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**RECENT MOVEMENTS IN AGRICULTURE'S
TERMS OF TRADE IN PAKISTAN**

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Recent Movements in Agriculture's Terms of Trade in Pakistan

Stephen R. Lewis, Jr.*

Introduction

The purpose of this study is to add five years' data to a study [4] undertaken some years ago by S. Mushtaq Hussain and myself. The original study developed a fairly complete set of price weights and price indices for manufactured and agricultural commodities in Pakistan from 1951/52 to 1963/64, and analyzed the movements in the net barter terms of trade of the domestic agricultural and manufacturing sectors. The results showed that the terms of trade had been turned against agriculture by the trade-restricting policies of the government in the early 1950's and that the subsequent relatively slow growth of agriculture and rapid growth of manufacturing had resulted in a movement of domestic relative prices more favorable to agriculture over the late 1950's and early 1960's. The earlier movement against agriculture and the later improvement in agriculture's terms of trade were more pronounced in East than in West Pakistan.

A subsequent study [2] compared the terms of trade agriculture received in Pakistan and the terms of trade it might have received had the agricultural sector been able to trade directly with the rest of the world without

* I am grateful to S. Fletcher Clark for performing statistical chores and to Walter P. Falcon, John B. Sheahan, and Gordon C. Winston for helpful comment. They share no blame for the outcome.

going through the government's exchange control mechanism. From the latter study it was clear that, even though there had been an improvement in agriculture's terms of trade from the mid-1950's to the early 1960's, agriculture in both provinces was being "squeezed" relative to the terms of trade it might have received in the rest of the world. East Pakistan farmers received 55¢ to 60¢ in manufactured goods per Dollar of marketed commodities, while West Pakistan farmers received 60¢ to 65¢ per Dollar of marketings for the three year average 1961-1964, when both agricultural and manufactured goods were valued at world market, rather than domestic, prices. Thus, the terms of trade had been used as a device to transfer income away from the agricultural sector even in the 1960's, that is, after there had been substantial improvements in domestic relative prices of agricultural goods for almost a decade.

The interest in agriculture's terms of trade is related to several key problems of economic development policy. One problem already mentioned is that of transferring some portion of agriculture's income either to the government or to the modern manufacturing sector (or to both) and the terms of trade seem to have performed that function in a very substantial way in Pakistan in each of the thirteen years of the earlier studies.¹ A

1. This is a widely accepted view in Pakistan, both officially [5] and unofficially [4], [7].

second area in which agriculture's terms of trade are important is in connection with the incentives given to the agricultural sector to adopt new

technologies, to produce and market more goods, etc. The appropriate measure of the relevant terms of trade for analysis of agriculture's overall price responsiveness presents some significant problems, since a different set of commodities and weights would be desired for each purpose. However, most literature on agricultural development stresses the importance of relative prices of agricultural and manufactured commodities in the decision making process of the agricultural sector. In view of the very great emphasis placed on agricultural development in the revised allocations of the Pakistan Third Plan (1965-70) and in the current policies of the major aid-giving countries, the recent movements of the terms of trade in East and West Pakistan may be of some interest. The next section reviews briefly some major developments in the Pakistan economy in the past several years, and section III gives the price indices and terms of trade calculated in this study, with a few interpretive comments and some implications.

II. Recent Developments in the Pakistan Economy

The previous study of agriculture's terms of trade ended in the fourth year (1963/64) of Pakistan's Second Five Year Plan (1960-65). During the Second Plan Period, the rate of growth of the agricultural sector in both East and West Pakistan had accelerated considerably from the previous decade's rate of growth. In rough terms, agriculture in both provinces grew at compound rates of 3.5 percent per year, and the rate seemed to be accelerating in West Pakistan at the end of the Second Plan.¹ Manufacturing in the Second Plan grew

1. For a discussion of the reasons for that growth as well as estimates of growth rates by crop and by province see Falcon and Gotsch [1].

at compound rates of about fifteen percent per year, with a slightly higher rate (from a lower base) in the East and a slightly lower rate in the West. The inflow of foreign aid accelerated over the Second Plan period, and so did the growth of exports, and the flow of imports increased at a rate of almost twenty percent per year. Imports of PL480 foodgrains were important in both provinces throughout the Second Plan despite the continued growth in agricultural output, but rapid growth of domestic manufacturing and in imports of manufactured goods provided enough added supply to improve agriculture's terms of trade. The Third Plan was launched on a note of optimism about the future prospects both in agriculture and in manufacturing industry.

