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INTERSECTORAL TERMS OF TRADE AND MARKETED SURPLUS
OF AGRICULTURAL PRODUCE, 1951-52 TO 1965-66

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This study estimates and analyses the terms of trade between the agricultural and the non-agricultural sectors of the Indian economy during the period 1951-52 to 1965-66. The analysis has been carried out in relation to the marketed surplus of agricultural products in general. The pattern of intersectoral purchases has also been examined. On the basis of this analysis, some inferences are drawn regarding the contribution of the agricultural sector to economic development as also its participation in the developmental benefits.

II

In this paper, the agricultural sector includes crop and animal husbandry; and all that is not agricultural in that context is termed the non-agricultural sector. While the net barter terms of trade between the sectors are derived as a ratio of the export-import prices (i.e., the ratio of prices received by agriculture to the prices paid by agriculture), the income terms of trade are the result of correcting the commodity terms of trade for changes in the volume of 'exports' (i.e., in the volume of the surplus marketed by the agricultural sector to the domestic non-agricultural sector).

Products are exchanged between the sectors for intermediate and final consumption. "Export" prices could be represented by a composite index of prices of all agricultural

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* Extract. Economic and Political Weekly, Vol. IV, No.26, Review of Agriculture, June 28, 1969.

Barter terms of trade = $\frac{\text{prices received by agriculture}}{\text{prices paid by agriculture}}$

? Income terms of trade = $\frac{\text{volume of surplus marketed by agriculture}}{\text{volume of surplus marketed to agriculture}}$

products purchased by the non-agricultural sector for intermediate and final consumption. Similarly, "import" prices could be indicated by a composite index of prices of all non-agricultural products purchased by the agricultural sector for intermediate and final uses. Thus, the time-series of the prices of these individual products have to be noted for the period 1951-52 to 1965-66 and the value of the intersectoral purchases of the relevant commodities estimated for the base year, in order to be used as 'weights' in the construction of the composite indices of the prices of the basket of goods purchased by each sector from the other sector. For purposes of the construction of these composite price indices, the year 1960-61, being a recent one, would be reckoned as the base year. It is also proposed to estimate the value, at constant prices, of intersectoral purchases at two points of time i.e., 1951-52 and 1960-61 in order to examine the direction and magnitude of change in the intersectoral seepage of wants. Further, with a view to constructing the income terms of trade between these sectors, it is necessary to estimate the time-series of the values, at constant prices, of the marketed surplus of the agricultural sector to the domestic non-agricultural sector during 1951-52 to 1965-66.

III

ESTIMATES OF MARKETED SURPLUS OF AGRICULTURE, 1951-52 TO 1965-66

(1) Marketed Surplus of Agricultural Products to Non-Agriculture - For Final Use

A. VALUE AT CURRENT PRICES

At any point of time, the "ex-post" or realised demand of the non-agricultural sector for agricultural products (net of imports) can be taken to be the "effective

supply" or the marketed surplus of the domestic agricultural sector.¹ This fact has been made use of in the estimation of the value of purchases for final use by non-agriculture from agriculture.

The time-series of estimates of marketed surplus of agricultural products to non-agriculture for final use have been derived by combining the national income data published by the Central Statistical Organisation² (CSO) with the consumer expenditure data published by the National Sample Survey³ (NSS).

The following are the major steps involved in the estimation.

(a) From the national income data published by the CSO, the time-series of values of consumer expenditure at current prices have been obtained using the following national accounting relationships. i.e.

$$(y_f - y_g) + y_r + y_m + y_t + y_k = y_p \quad \dots (1)$$

$$y_p - t - u - s_h = c_p \quad \dots (11)$$

where y_f = net domestic product at factor cost
 y_g = income from domestic product accruing to government
 y_r = national debt interest
 y_m = earned income from abroad
 y_t = transfer payments
 y_k = net private donations from abroad
 y_p = private income
 t = direct taxes including corporation tax
 u = undistributed profits of the corporate sector
 s_h = savings of the household sector
 c_p = private consumer expenditure

(b) The NSS has so far published reports on sixteen rounds of survey of consumer expenditure. One could recombine⁴ these rounds of survey to represent the financial years 1951-52 to 1966-67.

