278.74	299.11	311.78
1976-77	317.50	345.42	353.01
1977-78	358.87	401.15	419.98
1978-79	356.09	384.97	397.16
1979-80	367.44	400.33	416.67
1980-81	398.30	431.64	447.98
1981-82	430.90	474.53	488.65
1982-83	454.44	502.43	519.36
1983-84	507.57	547.88	565.04

YEARS	VALUE ADDED				GROSS VALUE OF OUTPUT				NET AVAILABILITY			
	Consumption	Intermediate	Investment	TOTAL	Consumption	Intermediate	Investment	TOTAL	Consumption	Intermediate	Investment	TOTAL
1951-52	86.20	73.59	105.01	86.91	85.51	71.39	105.41	85.51	82.57	80.05	111.96	87.54
1952-53	93.36	78.32	95.59	92.38	91.66	74.42	94.58	90.55	88.76	86.54	99.08	91.36
1953-54	106.09	78.97	88.71	100.97	104.92	75.19	87.45	99.76	99.66	85.36	89.09	94.80
1954-55	89.87	72.84	83.69	87.14	90.31	70.91	83.05	87.31	89.15	76.89	84.09	85.80
1955-56	86.04	88.79	89.24	86.89	86.11	86.65	87.92	86.43	85.92	91.35	86.52	87.13
1956-57	90.07	94.98	97.41	92.16	90.31	92.34	97.83	91.98	89.38	97.36	101.94	95.07
1957-58	98.47	97.41	100.86	98.83	99.82	94.80	101.42	99.54	97.65	99.36	105.05	100.47
1958-59	95.20	98.10	94.97	95.51	96.21	95.21	94.30	95.73	95.25	100.24	94.96	96.05
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	99.09	95.72	97.27	98.38	99.02	95.49	96.63	98.15	98.57	97.10	97.88	98.07
1961-62	99.93	96.45	107.08	99.74	99.77	96.56	100.30	99.50	99.10	98.03	100.52	99.39
1962-63	99.34	98.25	109.56	101.29	99.29	97.58	109.55	101.05	100.51	100.01	110.91	103.96
1963-64	99.45	102.47	111.21	102.22	99.26	101.31	110.94	101.73	100.26	104.92	112.86	105.38
1964-65	97.15	106.13	106.45	102.81	99.22	103.62	106.77	103.02	101.46	102.16	109.54	104.28
1965-66	99.64	113.82	114.01	107.08	102.30	111.03	114.92	107.66	105.94	108.23	116.57	109.88
1966-67	103.56	124.01	122.74	112.75	106.85	121.39	123.36	113.62	111.15	116.90	123.08	116.14
1967-68	104.95	124.57	133.04	115.86	107.71	123.52	134.60	116.53	110.62	117.39	133.15	119.31
1968-69	105.14	130.27	143.11	118.87	107.62	129.12	144.44	119.18	111.42	122.88	143.92	124.36
1969-70	104.56	133.20	152.47	120.85	107.32	133.01	153.50	121.25	110.99	125.20	149.83	126.83
1970-71	107.21	140.09	162.97	125.50	109.71	139.03	164.37	125.83	113.93	131.99	161.61	133.27
1971-72	113.29	149.32	167.74	132.54	116.19	147.99	168.59	132.47	122.68	142.20	163.55	140.13
1972-73	124.56	159.75	199.36	148.33	127.81	158.50	196.61	147.47	135.37	153.37	180.70	154.14
1973-74	159.58	182.43	265.40	188.86	162.99	182.15	262.61	187.29	166.83	181.60	241.05	194.23
1974-75	209.55	240.43	406.38	258.08	211.97	233.71	405.68	254.37	215.90	236.62	384.70	275.32
1975-76	265.73	322.62	439.55	315.26	266.76	327.50	432.18	314.34	263.43	298.15	396.69	314.16
1976-77	293.32	315.11	460.10	336.10	292.36	321.28	452.38	334.55	284.96	282.49	415.15	327.01
1977-78	310.10	333.28	466.88	350.97	307.43	339.46	459.75	348.51	298.46	300.67	423.74	339.63
1978-79	310.23	353.60	617.29	385.94	310.39	369.26	591.08	376.19	313.95	319.01	502.85	377.24
1979-80	338.82	487.84	749.02	451.95	337.26	499.57	712.25	435.31	343.38	453.29	591.86	447.56
1980-81	361.51	604.35	861.06	505.83	358.69	611.15	813.32	483.75	366.46	574.84	651.38	504.84
1981-82	388.74	615.75	846.91	523.19	385.42	623.27	795.88	500.55	390.39	588.35	651.81	515.67
1982-83	424.64	686.13	850.22	557.07	416.72	683.94	791.24	531.82	414.22	656.56	622.84	530.23
1983-84	464.93	723.24	910.13	600.56	456.87	730.20	845.03	572.00	454.78	684.26	650.84	563.57

-82-

YEARS	PURCHASE				BY								AGRICULTURE			
	ALTERNATIVE 1				ALTERNATIVE 2				ALTERNATIVE 3				ALTERNATIVE 4			
	Consumption	Intermediate	Investment	Total	Consumption	Intermediate	Investment	Total	Consumption	Intermediate	Investment	Total	Consumption	Intermediate	Investment	Total
1951-52	82.76	87.25	112.10	83.61	82.66	88.04	112.14	85.29	82.53	87.52	115.12	85.03	82.64	88.61	109.32	85.07
1952-53	89.43	93.54	99.20	89.97	89.81	94.52	98.88	91.26	89.56	93.51	98.77	90.79	90.03	95.24	99.37	91.43
1953-54	100.02	89.00	89.14	99.24	100.79	89.76	88.90	98.15	100.61	86.47	87.94	98.34	100.89	93.12	91.07	98.42
1954-55	88.61	80.04	84.14	88.16	88.06	79.81	83.97	86.31	88.30	78.87	83.60	87.67	87.77	79.99	84.68	85.85
1955-56	85.82	101.74	86.51	87.31	85.64	96.01	86.35	88.22	85.63	99.69	84.60	87.08	85.53	95.65	88.64	88.67
1956-57	89.06	104.40	102.23	91.49	88.82	98.80	102.06	93.03	89.01	102.39	103.15	92.80	88.62	98.49	100.74	92.74
1957-58	96.56	102.57	105.35	97.71	95.89	98.56	105.22	97.81	96.35	101.09	106.22	98.52	95.27	98.41	103.90	97.08
1958-59	94.42	101.03	94.92	95.19	90.55	98.69	94.84	95.26	93.90	100.13	94.31	95.00	93.10	98.66	95.77	95.29
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	98.48	95.59	97.90	98.12	98.19	98.52	97.09	98.34	97.92	96.70	97.44	98.03	98.13	98.77	98.49	98.48
1961-62	99.04	93.03	100.50	98.44	98.57	103.42	101.77	100.08	98.60	96.93	99.54	98.50	98.48	103.91	101.73	100.51
1962-63	100.59	91.28	111.00	100.03	100.17	103.47	111.02	102.44	100.14	95.85	110.68	101.22	100.18	104.09	110.97	102.43
1963-64	100.14	94.21	112.88	100.15	99.57	106.87	112.83	103.18	99.09	98.66	112.71	101.47	99.44	107.55	113.11	103.26
1964-65	122.72	87.48	112.98	101.56	100.45	103.67	110.45	103.66	101.56	99.47	106.67	101.98	100.72	98.27	105.82	103.49
1965-66	116.78	88.09	120.22	105.54	104.65	105.27	117.61	107.69	105.79	100.72	113.64	106.30	104.76	111.07	112.44	107.44
1966-67	123.45	91.53	126.87	110.23	109.58	110.02	124.16	112.50	111.03	104.34	119.71	111.35	109.83	114.98	118.97	112.16
1967-68	123.27	95.76	137.11	110.91	108.87	112.22	134.44	113.94	110.44	108.46	129.85	112.99	109.10	117.21	128.17	113.29
1968-69	123.30	100.16	148.17	113.10	110.07	118.30	145.30	117.67	111.53	114.08	140.47	116.21	110.44	123.77	138.59	117.07
1969-70	123.78	101.12	154.34	113.09	109.32	121.28	151.36	118.78	110.86	115.71	145.25	116.67	109.58	127.02	145.23	115.24
1970-71	126.66	104.11	166.50	116.49	111.38	127.63	163.47	123.63	113.53	120.22	157.57	120.96	112.04	133.98	157.12	127.97
1971-72	137.25	104.11	168.48	124.36	120.83	139.62	165.38	132.75	122.41	124.16	158.96	127.98	121.14	147.4	160.44	132.81
1972-73	153.52	93.67	186.11	134.91	134.08	146.74	182.58	145.09	137.26	117.39	174.35	138.11	136.29	156.02	187.69	145.68
1973-74	190.01	112.92	248.58	166.07	165.38	164.44	243.68	176.39	167.86	136.75	222.65	172.02	165.99	174.48	240.72	175.51
1974-75	245.11	142.56	396.72	217.11	214.39	190.02	389.54	231.01	217.42	166.13	217.65	232.79	215.89	200.98	325.16	225.48
1975-76	297.64	168.82	409.08	263.09	263.72	255.64	400.80	281.00	266.45	207.75	359.17	273.79	265.49	271.38	397.87	279.62
1976-77	324.06	160.20	428.32	280.64	287.67	226.12	419.58	289.59	290.36	191.29	385.06	290.92	290.63	238.64	423.84	285.39
1977-78	340.88	168.32	437.28	293.78	302.74	234.07	428.36	301.84	216.73	198.80	393.98	303.91	306.30	246.79	431.24	297.84
1978-79	357.57	191.39	519.07	314.94	317.86	281.30	507.00	334.23	315.88	232.31	441.37	319.48	321.59	297.53	542.84	333.25
1979-80	389.98	246.17	611.25	354.60	348.57	401.11	596.68	402.55	351.05	310.23	510.03	362.35	352.40	427.11	650.26	402.81
1980-81	417.85	305.12	682.88	385.89	371.67	486.69	666.32	443.60	374.58	378.71	559.02	395.69	375.88	518.44	739.50	453.79
1981-82	448.87	316.25	672.71	417.82	396.46	504.35	655.71	461.94	399.79	392.28	546.77	413.11	401.58	537.23	733.91	474.09
1982-83	480.14	335.12	640.69	433.14	424.95	532.22	624.83	483.08	427.75	413.16	507.20	436.75	431.90	566.70	718.10	499.82
1983-84	525.13	358.02	669.71	466.74	465.35	539.81	652.95	512.82	468.54	431.75	522.79	470.59	472.35	570.24	758.86	529.40

-83-

Table-A 3.19

Table: ALTERNATIVELY WEIGHTED DOMESTIC PRICE INDICES FOR MANUFACTURING
BY BROAD CATEGORIES

(Contd..)

Years	VALUE ADDED			GROSS VALUE OF OUTPUT			NET AVAILABILITY			PURCHASE BY AGRICULTURE (Acternative-1)		
	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods
	1	2	3	4	5	6	7	8	9	10	11	12
1951-52	84.67	88.35	89.79	83.48	86.94	87.10	81.88	89.09	97.26	82.63	83.28	97.60
1952-53	91.83	93.92	89.53	89.80	92.19	87.03	88.25	92.23	94.99	89.50	89.81	96.69
1953-54	103.88	103.50	85.31	102.20	102.43	85.45	97.18	96.44	87.90	100.06	103.00	89.09
1954-55	85.73	88.63	79.45	86.65	89.06	78.16	84.17	87.41	81.30	85.35	88.20	81.47
1955-56	86.65	86.53	89.47	86.29	86.34	87.77	87.32	86.06	88.83	87.43	85.68	96.89
1956-57	91.01	91.85	96.46	90.65	91.98	95.73	91.77	94.68	102.24	91.05	90.02	102.39
1957-58	98.33	99.13	99.42	99.09	100.26	98.76	98.07	100.81	102.90	97.25	97.25	102.46
1958-59	95.55	94.99	96.21	95.97	95.68	94.74	96.39	94.96	96.78	94.95	94.12	98.76
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	98.60	98.59	97.12	98.92	98.42	96.75	98.08	98.20	97.69	98.00	98.32	96.86
1961-62	99.55	100.00	100.28	99.42	99.77	99.58	98.81	99.46	100.04	98.32	98.79	97.77
1962-63	99.30	101.44	105.87	99.13	101.12	105.44	100.34	104.57	107.37	99.42	100.82	99.81
1963-64	100.05	101.93	108.54	99.56	101.59	107.72	101.16	105.59	110.32	99.40	101.39	102.79
1964-65	102.05	102.62	105.45	102.36	103.32	105.02	103.30	104.20	105.83	101.36	100.35	101.31
1965-66	105.38	106.39	112.67	106.00	107.38	112.68	108.22	109.60	112.39	105.21	104.56	104.13
1966-67	110.44	111.64	121.01	114.73	112.94	124.40	114.55	115.47	119.51	110.31	111.36	108.27
1967-68	111.70	115.24	127.17	112.59	116.41	128.39	114.36	119.31	125.87	110.15	111.76	113.55
1968-69	112.93	117.82	135.76	113.47	118.29	136.91	116.57	124.24	134.74	111.83	113.40	120.31
1969-70	112.99	119.20	142.15	113.84	119.56	143.70	117.01	128.24	139.16	111.52	111.28	123.06
1970-71	116.05	123.87	151.57	116.91	124.42	153.09	121.15	133.16	149.43	114.49	116.87	129.58
1971-72	124.80	130.42	159.49	124.09	130.55	160.04	132.45	139.33	154.87	122.79	125.11	132.95
1972-73	138.00	148.65	184.73	138.39	147.67	1.83.54	145.79	156.54	172.50	136.29	140.24	134.00
1973-74	169.50	189.96	228.18	220.67	188.28	226.34	174.04	195.50	214.69	162.84	174.41	161.26
1974-75	220.77	263.94	330.88	219.20	260.17	330.85	225.07	285.15	326.30	209.85	227.67	221.56
1975-76	283.88	314.49	381.31	281.94	307.54	380.22	277.86	313.43	350.84	256.95	272.93	252.11
1976-77	305.01	343.03	391.51	302.32	334.34	392.31	288.41	335.08	360.97	274.73	302.25	247.92
1977-78	322.00	357.98	401.64	317.92	348.78	403.08	321.05	348.55	372.67	288.31	301.20	255.33
1978-79	327.36	394.14	500.49	326.14	379.39	494.32	320.57	389.98	429.39	306.04	336.93	301.01
1979-80	376.29	448.18	632.98	370.71	427.53	619.30	382.13	413.13	534.77	343.44	366.77	380.13
1980-81	415.32	493.11	742.46	406.55	467.13	721.67	434.27	485.72	621.47	372.80	403.36	445.81
1981-82	441.14	511.68	739.39	431.91	484.88	716.38	455.91	496.13	620.76	396.29	438.86	452.85
1982-83	485.12	541.05	766.77	467.94	509.15	736.52	492.80	498.34	627.14	422.50	437.98	459.02

(Table Contd...)

Years	PURCHASE BY AGRICULTURE (Alternative-2)			(Alternative-3)			(Alternative-4)		
	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods	Consumption and Intermediate Goods	Consumption and Investment Goods	Investment and Intermediate Goods
	13	14	15	16	17	18	19	20	21
1951-52	83.22	84.89	97.98	82.76	84.84	104.64	83.42	84.38	95.26
1952-53	90.15	90.95	96.92	89.16	90.71	97.66	90.70	91.00	96.98
1953-54	99.65	99.30	89.27	100.12	99.06	88.18	99.21	99.87	90.38
1954-55	84.06	87.57	81.12	86.16	87.76	82.29	83.55	87.48	80.90
1955-56	87.13	85.71	93.47	87.49	85.50	92.49	88.79	85.86	94.34
1956-57	91.87	91.13	99.89	91.11	91.31	102.78	92.07	90.53	98.96
1957-58	96.70	97.51	100.76	97.03	98.09	103.80	96.36	96.33	99.61
1958-59	96.46	93.77	97.49	94.88	93.92	97.02	95.03	93.18	98.04
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	98.27	98.15	93.31	97.98	98.20	97.09	98.36	98.09	98.71
1961-62	100.42	98.70	102.49	98.32	98.18	98.32	100.38	98.67	103.43
1962-63	99.49	101.98	105.96	99.43	102.04	103.83	101.54	101.61	105.61
1963-64	100.23	101.78	108.80	98.98	102.30	106.15	102.27	101.06	108.75
1964-65	102.08	107.33	101.07	101.07	102.46	106.31	103.34	101.36	107.69
1965-66	106.92	106.69	111.42	104.98	107.17	107.61	106.97	105.78	111.34
1966-67	111.60	111.99	116.00	109.96	112.56	112.71	111.63	110.98	115.84
1967-68	111.80	113.15	120.60	110.07	113.86	119.85	111.94	111.63	119.21
1968-69	114.56	115.90	128.38	111.93	116.72	128.27	115.10	114.17	127.03
1969-70	115.00	116.32	132.34	111.62	116.97	131.48	115.71	114.32	130.97
1970-71	118.83	120.51	140.87	114.54	121.80	140.15	119.70	118.02	139.00
1971-72	129.09	128.53	150.33	122.74	129.00	142.73	130.34	126.36	150.25
1972-73	143.53	144.50	162.43	135.99	143.87	147.78	144.77	142.82	163.01
1973-74	168.22	180.17	190.73	162.63	179.74	182.63	169.17	178.90	186.61
1974-75	210.60	243.97	254.94	209.25	243.78	272.78	210.70	237.97	237.98
1975-76	266.10	285.22	302.48	257.11	282.92	288.60	267.64	283.12	296.46
1976-77	273.61	309.18	289.66	274.62	306.84	294.64	272.46	308.00	276.47
1977-78	286.61	324.01	297.61	288.25	321.01	303.04	285.53	322.96	284.32
1978-79	312.54	349.75	356.06	306.55	342.05	344.05	313.28	351.02	347.63
1979-80	371.85	382.86	469.01	844.52	379.25	417.04	378.72	391.99	471.58
1980-81	414.80	420.98	549.97	375.19	407.32	475.18	425.99	424.19	562.30
1981-82	438.17	440.33	559.10	398.50	425.89	474.94	449.27	445.71	578.18
1982-83	468.91	459.29	568.65	425.38	441.93	463.60	479.28	469.95	596.53
1983-84	497.14	497.51	581.54	462.63	478.23	480.64	502.46	510.37	609.71

Years												
1954-55	67.46	81.55	80.89	77.16	66.81	81.22	81.48	75.23	67.19	81.45	81.07	74.22
1955-56	74.33	90.10	80.23	82.72	74.92	89.72	77.38	79.38	75.24	87.72	75.59	77.02
1956-57	90.42	102.01	79.21	92.39	90.95	102.24	78.66	89.65	91.46	96.20	78.11	87.13
1957-58	99.85	109.62	86.10	100.35	97.41	110.35	86.31	96.91	97.62	105.62	86.01	94.37
1958-59	95.94	98.97	88.67	95.29	95.26	99.72	89.16	94.33	95.14	93.77	88.97	92.67
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	109.41	111.25	102.93	108.45	109.88	111.40	103.71	108.21	111.56	106.43	103.53	107.91
1961-62	106.70	115.25	101.24	108.91	105.97	116.04	102.18	107.19	107.47	106.05	101.72	105.15
1962-63	103.45	115.73	101.53	108.22	102.04	116.72	102.44	105.78	103.02	105.73	102.09	103.03
1963-64	120.08	115.16	101.51	110.44	110.64	116.06	102.03	109.12	111.74	109.45	101.32	107.57
1964-65	120.98	126.47	106.81	108.96	114.59	131.58	107.73	116.03	116.75	126.15	108.43	113.97
1965-66	113.48	124.16	110.12	109.29	108.48	130.21	110.98	115.86	110.21	125.55	111.41	113.56
1966-67	152.75	115.77	115.36	120.13	150.05	128.10	117.21	136.44	153.96	127.92	117.49	139.41
1967-68	145.47	96.51	123.17	110.30	138.66	103.52	126.16	128.14	140.83	110.95	126.51	131.82
1968-69	133.01	103.64	130.57	111.22	126.06	111.39	132.51	123.93	126.64	118.04	133.32	127.82
1969-70	140.64	108.46	137.64	117.01	130.72	119.32	139.83	130.90	132.79	128.79	140.40	134.94
1970-71	142.53	117.86	148.42	123.88	132.92	121.03	151.56	136.20	135.06	127.63	152.08	140.40
1971-72	153.01	127.43	155.20	132.16	144.45	133.14	158.25	147.05	146.51	144.91	159.33	151.05
1972-73	182.44	150.54	178.42	155.79	165.82	154.09	180.38	168.05	165.60	163.79	182.95	171.93
1973-74	242.72	198.61	253.60	210.04	216.76	205.64	258.60	227.70	217.04	215.98	259.63	232.33
1974-75	284.24	203.73	300.33	237.28	275.37	224.12	309.27	273.94	277.43	247.81	310.59	285.88
1975-76	306.92	242.54	346.74	278.74	286.33	258.06	357.23	299.11	287.00	253.76	358.45	311.78
1976-77	334.33	298.19	433.58	317.50	307.02	308.50	447.12	345.42	308.58	324.28	448.60	353.01
1977-78	426.34	323.71	443.25	358.87	397.66	333.39	455.67	401.15	404.55	365.37	459.77	419.98
1978-79	394.58	349.60	430.03	356.09	367.37	342.41	438.65	384.97	369.72	386.42	440.94	397.16
1979-80	416.54	343.52	463.06	367.44	380.47	334.52	474.21	400.33	382.18	381.94	475.17	416.67
1980-81	452.87	382.29	487.86	398.30	406.10	377.85	503.81	431.64	404.24	420.71	503.16	447.98
1981-82	497.87	399.56	531.71	430.90	459.36	394.29	553.04	474.51	455.97	430.68	552.96	488.65
1982-83	513.59	411.41	584.03	454.44	475.80	403.59	608.99	502.43	473.12	439.91	609.43	519.36
1983-84	533.70	495.26	650.19	507.57	491.94	470.47	665.82	547.88	490.84	502.47	678.03	565.04

Table-A 3.21

AGRICULTURAL INPUTS IN PAKISTAN - 1953-54
TO 1983-84

Years	Value Added by Agriculture (Million Rs.)	Land Cropped Acres (in Mill)	Land (Net Area Sown in Millions)	Land (Cultivated Area in Millions)	Agricultural Labour Force (in millions)	Livestock (Million Heads)	Tubewells (in Nos.)
1953-54	4532	32.77	29.94	38.39	6.21	6.5	990
1954-55	4320	32.80	29.30	37.86	6.32	6.1	1300
1955-56	4406	34.32	30.44	38.70	6.38	6.1	1600
1956-57	4502	35.00	31.22	39.56	6.84	8.2	1900
1957-58	4578	34.42	31.01	40.14	7.48	8.4	2200
1958-59	4822	35.41	31.92	40.04	7.86	8.4	3300
1959-60	4775	36.29	32.31	40.60	7.93	6.8	4600
1960-61	4709	36.72	32.78	44.76	8.97	6.9	8000
1961-62	5127	37.69	33.70	44.23	9.06	7.0	13000
1962-63	5486	38.21	34.04	44.55	9.25	7.5	18400
1963-64	5638	37.40	33.14	45.30	9.89	7.0	25000
1964-65	6018	4?.14	34.98	46.26	10.10	7.5	31600
1965-66	5993	38.41	34.42	47.54	10.21	8.3	40207
1966-67	6421	40.54	35.16	47.60	10.39	7.9	51327
1967-68	7484	41.85	36.76	48.00	10.49	7.6	62163
1968-69	7924	40.12	35.21	47.67	10.38	7.3	72149
1969-70	8916	41.45	35.92	47.53	10.33	7.0	72223
1970-71	8463	41.07	35.68	47.47	10.73	6.6	89143
1971-72	8843	41.01	35.42	47.16	10.86	7.9	99373
1972-73	8951	41.82	34.75	47.23	11.00	8.0	109514
1973-74	9429	45.15	37.52	47.87	11.24	8.1	120483
1974-75	9134	42.90	36.48	48.29	11.54	8.2	144278
1975-76	9672	44.51	37.20	48.98	11.86	8.3	150087
1976-77	9864	44.98	37.32	48.81	11.98	8.4	155864
1977-78	10077	45.69	37.45	49.28	12.32	8.4	161114
1978-79	10338	47.69	38.08	49.37	12.80	8.6	166985
1979-80	11191	47.49	38.33	49.87	12.84	8.8	176517
1980-81	11588	47.76	38.23	49.79	13.66		

Table — .J.22

Aggregate Input Index, Value Added Index and the Total Factor Productivity Index 1953-54 to 1983-84
(Base Period 1959-60)

Years	Value Added Index	Labor Index	Live-stock Index	Capital Index	LAND INDEX USING			AGGREGATE INPUT INDEX USING			TOTAL FACTOR PRODUCTIVITY INDEX		
					Cropped Area	Net Area Sown	Cultivated Area	Cropped Area	Net Area Sown	Cultivated Area	I	II	III
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1953-54	94.91	78.31	95.59	91.2	90.30	92.66	94.09	83.36	84.05	84.47	113.85	112.92	112.36
1954-55	90.47	79.70	89.71	86.1	90.38	90.68	92.79	83.59	83.68	84.30	108.23	108.11	107.32
1955-56	92.27	80.45	89.71	86.5	94.57	94.21	94.85	85.31	85.21	85.39	108.16	108.23	108.06
1956-57	94.28	86.25	120.59	115.9	96.44	96.63	96.96	92.72	92.78	92.88	101.68	99.45	99.34
1957-58	95.87	94.32	123.53	119.0	94.85	95.98	98.38	97.38	97.72	98.42	98.44	98.11	97.41
1958-59	100.98	99.12	123.53	120.4	97.57	98.79	98.14	101.17	101.53	101.34	99.81	99.46	99.64
1959-60	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1960-61	98.62	113.31	101.47	105.8	101.18	101.45	109.70	112.89	108.86	108.94	87.36	90.59	90.53
1961-62	107.37	114.25	102.94	113.5	103.86	104.30	108.41	111.10	111.23	112.22	96.64	96.53	95.49
1962-63	114.39	116.64	110.29	127.4	105.29	105.35	109.19	114.56	114.58	116.07	100.29	100.27	98.96
1963-64	118.07	124.72	102.94	128.9	103.06	102.57	111.03	118.84	118.69	121.18	99.35	99.49	97.42
1964-65	126.03	127.36	110.29	144.3	110.61	108.26	113.38	124.44	123.75	125.25	101.28	101.84	100.62
1965-66	125.51	128.75	122.06	166.5	105.84	106.53	166.52	126.46	126.67	129.61	99.25	99.08	96.64
1966-67	134.47	130.89	116.18	175.2	111.71	108.82	166.67	130.47	129.62	131.93	103.06	103.74	101.92
1967-68	156.73	132.28	11.76	184.9	115.35	113.77	117.65	133.51	133.05	134.19	117.39	117.80	116.80
1968-69	165.95	130.89	107.35	193.6	110.55	108.97	116.84	131.50	141.04	133.35	126.20	119.60	117.53
1969-70	186.72	130.26	102.94	189.5	114.22	111.17	116.49	132.53	131.63	133.20	140.89	141.85	140.18
1970-71	177.23	135.31	97.06	205.7	113.17	110.43	116.35	137.10	136.30	138.04	129.27	130.03	128.39
1971-72	185.19	136.95	116.18	236.8	113.01	109.62	115.59	141.69	140.70	142.45	130.70	131.62	130.00
1972-73	187.45	138.71	117.65	251.2	115.24	107.55	115.76	145.08	142.82	145.23	129.20	131.25	129.07
1973-74	197.46	141.74	119.11	266.6	124.41	116.12	117.33	151.38	148.94	149.29	130.44	132.58	132.27
1974-75	191.29	145.52	120.59	298.5	118.21	112.91	118.36	155.53	153.97	155.58	122.99	124.24	122.95
1975-76	202.55	149.56	122.06	307.4	122.65	115.13	120.05	160.27	158.06	159.50	126.38	128.15	126.99
1976-77	206.58	151.07	123.53	316.5	123.95	115.51	119.63	162.61	160.13	161.34	127.04	129.07	128.04
1977-78	211.04	155.36	123.53	322.9	125.90	115.91	120.78	165.46	163.53	164.96	126.78	129.05	127.93
1978-79	216.50	161.41	126.47	333.2	131.41	117.86	121.00	172.86	168.88	169.80	125.24	128.20	127.50
1979-80	234.37	161.92	129.41	348.2	130.86	118.63	122.23	174.77	171.18	172.23	134.10	136.91	136.08
1980-81	242.68	172.13	130.88	362.5	131.61	118.32	122.03	182.67	178.77	179.86	132.85	135.75	134.93
1981-82	251.33	176.67	132.35	372.4	134.69	119.06	122.70	187.42	182.82	183.89	134.37	137.75	136.95
1982-83	251.73	185.37	135.29	383.9	136.87	119.59	123.11	194.53	189.45	190.48	129.40	132.57	132.15
1983-84	251.62	189.11	138.82	395.2	139.07	120.12	123.53	193.01	193.43	194.44	126.43	130.08	129.42

Continued..