In June 1965, the month before the Third Plan was to begin, the Aid-to-Pakistan Consortium was postponed at the request of the United States. In July and August tensions rose between India and Pakistan, and in September there were open hostilities between the two countries. In the wake of the hostilities, defense expenditures were increased, the prospects for increases in foreign assistance became dimmer, and priorities within the Third Plan were re-arranged. There was a sharp deceleration in the growth of imports and of investment, and a slowdown in the rate of industrial growth domestically as well (from the fifteen percent of the Second Plan to less than ten percent in the Third Plan).¹ Part of the changed priorities in the Third Plan involved a greater

1. The latest generally-available publication detailing the progress the Third Plan made is the April 1968 Mid-Plan Review / 6 /.

concentration on agricultural development, particularly food-grain self-sufficiency, and there was increased emphasis placed on fertilizer imports, the provision of pesticides, and research and development on higher yielding varieties of wheat and rice (based on the Mexican success with wheat and the International Rice Research Institute success with rice) in both East and West Pakistan. Despite bad weather in two years, the progress of the agricultural sector in West Pakistan overall has been remarkable, and the growth rate for the Third Plan in West Pakistan agriculture may be between 4.5 and five percent per year. This success is due to the new and higher-yielding varieties of wheat and rice, to substantial increases in fertilizer consumption, and to the continued private and public investment in irrigation tubewells.

In East Pakistan the progress has been much less marked. Bad weather was a factor, but there has not been the kind of technological breakthrough in plant varieties and in water/fertilizer use in the East that there has been in the West. The growth rate of agriculture in the East may not even equal the rate of population growth in that province during the Third Plan, and the end of the Third Plan will probably see a disappearance of a foodgrain deficit (and perhaps the production of a consistent surplus) in the West with a worsened overall deficit in the East. There has also been a slowdown in the rate of imports of PL480 foodgrains into Pakistan in the Third Plan period, and this, too, has helped to make the food situation in East Pakistan a continuing problem. The political problem of rising food prices in the East has as an interesting counterpoint a political problem of maintaining price supports

for foodgrains in the West due to the success of the new technology. It is with the sketchy background that one turns to the movements in agriculture's terms of trade in the two provinces.

III. Movements in Agriculture's Terms of Trade

In our earlier study, S. Mushtaq Hussain and I explored a variety of weighting schemes for both agricultural and manufactured goods prices. The base year chosen for the weighting systems in all cases was 1959/60, and that base year is used here as well. Since much of the information used in devising the weighting systems was of dubious accuracy, it was an important finding of our earlier study that the different weighting systems tried had relatively little effect on the conclusions reached about the movements in the terms of trade of the agricultural sector, so for the present study I have used one basic set of weights.

The main set of prices we were concerned about in the earlier study, and the set of prices of concern here, is the prices received by agriculture for its marketings of commodities relative to the prices paid by agriculture for the purchases it makes of manufactured goods. That is, the interest is in the net barter terms of trade of agriculture, where the weights are the estimated sales (or marketings) of agricultural output, and the estimated purchases of manufactured goods by the agricultural sector.¹ Two adjustments to the

1. See the Appendix on Data and Method for discussion. The terms of trade computed here will not be the inverse of the manufacturing sector's terms of trade for a variety of reasons outlined in Lewis and Hussain's Appendix on Method [4].

1959/60 weights have been tried as alternatives to recognize truly major shifts (i) in composition of marketings (in West Pakistan where the recent major increase in wheat output apparently has resulted in a greater than proportional increase in marketings), and (ii) in purchases of manufactured goods (fertilizer and machinery in West, fertilizer in East).¹ Otherwise, the 1959/60 weights have been used. The data presented here are three-year

1. See Appendix for details.

moving averages in order to eliminate the year-to-year fluctuations as much as possible. I have included data from 1958 to 1969 in order to examine the decade trend. Index numbers for agricultural and manufacturing prices in East and West Pakistan and for agriculture's terms of trade given in Table I, and the terms of trade for the two Provinces are shown in Figure I.