The NSS gives the pattern of consumer expenditure in rupees per person for a period of thirty days by twelve major categories⁵ of consumption and by monthly per capita expenditure classes, separately for rural and urban areas. For purposes of our study, the items foodgrains (or cereal and cereal substitutes), milk and milk products, meat, eggs and fish and other food are included under agricultural products, while the rest of the items constitute the non-agricultural products.

(c) It is then assumed that (i) the pattern of consumer expenditure observed by the NSS in the rural areas is representative of that obtaining in the agricultural sector and in the less organised sub-sectors of the non-agricultural sector, (viz., forestry, fishery, small enterprises and construction) and (ii) the pattern observed by the NSS in the urban areas is true of the rest of the non-agricultural sector (i.e., constituted by the sub-sectors mining and quarrying, factory establishments, services, etc.).⁶

(d) In order to blow up the NSS estimates of per capita consumer expenditure in the agricultural and the non-agricultural sectors, the estimates of population by the sectors agriculture, organised sub-sectors of non-agriculture and less organised sub-sectors of non-agriculture have been derived.⁷

Using these sectoral estimates of population and the estimates of per capita expenditure in the different sectors on the agricultural and non-agricultural products and assuming, as already mentioned, that the rural pattern of consumer expenditure applies to both the agricultural sector and the less

organised sub-sectors of the non-agricultural sector and that the urban pattern refers to the rest of the non-agricultural sector, the value, at current prices, of the total expenditure of the economy and of the entire non-agricultural sector on agricultural products had been calculated for each of the years 1951-52 to 1965-66.

(e) The time-series of the percentage (thus calculated from the NSS data) of expenditure on agricultural products by the non-agricultural sector to the economy's total consumer expenditure have been applied to the estimate of private consumer expenditure in the respective years. This resulted in the final and corrected estimates of the value, at current prices, of the expenditure of the non-agricultural sector on agricultural consumption products in each of the years 1951-52 to 1965-66. However, these are gross of imports (from other countries) of agricultural products purchased by the economy for final use. The value of imports⁸ of the economy of cereals, fruits and vegetables (which are the agricultural products imported for final use) have been assumed to have been purchased and used solely by the non-agricultural sector and hence deducted from that sector's total expenditure on agricultural products.⁹ This yields us the estimates, at current prices, of the non-agricultural sector's purchases of the domestically produced agricultural products for final consumption. In the ex-post sense, these estimates would be taken to represent the value at current prices of the marketed surplus of agricultural products to the domestic non-agricultural sector, for final use.

B. VALUE AT CONSTANT (1960-61) PRICES

Further, the time-series of the value of the marketed surplus of agricultural products for final use have been

deflated with the composite index number of wholesale prices¹⁰ paid by the non-agricultural sector to agriculture for the purchase of products for final use. (The methodology of construction of this composite index number is detailed in a subsequent section. This resulted in the value at constant (1960-61) prices of the marketed surplus of agricultural products for final use by the non-agricultural sector during 1951-52 to 1965-66.

(ii) Marketed Surplus of Agricultural Products to Non-Agriculture ~~For~~ Intermediate Use

A. VALUE AT CURRENT PRICES

The products that are bought by the non-agricultural sector from the agricultural sector for intermediate use have already been identified. Assuming that (a) the entire production in each case¹¹ is sold out to the non-agricultural sector for intermediate use either in the manufacturing or in the processing industries and (b) that the commodities that are exported out of the country, first come to the domestic non-agricultural sector for processing and are exported subsequently from the non-agricultural sector, the value, at current prices, of production in 1960-61 of each of these agricultural products¹² have been projected backwards and forwards to cover the entire period of 1951-52 to 1965-66. The estimates, which are in effect the value at current prices of agricultural products marketed to the domestic non-agricultural sector for intermediate use, are obtained.

B. VALUE AT CONSTANT (1960-61) PRICES

The corresponding estimates at 1960-61 prices have been derived by projecting the current value for 1960-61 backwards and forwards with either the indices of production of the respective crop or indicators of production (for e.g.,

cattle population for cattle hides) as the case may be.

IV

ESTIMATES OF INTERSECTORAL PURCHASES OF INDIVIDUAL
COMMODITIES FOR INTERMEDIATE AND FINAL USES, 1951-
52 AND 1960-61

In order to be able to measure the direction and order of change in the intersectoral demand for products, the intersectoral purchases of individual products for intermediate and final uses, have been estimated for two years 1951-52 and 1960-61 at constant (1960-61) prices. Incidentally, it may be noted that the estimates for 1960-61 will be used as "weights" in the construction of the composite indices of the agricultural and the non-agricultural prices.