CHAPTER IV

INTRA-SECTORAL PARITY ISSUES IN PRICING OF
AGRICULTURAL OUTPUT AND INPUTS

1.   **INTRODUCTION**

The terms of trade discussed in the previous chapter are an
indicator of the profitability of the agricultural sector and of the purchasing
power of goods and services of agricultural income. After the initial alloca-
tion of resources to the agricultural sector, the further allocation of
these resources within the sector is influenced by the relative levels of
costs, prices and the income from different agricultural commodities and other
related farm activities. Most planning agencies set specific targets of
production for different crops. Agricultural price policy has important
implications for the achievement of these planned targets. An appropriate
relationship needs to be maintained between costs and prices of, and the
income from different commodities if planned targets are to be fulfilled.

In Pakistan, there has been some controversy that the prices of
agricultural crops fixed by the government are not in parity with the costs
and that producers of some crops are unduly handicapped. The purpose of
this chapter is to present evidence on various notions of inter-crop,
input-output prices and income parity for a number of crops and evaluate
the price policy from the view point of parity in costs and prices of and
the income from different crop activities.

2.   COSTS OF PRODUCTION

The farming community generally maintains that it looses money in the farming business and argues for fixing prices of agricultural output at levels that cover 'costs of production'. The policy-maker needs reliable figures on costs of production as a basis for judicious price policy. It is important to understand, however, that theoretically there is a schedule of costs and outputs and that these schedules vary by farm and by agro-climatic zones and are a function of the price of output. Data problems further compound the situation as reliable farm surveys on costs of production are often not conducted. Valuation of family labour and land also creates problems in the estimation of costs of production.

The state of the art in the estimation of costs of production data for different crops in Pakistan is in its first stage of development. The Agricultural Prices Commission established in 1981 has conducted some large scale farm surveys but their findings have not been released to outside analysts. The earlier studies conducted by the Planning Commission and the Ministry of Agriculture on costs of production of different crops are based on small samples. The findings of these studies, in the light of the sampling and other problems mentioned above, should be taken with the proverbial pinch of salt.

Table IV.1 provides information on cost of production and price-cost ratios for five major crops, viz. wheat, rice, cotton, sugarcane and maize for selected years between 1969/70 and 1980/81. The index numbers of costs of production per maund with 1969/70 as the base year are also presented.

TABLE IV.1

COST (PRODUCTION AND PRICE-COST RATIOS FOR SELECTED CROPS

Years	٧	at	Paddy Coarse	Paddy Fine	American Cotton	Sugarcane	Ma
			COST OF PRODUCTION			(Rs. per maund)	
1969-70	1	13	25.57	33.47	53.64	2.71	14
	(	0)	(100)	(100)	(100)	(100)	(1
1975-76	:	80	30.53	44.4_	86.09	5.48	35
	(	5)	(119)	(133)	(160)	(202)	(2
1976-77	:	14	29.21	45.05	115.03	4.70	43
	(	5)	(114)	(135)	(214)	(173)	(2
1977-78	4	30	29.80	46.69	132.51	4.99	47
	(	3)	(116)	(148)	(247)	(184)	(3
1978-79	4	۰9	28.41	52.47	143.09	5.60	46
	(	¡)	(111)	(157)	(267)	(207)	(3
1979-80	4	37	27.90	53.52	111.65	7.11	48
	(	))	(109)	(160)	(208)	(262)	(3
1980-81	4	۰7	38.79	73.32	117.82	8.41	51
	(	¡)	(152)	(219)	(220)	(310)	(3
		PRICE-COST RATIO					
1969-70	0.		1.27	0.97	2.08	0.70	1.
1975-76	1.		1.94	1.33	3.37	0.54	0.
1976-77	1.		2.26	1.46	3.42	0.67	0.
1977-78	1.		2.15	1.29	3.02	0.63	0.
1978-79	1.		2.41	1.31	3.89	0.58	0.
1979-80	1.		2.59	1.35	4.45	0.52	0.
1980-81	1.		2.33	1.23	4.10	0.51	0.

Note 1: Cos̱ of production includes expenditure on: (i) prepara
(ii Seed bed preparations, (iii) Seeds, (iv) Sowing c
(v) anuring (vi) Fertilizing (vii) Watering (viii) Pl
(i⅟ Water charges, (x) harvesting, (xi) threshing, an
2; Fig es in parenthesis are the index numbers with base p

Source: Stṵ es on Cost of Production of Crops,Ministry of Food,
and ɔoperatives, Government of Pakistan,(various issues

The table shows that the costs of production for all crops have increased considerably during 1970s. However, quite divergent rates of increase in the costs are found for different crops. The percentage increase is highest for maize (252 per cent) which is followed by sugarcane (210 per cent), wheat (174 per cent), cotton (120 per cent), paddy fine (119 per cent) and paddy coarse (52 per cent). Like the cost of production, t..e price-cost ratios for wheat, coarse paddy, fine paddy and American cotton show an increasing trend. It shows a near price-cost parity for wheat and maize crops. The ratio is above the unit-level for wheat, coarse and fine varieties of paddy and cotton. The price-cost ratios for sugarcane and maize show a downward trend and are less than one for all the years, except the ratio for 1969/70 for maize, which was 1.12.

3.   TRENDS IN PRICES OF INPUTS

Fixed resources, owned or rented, are not critical determinants of the allocation between different farm activities and/or of the level of output of different crops. The prices of variable inputs in conjunction with produce prices are important datum for farmer's decision in this regard. Table IV.2 shows the index numbers of prices of six important inputs with 1969/70 as the base year.

The average percentage increase in the prices of agricultural inputs between 1969/70 and 1983/84 comes to 342. During the same period the percentage increase in prices is highest for pesticides (678 per cent) and lowest for fertilizer (267 per cent). The percentage increase in prices of all other inputs falls in the range indicated above. The effect of sharp increases in the prices of agricultural inputs is reflected in the increases in the costs of production of different crops shown in Table IV.1. This finding allows some measure of confidence in the reliability of data on cost of production of crops.

TABLE IV.2

INDEX NUMBERS OF PRICES OF AGRICULTURAL INPUTS

Years	Seed	Ferti-lizer	Electri-city	Pesti-cides	Water	Transport charges
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1969-70	100	100	100	100	100	100
1970-71	124	134	100	100	321	130
1971-72	135	128	100	100	328	144
1972-73	176	100	100	175	383	168
1973-74	216	222	110	183	399	201
1974-75	289	286	117	280	420	252
1975-76	283	256	143	400	445	266
1976-77	311	254	143	450	478	288
1977-78	342	243	143	300	557	333
1978-79	364	230	257	400	432	355
1979-80	380	248	314	480	409	375
1980-81	402	318	327	589	442	402
1981-82	444	340	354	642	515	452
1982-83	483	367	362	708	513	472
1983-84	484	367	379	768	515	500

Note: 1. Expen iture on each input relative to total expenditure on
input was used to assign weight to each of the inputs to
calcu ate the aggregate input price index.

Source: Colum s (2), (3), (5), (6) and (7) have been taken from
Natio al Accounts of Pa istan (Product and Expenditure),
Feder l Bureau of Statistics, Government of Pakistan,
(Vario s Issues).

Colum (4) has been taken from Monthly Statistical Bulleti
Feder l Bureau of Statistics, Government of Pakistan,(Vari

4.   TRENDS IN PRICES OF AGRICULTURAL COMMODITIES

The government announces the procurement and/or minimum support prices for a few selected crops every year on the basis of the recommendations of the Agricultural Prices Commission. For all other crops, prices are determined by market forces. Even in the case of crops for which the government intervenes, market forces play a dominant role in determining the actual prices received by the farmers. Table IV.3 presents data on producer prices for 12 crops for the period 1969/70 to 1983/84. Indices of farm prices for each of the 12 crops with 1969/70 as the base year are also shown in the table.

It would be seen from table IV.3 that the prices of all crops show considerable increase over the period of study. The weighted average price for all crops shows an increase of 334 per cent. The highest increase in prices is for cotton (533 per cent) and the lowest increase is for sugarcane (255 per cent). Excepting the case of cotton, it turns out that commodities for which government intervention obtains, show smaller increases in prices than crops in whose case government does not intervene in the pricing or marketing operations. The divergent rates of increase in prices of different crops have implications for inter-crop resource allocation. However, two additional considerations need to be taken into account to measure the incentives being provided to farmers for the production of different crops. The increase in the prices of crops needs to be examined in the light of both the increases in prices of major purchased agricultural inputs and changes in productivity of crops. The table shows that increase in the prices of purchased inputs (342 per cent) is much higher than the increase in the prices of rice sugarcane, jowar, maize, tobacco and rape and mustard seeds. In case of wheat and weighted average of all the selected crops the increase in output prices was less than the increase in input prices, but the difference between them was relatively small. The increase in the prices of cotton, gram, barley, bajra and sesamum was much higher than average increase in the prices of agricultural inputs during the period. We now turn to the examination of increases in output prices to the change in productivity of crops in the next section.

Table IV.3

PRODUCER PRICES FOR MAJOR CROPS

Rs. Per Maund

Rice	Wheat	Sugarcane	Cotton	Gram	Barley	Jowar	Bajra	Maize	Tobacco	Rape and Mustard	Sesamum	All crops
32.47	17.43	1.90	111.57	28.18	14.37	14.44	16.95	16.35	122.43	39.68	41.99	
(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100)
30.94	18.44	2.09	133.74	21.61	14.78	14.97	16.20	16.24	131.13	39.00	59.72	(105.74)
(95.29)	(105.79)	(110.00)	(119.87)	(76.69)	(102.85)	(103.67)	(95.58)	(99.33)	(107.13)	(98.28)	(142.22)	
28.93	19.75	2.95	136.39	25.12	17.02	18.44	18.55	18.36	130.87	39.30	55.99	(117.66)
(87.43)	(113.31)	(155.26)	(122.25)	(89.14)	(118.44)	(127.70)	(109.44)	(112.29)	(106.89)	(99.04)	(133.34)	
38.22	22.10	3.66	166.22	32.88	18.85	22.13	21.35	21.61	144.57	44.49	70.92	(139.62)
(117.71)	(126.79)	(192.63)	(148.98)	(116.68)	(131.18)	(153.25)	(125.96)	(132.17)	(118.08)	(112.12)	(168.90)	
47.74	28.67	2.13	261.85	35.50	26.84	16.20	25.08	20.19	146.47	61.22	80.89	(149.20)
(147.03)	(164.49)	(112.10)	(234.70)	(125.98)	(186.78)	(112.19)	(147.96)	(123.49)	(119.64)	(154.28)	(192.64)	
52.07	44.27	2.28	232.92	41.21	26.43	29.75	50.39	37.21	206.98	80.81	107.32	(214.92)
(160.36)	(253.99)	(120.00)	(208.77)	(146.24)	(183.92)	(206.02)	(297.29)	(227.58)	(169.06)	(203.65)	(255.58)	
59.13	42.51	2.95	289.85	40.98	31.28	28.44	50.05	35.20	215.60	83.31	105.19	(226.29)
(182.11)	(243.89)	(155.26)	(259.79)	(145.42)	(217.68)	(196.95)	(295.28)	(215.29)	(176.10)	(209.95)	(250.51)	
65.92	41.58	3.17	393.69	44.16	27.40	30.46	43.22	31.13	227.02	91.41	188.21	(240.33)
(203.02)	(238.55)	(166.84)	(352.86)	(156.71)	(190.68)	(210.94)	(254.99)	(190.49)	(185.43)	(230.37)	(281.52)	
64.95	55.51	3.17	400.15	75.55	37.33	29.30	51.55	36.69	239.60	103.43	129.23	(284.37)
(197.26)	(318.47)	(166.84)	(358.65)	(268.10)	(259.78)	(202.91)	(304.13)	(224.40)	(195.70)	(260.66)	(307.76)	
68.57	54.61	3.25	557.15	62.15	45.73	31.39	55.58	43.90	276.11	139.68	178.80	(319.85)
(211.18)	(313.31)	(171.05)	(499.37)	(220.55)	(318.23)	(217.38)	(327.91)	(268.50)	(225.52)	(352.02)	(425.81)	
72.19	56.29	3.73	496.60	68.08	51.88	40.01	76.00	41.43	305.78	166.11	216.09	(327.97)
(222.33)	(322.95)	(196.31)	(445.10)	(241.59)	(361.03)	(277.08)	(446.38)	(253.39)	(249.76)	(418.62)	(514.62)	
90.29	57.11	4.29	483.31	149.08	64.87	43.82	88.09	44.57	421.20	115.83	147.22	(340.09)
(278.07)	(327.65)	(225.79)	(433.19)	(529.03)	(451.43)	(303.46)	(519.71)	(272.60)	(344.03)	(291.91)	(350.61)	
100.63	66.67	4.63	508.25	210.00	60.02	48.79	76.03	61.51	392.76	97.15	120.75	(380.50)
(309.92)	(382.50)	(243.68)	(455.54)	(745.21)	(417.68)	(337.88)	(448.55)	(376.21)	(320.60)	(244.65)	(287.57)	
102.28	69.47	4.78	530.79	182.69	59.91	53.11	102.46	63.64	360.06	104.85	139.12	(399.15)
(315.00)	(398.56)	(251.58)	(475.75)	(648.26)	(415.91)	(367.80)	(604.48)	(389.24)	(294.09)	(264.23)	(331.32)	
102.91	73.27	4.85	706.61	137.29	67.90	44.42	107.02	57.67	398.54	143.63	186.64	(434.46)
(316.94)	(420.37)	(255.26)	(633.33)	(487.19)	(472.51)	(307.62)	(631.39)	(352.72)	(325.52)	(361.97)	(444.49)	

e of gross income from each crop in total gross income was used to assign weights to producer price indices ndividual crops to calculate overall weighted price index.

res in Parenthesis are the index numbers of price with base period 1969-70.

blished data from National Income Section, Federal Bureau of Statistics, Government of Pakistan.

5.   PARITY INDICES OF PRICES OF
          AGRICULTURAL CROPS AND INPUTS

      The relationship between prices received by farmers for different crops and the prices paid for agricultural inputs as measured by the parity indices is shown in Table IV.V.

      The overall parity between prices of agricultural produce and inputs was very near for the years 1969/70 and 1979/80. However, the parity index in 1970/71 falls to as low as 46.65. It increases to the figure of 80 in 1971/72, falls to 52.39 in two years and shows consisten recovery till 1979/80 when it reaches the figure of 100.12. After a fall, the index recovers to 98.30 for the year 1983/84. The overall impression is that of drastic declines in terms of trade in some years but gradual and sustained increases in the terms of trade in favour of farmers over most years.

      The parity indices between the prices received and prices paid for crops reveal a lot of divergence. In the case of cotton, gram, barley and bajra price-cost parity indices were much higher in later years which is a reflection of the fact that output prices had outpaced input prices by a wide margin. In the case of rice, wheat, sugarcane, jowar, maize and tobacco the parity indices had remained lower than the base yea for all years of the study. In the case of sesamum near parity was registered for the years 1969/70 and 1983/84. However, very high values of the parity index were found for 1978/79 and 1979/80. In the case of rape seed and mustard seed, the parity indices were lower than 100 for all years excepting 1978/79 and 1979/80 when high values of the parity index were registered.

Years	Rice	Wheat	Sugarcane	Cotton	Gram	Barley	Jowar	Bajra	Maize	Tobacco	Rape Seed &	Sesamum	All
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1970-71	43.84	48.67	50.61	55.15	35.28	47.32	47.70	43.98	45.70	42.29	45.22	65.43	48.65
1971-72	40.29	52.21	71.55	56.33	11.58	54.58	58.85	50.43	51.74	49.26	45.64	61.44	81.87
1972-73	46.62	50.20	76.26	58.98	46.19	51.93	60.67	49.87	52.33	46.75	44.39	66.87	55.28
1973-74	51.63	57.76	39.37	82.42	44.24	65.59	39.40	51.96	43.37	42.01	54.18	67.65	52.39
1974-75	49.14	77.94	36.79	63.98	44.82	56.37	63.14	91.11	69.75	51.81	62.41	78.33	65.87
1975-76	56.27	75.36	47.97	80.27	44.93	67.26	60.85	91.23	66.52	54.41	64.87	77.40	69.61
1976-77	59.63	70.07	49.01	103.65	46.03	55.01	61.96	74.90	55.95	54.47	67.67	82.69	70.59
1977-78	52.74	85.14	44.60	95.89	71.68	69.45	54.25	81.31	59.99	52.32	69.69	82.28	76.03
1978-79	64.57	95.80	52.30	152.68	67.43	97.30	66.46	100.26	82.10	68.05	107.63	130.19	97.20
1979-80	67.87	98.59	59.93	135.88	73.75	110.21	84.59	136.88	77.35	76.25	127.80	157.10	100.12
1980-81	74.30	87.55	60.33	115.76	141.36	120.63	81.09	138.87	72.84	91.93	78.00	93.69	90.88
1981-82	74.52	91.97	58.59	109.53	179.18	100.43	81.24	107.85	90.46	77.14	58.87	69.15	91.49
1982-83	71.87	90.93	57.40	108.54	147.90	95.12	83.92	137.91	88.81	67.10	60.29	75.59	91.07
1983-84	71.75	95.17	57.79	143.38	110.30	106.97	69.64	142.94	79.85	73.70	81.95	100.63	98.36

te 1: Share of gross income from each crop in total gross income was used to assign weights for producer price indices of each of the crops to calculate overall weighted ...

6.   TRENDS IN GROSS INCOME OF CROPS AND
        INTER-CROP GROSS INCOME PARITY INDICES

Gross income per acre at market prices for 12 selected crops
is shown in Table IV.5. The gross income has shown the maximum increase
of 554 per cent in the case of gram and the minimum increase of 78 per
cent in the case of tobacco during the period 1969/70 to 1982/83. The
ranking of crops in descending order is bajra (535 per cent), wheat
(471 per cent), cotton (469 per cent), maize (381 per cent), barley
(343 per cent), rice (270 per cent), jowar (262 per cent), sesamum (255
per cent) rape and mustard seed (217 per cent) and sugarcane (108 per cent)

These relative trends in gross-income by crops reflect public
policy in the area of pricing of major crops which was designed to reduce
the disparity in the value productivity of major crops. Sugarcane, an
inefficient user of resources from the society's perspective, was the most
profitable activity for farmers in 1969/70. By 1982/83, the disparity in
the value productivity of rice, wheat, cotton and maize as compared with
sugarcane was considerably reduced. In fact, cotton and rice were
earning more income per acre than the sugarcane. The other important
finding is that the prices of crops whose physical productivity increased
markedly due to widespread adoption of high-yielding new varieties
were relatively restrained with a view to pass on part of the benefits of
technological advances to consumers.

The crop calendar in Pakistan is complex and a farmer can
choose from various combinations of crops. There are two main crop
seasons known as Rabi and Kharif. In the Rabi season, crops are sown in
fall and harvested in spring. The main crops in this season are wheat,
gram, barley and rape and mustard seed. The main crops in the Kharif
season are rice, cotton, jowar, bajra, maize and tobacco. These crops

Table IV.5

GROSS INCOME PER ACRE OF MAJOR CROPS IN PAKISTAN

	RICE (1)	WHEAT (2)	SUGARCANE (3)	COTTON (4)	GRAM (5)	BARLEY (6)	JOWAR (7)	BAJRA (8)	MAIZE (9)	TOBACCO (10)	RAPE AND MUSTARD SEED (11)	SESAMUN (12)	ALL CROPS (13)
69-70	521.45 (100.00)	221.33 (100.00)	886.31 (100.00)	368.35 (100.00)	166.64 (100.00)	103.10 (100.00)	90.66 (100.00)	87.86 (100.00)	182.50 (100.00)	360.92 (100.00)	228.97 (100.00)	163.64 (100.00)	(100.00)
70-71	490.65 (94.09)	216.79 (97.91)	824.68 (93.05)	453.37 (123.08)	126.60 (75.97)	103.32 (100.21)	95.11 (104.91)	83.09 (94.57)	197.39 (108.16)	265.16 (73.47)	223.03 (97.40)	210.53 (128.65)	(95.45)
	487.11 (93.41)	254.4 (114.96)	1157.76 (130.63)	534.79 (145.18)	143.92 (86.36)	121.15 (117.51)	122.92 (135.58)	95.44 (108.63)	221.98 (121.63)	243.92 (67.58)	228.27 (99.69)	204.09 (124.72)	(111.7)
72-73	652.57 (125.14)	299.03 (135.01)	1477.55 (166.71)	629.45 (170.88)	193.73 (116.26)	135.72 (131.64)	144.88 (159.80)	115.06 (130.96)	256.62 (140.61)	224.45 (62.19)	246.27 (107.55)	260.27 (159.05)	(106.89)
73-74	640.42 (151.18)	388.09 (175.34)	851.96 (96.46)	1014.10 (275.28)	211.82 (127.11)	197.41 (191.47)	112.68 (124.28)	130.29 (148.29)	265.46 (145.46)	238.25 (66.01)	275.36 (120.26)	320.98 (196.15)	(190.3)
74-75	814.56 (156.21)	633.73 (286.35)	785.52 (88.63)	788.25 (213.99)	245.52 (147.93)	202.34 (196.26)	192.79 (212.65)	266.57 (303.40)	491.29 (269.20)	371.36 (102.89)	405.65 (177.16)	470.71 (287.65)	(263.68)
75-76	981.55 (188.23)	655.36 (296.10)	1369.26 (151.92)	872.27 (236.80)	249.98 (150.01)	237.15 (230.02)	181.94 (200.68)	267.19 (304.11)	493.47 (270.39)	249.90 (69.24)	534.24 (233.32)	449.27 (274.54)	(285.9)
76-77	1518.03 (218.46)	645.91 (291.53)	1295.46 (146.16)	995.70 (270.31)	283.97 (170.41)	211.65 (205.29)	192.84 (212.71)	224.82 (255.88)	413.13 (226.37)	355.74 (98.56)	565.49 (246.97)	506.67 (309.62)	(298.0)
77-78	1078.79 (206.89)	791.8 (357.75)	1264.02 (142.52)	1353.37 (367.41)	457.68 (274.65)	293.21 (284.39)	173.55 (191.43)	277.15 (315.44)	497.77 (272.75)	361.63 (100.20)	641.94 (280.36)	576.92 (352.55)	(365.1)
78-79	1200.94 (230.13)	581.12 (358.10)	1678.15 (189.34)	510.76 (410.14)	296.15 (177.72)	359.21 (348.41)	182.93 (201.77)	289.85 (329.90)	585.07 (320.69)	472.22 (130.84)	867.34 (378.80)	812.07 (496.25)	(434.0)
79-80	1237.06 (237.23)	954.29 (431.16)	1554.01 (175.32)	1803.45 (511.32)	204.77 (122.83)	417.41 (404.86)	255.43 (281.74)	406.85 (463.07)	561.06 (307.43)	518.58 (143.68)	999.93 (436.71)	964.57 (589.45)	(502.9)
81	1678.13 (302.83)	1017.72 (459.82)	1825.45 (206.07)	1776.93 (482.40)	646.24 (387.81)	478.12 (463.74)	277.32 (305.89)	503.36 (572.91)	629.97 (345.19)	713.81 (197.77)	761.83 (332.72)	651.85 (398.34)	(525.0)
82	1603.83 (353.03)	1131.61 (511.23)	1944.18 (219.35)	1861.59 (505.39)	722.22 (433.40)	463.01 (449.09)	303.51 (334.78)	401.06 (456.48)	839.39 (459.94)	681.81 (188.91)	645.43 (281.88)	520.49 (318.07)	(605.2)
83	1631.10 (370.33)	1264.10 (571.38)	1843.47 (207.99)	2095.46 (568.87)	1089.13 (653.58)	457.00 (443.25)	327.90 (361.68)	558.06 (635.17)	878.26 (481.24)	641.22 (177.66)	725.41 (316.81)	581.38 (355.28)	(691.8)

1. Share of gross income from each crop in total gross income was used to assign weights to producer price indices of each of the crops to calculate overall weighted index of prices received by the agricultural sector.
2. Figures in parenthesis are the index numbers with base year 1969-70.

are sown in the beginning of summer and harvested in the fall. Sugarcane is an annual crop. The reliance on relative prices of competing crops as a measure of relative profitability can be deceptive if differential growth in the physical productivity of crops occurs. A better measure in such situations is that of inter-crop gross income parity. Such indices for various crop combinations are given in Table IV.6.

Within the _Rabi_ season, the gross profitability of wheat is compared to, two crops, gram and rape and mustard seed. The gross profitability of wheat is higher by different magnitudes relative to its competing crops. Relative to gram, the parity index is less than 100 only in 1982/83 while for all years the index is higher than 100. Similarly, wheat profitability is higher relative to rape and mustard seed for all years except 1979/80. The sharp rise in profitability of gram and rape and mustard seed in one year is due to the sharp rise in prices of these two crops. For the remaining 13 years of the study, the sustained and high rise in physical productivity of wheat explains high levels of its profitability.

Within the _kharif_ season, the relative profitability of rice, maize and cotton is measured. Cotton is more profitable as compared with rice, except in 1973/74 while cotton is more profitable compared with maize for all years of this study except 1974/75 and 1975/76. In terms of relative profitability, the ranking of summer crops is cotton, maize and rice.

As mentioned previously, sugarcane is an annual crop and competes for the use of land with both summer and winter crops. The indices of relative profitability of sugarcane to rice and wheat, to wheat and cotton and to wheat and maize show that sugarcane's advantage in the

Table IV.6.