The movements of relative prices in West Pakistan are more mild than in East, and I shall discuss the former first. Also, the recent "green revolution" in the West has stirred much interest in the question of agricultural prices price supports, and pricing and subsidy policy in that province generally. To a certain extent, the use of the three year averages masks the most recent development in the West, but I have generally felt safer relying primarily on averages for more than one year since fluctuations can be so misleading(although the last three years' data are given separately below). Even so, one can see that there was a slow but steady rise in agricultural prices through the period 1964/67, with relative stability for the past several years taken as an average. Manufacturing prices, however, rose more slowly in the period up to 1963/66 (which was

TABLE I : Index Numbers of Agricultural and Manufacturing Prices and Agriculture's Terms of Trade (Three-year moving averages)

	WEST PAKISTAN			EAST PAKISTAN		
	<u>Agricultural prices</u>	<u>Manufactured prices</u>	<u>AGR/MFG.</u>	<u>Agricultural prices</u>	<u>Manufactured prices</u>	<u>AGR/MFG.</u>
1958/61	101.25	97.87	103.44	107.24	99.15	108.14
1959/62	105.79	99.47	106.37	111.34	100.01	111.41
1960/63	108.53	100.29	108.25	112.36	100.66	111.78
1961/64	109.19	101.90	107.17	101.93	100.57	101.35
1962/65	112.55	103.10	109.15	105.46	100.11	105.37
1963/66	115.46	104.98	110.01	112.91	101.38	111.19
1964/67	121.47	108.37	112.10	129.10	104.67	123.07
1965/68	121.44	111.95	108.46	134.03	108.62	123.41
1966/69	122.44	114.97	106.55	140.79	111.68	126.13

Source: See Appendix on Data

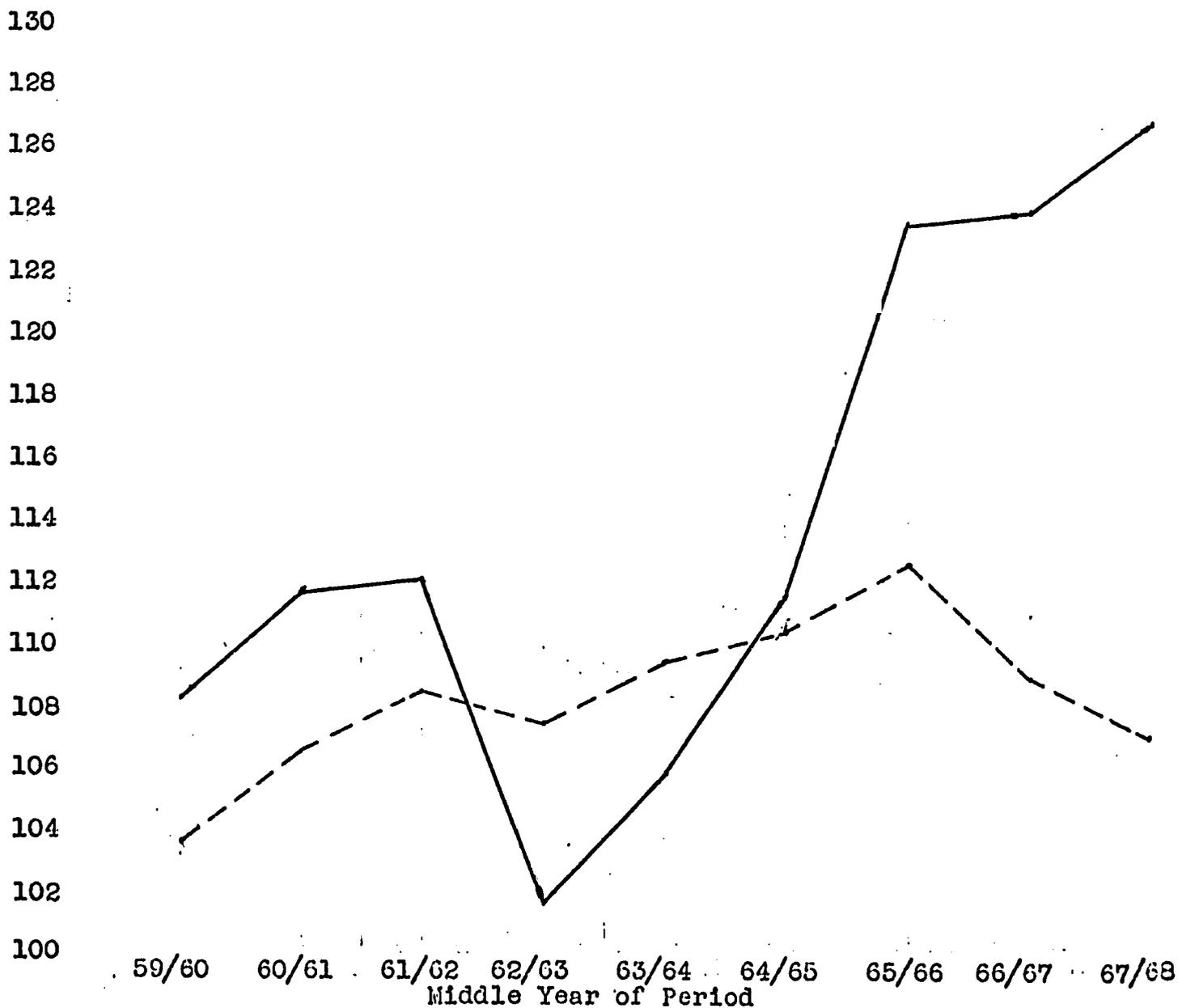
Weights for agricultural prices are estimated marketings of agricultural commodities. Weights for manufactures are estimated purchases of manufactured goods by agriculture. Both are estimated for 1959/60.