(1) Purchases by Non-agriculture from Agriculture -
Individual Commodities (Value at 1960-61 Prices)

A. FOR INTERMEDIATE USE

These have been estimated in the previous section, and in fact for each of the years 1951-52 to 1965-66.

B. FOR FINAL USE

While in the previous section we had estimated the value, at current prices, of total purchases of agricultural products by non-agriculture for final consumption, we have now to break these estimates under individual commodity heads. For each of the two years 1951-52 and 1960-61, with our previous assumption about the tastes of the sub-sectors of the non-agricultural sector and with the help of the population estimates in the sub-sectors of the non-agricultural sector, the NSS estimates¹³ of per capita expenditure on the individual agricultural products by the rural and urban sectors, have

been blown up to yield the estimates of non-agricultural expenditure on these individual agricultural products. The ratio of this estimated expenditure by the non-agricultural sector on the individual agricultural products, to that sector's total expenditure (based again on NSS data alone) on all these products put together, was applied to the corrected and final estimates of expenditure of non-agriculture on agricultural consumption products. This has been done for two years 1951-52 and 1960-61. These estimates have been then netted of the imports of the respective commodities.¹⁴

(ii) Purchases by Agriculture from Non-agriculture - Individual Commodities (Values at 1960-61 Prices)

A. FOR INTERMEDIATE USE

The value at current prices of the purchases of individual commodities by agriculture from non-agriculture for intermediate use in 1951-52 and 1960-61 have been taken from the publications of the CSO¹⁵, and have further been netted of the imports¹⁶ in the respective years.

B. FOR FINAL USE

For each of the two years 1951-52 and 1960-61, the percentage of agriculture's expenditure on each of the individual products purchased from non-agriculture for final consumption, to the economy's total consumer expenditure was estimated with the help of the NSS data and the sectoral estimates of population. These percentages were then applied to the estimates of private consumer expenditure in the respective years, and the value (gross of imports)¹⁷ on agriculture's purchases from non-agriculture for final use derived for each of the two years 1951-52 and 1960-61.

Assuming that the imports of the respective products were consumed by the two sectors in the same ratio as their

total value (gross of imports), the value of agriculture's purchases from domestic production of non-agricultural products for final use was estimated for 1951-52 and 1960-61.

V

COMPOSITE PRICE INDICES AND TERMS OF TRADE

The wholesale price indices for the period 1951-52 to 1965-66 of each of the commodities bartered between agriculture and non-agriculture have been noted from the Economic Adviser's series of Index Numbers of Wholesale Prices¹⁸ and expressed with 1960-61 as the base year. Then, using the actual value of the purchases of individual commodities by each sector from the other sector in 1960-61 as "weights", the following composite price indices¹⁹ have been formed.

A. Prices Received by Agriculture, i.e. Prices of Agricultural Products Purchased by Non-agriculture for (i) Intermediate Use (ii) Final Use; and (iii) All Uses.

B. Prices Paid by Agriculture, i.e., Prices of Non-Agricultural Products Purchased by Agriculture for (i) Intermediate Use; (ii) Final Use; and (iii) All Uses.

Using these indices, the net barter terms of trade of products for (a) intermediate use, (b) final use and (c) all uses have been estimated (vide Table 11). Further, in order to get a correct idea of the purchasing power of the agricultural sector, the indices of the net barter terms of trade have been corrected with the value (at constant prices) of the actual "exports" of the agricultural sector to the domestic non-agricultural sector for all uses. The income terms of trade thus derived are given in Table 11.

TABLE 11*: INDICES OF NET BARTER AND INCOME TERMS OF TRADE
(1960-61 = 100)

Year	Net Barter Terms of Trade			Income Terms of Trade
	Of Inputs	Of Output	Of All Products	
(1)	(2)	(3)	(4)	(5)
1951-52	121.41	96.61	100.72	67.07
1952-53	87.46	105.01	99.13	72.41
1953-54	97.87	106.88	103.74	88.40
1963-64	90.38	101.33	97.39	106.03
1964-65	99.96	113.56	108.66	124.27
1965-66	105.58	117.95	114.47	116.26

Note: Figures for 1954-55 to 1962-63 are not reproduced here.