INDICES OF INTER-CROP GROSS INCOME PARITY AND GROSS INCOME-INPUT PRICES PARITY

Years	Wheat to Grain	Wheat to Rape & Mustard	Gross Income Parity Index of							Gross Income-Input Prices Parity Index
			Rice to Cotton	Rice to Maize	Cotton to Maize	Sugarcane to Rice and Wheat	Sugarcane to Wheat and Cotton	Sugarcane to Wheat and Maize		
1969-70	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00
1970-71	128.87	100.52	76.45	86.99	113.79	97.71	81.89	90.75		43.91
1971-72	133.12	115.32	64.34	76.80	119.36	130.84	97.60	110.72		51.49
1972-73	116.13	125.53	73.23	89.00	121.53	130.15	105.90	121.20		42.31
1973-74	137.94	145.81	58.55	110.81	189.25	58.32	40.57	59.60		66.84
1974-75	193.57	161.63	73.00	58.03	79.49	45.45	36.75	31.81		80.81
1975-76	197.39	126.91	79.49	69.61	87.58	59.86	50.92	46.37		88.36
1976-77	171.08	118.04	79.33	94.73	119.42	61.56	52.52	55.77		87.56
1977-78	130.26	127.60	56.30	75.84	134.71	56.63	39.20	44.66		111.64
1978-79	224.00	105.10	56.11	71.78	127.93	67.55	46.68	52.15		132.50
1979-80	350.88	98.73	46.40	77.17	166.32	59.43	36.43	46.72		134.40
1980-81	118.57	138.20	62.78	87.73	139.75	58.94	43.48	50.50		140.30
1981-82	117.96	181.36	71.83	78.93	109.88	53.85	43.21	44.94		145.76
1982-83	87.42	180.35	65.10	76.95	118.21	48.35	36.51	39.21		157.84

early years of study was rapidly eroded as the inter-commodity gross income parity moved against sugarcane vis-a-vis all its competing crop combinations.

The gross income-input prices parity indices given in the last colum in Table IV.6 show that the parity index falls drastically in 1970/71 and becomes as low as 42.31 in 972/73. The steep decline is due to sharp increase in the prices of inputs without comparable increases in the prices of agricultural commodities and in the physical productivity of crops. In fact for some of these years, agricultural output also fell drastically. However, due to deliberate price policy of the government which had led to an increase in the prices of selected major crops and had resulted in increasing productivity through development programmes, the parity was restored by 1978/79. The index shows an increasing trend and was as high as 158 in 1982/83.

7. CONCLUSIONS AND POLICY IMPLICATIONS

The foregoing analysis has some obvious implications for public policies that need to be briefly highlighted. The relationship between increase in incomes and prices of inputs in the agricultural sector as measured by the gross income-input prices index is one of deterioration in early to mid-1970s but sustained and rapid rise since 1978/79. The incentives provided to sugarcane producers were drastically curtailed possibly to improve the allocative efficiency of resource use in the agricultural sector. There was also an attempt to pass on some of the benefits of technological advance in the high-yielding crops of wheat and rice to the consumers as their prices were somewhat restrained relative to certain other crops. In view of the shortage of pulses and oilseeds

in the   ountry, and the inherent nature of risk involved in the

cultiv   ion of pulses and oilseeds, the present policy of maintai

high g   s income parity in favour of wheat vis-a-vis gram and oi

may ne   to be revised. There is also a need to improve the data

especi   ly in the area of costs of production of different crops.

: RESPONSIVENESS IN PAKISTAN'S AGRICULTURE:
A REVIEW

[ON

tent of farmers' response to relative price changes is a

subject in many developing countries. Governments in

itries have extensively used agricultural pricing policies

east three functions (i) to accelerate the growth of

itput; (ii) to accelerate or decelerate the growth of an

, in accordance with the priorities of the government; (iii)

keted surplus of food crops to ensure better availability of

ban areas of the country; and (iv) to improve terms of trade

ural sector in relation to the industrial sector. These

however, rarely compatible with each other. Market supply

inter-crop substitution depends on inter-crop price

the growth of aggregate output depends on the variations

iral price index relative to the variations in the prices of

ims and/or goods purchased by the farmers for consumption

:fore, the particular pricing policy to be followed depends

:s set forth by the government and empirical results of

erent aspects of agricultural pricing.

to formulate an effective pricing policy, reliable empirical

the degree of price responsiveness of supply to the relevant

is necessary. In this context three types of supply response

need   ) be distinguished viz. the supply response of the agricul

sect   as a whole, the supply response of individual crops and tl

supp   response of marketed surplus. The main purpose of this pa

is t   review and provide empirical evidence on these three types

supp   response. This will give policy makers an adequate under

stan   g of the direction and magnitude of the effects (intended

unin   ded) of agricultural pricing policies. This chapter revi

the   ults of the empirical work on price responsiveness for Pa

agri   ture. It also provides estimates of supply response of

aggr   ite output to lagged terms of trade for agriculture and ot

shif   g variables.

     The second section of this chapter presents information

resp   iveness of aggregate output while the third section is co

with   reage response and the fourth with the responsiveness of

mark   ed surplus. The fifth section contains a summary of the m

conc   ions and highlights the areas for further research.

2.   AGGREGATE OUTPUT RESPONSE

     The price responsiveness of aggregate output has receiv

cons   erable attention in the literature[1]. The knowledge of suc

resp   se is important for the formulation of policies regarding

allo   tion of public resources between the agricultural and the

agri   ltural sectors. It is possible to find negative or insigni

pric   responsiveness of aggregate output even in situations whe

indi   dual crops exhibit significantly positive responsiveness t

move   nts in relative prices. This aggregation problem is inhere

---

[1]See   for example $\boxed{50}$, $\boxed{51}$ and $\boxed{84}$.

-106-

in any econometric exercise of this kind. There is, thus, a need to study
price responsiveness at fairly disaggregated levels in order for the
estimates to be used for effective policy making. It may be noted,
however, that in a situation where one or two crops dominate the total
agricultural output, the distinction between the responsiveness of
aggregate and individual crops may not be so relevant. A number of addit-
ional points need to be considered in the formulation and estimation of
supply functions for the agricultural sector. In land scarce areas
where there is multi-crop agriculture, the elasticity of supply of land
is expected to be very low. Responsiveness of aggregate output in
these areas depends on the potential for improving the yield through
intensive application of current inputs and use of new techniques of
production. In land abundant areas this physical constraint on price
responsiveness is not present. Aggregate supply function based upon
data from different regions need to specifically take this into account.
Secondly, the availability of transport facilities as well as the level
of monetization and commercialization of the region need to be
explicitely considered for a discussion of price responsiveness to be
meaningful. Unfortunately very little work has been done in this area
and this is due largely to the dearth of necessary data in Pakistan.

Most of whatever little work has been done in Pakistan on
price response relates to individual crops. The study of aggregate
output has been very limited. Wizarat $\overline{/}91\overline{/}$ conducted a study to
investigate the role of factor productivity in accelerating the growth
of aggregate agricultural output. She calculated a total factor pro-
ductivity index as the ratio of the value added index to the aggregate
input index. She found that stagnation in the agricultural sector

during the 50's was mainly due to the use of old technology, constraints on vital inputs and the disincentive effect of various government pricing policies.

In the absence of alternative empirical evidence and in order to get a rough idea of the effects of terms of trade for agriculture on aggregate output we have e .imated the following equation. The equation has been estimated using the available terms of trade series for the years 1951-52 to 1983-84 presented in Chapter III.

$$Q_t = -13.72 + 0.75 \ Q_{t-1} + 0.28 \ P_{t-1} + 0.07 \ W_t + 1.12 \ T$$
$$(6.05) \quad (1.55) \quad (2.81) \quad (1.40)$$

Adjusted $R^2 = 0.98$

Where the figures in paranthesis are estimated t ratios and

Q_t = Index of agricultural output;

P_{t-1} = Lagged terms of trade for agriculture;

W_t = Index of water availability calculated as percentage of irrigated area in total cultivated area;

T = Time trend variable; and

Q_{t-1} = Lagged dependent variable.

The equation explains about 98 percent of variations in the dependent variable. The estimated results show that terms of trade movements have a positive effect on the growth of agricultural output. The short-run elasticity, calculated at mean values of the output index and the terms of trade index, is 0.18. The long-run elasticity is 0.73. These values of elasticities are small but suggest that farmers are responsive to changes in prices. These estimates should only be taken as rough indicators of the price responsiveness of aggregate

output. A number of alternative specifications in terms of choice of explanatory variables and lag structures were tried. However, these were rejected on the basis of low explanatory power and non-signifi-cance of the estimates. In the selected equation the water availability variable also turned out to be . significant at the 95 percent confidence level, indicating that pricing policy is not the sole instrument to foster agricultural growth. The time-trend variable is also positive and significant but at the 85 percent confidence level indicating the role of technological change in increasing agricultural output.

The longer-term benefits from any dynamic effects of price incentives depend largely on the adoption of new technology and the development of an appropriate institutional framework. Agricultural price policy, therefore, needs to take into consideration technological and institutional factors.

3. RESPONSIVENESS OF CROP ACREAGE

Considerably more work has been done on the acreage responsiveness of different crops to relative price movements. Most of the recent work is based on the Expectations-Adjustment model developed by Nerlove. Cummings $\underline{/}$ 19$\overline{/}$ estimated the model for Pakistan to seek answers to the fundamental question as to whether farmers respond to price incentives while deciding about acreage to be allocated to a crop. He included seven major cereal and cash crops viz. wheat, rice, barley, cotton, rape and mustard seeds, sesamum and tobacco in his analysis. The model was estimated at the national and regional levels. The detailed results of the regressions are presented in Appendix Table A-5.1. The results at the national level indicated positive price responsiveness of acreage for all crops except two i.e. sesamum and tobacco. The estimated price coefficients for wheat and barley were not significantly different from zero. The coefficients for the other crops were, however, significant. Supply elasticities obtained from the estimated price parameters are shown in Table V.1. The short-run and long-run supply elasticities estimated by Cummings for cotton varieties and for rape and mustard seed were notably higher than those for the less market oriented cereal crops.

Cummings also estimated the elasticities based on data for ten Divisions and for selected districts of Pakistan. His estimates of short-run and long-run acreage elasticities by Divisions and Districts and for all the crops are also presented in the Appendix Tables A-5.2 and A-5.3 respectively. For rice, the small supply elasticity indicated nationally was also found in most of the divisions and districts.

Statistically insignificant negative estimates were found in some cases.
For wheat, the national estimates like most of the geographically
disaggregated estimates are positive but insignificant. However, there
are some estimates that are significant but negative. For the major
cash crop, cotton, positive price responsiveness is indicated. The
degree of responsiveness is greater for American cotton which commands
higher market prices. At the district level the estimated price
parameter was found to be negative but insignificant for Hyderabad which
is one of the most important cotton growing districts. For mustard
seed, a fairly large and statistically significant positive elasticity
was indicated at the national level and at the division and district
levels. For Sesamum, which is a minor crop, a negative but statistically
insignificant relationship between prices and acreage was found at the
the national level and in four of the six divisions. The negative but
statistically insignificant relationship at the national level was not
confirmed by the results of disaggregated analysis at the district level.

The pattern of acreage responsiveness that emerges from the study
by Cummings can be classified into low response, medium response and
high response groups for the long-run acreage elasticities in the ranges
of zero to 0.1, 0.1 to 0.4 and 0.4 to 0.7 respectively. It is evident
that the response of foodgrain crops falls in the range of the low or
medium category. The response of sesamum and tobacco is also low.
Commercial crops such as cotton (American) and rapeseed and mustard
have the highest acreage elasticities.

Falcon $\underline{/\,23\,/}$ estimated a simple model of price responsiv[e] for cotton and wheat crops. The following estimated equation w[as] reported for the cotton crop.

$$A_t = -4.1 + 16.7 \left[\frac{\text{Price of Cotton}_{t-1}}{P_{t-1}} \right]$$
$$(2.4)$$

$$R^2 = 0.70$$
$$n = 25$$

Where

A_t = Pe[r]centage change in acreage under the crop fr[o]m period t-1 to t.

P_{t-1} = La[g]ged weighted price of rice, bajra, jowar, ma[i]ze and sugarcane.

A similar equati[o]n was estimated for wheat where the explanatory variable was the relative price of wheat. In order to analyse y[ield] response in cott[o]n, the percentage change in cotton yield was su[bsti]tuted as the dep[en]dent variable in the above equation. The co-efficient of lag[ge]d relative price was positive for both wheat a[nd] cotton crops. T[he] coefficient of determination was 0.70 for the cotton equation [in]dicating that seventy per cent variation in t[he] dependent variab[le] are explained by the model. Falcon estimated positive short-r[un] acreage elasticity of 0.41 for cotton crop (Table V.1). He e[s]timated the acreage response function for the wheat crop, sepa[ra]tely for irrigated and rainfed (barani) areas. For irrigated are[a] sabout 25 per cent of the variation in the dependent variab[le] was explained by the price of wheat relative the price of suga[r]cane, lagged by one year. The estimate of pric[e]

elasticity was low and varied between 0.1 and 0.2. For rainfed
areas relative price could explain very little of the variation in
the dependent variable. In these areas acreage under the crop was
found to be highly correlated with the rainfall variables. Falcon's $\underline{\big/}$23 $\underline{\big/}$
estimates of cotton and wheat short-run elasticities are consistent
with the findings of Cummings $\underline{\big/}$19$\underline{\big/}$ although the estimates pertain to
slightly different time periods. On the whole, Falcon's analysis
suggests that farmers behave rationally and react to the changes in
price level.

Acreage response functions were also estimated by Gotsch and
Brown $\underline{\big/}$31$\underline{\big/}$. The authors estimated a traditional Nerlovian
distributed lag model for wheat, rice, cotton and sugarcane. They
estimated the following equation for Central Punjab for the period
1934/35 to 1964/65 and for the Pakistani Punjab for 1960/61 to
1975/1976:

$$A_t^c = a + b\ P_{t-1}^c + d\ A_{t-1}^c - e\ W_{t-1}$$

Where

b	=	short-run supply response to price
$\dfrac{b}{1-d}$	=	long-run supply response to price.
e	=	short-run supply response to water.
$\dfrac{e}{1-d}$	=	long-run supply response to water.
A_t^c	=	Acreage under a crop in period t.
P_{t-1}^c	=	Crop price in period t-1 relative to the weighted average price of production substitutes.
A_t^c	=	lagged dependent variable
W_{t-1}	=	water availability in period t-1.

The implicit assumption in estimating the above equation is that the decisions of farmers about the acreage to be brought under each crop are based on the expectation of prices,which are formed on the basis of previous experience. The results of this study are also presented in Table V.1. The authors estimated separate equations for irrigated and rainfed areas for the wheat crop. The price elasticities for both the areas were low and possibly due to the subsistence nature of the crop. There were marked difference in price responsiveness between the irrigated and the rainfed areas. The price elasticity for cotton was about 0.3 which is slightly lower than the previous estimates of 0.4 found by Falcon $\underline{/\ 23\ \underline{/}}$. Sugarcane had the highest price elasticity of 0.44 indicating that farmers are highly sensitive to pricing policies while deciding about the acreage to be allocated to the crop. The authors concluded that there was substantial absolute acreage response due to changes in relative prices.

Gotsch and Falcon $\underline{/\ 33\ \underline{/}}$ analysed the role of new technology and pricing policies by applying a linear programming model. The authors noted that farmers respond to relative net revenue rather than to relative price because they intend to maximize profit. This distinction seems to be more important in situations where a new technology is introduced to foster agricultural growth. The authors derived(static) normative supply curves through linear programming by varying the price of wheat and calculating the net revenue asso- ciated with each price. The effect of new technology on output at current prices and the elasticity of farmers' supply response was traced by varying the price of wheat parametrically with alternative

TABLE V.1

Estimates of Short and Long Run Price Elasticities and Estimated Values of the Adjustment Coefficients in the Adaptive Expectations Model, by Different Studies.

CROP	PRICE ELASTICITY		ADJUSTMENT COEFFICIENT		PERIOD	SOURCE
	Short-run	Long-run	Price	Area		
Rice	0.12	0.17	0.90	0.69	1949-68	Cummings
	0.16	0.41			1934-65	Gostch & Brown
	0.18	0.35			1960-76	Gostch & Brown
Wheat	0.10	0.22	0.70	0.45	1949-68	Cummings
	0.10 to 0.20	-			1933-58	Falcon
	0.07	0.21			1956-68	Cummings
Wheat (Irrigated)	0.06	0.31			1934-65	Gostch & Brown
Wheat(Rainfed)	-0.09	-0.18			1934-65	Gostch & Brown
Wheat(Rainfed)	0.07	0.35			1960-75	Gostch & Brown
Barley	0.03	0.02	0.85	1.31	1951-68	Cummings
Cotton (American)	0.40	0.47	1.10	0.86	1950-62	Cummings
	0.29	3.62			1934-65	Gostch & Brown
	0.15	1.07			1960-75	Gostch & Brown
Cotton (Desi)	0.41	0.28	1.10	1.49	1950-62	Cummings
Rape & Mustard	0.38	0.48	0.80	0.79	1951-67	Cummings
Sesamum	-0.09	-0.09	0.90	0.98	1951-67	Cummings
Tobacco	-0.13	-0.14	0.70	0.94	1951-67	Cummings
Sugarcane	0.14	1.57				Gostch & Brown

sets of assumptions about the technology and the availability of supplementary water. The study found that the new technology greatly increased the price sensitivity of the system. However, little could be accomplished without supplementary water.

It must be noted that most of the estimates of price elasticity discussed so far are less than unity and thus, inelastic by the usual definition of the elasticity concept. These estimates indicate an awareness and willingness on the part of individual cultivators to make changes between crops and to adopt a cropping pattern that tends to maximize the economic potential of the available resources.

4. RESPONSIVENESS OF MARKET SUPPLY

In Pakistan, like other developing countries, a large proportion
of total output is retained for domestic consumption, feeds, seeds and
payments in kind. A knowledge of the determinants of market supply is
necessary for estimating the food availability for the urban sector and
forecasting the required level of foodgrains imports in any one year.

In the case of crops which are almost wholly marketed the
elasticities of output and market supply can be regarded as approximately
the same. But in the case of those crops, a substantial part of whose
output is retained by farmers, the responsiveness of the marketed
surplus must be measured separately from the responsiveness of total
output.

There are two basic approaches to estimating the price elasticity of
marketed surplus. Firstly, the direct approach where a relationship
is established, usually by regression analysis, between the marketed
surplus and the relative price of the crop. The statistical data
required to estimate the elasticity using the direct approach are
extremely difficult to obtain. The elasticity is, therefore, often
measured by applying the indirect approach. Various methods of indirect
estimation have been suggested in the literature. A review of these
methods shows that most of them are aimed at estimating the
approximate range within which the elasticity may be expected to lie.
Krishna $\underline{/}$ 50 $\underline{/}$ presented a framework for an indirect estimation of price
elasticity of the marketed surplus of a subsistence crop. He started

with the simple notion that total output can be distributed betw
consumption and sales. Thus, sales (M) will be identical to the
difference between the output (Q) and the consumption (C), i.e.

$$M = Q - C \qquad \dots\dots\dots\dots\dots$$

By differentiating (1) with respect to the price relative and pe
ming a series of manipulations ne obtained an expression for the
elasticity as:

$$e = rb_1 - (r-1) (g + mhk) \qquad \dots\dots\dots\dots\dots\dots$$

Where

e	=	Price elasticity of market supply
r	=	Inverse of the sale ratio i.e. M/Q
b_1	=	Price elasticity of output of the crop
g	=	Price elasticity of consumption
m	=	Sales ratio (i.e. M/Q or 1/r)
h	=	Income elasticity of crop output
k	=	Ratio of the value of crop output to net inco

Krishna pointed out that not much reliance can be placed on such
estimates of price elasticities of marketed surplus. He therefo
suggested another method for estimating the elasticity. Accordi
this method the elasticity e is a product of the price elasticit
output (b_1) and the output elasticity of the market supply E_{mq}.

$$e = b_1 E_{mq} \qquad \dots\dots\dots\dots($$

Noshirvani and Behrman critically examined eq. 2 of Kri
indirect method. Noshirvani incorporated an income effect and co
Krishna's estimate of the price elasticity as below:

$$e = rb_1 - (r-1) (g + hk + hk b_1) \qquad \dots\dots\dots\dots($$

Behrman .... also included other crops as a source of income and corrected the expression as

$$e = rb_1 - (r-1)(g+hk+hk+b_1)-(r-1)hb_2(1-k) \ldots\ldots(5)$$

where b_2 is the price elasticity of production of crops other than the subsistence crop. A comparison between Krishna, Noshirvani and Behrman shows the difference in their assumptions and derivation procedure. Therefore, the estimates of price elasticity from these three models will yield different results. The models of Noshirvani and Behrman are more relistic and involve fewer statistical problems. It is, therefore, preferable to use these two models while indirectly estimating the price elasticity of marketed surplus.

There are very few empirical studies, in the context of Pakistan, concerning the price response of market supply. A possible reason for this is the absence of time series data on marketed surplus and the small variance of food prices in any one year.

Qureshi $\underline{\smash{/}}\ 78\ \underline{\smash{/}}$ estimated eqs. (2), (3), (4) and (5) for three alternative values of m and r to compute plausible ranges of price elasticity of marketed surplus of wheat in Pakistan. The results of his estimation are summarised in Table V.2 below:

TABLE V.2

RANGES OF PRICE ELASTICITY OF MARKETED SURPLUS OF
WHEAT

Eq. No.	$m = 0.09$ $r = 11.11$	$m = 0.55$ $r = 1.81$	$m = 0.92$ $r = 1.09$	$b_1 = 0.1$ to 0.2 $E_{mq} = 1.273$ to 2.178
2	Min. e 1.854	0.1899	0.102	-
	Max. e 4.141	0.064	0.240	-
4	Min. e 2.143	0.090	0.009	-
	Max. e 5.229	0.603	0.340	-
5	Min. e 2.321	0.103	0.023	-
	Max. e 5.437	0.620	0.242	-
3	Min. e -	-	-	0.13
	Max. e -	-	-	0.44

Source: $\boxed{78}$.

The results suggest a positive price response of marketable surplus for likely values of the parameters used to estimate the elasticity. All of the models of indirect estimation showed estimates of the price response for market supply of wheat larger than the price response for wheat production. There may be various factors that have accounted for the positive value of the elasticity. Larger farmers, who are often assumed to behave 'rationally', may have positive elasticity due to a negative consumption effect arising from increases in food prices or the substitution of cheaper food items in consumption by peasants. Qureshi also estimated a market supply function for the wheat crop using cross-section data on marketable surplus. The results of his estimation are given in Table V.3. The results showed a positive price response for the entire sample i.e. owners and mixed categories of farmers. The response is negative for the tenants but the co-efficient is insignificant. He found the partial elasticity of the market supply with respect to the level

of production to be significant and greater than unity. This implies
that marketable surplus for wheat will increase more than proportional
to the increase in output. He estimated the price elasticity of
marketable surplus to lie between 0.3 and 0.7. His results suggest that
a   price increasing policy will result in higher levels of marketable
surplus through reduced family consumption and increased farm sales.
The author admitted however, that the conclusions drawn were a 'first
approximation' of the true picture, the nature and quality of data
being the limiting constraints.

Another attempt to establish the link between the market supply
and output was made by Khan and Chaudhry /¯45_/. Since the marketable
surplus is the surplus of production over the minimum consumption level,
the resultant income is used for consumption and investment purposes.
According to these authors the main determinant of marketable surplus is
the level of output. They also expected rent to be an important
determinant of marketable surplus and estimated the following equation;

$$M = 18.39 + 0.35 \: X - 0.21 \: R$$
$$(0.01) \quad (0.02)$$
$$R^2 = 0.58$$

Where the figures in parenthesis indicate the standard errors of the
estimated coefficients; and

M   =   Marketable surplus

X   =   Output of food per capita

R   =   Total rent payment per capita

The signs of the coefficients are consistent with the hypothesis. The
output elasticity of marketable surplus at mean values worked out to

be greater than unity (1.60). The model explained 58 percent of variation in the dependent variable.

The authors also tested the hypothesis that farmers market only that portion of their output which is enough to satisfy their minimum cash requirements. The hypothesis suggests that cash requirements of the farmers will be the main determinant of marketable surplus. In this connection the prices of food crops will be a relevant variable in order to determine marketable surplus. The following equation was estimated to test this hypothesis.

$$M = -12.14 + .35 X_0 - .19 R - .02 X_c$$
$$ (0.01) (0.01) (0.02)$$

$$R^2 = 0.58$$

Where the figures in parenthesis indicate the standard errors of the estimated coefficients; and

X_c = Output of cash crops per capita

X_0 = Income from other sources

The signs of the estimated coefficients were found to be consistent with the hypothesis.

Most of the work on market supply responsiveness relates to the wheat crop while little or no work has been done to analyse price responsiveness of market supply for rice, maize, gram, pulses and other food crops. At present there is no time-series study available on marketed surplus of agricultural commodities as a whole. A positive step in this direction will be to plan studies in this area to establish the degree of generality of the findings established for other developing countries.

5.   SUMMARY   AND   CONCLUSION

The main findings of the preceding analysis need no elaborate summary. However, some concluding remarks may be fruitful for a busy reader. The trends and phases of domestic economic incentives as measured by the net terms of trade for the agricultural sector and its various sub-sectors were analysed in the chapter on 'Terms of Trade and the Price Policy'. The impact that the domestic incentives may have had on the level and composition of agricultural output was the focus of attention in this chapter.

Shifts in the relative prices of crops were frequent and large. The empirical evidence that the acreages of different crops vary systematically in response to intercrop price movements is abundant and shows that cropping patterns are a function of prices. The price elasticities for food crops are lower than those for cash crops, but even in these cases positive price responsiveness is indicated.

While acreage response functions have been subjected to detailed scrutiny, little work has been done on the output response. The elasticity of output with respect to price is the sum of elasticity of yield per acre and the elasticity of acreage. We have already noted that acreage elasticity is positive. If yields are sensitive to the relative prices of output and inputs, one should expect the output elasticity to be not only positive but larger than the acreage elasticity. Some evidence exists, in Pakistan, that farmers adjust the quantities of variable inputs, especially modern inputs, in response to changes in

the input prices. However, no solid empirical work has been done
in this area. Need for a careful analysis of the output response to
the relative output-input prices is obvious and urgent and would be of

direct policy relevance.

Another area of research which is required on the agenda for
further research is the likely effect of prices on the "effective"
supply of agricultural products for the non-agricultural sector. Cash
crops are marketed almost totally. The price responsiveness of the marketed
supply needs to be estimated for different food crops. Studies on this
issue are very few, only two studies were available. A possible reason for
this is the absence of time series data on marketed surplus. The price
elasticity of wheat for market supply was found to lie between 0.3 and
0.7. A significant relationship between marketed surplus and food
output was also noted. A rapid increase in the marketed surplus of some
food crops in Pakistan, notwithstanding positive elasticity of marketable
surplus with respect to prices, is ultimately explainable in terms of
technological factors behind the observed increased output. Relative
price changes were not of a magnitude that could explain the market
supply of foodgrains.