FIGURE I

THREE-YEAR MOVING AVERAGES OF
AGRICULTURAL TERMS OF TRADE

E. Pakistan: ———

W. Pakistan: - - - -



the end of the period of extremely rapid industrial growth accompanied by rapid increases in imports), after which manufacturing prices rose somewhat more rapidly (as both the growth of domestic output and the imports of manufactures slowed). The agricultural sector's net barter terms of trade in West Pakistan improved slightly through the period 1964/67, and then declined somewhat. The annual figures for the last three years (1966/7, 1967/8, and 1968/9) show a more marked decline in agriculture's terms of trade: 113.32, 103.85, 102.49.¹ Despite the recent decline in the net barter terms of trade, the income terms of trade for agriculture were probably holding their own or improving, due to the increased production and parti-

1. If higher weights for wheat were used the fall is slightly steeper, since the 1966/67 figure would be four points higher than that shown here, while there is practically no change in the 1968/69 figure.

cularly the increased marketing of major agricultural commodities. The net barter terms of trade of the agricultural sector were in recent years about what they were a decade ago (in terms of domestic prices only). The rapid rate of agricultural growth has been accompanied by a less rapid rate of industrial growth and a decline of imported foodgrains. A continuation of the rapid growth of agriculture and the slowed growth rate in manufacturing could combine to depress the terms of trade further in the future unless export markets to East Pakistan or to the rest of the world are available at a reasonable exchange rate.

There is no easy or convenient basis for comparing the recent movements in agriculture's terms of trade domestically with the terms of trade West Pakistan agriculture might have received had it been able to trade abroad

directly. If world prices of the relevant agricultural and manufactured goods had remained at their 1961/64 levels, the agricultural sector in the last three years would still be receiving about 60¢ worth of manufactured goods for every Dollar's worth of agricultural goods it sold. It appears, however, that world foodgrain prices have softened relative to domestic Pakistan prices, which would imply that West Pakistan farmers were better off than they had been. These comments are shaky, however, and should not be used with confidence. One should also recall, before making welfare judgments based on the net barter terms of trade, that real value added in agriculture was increasing at a rate of over four percent per year over this decade.

The data for East Pakistan, also shown in Table I and Figure I, present a somewhat different picture. Annual fluctuations in prices have always been greater in East than in West Pakistan, but there has been a fairly distinct upward movement of agricultural prices in the past decade, and it has been particularly pronounced in the Third Plan period. Prices of manufactured goods purchased by the agricultural sector, however, were relatively stable from 1958/61 to 1963/66 (when both domestic production and imports of manufactures were growing more rapidly) and rose about ten percent in the next three years (as production and import growth slowed). The combined movements in agricultural and manufactured prices led to fluctuations with no clear trend from 1958/61 to 1963/66, and a relatively sharp improvement (between ten and fifteen percent) in terms of trade of agriculture during the Third Plan period. As mentioned earlier, the years of bad weather and bad crops combined with a lack of strong improvement in agricultural output even in years of good weather in the Third Plan period to produce food shortages and rising prices in East Pakistan during the past several years. One would also suspect that

the shortages of foodgrains and consequent rising prices have been compounded by the efforts of the government to increase development expenditures in East Pakistan since the more than fifty percent increase in development expenditure from 1964/65 to 1968/69 must have added more to the demand for foodgrains than was forthcoming from marketed surpluses plus imports. In other words, improved terms of trade came not from a rapid growth of manufactured goods' supplies but from shortages of agricultural commodities relative to the growth of aggregate demand and the growth of manufactured goods.