VI

On the basis of the time-series estimates of marketed surplus of agricultural produce, intersectoral purchases of products and terms of trade, we may study the performance of Indian agriculture during the three Plans. For this purpose, the time rates of growth of some of the relevant variables have been calculated by fitting an exponential function of the form $y = ab^t$, where t indicates time and y , the index of the particular variable (vide Table 12).

* Tables 1 to 10 are not reproduced here.

TABLE 12 : TIME RATES OF GROWTH

S.No.	Particulars : Indices	Per Cent Rate of Growth
<u>Prices Received by Agriculture</u>		
(1)	Prices of agricultural products purchased by non-agriculture for intermediate consumption (aPni)*	2.92
(2)	Prices of agricultural products purchased by non-agriculture for final consumption (aPnf)*	3.23
(3)	Prices for agricultural products purchased by non-agriculture for all uses (aPn)*	3.14
<u>Prices Paid by Agriculture</u>		
(4)	Prices of non-agricultural products purchased by agriculture for intermediate consumption (nPni)*	3.01
(5)	Prices of non-agricultural products purchased by agriculture for final consumption (nPaf)*	2.57
(6)	Prices of non-agricultural products purchased by agriculture for all uses (nPa)*	2.62
(7)	Net barter terms of trade : intermediate products	0.025
(8)	Net barter terms of trade : final products	0.65
(9)	Net barter terms of trade : all products	0.51
(10)	Income terms of trade of all products	3.40
(11)	Marketed surplus of agriculture (at 1960-61 prices)	2.90
(12)	Agricultural production ^{\$}	2.74

* For the sake of simplicity in reporting, we shall refer to these prices by the short forms given against them in brackets.

^{\$} Government of India, Ministry of Food and Agriculture, Index Numbers of Agricultural Products (Agricultural year ended June 1950 = 100).

(1) Behaviour of Prices : Agricultural and Non-agricultural.

A. TRENDS

It may be noted from Table 12 that all prices, received and paid by agriculture, irrespective of the nature of use, show an upward trend during the period of our study, though at differential rates.

The annual rate of increase of aPnf (3.23 per cent) is faster than that of nPaf (2.57 per cent); while in the case of the products for intermediate use, we observe the reverse case of nPai rising faster (i.e., at 3.01 per cent per annum) than aPni (2.92 per cent). In spite of this latter phenomenon, the index of aPn has registered a faster annual rate of growth (3.14 per cent) than nPa (2.62 per cent). Thus during this period of inflationary trends, the prices of agricultural products purchased by non-agriculture have, on the whole, moved faster than the prices of non-agricultural products purchased by agriculture.

The above results are naturally reflected in the movements of the net barter terms of trade between the two sectors. Whereas the net barter terms of trade in products for intermediate use have been deteriorating²⁰ against agriculture, those with respect to products (a) for final use and (b) for all uses, have been improving and showing a rising trend. It is, however, noteworthy that the rates of deterioration in the first case and of improvement in the latter cases are marginal.

The net barter terms of trade, being just an index of export-import prices, may not convey much meaning in the context of intersectoral comparisons. On the other hand, if these commodity terms of trade are corrected for change in the volume of "exports" by the agricultural sector to the non-agricultural sector, the income terms of trade thus derived,

would indicate the movements in the purchasing power of the agricultural sector in terms of non-agricultural products. It is obvious that a deterioration in the commodity terms of trade need not always reduce agriculture's purchasing power, if only the marketed surplus of agriculture increases more than the unfavourable movements in the net barter terms of trade. From Table 12 it may be observed that the income terms of trade between agriculture and non-agriculture have been improving in favour of agriculture at a fairly high annual rate of 3.40 per cent.