Although supply response, especially the acreage response functions,
is a reasonably well researched area, no studies relating
aggregate farm output to terms of trade are available for Pakistan.
Some researchers have noted in passing that they had tried to establish
a statistical relationship between terms of trade and value added in
agriculture. The results were dismal and contrary to a priori

Estimated Parameters for Price Responsiveness of Acreage at the National Level.

Crop	Time Period	Constant	Price	Lagged Area	Rainfall	Trend	R^2
Rice	1949-1968	+963.7[a] (1.39)	+15.03[b] (2.11)	+0.310 (0.78)	+0.107 (0.32)	+55.59[c] (2.21)	0.94
Wheat	1949-1968	+1636.0 (0.03)	+90.83 (1.03)	+0.310 (0.65)	+4.391[a] (1.37)	+120.7 (0.63)	0.89
Barley	1951-1968	+514.8[d] (4.40)	+ 1.434 (0.38)	-0.308 (1.02)	+0.312[d] (3.02)	-6.218 (2.17)	0.54
Cotton(American)	1950-1962	+1448.0[d] (3.46)	+16.46[d] (0.99)	+0.139 (1.89)	+1.057[b] (2.60)	+122.96[c]	0.82
Cotton (Desi)	1950-1962	+690.7[c] (2.94)	+2.839[c] (2.34)	-0.490[b] (1.85)	+0.046 (0.24)	-10.53 (0.78)	0.41
Rape and Mustard	1951-1967	+363.2 (0.94)	+20.60[a] (1.65)	+0.208 (0.55)	+0.366 (0.51)	-19.42[a] (1.30)	-
Sesamum	1951-1967	+59.78[b] (2.01)	-0.160 (0.46)	+0.021 (0.04)	+0.040[a] (1.32)	+1.255[a] (1.44)	0.31
Tobacco	1951-1967	+36.98[a] (1.71)	-0.106 (0.72)	+0.100 (0.30)	+0.031 (0.50)	+7.005[d] (3.87)	.074

Notes: Figures in parentheses are t-values.

    a. 30 percent significance level   c. 5 percent significance level
    b. 10 percent significance level   d. 1 percent significance level

Source: Cummings / 19 /.

Table A-5.2

Short and Long Run Elasticity Estimates based on Data for Divisions

Division		Rice	Wheat	Barley	Cotton (American)	Desi	Mustard	Sesamum	Tobacco
Bahawalpur	SR	-0.15	+0.08	+0.48[a]	+0.40[a]	+0.60[c]	+1.09[c]	+0.30[c]	-
	LR	-0.17	+0.10	+0.51	+0.29	+0.44	+0.61	+0.42	-
Dera Ismail Khan	SR	-	+0.01	+0.55[d]	-	-	-1.94[c]	-	-
	LR	-	+0.01	+0.45	-	-	-1.15	-	-
Hyderabad	SR	+0.35[c]	+0.02	-0.50[a]	0	-	-0.33	-0.74[d]	-
	LR	+0.36	+0.02	-0.28	0	-	-0.11	-0.51	-
Khairpur	SR	-0.11	+0.57[b]	-0.34[b]	+1.84[d]	+0.45	+0.74[a]	-0.20	-
	LR	-0.13	+0.63	-0.30	+3.54	+0.51	+0.77	-0.07	-
Lahore	SR	+0.09	-0.09	+0.20[a]	+0.42[b]	-0.05	+0.63	-0.99[d]	-0.03
	LR	+0.14	-0.09	+0.34	+0.67	-0.03	+0.73	-1.05	-0.03
Multan	SR	+0.08	-0.03	+0.09	+0.52[c]	-0.57	+0.81[d]	-0.33[a]	-0.37[c]
	LR	+0.42	-0.04	+0.06	+0.46	-3.35	+0.47	-0.58	-0.46
Peshawar	SR	+0.08	0	+0.21	-	+0.15	-0.45	-	+0.83[a]
	LR	+0.07	0	+0.22	-	+0.21	-0.38	-	+0.94
Quetta	SR	+0.11	-0.26[a]	+0.46[b]	-	-	-	-	-
	LR	+0.16	-0.27	+0.47	-	-	-	-	-
Rawalpindi	SR	+0.76[d]	-0.26[c]	+0.19	+0.26[a]	+0.57[c]	+0.11	-	+0.31[a]
		+38.0	-0.42	+0.17	+0.72	+0.32	+0.20	-	+0.34
Sargodha	SR	-0.34[a]	-0.39[a]	+0.14	+0.23[c]	+0.33[a]	+0.94[c]	+1.01[d]	+1.10[c]
	LR	-0.34	-0.40	+0.22	+0.16	+0.20	+0.94	+0.68	+0.65

Notes: (1) Lack of a figure indicates no supply analysis was performed.
(2) Significance level of price parameter from which elasticity was derived.
    a. 30 percent   b. 10 percent   c. 5 percent   d. 1 percent

Source: Cummings [19].

Short and Long Run Elasticity Estimates Based on Data for Selected Districts

District 1	Short-run Elasticity 2	Long-run Elasticity 3	District 4	Short-run Elasticity 5	Long-run Elasticity 6
Rice					
Dadu	+0.28[a]	+0.72	Larkana	-0.06	-0.09
D.G. Khan	+0.02	+0.03	Sahiwal	+0.08	-0.24
Gujranwala	-0.36	-0.32	Muzaffargarh	+0.56[a]	+1.33
Gujrat	+0.91[d]	-10.1	Sanghar	+0.47	+1.37
Hazara	+0.47[b]	+0.26	Sheikhupura	-0.24	-0.22
Hyderabad	+0.42[a]	+0.23	Sialkot	+0.82[c]	+1.00
Jacobabad	-0.06	-0.15	Sibi	+0.13	+0.25
Khairpur	+0.80	+0.86	Sukkur	+0.05	+0.06
Kurram	+0.20[b]	+0.33	Tharparkar	+0.81[a]	+0.65
Lahore	+0.18[c]	+0.69	Thatta	+0.49[d]	+4.90
Wheat					
Attock	-0.33[d]	-0.67	Loralai	-0.16	-0.19
Bannu	-0.05	-0.06	Lyallpur	-1.22[c]	-1.03
Chagai	+0.94[b]	+1.52	Mianwali	+0.49[a]	+0.35
Dadu	+0.52[c]	+0.52	Sahiwal	-0.18[d]	-0.15
D.G.Khan	-0.05	-0.04	Multan	+0.01	+0.02
D.I.Khan	-0.19	-0.12	Muzaffargarh	0	0
Gujranwala	-0.13	-0.17	Nawabshah	+0.46[a]	-0.43
Gujrat	-0.13[a]	-0.20	N.Waziristan	+0.01	+0.01
Hazara	-0.15[d]	-0.09	Peshawar	-0.06	-0.24

(Continued)

1	2	3	4	5	6
Wheat-contd.					
Hyderabad	-0.90	-1.03	Quetta	-0.09	-0.11
Jacobabad	+2.60^d	+3.38	Rawalpindi	-0.05	-0.06
Jhang	-0.51^d	-0.46	Sanghar	+0.04	+0.05
Jhelum	+0.05	+0.09	Sargodha	-0.17^b	-0.20
Khairpur	+0.62^a	+1.17	Sheikhupura	-0.07	-0.06
Kohat	-0.19	-0.19	Sialkot	-0.08	-0.07
Kurram	-0.02	-0.02	Sibi	+0.13^a	+0.25
Larkana	+0.17	+0.15	Zhob	+0.05	+0.04
Lahore	-0.07	-0.08			
Barley					
Attock	-0.06	-0.08	Mardan	-0.40^b	-1.74
Bannu	+0.90^a	+0.85	Mianwali	+0.26	+0.27
D.I.Khan	+0.47^a	+0.28	Sahiwal	+0.02	+0.02
Gujranwala	+0.32^c	+1.10	Muzaffargarh	+0.01	+0.01
Gujrat	+0.55^d	+2.75	Peshawar	+0.09	+0.21
Hazara	+0.16^b	+0.17	Quetta	-0.04	-0.05
Khairpur	+0.04	+0.11	Sheikhupura	+0.43^d	+0.43
Kohat	+0.81^c	+0.63	Sialkot	+0.08	+0.06
Lahore	+0.40^a	+0.54	Sukkur	-0.37	-0.36
Loralai	+0.48	+0.50	Thatta	-0.31^a	-0.36
Cotton (American)					
Gujrat	+0.26^a	+0.72	Multan	+0.43^a	+0.35

1	2	3	4	5	6
Cotton(American) - contd.					
Hyderabad	-0.18	-1.13	Nawabshah	+0.94^c	+0.82
Jhang	+0.18	+0.18	Sanghar	+0.90^a	+0.07
Khairpur	+1.44^c	+4.50	Sargodha	+0.40^b	+0.34
Lyallpur	+0.74^c	+1.72	Sheikhupura	+0.34^a	+0.81
Sahiwal	+0.65^c	+0.81	Tharparkar	+0.02	+0.02
Cotton (Desi)					
Gujranwala	+0.64^d	+0.94	Lahore	-0.41^b	-0.95
Khairpur	+2.16^d	+2.14	Nawabshah	-0.22	-0.28
Sahiwal	-0.66	-3.67	Sialkot	+0.56^c	+0.61
Rape and Mustard					
Attock	-0.27	-0.64	Lyallpur	+0.44^b	+0.27
Dadu	+0.28^c	+0.31	Mianwali	+0.61^c	+0.80
D.I.Khan	-0.60^a	-0.36	Nawabshah	+0.71^a	+0.74
Hyderabad	-0.57^c	-2.48	Sanghar	-0.84^b	-4.94
Jacobabad	-0.52^c	-2.17	Sibi	+2.74^c	+5.71
Khairpur	-0.06	-0.06	Sukkur	+0.75^b	+1.29
Larkana	+1.39^c	+2.44	Thatta	-0.87^a	-0.88
Tobacco					
Attock	+0.16	+0.21	Mardan	+0.46	+0.46
Gujranwala	-0.19^a	-0.17	Sahiwal	-0.19^c	-0.12
Gujrat	+0.39^c	+0.36	Peshawar	+1.29^c	+2.30
Lahore	-0.26	-0.27	Sheikhpura	+0.27^c	+0.22
Lyallpur	+0.11^c	+0.08	Sialkot	-0.19	-0.15

Notes: Significance level of price from which elasticity was derived:

    (a) 30 percent; (b) 10 percent; (c) 5 percent; (d) 1 percent.

    Sahiwal was formerly known as Montgomery

Source: Cummings $\underline{/\ 19\ /}$.

I. INTRODUCTION

The principle of equity occupies a central place in the desired attributes of taxes. The application of equity criterion is easier when two entities of roughly equal economic capacity are considered in the analysis. The equal treatment of equals in taxation is based on sound ethical principles. The difficult problem arises when two economic entities with unequal economic capacities are to be subjected to the analysis of fair distribution of taxes. Although on the vertical scale the meaning of equity has evaded a precise definition, there is a general consensus that taxes which redistribute incomes from the rich to poor are generally preferable.

To estimate the redistributive impact of the actual tax system, two sets of estimates are needed. First, the incidence of different taxes is to be measured. Second, the desired level of progression is to be specified. Both aspects of this problem are inherently controversial. A theory or empirical estimates of the distribution of tax burden has been evolved nevertheless. The traditional application of this theory has been in the context of allocation of different taxes to different income groups. The theory has also been applied in the context of measuring state tax burden in measuring international tax burdens and in

measuring sectoral tax burdens with in different countries.In discussions of tax
reform in Pakistan the proponents of increased agricultural taxation often
base their case on the view that agricultural sector is "undertaxed". Previous
empirical work in Pakistan on interesectoral tax burden is scanty, outdated
and generally weak as far as the method of analysis is concerned. The study by
Kazi /¯43_7 is an exception. She has estimated sectoral tax burdens for the
years 1972-73 to 1979-80. Her study also contains a comprehensive review of
previous work done in this area. Notable work reviewed by her is the studies by
Javed Hamid entitled "Suggested Approach to Agricultural Taxation Policy in
Pakistan", The Pakistan Development Review, Vol.X. No.4, Winter 1970, Ghaffar
Chaudhry "The Problems of Agricultural Taxation and an Alternative Solution",
The Pakistan Development Review, Vol. XII, No.2, Summer 1973, Sarfaraz Qureshi,
"The Problem of Agricultural Taxation and an Alternative Solution: A Comment",
The Pakistan Development Review, Vol.XII. No.4, Winter 1973, and Jeetun A.
"Incidence of Taxes in Pakistan" Karachi. Applied Economic Research Centre
1978. This chapter attempts to measure the relative tax burden of the agricul-
tural sector for the years 1972-73 to 1983-84.

2.   CONCEPTUAL FRAMEWORK AND ITS LIMITATIONS

The theory of equitable distribution of tax   amongst various
economic entities can best be described in a series of steps in which it was
evolved. Equity is generally defined in terms of the equality of tax burden.
The tax burden on any economic unit is measured by the ratio of taxes to
taxable capacity. The taxable capacity of an individual unit is measured by its
economic capacity (income, wealth, consumption) minus subsistence requirement.
In view of the difficulties in measuring subsistence requirement, early econo-
mists defined tax burden as the ratio of taxes to income. Equal tax-income
ratios for two individuals implied equitable taxation according to this defi-
nition. Ghandhi /¯30_7 has pointed out certain limitations of this measure and
presented a modified measure of intersectoral equity. Before we list the limi-
tations of the traditional measure of tax burden, it should be pointed out that
for two units with roughly equal taxable capacity the measure gives valid
results.

The most serious limitation of measuring tax burden by the
ratio of taxes to income is that it endorses proportional.taxation as
the "norm" or "line of equal burden". The selection of norm for the
equitable taxation of individuals with unequal taxable income is a

tricky and at best an arbitrary exercise. Conclusions concerning the "fair" tax treatment of unequals vary according to the principle of sacrifice and the income-welfare relationship $\sqrt{26}$. Both the principle of equal sacrifice and that of proportional sacrifice can lead to regressive, proportional or progressive taxation depending on the slope of marginal-utility-of-income curve. Theoretical complexities aside, there is a general consensus that some progression in taxation is socially desirable.

This limitation of the traditional measure was corrected by Frank $\sqrt{27}$ and Richard Bird $\sqrt{13}$. Both suggested a measure of the tax burden which gives greater weight to income than to taxes. The measure is defined as the ratio of taxes, as a percentage of personal income (disposal income in case of Bird's measure), to personal income per capita. This measure squares the per capita income and thus introduces progression.

Henry Aaron $\sqrt{1}$ and Ghandhi $\sqrt{30}$ have generalized the measure suggested by Frank and Bird. Both show that income can be raised to the power of any specified number ranging from one (as in the traditional measure) to two (as in Frank's measure). Ghandhi has recommended a moderate level of progression by raising taxable capacity to the power of 1.5.

Another limitation of the traditional measure of the tax burden is that it assumes that equal incomes have equal subsistence requirements and that the subsistence requirement increases in proportion to income. The assumption that equal incomes have equal subsistence

requirements may be roughly valid although a purist may quarrel with this assumption. The assumption that subsistence allowance should increase proportionally with income cannot be justified on a priori grounds. A separate estimate for the subsistence requirement for both agricultural and non-agricultural sectors must be incorporated in the measure for relative tax burden.

The third limitation of the traditional measure of tax burden is that the measure of economic capacity has been measured by income only. In the literature on taxable capacity, income is considered as the most important index of taxpaying capacity. Other factors, like permanent income, wealth or consumption could be a substitute and/or complementary indices of taxable capacity. In the context of sectoral tax burden, distribution of income and wealth become additional sources of taxable capacity. The incorporation of these other measures of taxable capacity raises serious index number problems and also the problem of choice of appropriate weights for the different components of taxpaying capacity.

The limitations of the traditional tax burden measure discussed so far and their correction in the measure used in the present study makes the measure theoretically more relevant. Its empirical application is subject to the data weakness present in any practical situation. Before we present the measure and its empirical values, in the two sectors in Pakistan, we briefly list the criticisms of any tax burden measure. These criticisms relate both to the theory of tax incidence and the theory of interpersonal comparison of utilities.

Firstly, it is asserted that the concept of tax burden is meaningless because this assumes, for implicit comparison, the absence of government. In this context it is helpful to distinguish between absolute and relative tax burdens. Taxes are levied mainly to offset government expenditure. All individuals in a society derive benefits from the government. It is possible that none of the individuals may bear any net burden due to the fiscal operation of the government. Even when there is no absolute burden involved, if two individuals have equal taxable capacity but different tax payments, a valid case for tax inequity on relative burden considerations can be made. It must be remembered that the tax burden and not the fiscal burden is the main objective of study in this chapter.

Secondly, the computation of relative sectoral tax burden inherently involves comparison of interpersonal utilities. The comparison of such utilities is now acknowledged to be without operational content. To the extent that public policy demands making such comparisons, the basic limitation must always be kept in view.

Lastly, the incidence of taxes on different sectors ignores the effects of the tax system on the important variables in the economy.

These are only some of the criticisms of tax burden estimates. In view of such limitations it is a moot question whether the results are meaningful at all. The answer depends on one's view of economic analysis. If one considers economic analysis capable of providing

a feasible answer, then the exercise can be useful. In any case, these limitations qualify the results presented in later sections of the chapter.

2.1. Tax Burden Measure

As mentioned earlier, the traditional measure of the tax burden was defined as the ratio of taxes to income. Its limitations are: (1) proportionality as the norm of equitable taxation, (2) non-accounting of subsistence requirements, and (3) non-accounting of measures other than income as arguments of taxable capacity. The modified measure of tax burden that takes account of subsistence requirements and progression is as follows:

$$B_1 = \frac{t}{(y-s)^{e_0}}$$

Where B_1 is the first approximation measure of the tax burden, t is per capita tax, y is per capita income, s is per capita subsistence requirement and e_0 is the desirable degree of progression.

The first approximation measure of the tax burden can be modified to take account of factors other than income as arguments of taxpaying capacity. The second approximation measure of the tax burden is as follows:

$$B_2 = \frac{t}{f\,/\overline{y}-s,\ \overline{w},\ w,\ i\,/^{e_0}}$$

where additional factors of wealth per capita ($\overline{w}$), wealth inequality (w) and income inequality (i) are included in the denominator of the measure.

2.2   Intersectoral Equity

The inequity in taxation is measured by the inequality in the tax burden on two economic units. Our main objective is to test the hypothesis of the under-taxation of the agricultural sector. To do so, separate estimates of the tax burden for each of the two sectors need to be computed. If the tax burden on agriculture is less than the tax burden on non-agriculture, the undertaxation of agriculture is empirically established. In notations, if A and N stand respectively for agriculture and non-agriculture and C for the taxable capacity, the agricultural sector is undertaxed whenever

$$\frac{t_A}{C_A e_0} < \frac{t_N}{C_N e_0} \quad \text{or} \quad \frac{t_A}{t_N} < \frac{C_A}{C_N} \frac{e_0}{e_0}$$

In words, the agricultural sector is undertaxed if its relative tax payments are less than its relative equity-adjusted taxable capacity.

3.   SECTORAL TAX EQUITY IN PAKISTAN:
       FIRST APPROXIMATION

The first approximation measure of the tax burden on any sector requires estimates of (1) per capita taxes after taking full account of tax-shifting possibilities, (2) per capita income, and (3) per capita subsistence requirements. To analyse the relative tax burden on agriculture and non-agricultural sectors in Pakistan first, we develop the required information and then present the results regarding sectoral tax equity.

3.1   Shifting of Taxes in Pakistan

The theoretical considerations and the special institutional context in Pakistan that have some bearing on the incidence of different taxes need to be briefly reviewed. In conformity with the general practice in empirical studies on tax burden studies, assumptions on shifting about different taxes are made as a prelude to allocation of taxes to different sectors. Partial equilibrium analysis does not give a general answer with regard to the extent of shifting of any particular tax. It lays down conditions in terms of supply and demand elasticities. As would be noted in the ensuing discussion, the assumption in the general literature that commodity taxes are shifted forward to consumers is not quite valid in Pakistan, at least during the earlier eras of its economic history. The general procedure we adopt is to discuss the shifting of each of the major taxes in Pakistan. Given the controversial nature of assumptions about shifting of some of the taxes, the analysis is carried out for three alternative sets of shifting assumptions.

3.1.1   Land Tax

Land tax contributes   less than 1 per cent of the total tax collection by federal and provincial governments. The tax is applied at fairly low rates — generally in the range of 1-2 per cent of income. The tax is predominently levied on agricultural land. It is assumed that the tax is borne by the producers as there is no evidence to indicate forward shifting to the consumers of agricultural products. It has been argued that land taxes induce an increase in

marketable surplus in subsistence economies by forcing the taxpayer to earn enough money income to pay the tax [87]. If this argument is valid empirically, the land tax would cause a decline in produce prices suggesting that the landowners would be burdened by more than the amount of tax collected. The entire proceeds of the land tax are allocated to the agricultural sector.

3.1.2 Income Tax

The income tax in Pakistan is levied only on incomes earned in the non—agricultural sector as agricultural incomes are exempt from this tax . It contributes about 10 per cent to the total tax revenue. Economic theory lays conditions in terms of income and substitution effects to determine the effects of the tax on total earned income. These effects are not verifiable from available data. Most income tax payers cannot vary their hours of work as a response to the changes in tax rates. Survey data, in the context of professional people who can vary their hours, gives ambiguous results on the extent to which they change their effort levels and/or prices [25]. It is assumed that income taxes are borne by the income receiver. The proceeds of the tax are allocated entirely to the non-agricultural sector.

3.1.3 Company Tax

The company tax constitutes about 3 to 4 per cent of total tax collections in Pakistan. The incidence of this tax has been subjected to a continuing controversy on both theoretical and empirical levels in the context of both developed and developing countries. In view of this controversy, it is fortunate that the tax is a minor contributor to total tax levels.

The profit maximizing firm has no incentive to shift the tax as the profits are maximized at the same price-output mix with or without the tax. In fact, whether the firms are profit maximizers or they follow the pricing rules dictated by the maximization considerations is open to question. Studies on the pricing rules actually practiced indicate that pricing according to a mark up over average cost is the frequent practice.

The empirical studies of the econometric variety on the shifting of corporation tax were pioneered by Musgrave-Krzyzanic model. This model has been tested for U.S.A., India and other countries $\underline{/}$ 52$\underline{/}$. Evidence of forward shifting to a substantial extent is indicated by these studies. However, these findings have been contested on methodolo-gical grounds. Ghandhi analysed three industries with divergent market structures in India and found no evidence of forward shifting $\underline{/}$ 28$\underline{/}$.

The situation in Pakistan has not been analysed in any detail. Azfar has related the structure of industries to share of taxes paid and the pricing rules followed in different sectors in Pakistan $\underline{/}$ 9$\underline{/}$. The conclusion reached by him is that very little forward shifting is to be expected in Pakistan. We argue later that the special conditions in Pakistan impede the forward shifting of commodity taxes. These conditions give an additional reason for the non-shifting of company taxes in Pakistan. It has, therefore, been assumed that the entire proceeds of the company taxes fall on the non-agricultural sector.

3.1.4 Export Duties

Taxes on exports in Pakistan are levied mainly on agricultural exports. Cotton and jute were the main two items prior to 1971/72. The incidence of the taxes is a matter of relative values of supply and demand elasticities. In the case of jute, Pakistan was a dominant seller. A case could be made that the tax was shifted to foreign buyers. For other commodities, the tax is likely to be on the domestic economy. We assume that the export duty on all agricultural goods was borne by the agricultural sector while the duty on the manufactured goods was borne by the non-agricultural sector.

3.1.5 Imports Duties

Import duties and sales tax on imports are the second largest source of revenue contributing about 40 per cent to the total tax revenue. It used to be the dominant source in the early 1950s. The theoretical and empirical literature, in Pakistan, on the incidence of the import taxes has maintained that the duties are not shifted forward to the consumers. The theoretical argument for the non-shifting of the import duties was made by the author about two decades ago $\overline{/56\_/}$. The main message of the argument is that imports are licensed and the quantity of allowable imports is fixed. The market clearing prices for imports are high enough to guarantee abnormally high profits net of taxes and the costs of imports. Under this state of affairs, if the rates of import duties are increased the duties come out of the high profits. The hypothesis has been tested twice in Pakistan once in the mid and again in the late sixties $\underline{/75,4\_/}$. The mark-up of domestic prices over costs

including import taxes are generally quite high. The mark-ups also show
a direct relation with the stringency in licencing for different kinds
of imports. By the mid-sixties, the constraint on total allowable
imports had been relaxed relative to the early fifties. This relaxation
of the constraint occurred due to improved export performance and larger
aid flows beginning in 1959/60. In years when the level of imports
was relatively high, forward shifting of import taxes is expected.
Beginning in 1959/60, some imports under Bonus Voucher Scheme were
allowed. In case of such imports, forward shifting of import taxes
is a valid assumption. Due to the conflicting evidence and considerations,
alternative shifting assumptions for import taxes are made in the
analysis.

3.1.6   Domestic Indirect Taxes

The taxes on commodities and transactions are imposed by the
provincial and federal governments in Pakistan. The taxes imposed by
provincial government are mainly on liqour, tobacco, narcotics and
motor vehicles. These constitute about 10 per cent of the total tax
revenue. The taxes imposed by the central government on account of
excise and sales tax on domestic goods is the dominant source of tax
revenue. The shifting of taxes is a matter of relative values of
supply and demand elasticities. The usual assumption in the literature
on the incidence of these taxes is to assume full and forward shifting of
these taxes to consumers. An argument exactly parallel to the one made
for import duties has been made in the case of excise duties. Radhu
regressed per cent change in domestic taxes on percentage change in
the domestic prices for 33 commodities in Pakistan. He found no evidence
of forward shifting of the taxes in Pakistan /80/. This evidence can

support the assumption that domestic commodity taxes are not shifted to consumers. Azfar has critically examined the methodology of Radhu and has shown that if one separates the commodities that yield about 90 per cent of tax revenue, the data used by Radhu indicate forward shifting /‾9‾/. Azfar cites some evidence relating to some of the major revenue-raising commodities in later years to indicate forward shifting. Similar evidence on the forward shifting of taxes is found in the studies by Mohammad Irfan, "Shifting and Incidence of Indirect Taxes on Tobacco and Petroleum Products in Pakistan", The Pakistan Development Review, Vol. XIII, No.1, Spring 1974 and Bilquis Naqvi "Shifting of Indirect Taxes: A Further Study", The Pakistan Development Review, Vol. XIV.No.2, Summer 1975. However, these studies were limited in scope and coverage. Based on the contradictory evidence, we make alternative assumptions about the shifting of central indirect taxes in Pakistan. In any case, we assume that provincial indirect taxes are fully shifted to consumers. This is based on the nature of commodities taxed that show high inelasticity of demand.

As must be evident by now, there is a consensus on the nature of shifting for the land tax, income tax, export taxes and provincial indirect taxes. These taxes are, however, only an insignificant proportion of the total tax revenue. Assumptions regarding the shifting of these taxes are common to all three alternative sets of estimates for the intersectoral allocation of taxes. In the first alternative, all federal indirect taxes are assumed to rest on producer/seller or importer. In the second alternative, 25 per cent of the import taxes, sales taxes and surcharges and 50 percent of the federal domestic indirect taxes are shifted to the ultimate consumers. In the third alternative, all federal indirect taxes are shifted to the consumers. The first alternative is more realistic in period of acute shortage and tight licensing of imports of consumer, intermediate and capital goods. The second alternative is valid for most of the early years of our study. The third alternative is comparable to studies for other

countries and represents the state of affairs under a hypothetical
alternative situation that might have existed under a free economy.
This alternative may be a realistic reflection of the last few years
of our study as restrictions on the trading sector have been largely
removed.