So far as the "squeeze" on agriculture in East Pakistan is concerned, it appears that there may have been a more substantial movement toward a "world" price structure in East than in West Pakistan (which is at best a speculation since movements of world prices of the relevant commodities are not studied here). If one assumed no change in the world relative prices of agricultural and manufactured commodities relevant to East Pakistan, however, the fairly sharp upward movement in agricultural prices relative to manufactured prices would have left East Pakistan farmers receiving about 75¢ of manufactured goods per Dollar of agricultural goods in the 1966/69 period, while they received less than 60¢ of manufactured goods per Dollar of agricultural goods in the 1961/64 period. The recent fall of world grain prices, however, would appear to make the movement back in favor of agriculture even more sharp.

I stated earlier that there might be some bias to the price indices and terms of trade calculated using 1959/60 weights, since it is clear that there has been a much greater than proportional increase in purchases of machinery

(in the form of tubewells) in West Pakistan, and, again in West Pakistan, a very substantial increase in the quantity of wheat marketed in the past two years particularly. An adjustment was made in the weighting to take account of these particularly important changes in the weighting of price indices to see if there was any noticeable change in the behavior of each index in each province. The result of using these changed weights, as explained in the Appendix, was no more than a two-point change in any of the terms of trade figures given in Table I, even though the weighting changes tried were quite large.

Beacuse of the current interest in the incentives for the adoption of new technologies and the related importance of purchased inputs of manufactured goods by the agricultural sector, a subset of price indices was constructed using the prices of crops relative to the prices of intermediate and investment and related goods. The crop subsector of agriculture has been the focus of the technical improvements in research and development, and, in addition, the livestock subsector has the least reliable data. Also, since the largest share of purchases of manufactured goods by the agricultural sector are consumer goods, it would be possible for the overall terms of trade index to obscure a significant movement of agricultural prices relative to the prices of purchased inputs and capital goods and, thus, obscure movements in the profitability of investing in new techniques. The results of making the weighting adjustments mentioned in the last paragraph and of including only crop subsectors compared with prices of manufactured intermediate and investment and related goods are shown in Table II. There are no departures

TABLE II : Index Numbers of Prices of Crops, Manufactured Intermediate and Investment Goods Purchased by Agriculture, and Ratios of the Two Indexes (Three-year moving averages)

	WEST PAKISTAN			EAST PAKISTAN		
	<u>Crops</u>	<u>Mftrd. Inter- mediate + In- vestment goods</u>	<u>Ratio: Crops/ Mfrs.</u>	<u>Crops</u>	<u>Mftrd. Inter- mediate + In- vestment goods</u>	<u>Ratio: Crops/ Mfrs.</u>
1958/61	102.68	98.63	104.13	108.48	102.23	106.69
1959/62	107.29	100.01	107.29	112.43	104.61	108.31
1960/63	110.70	101.54	109.10	113.65	105.65	108.49
1961/64	111.76	104.20	107.28	102.41	105.52	97.09
1962/65	115.79	105.48	109.76	106.13	104.30	101.87
1963/66	118.56	107.11	110.72	113.90	105.77	107.72
1964/67	126.53	109.62	115.63	130.50	106.82	121.92
1965/68	125.71	113.58	110.78	135.13	110.11	122.53
1966/69	125.49	119.37	105.66	141.31	113.49	124.38

Source: See Appendix on Data

Weights for crops are estimated marketings in 1959/60. In West Pakistan the weight for wheat was increased ten percentage points for the last four years to reflect the increased importance of wheat marketings in the Third Plan. Weights for manufactured goods are estimated purchases by the agricultural sector. Weights for fertilizer in both provinces and machinery in West Pakistan were adjusted as explained in the text.

of any index in Table II from any comparable index in Table I that I would call particularly significant, with the possible exception of a somewhat more rapid increase in the price index of intermediate and investment and related goods in West Pakistan, with a consequent more pronounced decline in agriculture's terms of trade after the large increases in output in the last few years. However, the basic data are sufficiently crude to make any such fine distinctions somewhat suspect at best.

IV. Conclusion

The modest purpose of this paper has been to examine the recent changes in relative prices facing the agricultural sector in Pakistan in light of developments in production and aid flows in the past five years. The basic conclusion for West Pakistan is that, despite rather substantial structural changes in the agricultural sector and the economy as a whole over the five year period, there was little sustained change in the net barter terms of trade facing agriculture. There was a slight improvement in agriculture's net barter terms of trade in the beginning of the Third Plan period, presumably as a consequence of weather difficulties and reduced PL480 shipments, and a slight decline in the net barter terms of trade in the years that have marked the "green revolution" in West Pakistan.