It would be interesting to examine the trends in intersectoral prices from a different viewpoint. The trends of the prices received by agriculture from non-agriculture (aPn) and of the prices paid by agriculture for non-agricultural products for intermediate use (nPai) are not widely different from each other. While the annual rate is 3.14 per cent in the first case, it is only 0.13 less in the latter case. Hence one could maintain that during 1951-52 to 1965-66, though agricultural prices have been rising both absolutely and in relation to the non-agricultural prices, the rate of increase thereof seems to be just balancing that in the cost of the basket of the non-agricultural inputs in the agricultural sector. And yet, it is encouraging to find that the value at 1960-61 prices, of non-agricultural inputs in agriculture has risen from Rs 302.48 crores in 1951-52 to Rs 420.47 crores in 1960-61 (i.e., by as much as 39 per cent). This increase in the non-agricultural inputs in agriculture has been in spite of the fact that the productivity of these inputs increased only slightly from Rs 19.7 (at 1960-61 prices) in 1951-52 to Rs 20.6²¹ in 1960-61. This shows the extent to which the spirit of modernisation of agricultural production has permeated the agricultural sector. This becomes more evident when we observe that inputs such as electricity, diesel oil, pesticides and

insecticides which were non-existent in 1951-52 have been adopted by 1960-61; while there has been a twentyfold increase in the quantum of fertilisers used.

As against this comparison of the non-agricultural input-agricultural output prices, we find that while the prices of non-agricultural products, in general, have been rising during this period, the rate of increase has not been even commensurate with that in the cost of the basket of the agricultural products purchased by the non-agricultural sector for intermediate use. The annual rates of increase are 2.62 per cent and 2.92 per cent, respectively. In effect, the agricultural sector seems to be enjoying an improving position, in this context of comparison of the intersectoral input-output prices.

B. FLUCTUATIONS

Having thus examined the trends in agricultural and non-agricultural prices, we may pause to observe the nature and relationship of fluctuations in these prices. One could detect two phases, i.e., (i) 1951-52 to 1955-56, a period of falling prices and (ii) 1955-56 to 1965-66, a phase of rising prices. In fact, this latter period has been one of continuously rising prices in the case of almost all products. There has been, however, a slump in the prices of the agricultural products purchased by non-agriculture for intermediate use during two years, i.e., 1961-62 and 1962-63; while in 1961-62 the prices of non-agricultural products bought by agriculture for final use declined.

In order to find out the extent to which the fluctuations in agricultural and non-agricultural prices are related, a simple correlation between (a) aP_{ni} and nP_{ai} (b) aP_{nf} and aP_{af} and (c) aP_n and nP_a were calculated after eliminating the trend in each case. The results are given below.

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CORRELATION OF FLUCTUATIONS IN PRICES RECEIVED BY AGRICULTURE
AND PRICES PAID BY AGRICULTURE

S.No.	Particulars	Level of Significance (Per cent)	
(1)	Products for intermediate use (aPni and nPai)	0.725	1
(2)	Products for final use (aPnf and nPaf)	0.510	10
(3)	Products for all uses (aPn and nPa)	0.925	1

There is a positive and significant correlation between the prices paid by agriculture and those received by agriculture in the case of products for (a) intermediate (b) final and (c) all uses; though for (b), the magnitude of the coefficient is not high. Thus the fluctuations in these two sets of prices are related.

(ii) Terms of Trade, Agricultural Production and Marketed Surplus.

We find vide table 12 that the annual rate of increase in the value of marketed surplus at constant prices has been fast both absolutely and relatively to (a) terms of trade and (b) agricultural production, though both marketed surplus and agricultural production have expanded at a less fast rate than the index of prices received by the agriculturists. Thus while the net barter terms of trade have improved at a rate of only 0.51 per cent per annum, marketed surplus at constant prices has increased at a much higher annual rate of 2.90 per cent. Further the rate of growth of marketed surplus is higher than that of agricultural production (2.74 per cent) thus showing that during this period of fifteen years, the proportion of agricultural production marketed to non-agriculture has

been increasing. While in 1951-52, the agricultural sector was marketing 39 per cent of its output, in 1965-66, this percentage rose to 44. All the same, agricultural production and marketed surplus have shown a secular inelasticity with respect to the index of agricultural prices.