3.2 Allocation of Taxes of Sectors in Pakistan

Shifting assumptions are only the first step in the allocation
of taxes to their final resting place. In addition, for taxes that are
not shifted from the point of their impact, we need to know the sector
classification of taxpayers. This is an easy task for land tax, income
tax, company tax, export duties and import duties. For taxes that are
not shifted but the taxpayers can be found in both sectors, the task is
more complicated due to the lack of required data. For the commodity
taxes that are shifted to consumers, we need to know the location
of the consumers and their relative expenditure on the taxed commodities.
In this sub-section, general aspects of the methodology of allocation of
taxes to the two sectors is presented. The detailed method of analysis
for each commodity is presented in the Annexure attached to the chapter.

3.2.1 Burden of Non-agricultural Direct Taxes

These taxes include estate duty, wealth tax, gift tax and
stamps and registration. Published official data provide total
collections under each of these taxes. There is no easy way to
allocate these taxes amongst the two sectors. We could distribute the
tax revenue on the basis of relative sectoral population or relative

sectoral income or relative income of high-income groups in the two sectors. We have adopted the last method for the allocation of estate duty, wealth and gift tax as only high-income groups are subject to these taxes due to high exemption limits of these taxes. The ratio between the high incomes in the two sectors was worked out from the 1978/79 survey of distribution of rural and urban incomes in Pakistan / 68/. The share of the agricultural sector in the tax collection was about 20 per cent according to this method.

This methodology cannot be adopted for the allocation of stamps and registration taxes. These taxes are paid by poor and rich alike, though we would expect the rich people to incur the expenditure on these items to a greater extent. Agricultural population is arbitrarily assumed to pay about 15 per cent of the taxes.

3.2.2 Burden of Shifted Indirect Taxes on Sectors

The tax allocation on account of import duties, sales tax on imports, central excise duties, sales tax on domestic goods and provincial excise taxes are available according to the detailed commodity breakdown for most of the years. For the years that we did not have the commodity break-down, we used the ratio of sectoral shares in taxes for the most recently available year. The allocation of taxes on each commodity between two sectors is made according to the proportion of expenditure in the two sectors. The data on consumption expenditure patterns in the agricultural and non-agricultural sectors is approximated by the rural and urban consumption expenditure as estimated by a Survey conducted during 1979/80. The pattern revealed

in that year is assumed to hold for all years in our study. A detailed examination of the tax and survey data shows that the commodity coverage in the tax data is more comprehensive. The commodities were divided into three groups. Commodities for which the relative consumption expenditure data were available in the survey were treated quite easily. Secondly, the commodities for which data on similar consumption goods in the survey could be used were singled out and it was assumed that relative consumption expenditure on such commodities was the same between the two sectors as those for similar goods. Lastly, in the case of commodities for which no data were available or for which the incidence is likely to be diffused in the entire economic system, the sectoral shares were determined on the basis of relative expenditure on non-food items. For some commodities, the tax rate is graduated with respect to the price of the commodity in Pakistan. In such cases, the relative expenditure in the two sectors was adjusted as, in general, rich and ruban people spend more on high priced commodities compared with poor and rural people.

3.3 Estimation of Relative per capita Income and per capita Subsistence Requirement by Sectors.

The first estimate of taxable capacity requires the estimates of per capita income and per capita subsistence in agriculture and non-agricultural sectors. Both estimates are subject to data weaknesses and their precise magnitudes should be taken with the proverbial pinch of salt.

3.3.1   Per capita Incomes in the Sectors

The estimates of per capita sectoral incomes require estimates
of sectoral income and sectoral population. Sectoral incomes are taken
from the national accounts. Net value added by agricultural crops,
livestocks, forestry and fisheries is considered as agricultural income.
This procedure, widely followed by economists, is not quite valid
because the agriculturists may derive part of their income from non-
agriculture. Similarly, non-agriculturists may derive part of their
income from agriculture. In the absence of data, we have assumed that
the agriculturists' non-agricultural income offsets the non-
agriculturists' agricultural income. Sectoral population totals are
also estimated figures and may contain some errors. The total yearly
population for Pakistan is taken from the C.S.O. estimates as presented
in national accounts tables. Rural and urban population is estimated
for 1972 and 1981 using census ratios in the respective years. The
rate of growth of rural and urban population between 1972 and 1981
is estimated and applied to get yearly urban and rural population.
Agricultural population is estimated by applying the ratio of agricul-
tural labour force to the total labour force in rural areas. Non-
agricultural population is estimated as a residual. The data on per
capita income in agriculture and non-agriculture is presented in
Table VI.2.

3.3.2   Per capita Subsistence Requirements.

The estimation of subsistence requirements involves specification
of the subsistence bundle of goods and services and its valuation for
each sector. The specification of the subsistence bundle can be based
on nutritional, cultural or social considerations. The valuation of
this bundle requires prices of the commodities in agricultural and non-
agricultural sector. Price data in both sectors can be generated but
the difficulty in specifying a unique subsistence bundle is obvious.
Ghandhi used an indirect procedure in estimating rural and urban
subsistence /₋30/. He equated this with the income of the 30th percentile
in the income distribution for each sector. Since the per capita income
in non-agriculture is more than twice the income level in agriculture,
the per capita subsistence in non-agriculture comes out to be twice the
subsistence level in agriculture. Part of the differential can be
justified by higher urban prices and some additional items in the urban
subsistence bundles (i.e. rented accommodation). However, awarding
the urban sector twice the amount of rural subsistence does introduce
a major bias in the estimation of relative taxable capacity. Ghandhi's
case for the overtaxation of non-agriculture in India is probably an
outcome of the generous allowance for subsistence in urban areas.

The estimates of the subsistence requirements for the agri-
cultural sector are based on a recent study on rural poverty /₋37/.
The estimated rural poverty is assumed to provide 2550 calories to an
adult per day and provides him with additional income to pay for non-
food items like clothing, fuel and medicine to enable the farm family
to live efficiently for farm work. Tne subsistence food bundle was

priced at the prices prevailing in rural markets during 1979/80 which came to Rs. 75/- per month. This value which is for an average adult was converted into a per capita value by using the average ratio of adult equivalent to population (0.8). The resulting figure was then converted into per capita income using the ratio of food expenditure to income ratio observed in rural areas of Pakistan of 0.55. The corresponding subsistence income for 1979 comes to Rs. 109/- per capita per month. We assume the subsistence requirements to remain constant through the period 1972/73 to 1983/84 in physical terms. We adjust the subsistence requirements for movements in yearly cost of living based on C.S.O.'s index of price changes for the industrial workers as no separate index was available for rural areas.

The subsistence requirements per capita in non-agriculture are estimated with reference to the subsistence estimates for the agricultural sector. The food intake in urban areas is normally somewhat lower than the rural areas based on the fact that urban work is less exacting. However, the price of food is higher due to marketing cost. We assume urban prices 20 per cent above rural prices. Urban subsistence budgets include some extra items for minimum level of living. After taking these factors into account, we estimate the subsistence requirement per capita in non-agriculture to be equal to Rs. 1637.61 during 1979/80. The requirements for other years are shown in Table VI.2. The index used for deflation is again based on the cost of living index for industrial workers.

The estimates for subsistence are admittedly very rough. Separate cost of living indices for rural and urban areas would be an improvement. In general, the estimates seem to be consistent with the minimum wage standards set by the government for lowpaid workers in industry.

3.4.   The Tax Burden Estimates:
The First Approximation.

We have built all the blocks required for estimating the sectoral equity of taxation in Pakistan. Table VI.1 shows the tax per capita in both sectors under three alternative sets of shifting assumptions specified in a previous sub-section. For each sector and for each alternative, tax-income ratio is shown. Per capita income in non-agriculture is more than twice the per capita income in agriculture as shown in the last column in Table VI.1. Due to the unequal sectoral incomes, tax income ratio cannot be used as a measure of tax burden. If the norm of equitable taxation is some progression in tax rates, high incomes are expected to pay more taxes than low incomes. As pointed out in Section 1, the specification of the "desirable" level of progression is difficult and strictly outside the scope of economic analysis. Nevertheless, there is a general consensus that progressive taxation promotes equity better than proportional or regressive taxation. Table VI.1 brings out some interesting results. The agricultural sector (poorer) pays a lower percentage of its income in taxes than the non-agricultural sector for the first two alternative sets of shifting assumptions. Under the forward shifting assumption of federal indirect taxes, agriculture pays a higher tax rate for four out of twelve years. For these four years, the agricultural sector is clearly overtaxed.

Table VI.1

Incidence of Federal and Provincial Taxes on Different Sectors

| Years | Shifting Assumptions: Alternative I of No Shifting | | | | Shifting Assumptions: Alternative II of Partial Shifting | | | | Shifting Assumption: Alternative III of Full Shifting | | | | Ratio of Per Capita income of Non-agriculture to Per Capita Income in Agriculture |
| | A | | N | | A | | N | | A | | N | | |
	Tax Per Capita (Rs.)	T/y (%)	Tax Per Capita (Rs.)	T/y (%)	Tax Per Capita (Rs.)	T/y (%)	Tax Per Capita (Rs.)	T/y (%)	Tax Per Capita (Rs.)	T/y (%)	Tax Per Capita (Rs.)	T/y (%)	
1972/73	39.69	6.32	206.42	15.51	57.84	9.22	184.98	13.90	86.53	13.79	151.12	11.36	2.18
1973/74	58.76	7.61	266.52	15.67	70.79	9.17	242.82	14.27	116.46	15.08	199.11	11.70	2.22
1974/75	68.35	7.51	340.03	15.57	96.72	10.63	308.13	14.11	150.44	16.53	247.71	11.34	2.40
1975/76	33.63	3.29	410.52	16.31	64.27	6.30	376.85	14.97	122.32	11.98	313.10	12.44	2.47
1976/77	15.81	1.38	470.75	16.91	53.07	4.60	431.28	15.49	126.41	11.03	352.34	12.56	2.43
1977/78	23.55	1.79	563.44	20.96	63.04	4.79	522.60	19.44	136.31	10.37	446.81	16.62	2.54
1978/79	23.08	1.70	654.16	18.12	69.46	5.11	606.91	16.81	161.33	11.87	513.31	14.22	2.66
1979/80	27.23	1.76	784.71	18.86	80.45	5.20	731.83	17.59	181.62	11.74	628.81	15.12	2.69
1980/81	36.10	2.10	938.79	19.59	98.50	5.74	878.26	18.33	224.19	13.06	756.33	15.78	2.79
1981/82	27.65	1.42	948.58	17.78	116.55	5.96	1232.49	23.10	218.79	11.20	767.55	14.39	2.73
1982/83	28.30	1.33	1070.81	17.72	105.88	5.03	998.13	16.52	259.14	12.20	857.32	14.19	2.85
1983/84	30.23	1.40	1263.30	18.80	155.68	7.20	1150.07	17.18	365.45	16.90	960.73	14.35	3.10

Note : Tax per capita is in rupees; T/y is Tax as per cent of sectoral income; A denotes agriculture; sector while N denotes non-agricultural sector

Table VI.2

Some Indicators of Taxable Capacity of Different Sectors

s	Per Capita Income in Agricultural Sector (Rs.)	Subsistence Requirements Per Capita in Agricultural Sector (Rs.)	Per Capita Income in Non-Agricultural Sector (Rs.)	Subsistence Requirements in Non-Agricultural Sector (Rs.)	Taxable Capacity in Agricultural Sector (Rs.)	Taxable Capacity in Non-Agricultural Sector (Rs.)	Relative Taxable Capacity of Agriculture (Rs.)
-73	610.05	551.19	1330.77	668.68	58.86	662.09	0.089
-74	765.86	679.94	1701.16	836.81	85.92	864.35	0.099
-75	910.23	863.68	2184.19	1058.98	46.55	1125.21	0.041
-76	1020.71	968.37	2517.61	1181.94	52.34	1335.67	0.039
-77	1145.93	1051.40	2783.85	1344.43	94.53	1439.42	0.066
-78	1314.74	1120.09	3339.81	1380.03	194.65	1959.78	0.099
-79	1359.27	1205.22	3610.06	1484.54	154.05	2125.51	0.072
-80	1546.74	1328.05	4160.13	1637.61	218.69	2522.52	0.087
-81	1716.93	1510.05	4791.87	1864.75	206.88	2927.12	0.071
-82	1953.16	1701.53	5335.10	2104.04	251.63	3231.06	0.078
-83	2123.59	1770.66	6041.89	2192.17	352.93	3849.72	0.092
-84	2163.08	1806.42	6695.20	2239.69	356.66	4445.51	0.080

For the other eight years and in case of the other two alternative sets
of shifting assumptions for all twelve years, an appraisal of equity
requires a specification of "socially desirable progression' and an
explicit account of subsistence requirements in both sectors.

These limitations are removed in the measure of relative tax
burden as presented in Table VI.3. Relative tax payments by agriculture
under different shifting assumptions are presented in the first three rows.
The fourth row presents estimates of relative taxable capacity. The
capacity is defined by per capita income _minus_ per capita subsistence.
The relative capacity of agriculture fluctuates between 0.039 in 1975/76
and 0.99 in both 1973/74 and 1977/78. The relative capacity is raised
to powers ranging from 1.1 to 1.9 and the estimates are presented in
the last nine rows in Table VI.3. Intersectoral equity can be measured
by a comparison of relative tax payments and equity-adjusted relative
taxable capacity. We shall present results for only the moderate degree
of progression i.e. taxable capacity raised to power 1.5.

Under the first shifting assumption alternative, the relative
tax payments of agriculture are larger than the relative equity-adjusted
taxable capacity for all but one year. The inequity in favour of agri-
culture for the lone year vanishes for high values of desirable progression.
That agriculture is over-taxed for most years is clearly established.

Under the second and third alternative sets of assumptions,
agriculture is overtaxed for all years. As mentioned in an earlier sub-
section, the second alternative reflects the empirical reality more
closely than others. The third alternative assumption set, would be

Table VI.3

Relative Tax Burden on the Agricultural Sector: First Approximation

	1972/ 73	1973/ 74	1974/ 75	1975/ 76	1976/ 77	1977/ 78	1978/ 79	1979/ 80	1980/ 81	1981/ 82	1982/ 83	1983/ 84
Relative Tax Payments: I	0.192	0.220	0.201	0.082	0.034	0.042	0.035	0.035	0.038	0.029	0.026	0.024
Relative Tax Payments: II	0.313	0.292	0.314	0.171	0.146	0.121	0.114	0.110	0.112	0.095	0.107	0.135
Relative Tax Payments: III	0.573	0.585	0.607	0.391	0.359	0.305	0.314	0.289	0.296	0.285	0.302	0.380
(Relative Tax Capacity* for value of e_0 equal to: }												
1.0	0.089	0.099	0.041	0.039	0.066	0.099	0.072	0.087	0.071	0.078	0.092	0.080
1.1	0.070	0.079	0.030	0.028	0.050	0.079	0.055	0.068	0.054	0.060	0.072	0.062
1.2	0.055	0.062	0.022	0.020	0.040	0.062	0.043	0.053	0.042	0.047	0.057	0.048
1.3	0.043	0.049	0.016	0.015	0.030	0.049	0.033	0.042	0.032	0.036	0.045	0.037
1.4	0.034	0.039	0.011	0.011	0.020	0.039	0.025	0.033	0.025	0.028	0.035	0.029
1.5	0.027	0.031	0.008	0.008	0.017	0.031	0.019	0.026	0.019	0.022	0.030	0.023
1.6	0.021	0.025	0.006	0.006	0.013	0.025	0.015	0.020	0.015	0.017	0.022	0.018

applicable if quotas in the Pakistani economy were non-binding or slack constraints. This is the shifting alternative most likely to be useful for international comparisons of tax burdens on agricultural sectors.

The extent of inequity against or for agriculture is measured and the results are presented in Table VI.4. The figures of tax per capita on agriculture if the sector is taxed equitably are presented in columns 3, 6 and 9 for three alternatives of tax shifting. The calculation in these columns shows the tax-per-head that would be paid by agriculture to satisfy inter-sectoral equity and the need to keep all-Pakistan tax (and hence tax-per-head) at the level actually attained in the particular year. The difference between this and the tax per head in fact paid as a percentage of agricultural income per head shows the proportion of yearly agricultural income being transferred to non-agriculture as compared with a system that taxed the two sectors equitably.

Under the first shifting alternative, the degree of resource flow out of agriculture for the first four years varies from 3 per cent to 7 per cent. The resource flow out of agriculture declines sharply in 1976/77 and is less than 1 per cent. Under the other two alternatives, the extent of resource flow out of agriculture fluctuates but is quite heavy. This is especially so in the case of forward shifting of indirect taxes. The extent of this outflow represents the excess of agricultural tax payments, direct and indirect, over the payments that would reflect ability to pay.

-155-

Tax Per Capita, Equity Tax Per Capita, Resource Transfer from Agriculture.
First Approximation

Years	Shifting Assumption: Alternative-I			Shifting Assumption: Alternative-II			Shifting Assumption: Alternative-III		
	Tax Per Capita on A (Rs.)	Tax Per Capita A if A Taxed Equitably (Rs.)	Resource Transfer (%)	Tax Per Capita on A (Rs.)	Tax Per Capita A if A Taxed Equitably (Rs.)	Resource Transfer (%)	Tax Per Capita on A (Rs.)	Tax Per Capita on A if A Taxed Equitably (%)	Resource Transfer (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1972/73	39.69	6.54	5.43	57.84	6.56	8.40	86.53	6.59	13.10
1973/74	58.76	10.14	6.35	70.79	10.00	7.94	116.46	10.15	13.88
1974/75	68.35	3.54	7.12	96.72	3.48	10.24	150.44	3.48	16.14
1975/76	33.63	3.44	2.96	64.27	3.43	5.96	122.32	3.43	11.65
1976/77	15.81	7.79	0.70	63.07	8.26	4.78	126.41	8.09	10.32
1977/78	23.55	17.08	0.49	63.04	17.83	3.44	136.31	8.43	9.73
1978/79	23.08	12.96	0.74	69.46	12.95	4.16	161.33	12.91	10.92
1979/80	27.23	19.55	0.50	80.45	20.16	3.90	181.62	20.01	10.45
1980/81	36.10	17.33	1.09	98.50	16.21	4.79	224.19	8.11	12.58
1981/82	27.65	20.76	0.35	116.55	28.63	4.50	218.79	20.82	10.14
1982/83	28.30	29.69	-0.06	106.88	29.69	3.63	259.14	29.68	10.80
1983/84	30.23	28.74	0.07	155.68	28.70	5.87	365.45	28.62	15.57

4.   SECTORAL TAX EQUITY IN PAKISTAN:
        SECOND APPROXOMATION.

In this section, the tax burden on the agricultural sector is
estimated by considering a broader measure of taxable capacity than just
the average per capita income net of subsistence. It was argued in the
first section that wealth, wealth distribution and income distribution
are relevant as determinant of any sector's ability to pay taxes. We
would first review the possible alternative methods of the estimation
procedures adopted in the literature.

The general problem can be posed very easily but its solution
requires considerable ingenuity. The functional relationship of
taxable capacity to the relevant variables can be assumed as linear
and specified as

$$C = \alpha \bar{Y} + \beta \bar{W} + \gamma W + \delta i$$

Where C is taxable capacity, $\bar{Y}$ is taxable income per capita, $\bar{W}$ is
wealth per capita, W is some index of wealth inequality and i is some
index of income inequality. The problem being faced is one of finding
the coefficients α, β, γ and δ that can be applied in the construction
of an index of taxable capacity. No scientific and simple solution is
available for the estimation of these coefficients or weights. The
only requirement is that income should have a larger weight than other
variables and that the sign of the coefficients should be positive i.e.
the higher the values of Y. W. W and i, the higher the taxable capacity.
Three possible methods have been suggested in the literature to tackle
the issue at hand.

(a)   Model Tax System

        Model tax system and model tax rates can be assumed and the
actual yields can be compared to the potential yields. This method
has been applied to different states and countries / 64_/ However,
for two sectors, structurally quite different, this method is of limited
use. In any case no such comparable data are available for the sectors
in Pakistan.

(b)   Least Squares Method

        If the data on the relevant variables for sectors in other
countries of comparable structure are available, tax payments can be
regressed on the variables of interest. The estimated coefficients
from the equations for two sectors could be applied to the data for
Pakistan. The major assumption in this application is that the values
of independent variables used in the equations do not differ much from
the values in Pakistan. Since such data are available mostly for
developed countries, this method is not applicable in the case of Pakistan.

(c)   Arbitrary Weights

        Faced with the difficulties mentioned above, many authors
have adopted arbitrary weights for the different variables. Ghandhi / 30_/
has used this method to get an estimate of the relative measure of
sectoral taxable capacity. For a broad range of arbitrary weights for
income, wealth, income inequality and wealth inequality, the inequity
in favour of agriculture not only persisted but increased relative to
his first approximation estimates. This result is awkward for two

reasons[1]. First, since the income and wealth inequality is relatively more
even in the agricultural sector and the taxable capacity is a direct function
inequality, the broader measure of the taxable capacity for agricultural
sector should be lower than in the first estimation. Ghandhi's results
are in direct contradiction with the theoretical expectation. The reason
for the flaw in Ghandhi's measure is the peculiar nature of his
weighting scheme. The agricultural/non-agricultural ratios of income-
per-head and of Lorenz coefficients are weighted by a broad range of
arbitrary weights. Since the ratio of agriculture to non-agriculture
Lorenz coefficients (while less than unity) is greater than the ratio of
agriculture to non-agricultural incomes-per-head, the effect of such
weighting is to increase the apparent taxable capacity of the rural
areas relative to the urban areas. Greater rural equality than urban
equality, in theory, should reduce relative rural taxable capacity of
the agricultural sector. In Ghandhi's measure, the ratio of the rural to
urban Lorenz coefficients must fall short, not just of unity, but of
the ratio of rural to urban income per head. Since the facts are
otherwise, linear weighting introduces a theoretically untenable bias.
Second, the summary measures of distribution of income do not tell
anything about the distributional pattern at the really high and
taxable end of the income scale. Due to these reasons, the method
suggested by Ghandhi cannot be adopted in our study. To indicate the
extent of bias, we have applied the weighting scheme suggested by

---

1/ Michael Lipton / 57/ was the first one to criticize the Ghandhi's
    results for India. We build the argument for Pakistan largely on
    the method of analysis proposed by Lipton / 57/.

Ghandhi to the sectoral data for Pakistan. The results are presented
in Table VI.5. The comparison of the first and second approximation
estimates of relative taxable capacity of agriculture show considerable
divergence. More important is the finding that the second approximation
capacity is always higher than the first approximation.

(d)   Method Adopted in the Study

We start from the income distribution patterns in rural and
urban areas for 1979/80 $\boxed{\ 68\ }$. Table VI.6 presents estimates for
income distribution. We assume that the rural and urban distributional
patterns hold respectively for agricultural and non-agricultural sector.
Columns 4 and 7 in Table VI.6 estimate the share of sectoral income
per capita in each income group in agriculture and non-agriculture. We
can combine Tables VI.2 and VI.6 to estimate taxable capacity in
agricultural and non-agricultural sectors for 1972/73 to 1983/84. For
each year, the figure for each group is (1) income per capita from
Table VI.2, times the sectoral share of income from Table VI.6 minus
subsistence requirements per capita from Table VI.2. Tables VI.7 and
VI.8 respectively show the maximum total sum that could be taken from
each income-group of households from agriculture and non-agriculture
and still leave members of each sector in each group enough to subsist on.
Weighting the taxable capacity in each income-group by the percentage
of sectoral population in each group gives us the taxable capacity of the
average member in each of the two sectors. Sectoral weights are shown
in columns 3 and 6 in Table VI.6. Negative values in Tables VI.7 and VI.8
are assumed to be zero. This assumption is made as it is practically
impossible to transfer incomes from households with positive taxable

Table VI.5

Estimates of Relative Taxable Capacity of the Agricultural Sector with Arbitrary Weights Given to Income Per Capita and Income Inequality

Years	Relative Taxable Capacity First Estimate	Relative Taxable Capacity: Second Estimates		
		Alternative I Weights $\alpha = 10$ $\delta = 0.5$	Alternative II Weights $\alpha = 10$ $\delta = 1$	Alternative III Weights $\alpha = 1$ $\delta = 1$
1972-73	0.089	0.122	0.152	0.436
1973-74	0.099	0.131	0.161	0.441
1974-75	0.041	0.076	0.108	0.412
1975-76	0.039	0.074	0.107	0.411
1976-77	0.066	0.100	0.131	0.424
1977-78	0.099	0.131	0.161	0.441
1978-79	0.072	0.106	0.137	0.427
1979-80	0.087	0.120	0.150	0.435
1980-81	0.071	0.105	0.136	0.427
1981-82	0.078	0.112	0.142	0.430
1982-83	0.092	0.125	0.155	0.437
1983-84	0.080	0.113	0.144	0.431

Table VI.6

Rural and Urban Income Distribution for the year 1979-80

Monthly Income per Household in Rupees	RURAL AREAS			URBAN AREAS		
	Percentage of Sectoral Income	Percentage of Sectoral Population	Income Per Head : Sectoral Average Incor :	Percentage of Sectoral Income	Percentage of Sectoral Population	Income Per Head Sectoral Average Income
(1)	(2)	(3)	(4)	(5)	(6)	(7)
< 300	1.48	2.59	0.57	0.33	0.67	0.49
1-400	3.84	6.06	0.63	1.08	2.12	0.51
1-500	6.66	9.47	0.70	2.47	4.73	0.52
1-600	9.22	11.95	0.77	3.51	6.48	0.54
1-800	18.86	22.44	0.84	8.97	14.67	0.61
1-1000	15.46	16.73	0.92	10.66	15.37	0.69
1-1500	20.97	18.44	1.14	20.47	25.08	0.82
1-2000	8.66	6.21	1.40	12.85	12.87	1.00
1-2500	4.55	2.73	1.67	8.21	6.35	1.29
1-3000	1.94	1.07	1.81	5.17	3.29	1.57
1-3500	1.53	0.73	2.08	4.18	2.29	1.83
3500	6.81	1.59	4.29	22.11	6.09	3.63
Groups	100	100	1.0	100	100	100

Table VI.7

Taxable Capacity of Agricultural Sector Per Capita

(In Rupees)

Year/ Income Group	<300	301 to 400	401 to 500	501 to 600	601 to 800	801 to 1000	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 3000	3001 to 3500	3500 and above
1972-73	-203.46	-166.86	-124.16	-81.45	-38.75	10.06	144.27	302.88	467.59	553.00	717.71	2065.92
1973-74	-243.44	-197.45	-143.84	-90.23	-36.62	24.65	193.14	392.26	599.05	706.23	913.05	2605.60
1974-75	-344.85	-289.74	-226.52	-162.80	-99.09	-26.27	173.98	410.64	656.40	783.84	1029.60	3041.21
1975-76	-386.57	-325.32	-253.83	-182.42	-110.97	-29.32	195.24	460.62	736.22	879.12	1154.71	3410.41
1976-77	-398.22	-329.46	-249.25	-169.04	-88.82	2.86	254.96	552.90	862.30	1022.73	1332.13	3864.64
1977-78	-370.69	-291.80	-19°.77	-107.74	-15.71	89.47	378.71	720.55	107° 53	1259.59	1614.57	4520.14
1978-79	-430.44	-348.88	-253.73	-158.58	-63.43	45.31	344.35	697.76	1054.76	1255.06	1622.06	4626.05
1979-80	-446.41	-353.60	-245.33	-137.06	-28.89	94.95	435.23	837.39	1255.01	1471.55	1889.17	5307.46
1980-81	-531.40	-428.38	-308.20	-188.01	-67.83	69.53	447.25	893.65	1357.22	1597.59	2061.16	5855.58
81-82	-588.23	-471.04	-334.32	-197.60	-60.88	95.38	525.07	1032.89	1560.25	1833.69	2361.04	6677.53
82-83	-560.21	-432.80	-284.15	-135.50	13.16	183.04	650.23	1202.37	1775.76	2073.04	2646.41	7339.54
83-84	-573.46	-443.68	-292.26	-140.85	10.57	183.61	659.49	1221.89	1805.92	2108.75	2692.82	7473.19

Note: Each entry is agricultural income per capita for the year times the ratio of rural group income per capita to rural average income per capita minus agricultural sector subsistence requirements per capita for the year.