The situation in East Pakistan is somewhat different from that in West, since East Pakistan has not sustained the rate of agricultural development that the West has. As a result, the terms of trade have moved fairly substantially in favor of the agricultural sector in East Pakistan in recent years in the face of a continued expansion of demand for food and a series of crop failures and

inability to induce a real agricultural revolution. Even so, however, the agricultural sector in the East probably still receives less in domestic markets in real terms than it might receive if it could trade in international markets. It would be unfortunate if the correction of the relative price structure toward one more reflective of international opportunity costs continued to come about because of a failure of the agricultural sector to grow adequately in the poorer province.

APPENDIX ON DATA AND METHOD

The price indices for each commodity and commodity group were taken from the June 1969 issue of the CSO Statistical Bulletin. The data for 1968/69 were the ten month figures given in that issue, and these were used to represent the entire year.¹

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1. This introduces little problem into the accuracy of the calculations, since it would take a change of the price index of the last two months of almost twenty percent to affect the three year moving averages reported in the text by as much as one percent.

The weights used for each commodity group were taken from Appendix B of Lewis and Hussain [4]. The weights used for agricultural commodities were the estimated marketings of agricultural commodities in East and West Pakistan in 1959/60. As mentioned in the text, an adjustment was made for the last four years to account for the increased production (and much more than proportional increase in marketing) of wheat in West Pakistan, but even that adjustment did not materially affect the results of the calculations.²

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2. The weight for wheat was increased by ten percentage points for the last four years.

The weights for manufactured goods were the estimated purchases of manufactured commodities by the agricultural sector. The particular set of weights used for purchases was called "Alternative 2" in Lewis and Hussain,

and it was chosen since it gave relatively higher weights to intermediate and investment and related goods purchases than did some other weighting schemes tried, and this reflects an increasing modernization and commercialization of agriculture which is believed to be taking place in Pakistan. As shown by the other alternative tried in the text, however, a different weighting scheme would not greatly affect the calculations. There were two specific additional corrections made in the weightings in West Pakistan to account for the increased purchases of fertilizers and the increasing investment in private tubewells in the years since 1960. Using data from the Planning Commission which estimate fertilizer use and number of private tubewells installed, and recognizing the growth of agricultural income over the same period, the weights for purchases of fertilizer and machinery were increased annually until the relative weights were tripled for machinery and sextupled for fertilizer in West Pakistan. In East Pakistan, only the fertilizer weight was increased (by tenfold) over the course of the period, based again on Planning Commission estimates of fertilizer consumption in East Pakistan. Again, these adjustments in weights had little effect on the price index numbers for manufactured goods.

While the weights chosen probably give a good estimate of the changes in relative prices as seen by the agricultural sector, they are almost certainly unrepresentative of the terms of trade as seen by the manufacturing sector, since manufacturing price weights for output or sales by industrialists or agricultural price weights for purchases by the manufacturing sector would be very different from any of the possible sets of weights used to examine the

terms of trade as seen by agriculture. For a detailed explanation the reader is referred to Lewis and Hussain, the Appendix of Method and Appendices B and C. Annual data on price indices for the last five years are given in Table A-I here.

TABLE A-I. Annual Data on Price Indices for Manufactured and Agricultural Goods 1964/5 to 1968/9

	<u>West Pakistan</u>			<u>East Pakistan</u>		
	<u>Agric Prices</u>	<u>Mfg Prices</u>	<u>Agr ÷ Mfg Prices</u>	<u>Agric Prices</u>	<u>Mfg Prices</u>	<u>Agr ÷ Mfg Prices</u>
1964/65	118.99	103.67	114.78	114.58	99.56	115.09
1965/66	116.96	108.09	108.21	125.40	105.73	118.60
1966/67	128.45	113.35	113.32	147.33	108.71	135.53
1967/68	118.82	114.42	103.85	129.35	111.42	116.09
1968/69	120.05	117.13	102.49	145.70	114.92	126.78

Source: See Appendix Text. Data for earlier years can be found in Lewis and Hussain / 4 /. Weightings for agricultural prices are estimated marketings in 1959/60. Weightings for manufactured prices are estimated purchases by agriculture in 1959/60, called "Alternative 2" in Lewis and Hussain.