In order to examine the relationship of marketed surplus to terms of trade and agricultural output, a multiple regression equation of the form $M = a + bP + cO + dt$ was fitted to the time-series data (where M indicates the index of marketed surplus, P the net barter terms of trade, O the index of agricultural output and t time). The equation worked out to be

$$M = 60.9887 - \overset{@}{.3568} P + \overset{*}{.6802} O + \overset{**}{1.1658} t$$

(.2767) (.2178) (.6219)

figures in brackets indicate standard errors

@ - not significant at 10 per cent

* - significant at 1 per cent

** - significant at 10 per cent

R = .9141

A log-linear relation was also worked out between marketed surplus on the one hand and terms of trade, agricultural output and time on the other. The estimated equation was

$$\log M = 1.5451 - \overset{@}{0.2621} \log P$$

(.2304)

$$+ \overset{*}{.4428} \log O + \overset{**}{.1133} \log t$$

(.1852) (.0300)

figures in brackets indicate standard errors.

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- @ - not significant at 10 per cent
- * - significant at 5 per cent
- ** - significant at 1 per cent
- $R^2 = .9482$

It may be observed that the net regression coefficient of terms of trade with respect to marketed surplus is not statistically significant both in the linear and in the non-linear forms of relationship. On the other hand, marketed surplus is positively and significantly related to agricultural output, though the elasticity of marketed surplus with respect to total output is less than unity.

(iii) Pattern of Intersectoral Product Flows

So far we examined the extent of (a) the participation of agriculture in the benefits of economic development (i.e., in the form of improving terms of trade vis-a-vis non-agriculture) and (b) the contribution of agriculture to the development efforts (i.e., in terms of the quantum of the surplus marketed to the non-agricultural sector). The results observed therein could be further supplemented by an analysis of the pattern of intersectoral purchases of individual products for intermediate and final uses.

At both points of time, i.e. 1951-52 and 1960-61, the value (at constant prices) of the purchases by agriculture from non-agriculture exceed that of the sales by agriculture to the other sector, though the excess itself had reduced sufficiently by 1960-61. Thus, while in 1951-52 the agricultural sector was purchasing from non-agriculture 27.2 per cent more than it was selling to non-agriculture, by 1960-61 this relative difference had dwindled to 1.9 per cent. This is reflected in the fact that the percentage

increase in the value of sales by agriculture to non-agriculture (50.2 per cent) is more than double that in the purchases made by agriculture from non-agriculture (20.4 per cent).

In the case of agriculture as well as non-agriculture and at both points of time, a higher percentage of expenditure of each sector is spent on the other sector's products for final use vis-a-vis those for intermediate use. Thus in 1951-52 of her total expenditure on all non-agricultural products, agriculture spent 89.84 per cent on those for final use. Though this percentage decreased to 88.27 in 1960-61, it was still relatively higher in comparison to the percentage of expenditure on non-agricultural products for intermediate use. As against this, in 1951-52 and in 1960-61, the expenditure by non-agriculture on agricultural products for final use constituted respectively 58.70 per cent and 62.48 per cent of her total expenditure on all agricultural products; and was thus higher in relation to that on the agricultural products for intermediate use. It is noteworthy that while in the case of agriculture, the percentage of her expenditure on non-agricultural products for final use vis-a-vis those for intermediate use has declined, though marginally, the percentage of non-agriculture's expenditure on agricultural products for final use has increased quite substantially, relatively to those for intermediate use. This is due to the fact that the purchases by agriculture of non-agricultural inputs have risen by 39 per cent as against an increase of only 18.3 per cent in those of non-agricultural products for final use; whereas in the case of the non-agricultural sector, just the reverse has taken place, i.e., this sector's purchases from agriculture for final consumption have increased by 60 per cent in comparison to an increase of 36 per cent in those for intermediate use.

As we had observed earlier, in agriculture there has occurred an intensification of the use of fertilisers as also the introduction of new non-agricultural inputs such as pesticides, insecticides, diesel oil and electricity. On the consumption side, there has been a hundred per cent increase in sugar, while the purchases of edible oil and clothing have respectively expanded by 53 per cent and 46 per cent. However, there has been only a marginal rise in the consumption of non-food items.

VII

The results of this study may be summed up as follows:

(1) During the period of the three five-year Plans, all prices received and paid by agriculture, irrespective of the nature of the product use show an upward trend, though at differential rates. In general, prices received by agriculture have risen at a faster annual rate than those paid by agriculture, and yet the consequent secular improvement (in favour of agriculture) in the net barter terms of trade is marginal. The income terms of trade have registered a significant rate of increase thus indicating the improved purchasing power of the agricultural sector for non-agricultural commodities. While the rate of rise in the prices received by agriculture has compensated that in the prices that agriculture has had to pay for non-agricultural inputs, the cost of agricultural inputs for the non-agricultural sector has increased at a faster rate than the prices paid by agriculture for all non-agricultural products.