Taxable Capacity of Non-Agricultural Sector per Capita

(in rupees)

Year \ Income groups	<300	301 to 400	401 to 500	501 to 600	601 to 800	801 to 1000	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 3000	3001 to 3500	3500 and above
1972-73	-16.60	10.01	23.32	49.94	143.09	249.55	422.15	662.09	1048.01	1420.63	1760.63	4162.62
1973-74	-3.24	30.78	47.79	81.82	200.90	336.99	558.14	864.35	1357.69	1834.01	2276.31	5338.40
1974-75	11.27	54.96	76.80	120.48	237.38	448.11	732.06	1125.21	1758.63	2370.20	2938.09	6869.63
1975-76	51.69	102.04	127.22	177.57	353.80	555.21	882.50	1335.67	2065.78	2770.71	3425.29	7956.98
1976-77	19.66	75.33	103.17	158.85	353.72	576.43	938.33	1439.42	2246.74	3026.21	3750.02	8760.59
1977-78	256.48	323.27	356.67	423.47	657.25	924.44	1358.61	1959.78	2928.32	3663.47	4731.82	10743.48
1978-79	284.39	356.59	392.69	464.89	717.60	1006.40	1475.71	2125.52	3172.44	4183.25	5121.87	11619.78
1979-80	400.85	484.05	525.66	608.86	900.07	1232.88	1773.70	2522.52	3728.96	4893.79	5975.43	13463.66
1980-81	487.27	579.10	627.02	722.86	1058.29	1441.64	2064.58	2927.12	4316.76	5658.49	6904.37	15529.74
1981-82	510.16	616.86	670.21	776.91	1150.37	1577.18	2270.74	3231.06	4778.24	6272.07	7659.19	17262.37
1982-83	768.36	889.19	949.61	1070.45	1493.38	1976.73	2762.18	3849.72	5601.87	7293.60	8864.49	19739.89
1983-84	1040.96	1174.86	1241.81	1375.72	1844.38	2380.00	3250.37	4455.51	6397.12	8271.77	10012.52	22063.88

Note: Each entry is non-agricultural income per capita for the year times the ratio of urban group income per capita to urban average income per capita, Minus non-agricultural sector subsistence requirements per capita for the year.

capacity to households with negative taxable capacity via the present
tax system. Before weighting we raise each value in Tables VI. 7 and
VI. 8 to the power of 1.5 to adust the taxable capacity figures for the
equity criterion. Table VI.9 presents the equity-adjusted taxable
capacities for the two sectors and their relative values. In column 4,
we present the first approximation estimates of the relative taxable
capacity of agriculture. The relative sectoral capacity in the second
approximation is higher than the first approximation. This is inconsistant
with the theoretical expectations and arises because we assumed the negative
entries in Tables VI. 7 and VI.8 to be equal to zero. This tends to
overstate the relative capacity of agriculture since the negative values which
we have assumed to be zero are more frequent and larger in absolute terms
in agriculture.

The results on sectoral equity in taxation can be derived by
the comparison of relative tax payments under three alternative shifting
assumptions (first three rows in Table VI.3) with the relative taxable
capacity as shown in column 3 in Table VI.9. The general pattern of
results is different from the first approximation estimates of tax
burden on agriculture as it is relatively undertaxed under the first
alternative set of shifting assumptions for all years except for 1973/74
and 1974/75. The extent of resource inflow into agriculture was about
3 to 4 per cent for most years. Under the second set of shifting
assumptions, agriculture is overtaxed for six years and undertaxed
for the other six years. In the case of the third alternative of tax
shifting, agriculture is overtaxed. The resource transfer out of
agriculture varies from 4.98 per cent of agricultural income in 1977/78
to 12 per cent in 1983/84.

Table VI.9

Estimates of Taxable Capacity per Capita of Different Sectors with Moderate Progression Defined as Taxable Capacity Raised to the Power 1.5

(Second Approximation)

Year	Agricultural Sector	Non-Agricultural Sector	Relative Taxable Capacity of Agriculture (1) ÷ (2)	Relative Taxable Capacity Agriculture (First Approximation)
	(1)	(2)	(3)	(4)
1972-73	27.01	138.27	0.195	0.089
1973-74	39.15	205.34	0.191	0.099
1974-75	45.42	302.89	0.150	0.041
1975-76	53.94	391.34	0.138	0.039
1976-77	67.74	439.77	0.154	0.066
1977-78	94.49	687.22	0.137	0.099
1978-79	92.78	776.01	0.120	0.072
1979-80	118.99	1001.19	0.119	0.087
1980-81	133.56	1250.95	0.107	0.071
1981-82	164.72	1451.50	0.113	0.078
1982-83	211.76	1883.13	0.112	0.092
1983-84	213.86	2342.20	0.091	.080

5.   SUMMARY AND CONCLUSIONS

Based on certain assumptions regarding the shifting of direct
and indirect taxes levied by the federal and provincial governments,
formal incidence for the agricultural and non-agricultural sectors was
estimated for each of the twelve years from 1972/73 to 1983/84. The
analysis ignores the burden of local taxation as data on tax collection
at this level of government are not available. The analysis also ignores
the impact of usher, an Islamic levy based on the gross value of
agricultural production. This levy was introduced in 1982. Ignoring its
impact does not affect the analysis for years prior to 1982/83. The main
findings were listed as we proceeded with the analysis. These findings
are briefly summarised below:

(1)   The taxes per capita estimated for the agricultural sector are
lower than the taxes per capita for the non-agricultural sector for all
three alternative sets of shifting assumptions of taxes.

(2)   The agricultural sector's per capita income is less than half
the non-agricultural sector's per capita income. The traditional measure
of tax burden as a ratio between taxes and income is, therefore, not a
valid measure for the intersectoral comparison of the tax burdens. The
poorer sector has a lower tax to income ratio for all three sets of
alternative shifting assumptions of taxes except for a few years when in
the case of forward shifting of indirect taxes the agricultural sector has a
higher ratio of taxes to income. A clear case of overtaxation of the
agricultural sector can be made for these years.

(3)   First approximation estimates of relative t
agriculture were made on the basis of per capita inc
requirements. Agriculture was found to be undertaxe
under the non-shifting assumption of central indirec
overtaxed for all remaining years of the study. The
overtaxed for all the years in the case of the other
assumptions regarding the shifting of the taxes.

(4)   The extent of resource transfer from agricul
with respect to a hypothetical situation of equitable
two sectors, is sensitive to the shifting assumptions
a percentage of yearly agricultural income, the reso
varied from a figure of 0.07 per cent in 1983/84 to 7
for the shifting assumptions defined in this chapter
In the case of the other two alternatives of tax shif
the resource transfer out of agriculture was consider
transfer ranges from 3.43 per cent in 1975/76 to 29.6
using Alternative-II. The range for the resource tra
Alternative-III is from 9.73 per cent in 1977/78
in 1974/75.

(5)   A second approximation estimate of the relat
taxable capacity was made. According to this measure.
overtaxation of agriculture decreased relative to the
measure of tax burden. In the case of the first and s
alternative shifting assumptions, the agricultural sec
be undertaxed for most years of the study. However, f
alternative , which incidentally is the more realistic

regarding the shifting assumptions of different taxes for the period under study, the agricultural sector is found to be overtaxed for all 12 years of the study. The general conclusion that can be drawn from the analysis is that judging the tax system from the equity perspective the agricultural sector is overtaxed and bears a higher share of the tax burdens than its counterpart — the non-agricultural sector.

DISTRIBUTION OF TAX BURDEN BETWEEN
AGRICULTURAL AND NON-AGRICULTURAL SECTORS.

The purpose of this note is to provide information on the
allocation of the commodity taxes shifted forward to the consumers between
the agricultural and the non-agricultural sectors of the economy. Since
most of the indirect taxes are proportional to the expenditure, the revenue
has been distributed between the two sectors on the basis of total
expenditure on the taxed commodity. The total value of expenditure on a
taxed commodity by the agricultural/non-agricultural sector is obtained by
multiplying per capita expenditure on the commodity by the agricultural/
non-agricultural population. The main body of the chapter outlines shifting
assumptions of various direct and indirect taxes and provides details
regarding the estimation of agricultural and non-agricultural population.

The consumer expenditure data were collected from the Household
Income and Expenditure Survey, 1979. The geographical coverage of the
Survey was all rural and urban areas of Pakistan excluding Tribal Agencies,
Special Areas of Peshawar and D.I. Khan Divisions and Malakand Division
in the N.W.F.P. According to 1972 Population Census the population of
these excluded areas is about 6.7 per cent of total population of Pakistan.
Data on consumer expenditure were collected from 1400 sample households of
which 608 were urban and 792 were rural. The Survey provides detailed
information on the consumption expenditure pattern of rural and urban
households. It contains 37 items under food, 6 items under apparel,

textile and footwear, 14 items under fuel and lighting, 6 items under house rent and housing, 5 items under furniture and fixture and 13 items under the category of miscellaneous items. Commodity taxes are levied on a large number of commodities. Data are available on tax collection from Central Excise Duteis and Import Duties classified by 45 and 33 broad categories of commodities respectively. The main purpose for using Household Income and Expenditure Survey data was to find out the per capita expenditure on different commodities. The tax on the commodities for which consumption data were available from the Survey was distributed between the two sectors according to the consumption pattern. For those commodities for which consumption data were not available either the consumption pattern of similar commodities was used or arbitrary assumptions on the basis of informed judgment were made to distribute tax revenue between the agricultural and the non-agricultural sectors. Tax collections from commodity taxation has been assigned to the two sectors in the following manner:

CENTRAL EXCISE DUTIES

(1) Tea. Revenue from this source was distributed between the agricultural and non-agricultural sectors in the proportion of expenditure on tea. (2) Vegetable Non-essential Oil. The revenue was distributed between the two sectors in the ratio of expenditure on the consumption of edible oil. (3) Vegetable Produc The sectoral distribution of revenue from Vegetable Products was made on the basis of expenditure on vegetables. (4) Beverages. Revenue from excise duties on Beverages was distributed in the proportion of expenditure on food and drink (5) Sugar. The revenue was distributed in the ratio of combined expenditure on refined (i.e. milled) and desi-sugar. (6) Tobacco. Revenue from Tobacco was

divided between the agricultural and non-agricultural sectors on the basis of expenditure on cigarettes and cigars. (7) Cement. Most of the houses in the rural areas of Pakistan are "Katcha" houses. These houses are made of mud, grass, stones, etc. A majority of rural population seldom buys cement. Although the number of "Pukka" houses (houses made of cement, bricks, etc.) have increased in the rural areas due to influx of foreign remittances yet these are very small in number relative to the number of houses in urban areas. It was assumed that 90 per cent of total revenue from the source comes from the non-agricultural sector while the remaining 10 per cent from the agricultural sector. (8) Salt. Ratio of expenditure on salt was used to distribute the revenue between the agricultural and non-agricultural sectors. (9) Natural Gas. Ratio of expenditure on gas consumption was used to divide the revenue between the two sectors. (10) Petrolium Gases. Same ratio as in the case of (9) was used. (11). Furnace Oil. It is mainly used for casting iron. Same ratio as in the case of (7) was used to distribute revenue between the agricultural and non-agricultural sectors. (12) High Speed Diesel Oil. Expenditure on transport and travelling was used for sectoral distribution of revenue from high speed diesel oil. (13) Light speed diesel oil. This is mainly used in the agricultural sector. Sector-wise pattern of its consumption, given in Energy Yearbook of Pakistan, revealed that it is divided in the ratio of 95 : 05 between the agricultural and the non-agricultural sectors, respectively. (14) Kerosene Oil. Ratio of expenditure on Kerosene oil was used to divide the revenue between the agricultural and non-agricultural sectors. (15) Motor Spirit (including jet fuel). Ratio of expenditure on travelling and transport was used. (16) Petrolium Grease, Petrolium lubricant oil, Solvant Neptha, Asphalt and Other Petrolium Products. These fall in the broad category of

Petrolium oil and lubricant products. No information is available from
the Survey data on the consumption pattern of these items. The items appear
as intermediate input in the production of crops, grain milling, sugar
refining and most of the manufactured items. It was assumed that revenue
from the items is divided in the percentage of 75 and 25 between the non-
agricultural and the agricultural sectors respectively. (17) Polishes
and Creams. Same ratio as in the case of (7) was used. (18) Paints and
Varnishes. These are mainly used to paint houses, furniture and different kinds
of wooden and metal products. Most of the houses in the rural areas are
made of mud. Rural households rarely use paints and varnishes. It was
assumed that the revenue is distributed in the proportion of 85 :15 between
the non-agricultural and the agricultural sectors respectively. (19) Cosmatics.
It is believed that a large proportion of the revenue comes from the non-
agricultural sector. Therefore, 80 per cent of total revenue was allocated
to the non-agricultural sector and the remaining 20 per cent was distributed
in the proportion of expenditure on personal care. (20) Soap and Detergent.
Ratio of expenditure on personal care was used. (21) Soda Ash. Ratio of
expenditure on laundry and cleaning was used. (22) Plastic Products. It was
assumed that the revenue is divided in the ratio of 20 : 80 between the
agricultural and the non-agricultural sectors respectively. (23) Tyres and Tubes.
Revenue from tyres and tubes comes from two main sources viz. non-commercial or
private vehicles and commercial or public service vehicles. A small
proportion of agricultural population owns private motors and public
transport service is also centered in the urban areas due to better
availability or road and other infrastructure. It was, therefore, assumed
that 85 per cent of total revenue is generated from the non-agricultural
sector while the remaining 15 per cent was divided between the agricultural

and the non-agricultural sectors in the proportion of expenditure on travelling and transport. (24) Rubber Products. Same ratio as in the case of (22) was used to distribute revenue from taxes on Rubber Products. (25) Tanned Leather. Ratio of expenditure on footwear was used. (26) Paper and Paper Board. The Survey does not provide information on the sectoral consumption pattern of the item. However, the Survey provides information on expenditure on education that includes expenditure on paper and selected paper products. Expenditure on education was used to distribute revenue between the sectors. (27). Bank Cheques. The revenue was divided in the proportion of 05 : 95 between the agricultural and the non-agricultural sectors. (28) Cotton Yarn and Fabrics. The revenue was distributed in the proportion of expenditure on clothing. (29) Man-Made-Fabrics. Same ratio as in the case of (28) was used to distribute the revenue between the agricultural and the non-agricultural sectors. (30) Matches. Ratio of expenditure on matches was used. (31) Man-Made-Yarn. Same ratio as in the case of (28) was used. (32) Electric Batteries. Use of electric batteries is very rare in the rural areas of Pakistan. Tax on electric batteries enters as cost item in the manufacture of goods. The revenue was assumed to be distributed in the proportion of 05 : 95 between the agricultural and the non-agricultural sectors. (33) Electric Bulbs and Tube Lights. Use of electric bulbs and tubes is a necessity unlike the electric batteries. A large proportion of agricultural households do not use electric bulbs due to the obvious fact that electricity has not reached to their houses. The revenue was, thus divided between the agricultural and the non-agricultural sectors in the proportion of expenditure on electricity. (34) Electric Fans. Same ratio as in the case of (33) was used. (35) Caustic Soda. Ratio of expenditure on Laundry and cleaning was used. (36). Glass and Glassware. Ratio of expenditure on crockery was used. (37) Service Hotels. Same ratio as in the case of (27) was used.

(38) Wires and Cables. Ratio of expenditure on electricity was used.
(39) Knitting Yarn. Same ratio as in the case of (28) was used. (40) Woollen
Yarn and Fabrics. Same ratio as in the case of (28) was used. (41) Metal
Containers. Ratio of expenditure on durable household effect was used to
distribute the revenue. (42) Mild Steel Products. Ratio of expenditure on
durable items of crockery and cutlery was used. (43) Wires and Cables.
Same ratio as in the case of (33) was used. (44) Jute Manufactures. Same
ratio as in the case of (22) was used. (45) Miscellaneous Items. Expenditure
on these items was used to distribute revenue from miscellaneous items.

IMPORT DUTIES

(1) Meat Fish and their Preparations. The revenue was
distributed in the ratio of expenditure on meat and fish. (2) Milk, Butter,
Cheese and Honey. The revenue was distributed in the proportion of
expenditure on milk and milk products. (3) Fruits, Nuts and Vegetables.
The revenue was split between the agricultural and the non-agricultural
sectors in the ratio of expenditure on fruits and vegetables. (4) Coffee,
Tea and Spice. The revenue was distributed in the proportion of expenditure
on coffee, tea and spice. (5) Oil-seeds and Miscellaneous Fruits. The
revenue was split in the proportion of combined expenditure on edible oil
and miscellaneous fruits. (6) Sugar and Confectionary. Expenditure on
the combined category of Gur, Sugarcane products, honey and sugar preparation
was used to split the revenue between the agricultural and the non-agricultural
sectors. (7) Animal and vegetable fats and oils. Revenue was
distributed in the ratio of expenditure on edible oil. (8) Beverages,
spirits and vinegar. The Survey provides no information on the consumption

pattern of the items. It was assumed that the revenue is distributed in the proportion of 15 :85 between the agricultural and the non-agricultural sectors. (9) Tobacco. The revenue was distributed between the sectors according to consumption expenditure pattern of cigarettes and cigars. (10) Mineral Fuels, Oils and their Products. The revenue was split according to the expenditure on kerosene oil. (11) Chemicals and Chemical Products. The Survey does not provide information on the expenditure pattern of chemicals and chemical products. It is believed that a large proportion of the revenue comes from the non-agricultural sector. The revenue from the source was distributed in the proportion of 15 : 85 between the agricultural and the non-agricultural sectors respectively. (12) Pharmaceutical Products. The revenue was distributed in the proportion of expenditure on medical care. (13) Paints and Varnishes. It was assumed that the revenue is distributed in the proportion of 15 : 85 between the agricultural and the non-agricultural sectors respectively. (14) Perfumery Soap and Toilet Preparations. The revenue was distributed in the ratio of expenditure on personal care. (15) Matches and Other Explosives. The revenue was distributed in the proportion of expenditure on matches. (16) Photographic and Cinematographic Products. The revenue was split according to expenditure on goods and services relating to reading and recreation. (17) Rubber and Rubber Products. The Survey provides no information on the consumption pattern of the items. Since non-agricultural sector uses more intensively the products relative to the agricultural sector, it was assumed that the revenue is divided in the ratio of 20 : 80 between the agricultural and the non-agricultural sectors respectively. (18) Leather Articles and Footwear. The revenue was distributed in the proportion of expenditure on Footwear. (19) Wood, Pulp, Paper and Stationery. Ratio of

expenditure on education was used to distribute the revenue between the sectors. (20) Silk, Yarn and Fabrics. The revenue was distributed in the proportion of expenditure on cloth and its accessaries. (21). Glass and Earthenware. Ratio of expenditure on crockery was used to distribute the revenue. (22). Precious metals, stones, pearls and immitation jewellery. It was assumed that the revenue is distributed in the proportion of 5 : 95 between the agricultural and the non-agricultural sectors respectively. (23) Electrical Machinery and Equipment. The revenue was distributed in the proportion of expenditure on electricity. (24) Iron and Steel and their products. It was assumed that 70 per cent of the revenue comes from the non-agricultural sector whereas the remaining 30 per cent was distributed in the proportion of expenditure on durable household effects. (25) Textile Articles, Carpets, Matting, Lace and other Furnishing Fabrics, Yarn and Fabrics of Man-Made Yarn, Fabrics of Wool Flax, remic metal and vegetable goods and Cotton Yarn and Fabrics. The revenue from all of these categories was distributed in the proportion of expenditure on cloth and its accessaries. (26). Cutlery tools and other articles of base metal. The revenue was distributed in the ratio of expenditure on durable items of cutlery and crockery. (27) Machinery and Mechanical Appliances. Same ratio as in the case of (24) was used to distribute the revenue. (28) Motor and Other Vehicles. A small proportion of agricultural households owns or uses motors or other vehicles, therefore, the burden of such taxes on rural household is insignificant. It was assumed that 80 per cent of total revenue comes from the non-agricultural sector and the remaining 20 per cent was distributed in the proportion of expenditure on transport and travelling. (29) Ships, boats and aircrafts. Rural people rarely travel on ships, boats or air crafts. It was assumed that 80 per cent of the revenue comes from the non-

agricultural sector the remaining 20 per cent was distributed in the pro-
portion of expenditure on transport and travelling. (30) Clocks, Watches
and their Parts. Ratio of expenditure on miscellaneous items was used to
distribute the revenue. (31) Railway and Tramway Plant and Rolling Stock.
It was assumed that 50 per cent of total revenue comes from the non-agri-
cultural sector while the remaining 50 per cent was distributed in the
proportion of expenditure on transport and travelling. (32) Toys, Games
and Sports Goods. The revenue was distributed in the proportion of
expenditure on miscellaneous items. (33) Miscellaneous Items. Revenue from
taxes on miscellaneous items was distributed in the ratio of expenditure for
these items.

SALES TAX ON DOMESTIC AND IMPORTED GOODS

Data on commodity-wise collection of sales tax on imports, sales
tax on manufactures and sales tax on exciseable items are available for the
years 1972/73 to 1975/76 whereas aggregate figures for sales tax collection are
available for remaining years of the study. Revenue from each of the taxes
was divided between the agricultural and the non-agricultural sectors on
the basis of consumption pattern. The basis for sectoral distribution of
revenue were the same as those for import duties and central excise duties.
An average percentage share of each of the sectors was calculated and used
to distribute the revenue for other years of the study.

PROVINCIAL EXCISE

The revenue comes mainly from intoxicants, alcholic beverages and
non-alcnolic beverages. It was distributed between the sectors in the ratio of
sectoral expenditure on food and drinks.

CHAPTER VII

NET FISCAL BURDEN ON AGRICULTURAL PRODUCERS

1.   INTRODUCTION

        The finding that the agricultural sector in Pakistan is overtaxed
relative to the non-agricultural sector would be a convenient talking point
for the agricultural lobby that is always intent on blocking any measures
for the increased taxation of the agricultural sector. The case for higher
overall taxation is built on the developmental requirements of resources in
the public sector. The high income inequities and the high levels of
expenditure by the rich in both rural and urban areas imply the existence of
taxable capacity measured in absolute terms on both sectors of the economy.
Adherence to the principle of "equitable" taxation is always an important
consideration in an evaluation of any tax system. From the vantage point of
the development prospects of any economy, it is also important to have an
idea of the direction and extent of resource transfer from a sector. The
transfer is a measure of the overall incentives being provided to a sector.
The purpose of the chapter is to describe the open and concealed taxes and
subsidies which affect Pakistan's agriculture and to estimate their
magnitude for the period 1972/73 to 1983/84.

2.   OPEN TAXATION OF THE AGRICULTURAL SECTOR

        Two different taxes affect the farmers directly while there are
a number of indirect taxes on agricultural commodities that affect prices
received by agricultural producers. Table 7.1 presents the picture of
open taxation of farmers.

Table VII.1

INCIDENCE OF DIRECT AND COMMODITY TAXES ON AGRICULTURAL PRODUCERS

Years	DIRECT TAXES			COMMODITY TAXES						PER CAPITA TAXES								
	Land Revenue (Million Rupees)	Agricultural Income Tax (Million Rupees)	Total (Million Rupees)	Export Duty on Cotton (Million Rupees)	Export Duty on Rice (Million Rupees)	Profits of Cotton Export Corporation (Million Rupees)	Profits of Rice Export Corporation (Million Rupees)	Cotton Fee (Million Rupees)	Total (Million Rupees)	Direct (Rupees)	Commodity (Rupees)	Total (Rupees)	Direct Taxes per Hectare (Rupees)	Commodity Taxes Per Hectare (Rupees)	Total Taxes Per Hectare	Ratio of Direct Taxes to GDP from Agriculture (Per cent)	Ratio of Commodity Taxes to GDP from Agriculture (Per cent)	Ratio of Total Taxes to GDP from Agriculture (Per cent)
1972-71	168	3	171	442	128	–	–	–	570	4.76	15.87	20.63	8.94	29.81	38.75	0.28	2.60	3.38
1973-74	187	5	192	179	464	–76	–	59	626	5.23	17.07	22.30	9.91	32.30	42.21	0.68	2.23	2.91
1974-75	189	4	193	535	333	–228	–	60	813	5.24	22.07	27.31	9.87	42.21	51.46	0.57	2.62	2.99
1975-76	197	6	203	340	241	–6.1	187	65	772	5.40	20.55	23.95	10.24	38.95	49.19	0.53	2.01	2.54
1976-77	136	–	136	1	58	141	44	88	332	3.55	8.68	12.23	6.88	16.80	23.68	0.31	0.76	1.07
1977-78	117	–	118	–	–	–220	209	52	41	3.08	1.07	4.15	5.67	2.04	7.91	0.23	0.08	0.31
1978-79	231	3	234	–	–	–152	546	47	441	5.90	11.11	17.01	11.71	22.07	33.78	0.43	0.82	1.25
1979-80	172	–	172	–	–	151	589	103	843	5.26	20.86	25.12	8.47	41.67	50.14	0.27	1.35	1.62
1980-81	226	9	235	–	–	723	853	108	2184	4.26	53.06	58.77	11.58	107.59	119.17	0.34	3.12	3.46
1981-82	286	1	287	500	–	–237	596	116	625	5.71	14.91	21.76	14.12	30.74	44.86	0.35	2.99	1.62
1982-83	249	2	251	150	–	77	347	132	1018	6.85	23.85	29.73	16.12	49.88	62.18	0.23	1.14	1.12
1983-84	169	1	169	252	–	46	310	83	691	5.88	29.73	19.79	8.18	33.46	41.64	0.19	0.77	0.96

Of the direct taxes, land tax generally known in Pakistan as
land revenue is the oldest agricultural tax. Agricultural income tax
is also a misnomer as it is not a tax on agricultural incomes as
conventionally understood. It is a graduated surcharge on land
revenue with a high exemption limit and low rates. The yield from
land revenue, on the other hand, is much larger than is the case
with the agricultural income tax. The yield from the land revenue
goes up from Rs. 168 million in 1972/73 to Rs. 286 million in 1981/82
but declines to Rs. 169 million in 1983/84. The incidence of direct
taxes per capita or per hectare is low and fluctuates over a narrow
range. Direct taxes as a proportion of gross domestic product
originating from the agricultural sector have shown a declining trend
over the period of study.