(2) The contribution of agriculture to the growth of the economy is encouraging. On the demand side, the decade 1951-52 to 1960-61 has witnessed a rise in the total purchases by agriculture from non-agriculture. During this period, more than half of the increase in the use of non-agricultural inputs in agriculture was due to the larger purchases of fertilisers and the introduction of new inputs, such as pesticides, insecticides, diesel oil and electricity. It is noteworthy that this refers to a period prior to the inception of the new agricultural strategy. However, the insignificant increase in the consumption by agriculture of non-food items including education, conveyance, durable and semi-durable goods indicates a certain lack of momentum in the diversification of consumer demand in this sector. But this phenomenon is modified by the enhanced expenditure on other non-agricultural products.

(3) On the supply side, agricultural production, total and marketed has registered a secular growth, slower than the prices received by agriculture but faster than the improvement in the net barter terms of trade. The degree of monetisation in the agricultural sector has increased during these fifteen years. Abstracting from trends, it is noted that the elasticity of marketed surplus with respect to agricultural output, though less than unity, is positive and significant.

NOTES

- 1 The estimates would be underestimates of the total marketed surplus of agriculture to the extent that they exclude the value of agricultural exports to other countries. However, in the context of agricultural products for final use, exports from India are not substantial.
- 2 Government of India, Central Statistical Organisation (CSO), Estimates of National Income.
- 3 Government of India, Cabinet Secretariat, Reports of the National Sample Surveys of Consumer Expenditure (NSS). It is true that the National Sample Survey has been providing continuous reports on the pattern of consumer expenditure in the rural and urban sectors of the economy by individual commodities and by per capita expenditure levels. However, if one blows up the NSS estimates, they do not seem to be consistent with the national income data published by the CSO independently. At the same time, there is no other source to which one could take resort, for the pattern of consumer expenditure. It is, therefore, decided here to derive the estimates of private consumer expenditure in the economy from the national income data published by the CSO, and apply the pattern of consumer expenditure calculated on the basis of the NSS data to those derived estimates of private consumer expenditure.
- 4 For example, the Fourth Round refers to April-September, 1952. We have assumed that the results of the Fourth Round shall be true of the entire financial year 1951-52. The period of the NSS Survey and the year to which the information has been taken to correspond in this paper, are given in the following table:

Round of Survey	Period of Survey	Year to which the Information Has Been Taken to Correspond to, in This Paper
4th	Apr 52 - Dec 52	51-52
5th	Dec 52 - Mar 53	52-53
7th	Oct 53 - Mar 54	53-54
8th	July 54 - Mar 55	54-55
10th	Dec 55 - May 56	55-56
11th &		
12th	Aug 56 - Aug 57	56-57
13th	Sep 57 - May 58	57-58
14th	July 58 - June 59	58-59
15th	July 59 - June 60	59-60
16th	July 60 - Aug 61	60-61

The latest round of survey for which published report is available refers to 1960-61. It is assumed that for the subsequent years viz., 1961-62 to 1965-66, the pattern of consumer expenditure that prevailed in 1960-61 was generally unchanged.

- 5 The following are the categories: (1) foodgrains*; (2) milk and milk products; (3) edible oil; (4) meat, egg and fish; (5) sugar; (6) salt; (7) other food items; (8) clothing; (9) fuel and light; (10) rent; (11) taxes; and (12) miscellaneous.

* From the fourteenth round onwards, the term "foodgrains" has been replaced by "cereals and cereal substitutes".

- 6 There is precedence to the making of such assumptions about the consumer tastes in the sectors. See Desai, Padma: "A Short-Term Planning Model for the Indian Economy", Review of Economics and Statistics, Vol. XLIII, May 1961. Also her unpublished Ph.D. Thesis: "A Short-Term Planning Model for the Indian Economy", Thesis submitted to Harvard University.
- 7 Firstly, the geometric rates of growth of the entire population, the urban population and the rural population were worked out separately for each of the periods 1951-61 and 1961-65 with the help of the 1951 census data, the 1961 census data and the projected population estimates for 1966 (Government

of India, Office of the Registrar General: (i) Census of India 1951 and 1961 (ii) Expert Committee's Projections of Population). In the subsequent discussions, it will be assumed that population estimates as given in or derived from the Census reports for any year, are also true of that financial year, i.e., the population estimate for 1951 is also true for 1951-52.