The indirect taxes comprising export duties on cotton
and rice and profits of rice and cotton export corporations are by
far more important revenue raising devices than the direct taxes on
farmers. The revenue from the indirect taxes is, however, an instable
source for the public treasury. Excepting the year 1980/81, the ratio
of taxes to agricultural output shows a declining trend as it goes down
from 3.38 per cent in 1972/73 to 0.96 per cent in 1983/84.

3.   CONCEALED TAXATION OF AGRICULTURE

The agricultural producers in Pakistan have always been subject
to concealed taxes. During the 1950s and 1960s, agricultural exporters
suffered an income loss through an overvalued exchange rate. After
devaluation in 1972, this source of concealed taxation was replaced by
open taxes in the form of export duties and profits from government

monopoly trading corporations. In addition to the open taxes, farmers pay taxes (or receive subsidy) if the prices for their products are kept lower (higher) than those that prevail in the international market. The size of the tax (subsidy) to producers is measured by the difference between the value of output at domestic prices and the value of output at world prices.

Table VII.2 presents evidence on the extent of concealed taxes for wheat, Basmati rice and Irri rice. Calculations for other crops have not been made. Sugarcane is often cited as an example of a commodity receiving huge unbudgeted subsidy. For the three crops for which concealed taxes have been estimated, it is clear that producers have suffered a large cut in their income. Similar calculations for other crops and farm activities have not been made. It is not possible to get an overall idea of the extent of concealed taxation of farmers as a group. Need for detailed research is obvious and urgent.

Table VII.2

Concealed Taxation of the Agricultural Sector for Selected Crops

Years	Wheat (Million Rupees)	Basmati rice (Mil.Rs.)	Irri rice (Mil.Rs.)	Normal Protection Coefficients defined as Ratio of Domestic to International Prices			
				Cotton	Basmati rice	Irri-6 rice	Wheat
1973/74	-4700	- 718	-1985	0.62	0.46	0.35	0.34
1974/75	-2105	-1719	- 718	0.90	0.41	0.46	0.58
1975/76	-2517	- 892	- 235	1.02	0.61	0.77	0.56
1976/77	-1408	- 136	- 138	0.82	0.99	0.97	0.72
1977/78	-1608	- 137	876	1.17	0.93	0.75	0.85
1978/79	-2618	-1949	- 435	1.30	0.52	0.75	0.73
1979/80	-3788	-1702	-1094	0.97	0.56	0.74	0.61
1980/81	-3593	- 926	-1164	0.87	0.65	0.70	0.64
1981/82	-4548	-2054	18	1.13	0.66	0.94	0.75

Source: Kee-Cheok Cheong and Emmanuel H.D'Silva, Prices, Terms of Trade, and the Role of Government in Pakistan's Agriculture, World Bank Staff Working Papers No. 643, the World Bank, USA.

Note:- - sign indicates taxation and (+) sign indicates subsidization of the producer through the pricing of the commodity.

4.   OPEN SUBSIDIES TO FARMERS

Public policy in Pakistan has provided incentives to farmers through budgeted subsidies on a number of agricultural inputs. Starting in the early 1950s the government has provided a subsidy on land improvements, wells, soil conservation and land consolidation. Later additional subsidies were given for fertilizer, tubewells, plant protection, pesticides and seeds. Data on some of those subsidies are hard to assemble but for major inputs that account for a dominant proportion of open subsidies data are easily available. Table VII.3 gives an indication of the extent of subsidies received by farmers for the use of fertilizer and pesticides and installation of tubewells.

Table VII.3

Open Subsidies on Agricultural Inputs

(in Million Rupees)

Years	Fertilizer	Tubewells	Plant Protection and Pesticides	All Inputs
1972/73	207	22	116	345
1973/74	278	10	63	351
1974/75	326	16	112	452
1975/76	607	24	381	1012
1976/77	381	48	485	914
1977/78	617	20	523	1160
1978/79	1692	24	267	1983
1979/80	2454	22	218	2694
1980/81	2457	20	0	2477
1981/82	1794	24	0	1818
1982/83	1948	24	0	1972
1983/84	1690	0	0	1690

The amount of total subsidies increases from Rs. 345 million
in 1972/73 to Rs. 2694 million in 1979/80 and declines to Rs. 1690
million by 1983/84. Fertilizer accounts for the major share of the
total subsidy bill. In the early years fertilizer was directly subsi-
dized by about 50 per cent. The rate of subsidy has been gradually
reduced over time. The government is committed to eliminating the
subsidy on fertilizer by 1985. Despite the declining rate of subsidy
on fertilizer, the expanded use of fertilizer had resulted in a growing
subsidy bill till 1980/81.

The subsidy on pesticides increased from Rs.116 million in 1972/73
to Rs.523 million in 1977/78 and declined to Rs. 218 million in 1979/80.
The subsidy was withdrawn in 1980/81. The subsidy on the installation of
tubewells was modest in amount relative to the subsidy on fertilizer and
pesticides. The subsidy on tubewells was also withdrawn in 1983/84.

The main motivation of the government in eliminating open
subsidies on pesticides, tubewells and fertilizer has been the concern
with the budgetary impact. Farmers are   now aware of the advantages
of these inputs. There is some evidence that suggests that the
rates .of return on the use of these inputs remain high after input
prices increase as a result of the removal of subsidies.

5.   CONCEALED SUBSIDIES

The cost of open subsidies to the treasury can be seen easily. As
pointed out in the previous section, public policy to reduce the extent
of open subsidies was instituted when it became evident that the
subsidies were no longer required for their production impact and were a

burden on the excnequre. The concealed subsidies are difficult to
measure as income transfer takes place between different economic
agents in an implicit manner. Such subsidies are nevertheless important
determinants of incentives. The agricultural producers have received
concealed subsidies through the supply of cheap credit, irrigation
water and electricity. The rate of subsidy per unit could be defined
as the difference between the price at which an input for which
subsidy is being measured would sell without public intervention and
the price charged by a public agency after the government intervention.
Posing the estimation problem this way shows clearly that any measure-
ment of the subsidy would be subject to limitations of data and the
method of analysis. In view of the large magnitude of implicit
subsidies an approximate measurement is also an important piece of
information.

5.1.   Supply of Low Interest Loans

The institutional credit to farmers is supplied through
Agricultural Development Bank of Pakistan, direct government lending
through Taccavi loans, commercial banks and cooperatives. These sources
of credit charge lower than marke interest rates. Some of the loans
y these institutions are also not repaid by agricultural borrowers
which implies unintended subsidy in the form of defaulted loans.
The average interest rate on the institutional sources of credit in
1972/73 was 8.16 per cent per annum while the internal rate on non-
institutional sources was 15.34 per cent.[1] Assuming that the opportunity
cost of credit for the institutional sources is the rate of interest

[1]   Sarfraz K. Qureshi, Kalbe Abbas, Ahmed Naeem Siddiqui and Ejaz Ghani
       "Rural Credit and Rural Development: Some Issues". Pakistan Developm
       Review. Vol. XXIII, Summer-Autumn 1984.

charged by the non-institutional sources, the subsidy on credit is about 7.18 per cent per year.

Table VII.4 computes the subsidy on credit by assuming the subsidy rate at 5 per cent per year. We ignore the subsidy via defaulted loans and use a conservative estimate of the rate of subsidy. We also ignore the subsidy given to farmers through interest-free loans from the commercial banks. The subsidy on credit, which must be the lower bound, increases from Rs. 15 million in 1972/73 to Rs. 521 million in 1983/84.

Table VII.4

SUPPLY OF AGRICULTURAL CREDIT BY SOURCE AND
ESTIMATES OF SUBSIDY ON AGRICULTURAL CREDIT

(in Million Rupees)

Years	Agricultural Development Bank of Pakistan	Co-opera-tives	Taccavi	Commercial Banks	Total Annual Credit	Estimated Subsidy
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1972-73	168.80	42.02	10.23	85.70	306.75	15
1973-74	415.20	143.72	67.50	286.40	912.82	45
1974-75	395.50	81.54	12.13	520.90	1010.07	50
1975-76	532.20	91.84	25.67	808.10	1457.81	73
1976-77	637.90	95.45	13.14	970.10	1716.59	86
1977-78	429.80	138.04	9.00	1290.92	1867.76	93
1978-79	416.94	413.78	11.96	1381.11	2223.79	111
1979-80	711.55	708.64	8.20	1587.40	3015.79	195
1980-81	1066.62	1126.25	8.30	1826.77	4027.94	286
1981-82	1557.38	1100.80	10.34	2436.10	5104.62	299
1982-83	2310.44	1320.93	2.69	2680.89	6314.95	379
1983-84	3131.67	1449.89	9.30	4088.70	8679.56	521

Source: Pakistan Economic Survey, 1984-85, for columns 2 to 5.

5.2   Low Irrigation Water Rates

There is a huge unbudgeted subsidy being given to farmers as they are being charged low irrigation charges on account of water being supplied through public canals. In a competitive market, the price of a product is the cost of supplying the marginal unit. The alternative to water supply through canals is water pumped from tubewells. There are studies that document the marginal cost of water supplied by tubewells. There are also studies that report the market price of tubewell water. The subsidy on water could be calculated by comparing the price of water charged by government with either the marginal cost of tubewell water or the market price of tubewell water. Calculating the subsidy in this way shows the enormous extent of subsidy on irrigation water. Since we do not wish to err on the high side, we have estimated the subsidy on water as the difference between the operation and maintenance expenditure incurred by the government on public canals and the irrigation receipts.

Table VII.5 presents subsidies on irrigation water. It is found that the small surplus in the years 1972/73 and 1973/74 soon turns into deficit and increases to Rs. 926 million for the year 1983/84.

Table VII.5
Subsidy on Irrigation Water Supplied through Canals

(in Million Rupees)

Years	Gross Irrigation Receipts	Expenditure on Operation Maintenance of Canals	Net Irrigation Receipts
1972-73	308.5	271.0	37.5
1973-74	377.2	301.4	75.8
1974-75	341.1	419.4	(-)78.3
1975-76	370.9	507.0	(-)136.1
1976-77	384.8	534.9	(-)150.1
1977-78	497.3	618.0	(-)120.7
1978-79	496.3	727.2	(-)230.9
1979-80	575.7	936.7	(-)361.0
1980-81	635.9	1152.4	(-)516.5
1981-82	884.1	1486.1	(-)602.0
1982-83	974.1	1669.0	(-)694.9
1983-84	1027.3	1953.5	(-)926.2

5.3   Subsidy on Electricity

The farmers in Pakistan get electricity at a concessional rate.
Certain concessions are also given to farmers on installation and
minimum use charges. Data on these types of concessions are not
available. However, an estimate of subsidy on account of a favourable
rate can be made.

Table VII.6 presents the data for the computation of subsidy.
The cost of supplying electricity to farmers is always higher than the
average sale price of electricity for agriculture. The subsidy on
electricity goes up from Rs. 42 million in 1972/73 to Rs. 275 million
in 1983/84.

Table VII.6

Estimated Subsidy on Electricity Supply to
the Agricultural Sector

Years	Electricity Consumption in the Agricultural Sector (M.Kwh.)	Cost per Kwh/Paisa	Average Sale Price for Agriculture Paisa/Kwh	Subsidy Per Kwh (Paisas)	Estimated Subsidy (in Million Rupees)
1972-73	1170	13.59	9.96	3.63	42
1973-74	1131	16.91	10.71	6.20	70
1974-75	1531	23.14	11.99	11.15	171
1975-76	1386	26.62	15.53	11.09	154
1976-77	1400	29.95	15.71	14.24	109
1977-78	1717	27.41	14.37	13.04	224
1978-79	1666	28.23	20.42	7.81	130
1979-80	2056	31.76	27.85	3.91	80
1980-81	2125	33.26	31.16	2.10	45
1981-82	2357	41.45	34.66	6.79	160
1982-83	2546	45.52	36.01	9.51	242
1983-84	2750	48.50	38.50	10.00	275

Source: "Power System Statistics" Eighth Issue, Planning Department.
       Power Wing, WAPDA, Nov. 1983.

6.   NET FISCAL BURDEN ON FARMER-PRODUCERS.

A consolidated picture of agricultural taxes and subsidies given in
Table VII.7 shows up a number of important conclusions which are briefly
listed. Firstly, an unsatisfactory performance regarding resource mobili-
zation is sharply brought out as net taxes are positive for 1972/73, 1973/74
and 1974/75 and negative for all the remaining years. It should, however,
be pointed out that concealed taxation of farmers has not been included in the
computation of the net fiscal burden. On the other hand, it should also
be noted that we have greatly under-estimated the concealed subsidies
on credit and irrigation water. Secondly, the incidence of
taxes forms a small proportion of gross domestic output from agriculture.
There is a declining trend in the tax burden. It is clear that the agricul-
tural sector has not contributed much to the resources required for
financing   development. Third, the yield from taxes on commodities
shows a large element of instability while the yield from direct taxes is
stable. Finally, open subsidies on agricultural inputs are being
eliminated. However, concealed subsidies on inputs are increasing with
the passage of time.

	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
A. TAXES	741	818	1006	975	468	159	675	1015	2419	912	1268	861
Export Duty												
Rice	128	464	333	241	58	–	–	–	–	–		
Raw Cotton	442	179	535	340	1	–	–	–	–	150	462	252
Profits of Export Corporation												
Rice (RECP)	–	–	113	187	44	209	546	589	853	596	347	310
Cotton (CECP)	–	–76	–228	–61	141	–220	152	151	723	237	77	46
Cotton Fee	–	59	60	65	88	52	47	103	108	116	132	83
Land Revenue	168	187	189	197	136	117	231	172	226	285	249	169
Agricultural Income Tax	3	5	4	6	–	1	3	–	9	1	1	1
B. SUBSIDIES	365	390	753	1375	1369	1598	2455	3330	3324	2879	3288	3412
Fertilizer	207	278	326	607	381	617	1692	2454	2457	1794	1948	1690
Tubewells	22	10	16	24	48	20	24	22	20	24	24	N.A.
Plant Protection & Pesticides	116	63	112	381	485	523	267	218	N.A.	N.A.	N.A.	N.A.
Credit	15	45	50	73	86	93	111	195	286	299	379	521
Electricity	42	70	171	154	199	224	130	80	45	160	242	275
Irrigation	–37	–76	78	136	150	.121	231	361	516	602	695	926
NET TAXES (A–B)	376	428	253	–400	–881	–1439	–1780	–2315	–905	–1967	–2020	–2551

Note: "–" indicates entries as insignificant or zero.

CHAPTER VIII
POLITICAL ECONOMY OF LAND TAXES

1. INTRODUCTION

Taxation of the agricultural sector is a major instrument for mobilization of the surplus to finance development projects within the agricultural sector and/or the rest of the economy. For many years the need for a heavier taxation of agricultural land has formed part of the conventional wisdom about the ways to extract the agricultural surplus and to increase the tempo of agricultural development in poor countries. Land taxes have both equity and efficiency properties that gladden the hearts of economists and vocal politicians belonging to urban areas alike. Taxes on land promote efficiency in the allocation of scarce resources by creating incentives for farmers to increase their effort and reduce their consumption, expanding the amount of agricultural produce available to the non-agricultural sectors of the economy. A tax on land has an important redistributive function because its incidence falls squarely on the landlord and is neither shifted forward to consumers nor backwards to suppliers of agricultural inputs, nor does it introduce distortions in the allocation of productive resources.

The conventional wisdom has, had a difficult time in becoming conventional practice. The share of land taxes in total tax revenues is generally low in developing countries and its share has been declining. In Pakistan, the share of land taxes in total taxes has fallen from 16 per cent in 1960 to 6 per cent in 1970, to 2 per cent in 1975 and

finally to just .5 per cent in 1982. As a share of total agricultural
incomes, land taxes have shown a similar downward trend. The decline
stems in part from the fact that rates and assessments have not kept
pace with the growth of agricultural incomes, but in some cases the taxes
on land are either being abolished or rendered ineffective by exemptions
and archaic assessment procedures. In India, some states have simply
eliminated the land tax. In Pakistan, the land tax has recently been
seriously diluted by the exemption of irrigated land holdings below 12.5
acres and unirrigated holdings below 25 acres.

The growing gap between theory and practice has its roots in the
balance of political forces that determine tax policy in developing
countries. It is axiomatic that interest groups will attempt to
shift the burden of taxation to others while reaping, to the maximum
extent possible, the benefits of government expenditure. Since the
agricultural sector is the dominant political force in many of the
poorest developing countries, the erosion of land taxes in particular and
taxes on rural incomes in general is almost an inevitable outcome in a
world where voters and political leaders act on the basis of personal
benefit-cost calculation, as eloquently analysed by Anthony Downs /20_7.
In countries where rural interest groups predominate, the relevant
question is then how far can the agriculture sector shift the burden of
taxation on to other groups.

The recent experience of Pakistan offers some interesting
perspectives on the political economy of agricultural development
because the benefits of government development expenditures to the

rural sector have undergone a dramatic change in the past two decades. In the early 1960s yields began to rise as a result of tubewell-supplied irrigation water and increased fertilizer applications, both heavily subsidized by government. In the second half of the decade of the 1960s, these new inputs were joined by new seed varieties, whose multiplication and distribution were also the responsibility of government. One would expect, therefore, that the farmers' resistance to land taxes or other forms of direct taxes would have weakened.

But the share of taxes in Pakistan's GNP and the rural sector's share of those taxes have shown no tendency to rise. One explanation for this phenomenon, at least in the case of Pakistan, stems from another Downsian principle, namely that it is the perceived benefits and costs which are relevant to voters in deciding how they will cast their ballots. From the point of view of the rural voter, a tax on his land is direct and real while the benefits are diffuse, sometime intangible, and frequently vary.

If the perceived private returns to government expenditures could be raised, it follows that the taxation of land might become not only politically palatable but even actively sought by farmers as a mean of raising their income.

2. THE SYSTEM OF LAND TAXES IN PAKISTAN

The present land tax system in Pakistan has its origins in the British tax system introduced to the subcontinent in the 18th and 19th centuries. The British system was based on the classic economic principle that rent or the net output of land (i.e. the difference

between gross output and costs of the variable inputs) is an unearned source of income for landlords and can be taxed   without any adverse effect on production. Over the centuries, the British developed an elaborate administrative machinery for administering the land tax system. Cadastral surveys were painstakingly conducted to measure land productivity. Data on crop prices and cultivation costs were compiled for different geographical sub-units. The assessment of land rental values (generally known in the subcontinent as settlement) was first made by the British in the second half of the 19th century and have been periodically revised since then. A general reassessment was carried out in the 1920s and 1930s and special reassessments have subsequently been performed in some districts. Except for a few agriculturally poor districts in the Baluchistan province, Northern areas and some of the former princely states, Virtually all areas in Pakistan have been surveyed at least once for land tax purposes.

Two main systems of land tax assessment have evolved. The Punjab system is applicable to the provinces of Punjab, N.W.F.P., and most of   Baluchistan. For the purposes of assessment, each district is treated separately. The district is further sub-divided in clusters of much smaller areas for the purpose of assessment. In principle, the assessment area —— or Patwar circle, as it is commonly known — is supposed to be roughly homogenous with respect to the general agricultural conditions, and an equitable assessment rate is fixed for all land lying within the area. The fields within the patwar circle are measured and classified according to soil type. The tax rate for each plot of land is then geared to the quality of the soil and expressed as a multiple of the assessment rate for the area. The basis

of the assessment is net produce accruing to the landowner. The gross
value of output on each field is ascertained by multiplying the yield
per acre, average acreage under each crop and the average price for each
crop in the village market. The net produce (rental value) is obtained
by deducting the share going to the tenant and costs incurred in
cultivation by the landowner from the gross value of production.

The assessed values remain fixed between the settlements that are
generally made in each district at 40 year intervals. In the three districts
of Lahore, Faisalabad and Sahiwal, the assessed land values are reduced
if the price of the main crop in the district for any year is lower than
the price at which the physical output was valued during the year of tax
settlement. If the price is higher, the assessed values remain at the
level fixed in the settlement.

The rate of tax is fixed at the time of tax settlement. This
rate is applied to the rental value of cultivated land and land left
uncultivated does not incur any tax liability.

In areas other than the ones covered by the Punjab System, a
slightly different method known as the Sind System is applied for fixing
the assessed land values. This system is closer to the Ricardian doctrine
of land taxation. The tax settlements are more frequent as compared with
the Punjab System. For cotton, paddy and wheat the rate of assessment
per acre varies with   crop prices in both the rising and falling
phases of price changes. For other crops, the assessments remain
fixed for the period between the two tax settlements. In theory, the
Sind System is relatively more income elastic than the Punjab System.

An outcome of the efforts by the British to assess land for
taxation has been a legacy of an elaborate system of land tax assessment
and collection and maintenance of records of land rights. The adminis-
trative advantages of this legacy are obvious for strengthening the land
tax system in Pakistan.

3.   ANOMALIES IN THE LAND TAX SYSTEM

The administration of the land tax system in Pakistan contains
a number of anomalies, the first and most important of which is the
infrequent revision of the assessment rate. There has been no general
revision in land assessments since the 1930s although in some districts
changes in the assessment rates are made annually. In Lahore,
Faisalabad, and Sahiwal districts in the province of Punjab, assessment
values are reduced if the price of the main crop in the district during
the tax year is lower than the price of this crop in the year of the
original tax assessment. This procedure is not symmetrical, however,
and higher crop prices do not affect the assessment rate. In Sind,
the tax administrators have attempted to revise tax assessments more fre-
quently by taking into consideration the fluctuations over time in the
prices of the principal crops grown in their province. Such efforts have
proved difficult because landowners there constitute an even more
powerful political force than elsewhere in Pakistan.

A second anomaly of the system is that the rate and the tax base
are fixed at the same time. A variable tax rate would be one way to
compensate for annual fluctuation in crop prices. Nevertheless, the
British fixed a statutory tax rate in the original legislation that
established the land tax system and the tax rate cannot be changed

without amending this legislation. Prior to 1871, the rate of taxation was fixed at two-thirds of the assessed rental value, and the Land Revenue Act of 1871 reduced this rate to 50 per cent. In the 1920s the tax rate was revised along with the assessed evaluations, and the rate was reduced from 50 per cent to 25 per cent.

An additional anomaly in the procedures for establishing assessment rates is the legal ceiling on increases in the assessment rate for individual farms in the Patwar circle. The Land Revenue Act of 1928 stipulated that no assessment could be revised upwards by more than two-thirds for any single parcel of land or by more than one quarter for the assessment area as a whole. This limitation would not prove to be a substantial barrier if there were more frequent revisions in land assessments. But the tendency to revise land assessments at forty year intervals and the secular increase in agricultural prices virtually assure that land taxes will not rise as fast as increases in agricultural income in Pakistan.

Another anomaly is the narrow definition of the net produce of land used in establishing the assessment rate. No attempt is made to include the income generated by livestock or other on-farm activities. Revenue from these activities escapes all taxation because agricultural income is excluded from payment of income taxes.

4.   EQUITY ASPECTS OF LAND TAXES

It is generally believed in Pakistan that land tax is a regressive and an inequitable levy. It is argued that since tax settlements were done at different times in different areas, it is likely that wide variations in effective rates prevail.   The horizontal and vertical

inequities in the land tax are ascribed to the outdated assessed land values.
The opposition to increases in land taxes has argued that the design
and administration of a progressive land tax is a difficult task and the
present system is inequitable therefore the burden of the land tax should not be
increased by ad hoc increases in rates and/or assessed land values.
In fact, the argument has often been made that since flagrant inequities
are tolerated only when the tax is light, there is a need for lowering
the land tax rates in Pakistan.

No empirical study on the incidence of land taxes has tested the
hypothesis of this tax being a regressive one in Pakistan. The land tax
system in Pakistan is badly in need of reform if it is to play any
significant role in the generation of government revenues. Given the
configuration of political forces in Pakistan, one important consideration
in any reform of the land tax system will be its incidence. Given the
anomalies described above, it is impossible to say on a priori basis whether the
land tax system is progressive, regressive or neutral. A direct test
of the progressivity of Pakistan's land tax system can be made by examining
the share of taxes in the individual income for landowners of different
income classes. However, in the absence of appropriate household income
data for landowning families, it is necessary to use more aggregative
data. To determine tax progressivity, the share of land taxes in each
district's income has been regressed against the per capita agricultural
income of 37 districts of Pakistan.

The data needed for the analysis are: (1) tax collections by
districts, (2) agricultural income by districts, and (3) agricultural
labour force by districts. Before we present the result, a brief account
of the data sources and their quality is given.

Table VIII-1

Regressions of percentage of income
paid in taxes on Per Capita Income.

Equation No.	Sample	Estimated Equation	$\bar{R}^2$	e
1.	37 Districts	$T/Y_g = -.01218 + \underset{(4.43001)}{.00002} Y_g$	.36	2.039
2.	37 Districts	$T/Y_n = -.01365 + \underset{(5.17161)}{.00003} Y_n$	.44	2.22
3.	19 Below Mean Income Districts	$T/Y_g = -.00142 + \underset{(1.912)}{.00001} Y_g$	.18	1.48
4.	19 Below Mean Income Districts	$T/Y_n = -.00453 + \underset{(2.495)}{.00001} Y_n$	.27	1.05
5.	18 Above Mean Income Districts	$T/Y_g = -.01509 + \underset{(1.811)}{.00002} Y_g$	.17	1.63
6.	18 Above Mean Income Districts	$T/Y_n = -.0177 + \underset{(2.244)}{.00003} Y_n$	.24	1.81
7.	12 Districts under Sind System	$T/Y_g = -.00283 + \underset{(2.128)}{.00002} Y_g$	.31	1.61
8.	12 Districts under Sind System	$T/Y_n = -.00211 + \underset{(2.068)}{.00002} Y_n$	.30	0.88
9.	25 Districts under Punjab System	$T/Y_g = -.00020 + \underset{(2.686)}{.00001} Y_g$	.24	1.72
10.	25 Districts under Punjab System	$T/Y_n = .00024 + \underset{(2.637)}{.00001} Y_n$	.23	2.946

Notes: 1) T, Y_g and Y_n are respectively per capita tax, per capita gross income and per capita net income.

2) Figures in parentheses are t-values of the coeffifients.

elasticities of tax-in_ome ratio (e) calculated at the mean value are
presented in the table.

Equations 1 and 2 relate to the 37 districts of Pakistan. The
coefficients are highly significant and positive. The values of the
elasticity are higher than 2. The land tax is highly progressive as
between districts. The proportion of variance explained is also quite
high.

We tested against the possibility that the progressivity
found in the land tax may be just a statistical artifact. A scatter
diagram between the percentage of income in taxes and district per capita
income did not show any distinct clusters between high and low income
districts. Nevertheless, we divided the districts in two categories
those above or below the mean district per capita income.
A separate equation was estimated for each category of districts. The
results are presented in equations 3, 4, 5 and 6. The coefficients are
significant and positive for each type of district. The elasticities
are greater than one.

Separate equations for districts belonging to the Sind and the Punjab
Systems of land taxation were estimated. The results are presented in
equations 7, 8, 9 and 10. The coefficients are positive and significant
for both systems. The Punjab System is relatively more progressive than
the Sind System. This is in contradiction with theoretical
expectation. This finding may be explained by the nature of the administration
of land taxes as well as to different political power structures in the
two regions. The Sind System may be administered in a way that large
land-owners pay relatively lower taxes than under the Punjab
System. This probably explains the reversion to the Sind System in the

Sind province after the break-up of one unit in West Pakistan in 1968/69. In the new provincial Assembly in Sind, the Sindhi landowners could and did legislate for the reversion to the Sind System.

5. EFFICIENCY ASPECTS OF LAND TAXES

Economists often stress the beneficial effects of increased land taxes on agricultural output but the politicians generally argue that additional taxation adversely affects agricultural productivity. This section examines the effects of an increase in the burden of land tax, given the level of government expenditure benefiting the agricultural sector, on agricultural production in Pakistan. The cross-section data of different districts in Punjab for four years are analysed. We have regressed land tax per cultivated acre (X_1) and three alternative proxy variables $(X_2$ or X_3 or $X_4)$ for government expenditure on the value of agricultural output per cultivated acre. The data sources for values of agricultural output, taxes and cultivated area were described in the previous section. No data are available for government expenditure on agriculture on a district basis. We have used three proxy variables. The government has provided subsidized credit to farmers to buy fertilizer, install tubewells and purchase tractors and other items of agricultural machinery. Institutional credit in each district as a proportion of total institutional credit advanced to farmers in Punjab (X_2) and Institutional credit per acre in each district (X_3) are proxy variables for government expenditure benefitting the agricultural sector. The relative acreage under high yielding crop varieties is positively related to government expenditure on subsidized water, credit, ferti-lizer and, probably, agricultural machinery. Acreage under high yielding varieties of wheat as a per cent of total wheat acreage in each

district (X_4) is a proxy variable for government expenditure ir year 1970/71 and 1972/73.

Table VIII-2 presents the regression results. The land variable is positively and significantly related to the agricul output per acre for all four year: in all equations. Governmen expenditures on agricultural development are positively and sig cantly correlated with the agricultural output per acre for eig of ten equations. For the two equations the variables are rela positively but the government expenditure variable is statistic insignificant. It is thus safe to conclude that upward revisior the level of land tax would help to increase agricultural produ This beneficial effect would be reinforced if the revenue from i land taxes is spent on agricultural development via increased go expenditure benefitting the agricultural sector.

6.   POLITICS OF LAND TAXES

The archaic and inflexible land tax system in Pakistan c. traced to the political dominance of the landowning class who, a as a matter of principle, have resisted any reforms in the land i system. More than 40 per cent of the voters in Pakistan own agri tural land but their representation in elective bodies has always more than proportional to their numbers because of the influence they exercise over tenants and landless agricultural labour. The political power of landlords was apparent in the earliest days of

1951

and has not diminished markedly since then.[1/] In the cent-

al elections in Punjab, landlords won more than 80 pe[r]

seats while in the 1955 Sind elections landlords claim

ber cent of the seats. In 1971, the situation had no

ially. Out of 138 members of the West Pakistan Const

, 105 were landlords. Although no analysis on the so

background of the elected representatives in the nat

al assemblies elected in 1985 is available,

opinion holds that landlords have again been elected

es in a big way. Given this political complexion, it is not

ing that there has been no new legislation to reform the land

tem or to effectively introduce any formal agricultural income

The political influence of landlords is felt not only at the

:ive stage but also in the administration of existing land tax

he collection of land taxes is the responsibility of the district admin-

on and specifically of the District Commissioner, or the Collector

s sometimes known during the British period. The District

oner, however, is required by law to consult with memb-ers of the

munity. This practice has provided considerable leve-rage to

community in the area of land tax administration. P

duction by General Ayub Khan of the system of Basic D-mocracies

local government took the form of a Panchayat which i

an interesting analysis of the political importance o
s, see Shahid Alam, "Economics of the Landed Interest
y of Pakistan", Pakistan Economic and Social Review,

a view that land reforms have been hindered by these
Herring, R. and Chaudhry, M.G., "The 1972 Land Reform
their Economic Implications: A Preliminary Analysis",
lopment Review, Autumn 1974.

Equation No.	Years	Intercept	VARIABLES X_1	X_2	X_3	X_4	Degrees of Freedom	R^2
1.	1958/59	70.940	+ 9.086 (5.407)	+ 1.759 (2.695)			19	.72
2.	"	17.348	+ 9.731 (5.413)		+ .563 (1.991)		19	.67
3.	1959/60	87.440	+ 19.049 (4.180)	+ 1.783 (2.050)			19	.61
4.	"	89.018	+ 10.747 (4.312)		+ .413 (1.433)		19	.59
5.	1970/71	85.427	+ 29.098	+ 6.714 (3.120)			19	.67
6.	"	84.684	+ 32.123 (4.655)		+ 2.541 (2.272)		19	.61
7.	"	64.144	+ 19.812 (4.250)			+ 1.931 (6.076)	19	.65
8.	1972/73	140.700	+ 55.929 (5.819)	+ 8.525 (3.314)			19	.74
9.	"	126.265	+ 61.814 (6.203)		+ 3.937 (2.452)		19	.74
10.	"	102.466	+ 39.352 (5.203)			+ 2.783 (5.546)	19	.94

Notes:
a) The figures in parenthesis are t-values of the coefficients.
b) X_1 - Land tax per acre (in rupees)
c) X_2 - Institutional credit in each district as a proportion of total institutional credit advanced to farmers in Punjab.
d) X_3 - Institutional credit per acre (in rupees)
e) X_4 - Acreage under high yielding varieties of wheat as per cent of total wheat acreage

was made up of the representatives of the major land-owning clients in each village. With the advent of the Basic Democracies system, the balance of political power shifted in form but not in substance. The chairmanship of the union council was generally rotated among the largest landlords while the membership was made up of smaller landowners.

Land owners not only controlled the administration of the land tax system through the political process but they themselves are frequently the administrators. At the lowest level, the local official responsible for the collection of the land tax is the Namberdar who is, in almost every case the landlord owning the largest amount of land in the village. At higher levels the tax officers at the district, divisional, provincial and federal levels are civil servants, the great majority of whom have ties to the landowning classes. Because of the historic inequalities in the education system, the sons of the landlords have had easier access to higher education than sons of other rural classes and were able to enter the civil service more readily than any other group. Similarly, the military, which at times has been a dominant political force in Pakistan, draws its officer corps mainly from the landed classes. Even though Pakistan was endowed at the time of its creation with a civil service in which rank was based on merit and not social background, the fact that so many government officers had direct family ties to the landed classes has made effective reform and implementation of land tax laws difficult to achieve.

The tendency on the part of a local tax officers to minimize tax liabilities on land can be seen from a recent case study of the operation of land tax system in Multan district /‾10‾/ .

The settlement officer in 1966 underestimated the prices and
yield per acre. The measurement of matured area in the circle was
accurate. The costs of cultivation were under-estimated. The under-
estimation of prices, costs and physical output cannot be explained
because reliable data on these aspects are available from
other government agencies. The yield data published by the government
originates with revenue officials who are also responsible for the
settlement operations. The extent of underestimation is massive.
The gross value of crop output in 1966 settlement for the assessment
circle was 12 million rupees. An alternative estimate based on more
accurate price and yield data raises the value of gross output to
Rs. 33 million. Net income is similarly underestimated. The theoretical
upper limit for land tax per matured acre was Rs. 14.16 in 1966
settlement. An alternative estimate based on realistic figures of
yields and prices would have yielded the tax of Rs. 31.09 per acre.
The rate per matured acre actually fixed in 1966 settlement was only
Rs. 3.64. This is much lower than the theoretical limit as calculated
by the settlement officer himself. Interestingly enough, the actual
assessment in 1966 is the same as in 1921.

Two main factors explain the under-assessment of the land
tax. The narrow and legalistic factor could have prescribed the
limits beyond which the assessment on the circle and village level
cannot be increased between two consecutive settlements. This
explanation is not relevant to the 1966 settlement in Multan as the
settlement officer did not propose any increase in the assessment
over 1921 level. This explanation does not have much weight as a

CHAPTER IX

CONCLUSION AND POLICY IMPLICATIONS

The foregoing analysis permits us to pinpoint several interesting and useful policy implications. These are briefly summarized below:

1.   A tendency towards a reduction in income inequities during the 1960s — generally heralded in Pakistan as the Green Revolution period — and an increase in income inequities during the 1970s is clearly evident. On the other hand, the incidence of rural poverty shows an increase in the 1960s and a fall in the 1970s. Increased wage employment, non-farm employment and livestock are associated with a reduction in income inequalities. Remittances from overseas migrant workers have also reduced the incidence of rural poverty but have also paradoxically resulted in increased income inequalities.

2.   The barter terms of the agricultural sector have shown an upward trend over the entire period from 1951/52 to 1983/84. However, this trend conceals in it periods of considerable decline, considerable increase and large fluctuations in the net barter terms of trade. There was a declining trend in the 1950s, a sharp upward trend in the 1960s, large fluctuations around a rising trend in the 1970s and a declining trend since 1977/78.

3.   The extent of improvement in the purchasing power of agriculture as evidenced by changes in income terms of trade and single

factoral terms of trade since 1953/56 is large. Farmers' ability to pay taxes and their capacity to pay for modern inputs has improved considerably. This fact should be noted in debates on reducing farm subsidies or increasing the tax burden on agriculture. In an absolute sense, the taxable capacity and the purchasing power of the agricultural sector has certainly shown a considerable improvement. However, the limitations of any terms of trade index may be noted as it can be argued that the purchasing power of agriculture may worsen in relative terms if other sectors show a more rapid growth in their output or productivity.

4.   Government policies on prices for crops and inputs have been based on a number of factors. A mere glance over the terms of reference of the Agricultural Prices Commission would show the varied nature of considerations guiding the policy matter in this area of public policy. The need to provide incentives for adoption of improved technology, the need to ensure efficient use of resources, the impact of prices on different agents in the economy and the need to take into account the changes in the terms of trade between crops, between output prices and input prices and between gross income and input prices are some of the basic considerations to be kept in view by the Commission at the time when it evolves its recommendations for appropriate prices for different commodities.

5.   It is obvious that the cost of production needs to be covered by the fixed price if the farmer is to be provided an incentive to produce the crop. Current data on the costs of production of different crops are too patchy to be of much usefulness for policy purposes.

It would be helpful to be clear about the cost concept to be adopted as a basis for price determination. 'It would also be useful to decide the level of aggregation at which costs are to be estimated. The issue at stake is whether the appropriate level for data estimation is the province, country or a region of homogenous crop mix.

6.   In the case of the parity approach, we have shown that the gross-income input prices index shows a deterioration in the early to mid 1970s but has sustained a rapid rise since 1978/79. Government policies on prices of inputs and crops have, among other things, been based on the notion of a fair return to farmers. Changes in input prices are often followed by adjustment in output prices in the same direction. An increase in the farmers' income noted by us earlier, is also evident from the trends in the gross income-input prices index parity. In view of the shortage of pulses and oilseeds in the country, a case can be made against the present policy of maintaining a high gross income parity in favour of wheat vis-a-vis gram and oilseeds. In general an appropriate relationship needs to be maintained between costs and prices of and the income from,different crops if specific targets of production by crops are to be fulfilled.

7.   The impact of prices on the composition of output and on the total output of the agricultural sector is pervasive. The empirical evidence that the acreages of different crops vary systematically in response to intercrop price movements is abundant and shows that cropping patterns are a function of prices. The price elasticities for food crops are lower than those for cash crops, but even in their cases, a positive price responsiveness is indicated.

While acreage response functions have been subjected to detailed scrutiny, little work has been done on the output response. The elasticity of output with respect to price is the sum of elasticity of yield per acre and the elasticity of acreage. We have already noted that acreage elasticity is positive. If yields are sensitive to the relative prices of output and inputs, one should expect the output elasticity to be not only positive but larger than the acreage elasticity. Some evidence exists in Pakistan that farmers adjust the quantities of variable inputs, especially modern inputs, in response to changes in the input prices. However, no solid empirical work has been done in this area. Need for a careful analysis of the output response to the relative output-input prices is obvious and urgent and would be of direct policy relevance.

Another area of research which requires to be on the agenda for further research is the likely effect of prices on the "effective" supply of agricultural products for the non-agricultural sector. Cash crops are marketed almost totally. The price responsiveness of marketed supply needs to be estimated for different food crops. Studies on this issue are very few. A possible reason is the absence of time series data on marketed surplus. Only two studies were available. The price elasticity of wheat for market supply was found to lie between 0.3 and 0.7. A significant relationship between marketed surplus and food output was also noted. A rapid increase in the marketed surplus of some food crops in Pakistan, notwithstanding positive elasticity of marketable surplus with respect to prices, is ultimately explainable in terms of technological factors behind the observed increased output. Relative price changes were not of a magnitude that

could explain the market supply of foodgrains.

Although supply response, especially   acreage response
is a reasonably well researched area,   no studies relating
aggregate farm output to terms of trade are available for Pakistan.
Some researchers have noted in passing that they had tried to establish
a statistical relationship between terms of trade and value added
in agriculture. The results were dismal and contrary to the a priori
expectations and were not reported. We have estimated an aggregate
output response function. The estimated results show a positive and
significant (at 15 per cent significance level) relation between
agricultural output and lagged terms of trade. The short-run price
elasticity of 0.18 was estimated. The shifter variables, like an
index of irrigation and the time trend,were also found to be highly
significant.   The policy implication that emerges from the
analysis calls for a favourable price environment for agriculture
and a technology policy aimed at boosting output. In fact rising
factor productivity in agriculture can lead to increasing profitability
even when terms of trade do not rise very much.

8.   The impact of agricultural price policies,on both the output
and input sides,on income distribution has interesting and useful policy
implications. That high farm prices benefit large producers is
obvious. We have also found some support for the notion that high farm
prices also benefit small farmers and landless labour. The farmers' capacity
to hire labour is a function of   farm prices. Benefits from
subsidized inputs tend to accrue in large measure to large producers.

Reducing input subsidies would not greatly harm the small farmer and would release public resources that could finance investments for the benefits of small farmers. In this sense remunerative farm prices and low or no subsidies on farm inputs should increase the efficiency of resource use and the welfare position of the small farmer and the rural poor.

9.   Incentives to producers ould be given through attractive produce prices,   technological   innovations

        and through investment in complimentary sectors. Detailed specific research on the relative benefits and costs of providing incentives through these policies are required. The theoretical and empirical aspects of determination of support prices for different crops that provide just the right amount of incentives and maintain appropriate price relatives for different crops should be given a high priority in the research agenda. Incentives, measured by the rural-urban terms of trade, are the outcome of a host of interacting sectoral and macro policies. It is important to ensure that the commodity-specific price policies and the macro-economic policies are a consistent policy set in their impact on farm incentives.

10.   A strong case can be made for raising irrigation water rates and reducing subsidies on fertilizer, credit and other modern inputs. These inputs have been around for a long time and farmers are familiar with the their impact on output. Raising input prices, with an associated increase in output prices, would have little effect on production, either in total or in its

composition. It would contribute to resource generation and would
not in any major way worsen the income distribution. What is
required is not low prices of inputs for small farmers but an
equal and assured access to the inputs and services for small farmers
but an equal and assured access. If access to the inputs and services
is not assured for the small farmers, the benefits of any technological
innovations would accrue mainly to the large farm sector.

11.   The nature   of government financial subsidies to
agriculture changed   during the decade of the 1970s. The
agricultural sector was taxed much more than it was subsidized in the early
part of the 1970s. However, the net fiscal burden became negative
as subsidies   outpaced the tax revenue. Despite the stated
government policy of eliminating open subsidies on fertilizer and
pesticides, this situation has remained serious and will continue unless
unbudgeted subsidies on water, credit and electricity are reduced drastically.

12.   We have presented some evidence on the economic subsidies or
taxation implicit in commodity transactions due to the divergence between
domestic and international prices for a few selected crops. In the
absence of similar calculations for all crops, the situation for the
entire sector cannot be established. We have noted that
distorting prices of commodities has definite implications for the
efficient allocation of resources. The computation of economic
subsidies assume that producers and consumers do not change their
behaviour as a result of changed prices. In this sense, the computed
magnitudes of economic subsidies or taxation may be biased.

13.   The difficulties currently being faced with respect to resource
generation and the undesirable impact of relying on commodity taxation
as a source of government revenue has led us to appraise the potential
of land taxes in Pakistan. The detailed analysis of this tax highlights
interesting implications for public policy. The evidence that the
tax is progressive in its incidence and has desirable properties with
respect to allocation of resources should be kept in view. A machinery
to collect the tax from millions of farmers is in place and knows the
rural scene very intimately. The main stumbling block, in the enhanced
taxation from this source, has been the power of the landed class, who have
always succeeded in blocking   any tax reform proposals that would hurt
them. We have shown a way to lessen the effectiveness of the landed
lobby. It is proposed that the tax revenue generated from land taxation
be spent on projects benefitting the agricultural sector only. Once
this practice takes hold, opposition to this tax should vanish. We
also recommend that the present structure of the tax be kept as simple
as possible. To begin with the land assessments and rates of land
tax could be increased on an ad hoc basis to a level that generates
significant revenue.

B I B L I O G R A P H Y

1. Aaron, Henry. "Some Criticisms of Tax Burden Sharing". National Tax Journal, 18, No.3 (September 1965).

2. Acharya, S.S. "Parity Issues in Pricing of Foodgrain Output". Indian Journal of Agricultural Economics. Vol.XXXVI, No.4. October-December, 1981.

3. Ahluwalia. Montek. "Inequality, Poverty and Development". Journal of Development Economics. Vol.3, pp.307-342. 1976.

4. Alamgir, M. "The Domestic Price of Imported Commodities in Pakistan: A Further Study". Pakistan Development Review. Vol.VIII, No.1. Spring 1968.

5. Alauddin, Talat. "Mass Poverty in Pakistan: A Further Study". The Pakistan Development Review. No.14, pp.431-50. (Winter 1975).

6. Alavi, Hamza. "The Rural Elite and Rural Development in Pakistan". Rural Development in Bangladesh and Pakistan, ed. Robert D. Stevens et. al. The University of Hawaii, Honolulu. 1976.

7. Ayub, M.A. "Income Inequality in a Growth-Theoretic Context: The Case of Pakistan". Ph.D. thesis submitted to Yale University. May 1977.

8. Azam, A.K. "The Future of Green Revolution in West Pakistan: A Choice of Strategy". International Journal of Agrarian Affairs. March 1973.

9. Azfar, Javed. "The Income Distribution in Pakistan Before and After Taxes: 1966-67". Unpublished dissertation, Harvard University, 1971.

10. Azhar, B.A. "Land Revenue Assessment: A Case Study". Pakistan Development Review. Autumn 1982.

11. Bergan, A. "Personal Income Distribution and Personal Savings in Pakistan". Pakistan Development Review. 1967.

12. Bhatia, M.S. "Intra-Sectoral Parity Between Cost, Price and Income in Agriculture". Indian Journal of Agricultural Economics. Vol.XXXVI, No.4. October-December 1981.

13. Bird, Richard. "A Note on 'Tax Sacrifice' Comparisons". National Tax Journal. Vol.XVII, No.3. (September 1964).

14. Brown, Gilbert T. "Agricultural Pricing Policies in Developing Countries". In Theodore W. Shultz (ed.) Distortions of Agricultural Incentives. Bloomington: Indiana University Press. 1978.

15. Chaudhary, M.A. and Malik Muhammad Ashraf. "An Economic Analysis of Level and Structure of Irrigation Water Charges". Pakistan Institute of Development Economics. March 1981.

16. Chaudhry, M.G. "The Green Revolution and Income Inequality: Some Empirical Evidence from Rural Pakistan 1960-75". Ph.D. Thesis submitted to the University of Wisconsin. 1980.

17. Cheema, Aftab Ahmad. "Poverty in Pakistan: Some New Dimensions". Unpublished Research Paper, PIDE, Islamabad 1985.

18. Cheong, Kee Cheok and Emmanuel H. D'Silva. "Prices, Terms of Trade and the Role of Government in Pakistan's Agriculture". World Bank Staff Working Paper No.643.

19. Cummings, Thomas. "Cultivator Market Responsiveness in Pakistan - Cereal and Cash Crops". The Pakistan Development Review. Vol.XIV, No.3. Autumn 1975.

20. Downs, Anthony. "Economic Theory of Democracy". London: Harper and Row Ltd. 1957.

21. Ercelawn, Aly. "Income Inequality in Rural Pakistan: A Study of Sample Villages". Pakistan Journal of Applied Economics. Vol.III, No.1. 1984.

22. Faiz, Mohammad. "Rural Income Distribution in Pakistan: A Synthesis". Islamabad. Pakistan Institute of Development Economics. (Unpublished).

23. Falcon, Walter P. "Farmer Response to Price in A Subsistence Economy: The Case of West Pakistan". The American Economic Review. Papers and Proceedings. Vol.54. 1964.

24. Falcon, W.P. "The Green Revolution: Second-Generations of Problems". American Journal of Agricultural Economics. Vol.52. December 1970.

25. Fields, D.B. and W.T. Stanbury. "Incentives, Disincentives and the Income Tax: Further Empirical Evidence". Public Finance, XXV, No.3. 1970.

26. Fogan, Elmer D. "Recent and Contemporary Theories of Progressive Taxation". Journal of Political Economy. Vol.46, No.4. (August 1938).

27. Frank, Henry J. "Measuring State Tax Burden". National Tax Journal. Vol.XII, No.2. (June 1959).

28. Ghandhi, Ved P. "Company Tax Incidence-Industry Studies". Indian Economic Review. III, (New Series), No.1. 1968.

re of
/tan

s, Stephen R. Jr. and Sarfraz K. Qureshi. "The Struct
Revenue from Indirect Taxes in Pakistan". The Paki
Development Review.   IV, No.3. 1964.
versity
Policy

bn, Michael. "Why Poor People Stay Poor". Harvard Un
Press, Cambridge, Massachusetts, 1977, Ch.12. "Tax
Towards the Rural Sector". pp.270-286.
ay in
Ltd.

a, Ashok. "Terms of Trade and Class Relations: An Es
Political Economy". London: Frank Cass and Compan
1977.
ing
eview.

mmad, Ghulam. "Private Tubewell Development and Crop
Patterns in West Pakistan". Pakistan Development
Vol.V, No.1. Spring 1965.
me

hid, G.B.S. "A Note on Measurement of Poverty and Inc odology".
Inequalities in Pakistan: Some Observations on Met 8.
Pakistan Development Review.   Vol.XVII, Autumn 19

i, Syed Nawab Haider and Peter A. Cornelisse. "The An omy of
the Wheat Market in Pakistan. Islamabad: Pakistan institute
of Development Economics. October 1984.

m, S.M. "Mass Poverty in Pakistan: Some Preliminary Findings".
Pakistan Development Review. Winter 1973.

n, S.M. "Rural Poverty and Landlessness in Pakistan" in Poverty
and Landlessness in Rural Asia; ILO, Geneva 1977.

omber, Mabel. "An Index of the Taxpaying Ability of State and
Local Governments". (New Yrok, Columbia University Press
1935).

stan, Central Statistical Office, Survey on Population and
Labour Force, 1967-68.

stan, Government of. Agricultural Marketing Advisor. M
and Prices Annual Bulletin 1971-72. Vol.26, No.12 arkets
Karachi, n.d. A.

stan, Government of. Agricultural and Livestock Marke
Advisor. Markets and Prices Annual Bulletin 1979- ing
Vol.32, No.12-A. Karachi 1980. 0.

stan, Government of. Federal Bureau of Statistics.
Income and Expenditure Survey. 1979. ousehold

stan, Government of. Pakistan Economic Survey 1982-8
Islamabad: Economic Adviser's Wing, Finance Divisi
1983.

stan, Government of. Pakistan Economic Survey 1983-84
Islamabad: Economic Adviser's Wing, Finance Divisi
1984.

71.   Pakistan, Government of. Statistical Division. Household Income
       and Expenditure Survey 1971-72. Karachi: Statistical
       Division, Ministry of Finance, Planning and Development
       1973.

72.   Pakistan, Government of. Statistical Division. Monthly Statistic
       Bulletin. Various Issues (1971-72, 1979). Karachi:
       Central Statistical Office.

73.   Pakistan Institute of Development Economics. Population, Labour
       Force, and Migration Survey. Islamabad. 1979.

74.   Pakistan, Ministry of Agriculture. "Utilization of Agricultural
       Commodities".

75.   Pal. Mati Lal. "The Determinants of the Domestic Prices of Impor
       Pakistan Development Review. Vol.IV, No.4. Winter 1964

76.   Pearse, Andrew. "Technology and Production: Reflections on Globa
       Study". International Perspective in Rural Sociology.
       Ed. H. Newby (John Wiley and Sons Chichester, New York.

77.   Punjab Planning and Development Statistical Unit. Fertilizer and
       Mexican Wheat Survey Report. Lahore. 1970.

78.   Qureshi, Sarfraz Khan. "Price Responsiveness of Marketed Surplus
       of Wheat in Pakistan". The Pakistan Development Review.
       Vol.XII, No.2. Summer 1974.

79.   Qureshi, S.K. and A.N. Siddiqui. "Terms of Trade and the Agricul
       Price Policy". Islamabad, Pakistan Institute of Develop
       Economics, 1984. (Studies in Agriculture Pricing and
       Agricultural Taxation, Working Paper No.3).

80.   Radhu, Ghulam Mohammad. "The Relation of Indirect Tax Changes to
       Price Changes". The Pakistan Development Review. No.1,

81.   Sadiq, N. "Income Distribution in Pakistan". Unpublished paper
       (Mimeographed) Statistics Division. 1972.

82.   Scandizzo, Pasquale L. and Colin Bruce. "Methodologies for Measu
       Agricultural Price Intervention Effects". World Bank St.
       Working Paper No.387. April 1980.

83.   Sen, Amartya. "Poverty. "Poverty: An Ordinal Approach to Measurer
       Econometrica. 44 (March 1976), pp.219-231.

84.   Shu, David Lin. "Supply Responses of Primary Producers". Penerb
       University, Malaya, Kuala Lumpur 1975.

85. Suleman, P.M.U. "Employment, Income Distribution and Social
        Justice: Analysis of Distribution of Personal Income
        in West Pakistan". Paper presented to the 16th Annual
        All Pakistan Economic Conference, Islamabad University
        Islamabad. February 18-20, 1973.

86. Tyaqi, D.S. "Review of Agriculture: Farm Prices and Class Bias
        in India". Economic and Political Weekly.
        September 1979.

87. Wald, Haskell. "Taxation of Agricultural Land in Underdeveloped
        Economics". (Cambridge, Harvard University Press, 1959)

88. Wasay, Abdul. "An Urban Poverty Line Estimate". The Pakistan
        Development Review. 16 (Spring 1977). pp.49-51.

89. West Pakistan, Government of. "Data on Taxes, Duties and Other
        Receipts". 1970.

90. West Pakistan, Government of. Planning Board. "Agricultural
        Income in West Pakistan, 1967-68.

91. Wizarat, Shahida. "Technical Change in Pakistan's Agriculture:
        1953-54 to 1977-78'. Pakistan Institute of Development
        Economics, Islamabad. Research Report No.120.