The Census of India, 1951 (Vol. I - Part II B - General Population - Economic Tables : Tables B I and III) gives the economic classification of self-supporting persons by the following categories: (i) Primary industries not elsewhere specified (a) stock raising, (b) rearing of animals, (c) plant industry, (d) forestry, (e) hunting, (f) fishing, (ii) Mining and quarrying, (iii) Food Industries, textiles, leather; (iv) Processing and manufacturing of metals, chemicals and products thereof; (v) Processing and manufacturing of products not elsewhere specified; (vi) Construction; (vii) Commerce; (viii) Transport; (ix) Health; (x) Services.

As against this, the entire population has been given under the categories of (1) agriculture proper (2) production other than cultivation (3) commerce, (4) transport, and (5) other services.

Now, regarding the correspondence between the occupational classification of the self-supporting persons and the general classification of population, the Census Report 1951 states the following with respect to 1951. Groups, i, ii, iii, iv, and v of the self-supporting persons are said to correspond wholly to the population category "production other than cultivation" while the groups vi to x correspond to the population categories (3) to (5). Using this, the ratio of self-supporting persons under i(a), (b) and (c) to the total number of self-supporting persons under categories i to v has been applied to the population category "production other than cultivation" and an estimate of population to the "animal husbandry sector" made. (The implicit assumption is that population is distributed among the different occupations in the same ratio as the self-supporting persons.) This, when added to the estimate of population in "agriculture proper" gives us an estimate of population in "Agriculture and Animal Husbandry". Similarly, applying the ratio of self-supporting persons under each of the categories i(d)

(e) and (f) to the total number of self-supporting persons in Groups i to v, to the population category "production other than cultivation", an estimate of population in the sub-sectors "forestry" and "fishery" is obtained. Again, the ratio of self-supporting persons in "construction" to the total number of self-supporting persons in the category vi to x was applied to the total population under categories (3) to (5); and an estimate of population in "construction" derived. Finally, applying the ratio of self-supporting persons under occupational categories iii to v to the total number of self-supporting persons i to v, to the population estimate under "production other than cultivation", we get an estimate of population in the industrial sector. The industrial sector consists of the factory establishments and the small enterprises sub-sectors. In order to get separate population estimates for each of these sub-sectors, use was made of the ratio between, the estimated work-force in these two sub-sectors (The CSO in its document on the Proposals for a Revised Series of the National Income" have estimated that in 1951-52, 27.4 per cent of the workforce in the industrial sector, was in the factory establishments sub-sector - vide CSO : Proposals : p.7); and the total population in the industrial sector was split up between these two sub-sectors. The population estimates of forestry, fishery, construction and small enterprises have been grouped together and called the population in the "less organised" sub-sectors of the non-agricultural sector; while the rest of the non-agricultural sector is the 'organised' sub-sector. All the above estimates relate to 1951, which we assume to be true for 1951-52.

We have been applied the rural rate of growth of population (a) to the agricultural population in 1951-52 and (b) to the estimated population in the less organised sub-sectors of the non-agricultural sector in 1951-52 and thus derived the time-series of estimates of population in each of (a) and (b) for the period 1951-52 to 1965-66. For the same period, estimates of total population in the economy have also been calculated with the help of the rate of growth of total population. From these estimates of total population for each year, the respective estimates of population under agriculture proper and the less organised sub-sectors of the non-agricultural

sector have been deducted to yield the estimate of population for that year in the non-agricultural, non-rural sector of the Indian economy.

- 8 Government of India : Office of the Economic Adviser, Basic Statistical Material Relating to Foreign Trade, Production and Prices.
- 9 To the extent that there are fair price shops in the rural areas as well and that the farmers might purchase imported grain from these shops, our estimates of marketed surplus of agricultural products in general are underestimates.
- 10 The most suitable deflator would, of course, be an index of retail prices. Since there is no systematic collection of data on retail prices, we have used the wholesale prices. To that extent, the estimates at constant prices are overestimates.
- 11 In the case of oilseeds and sugarcane, however, retentions have been allowed at the rate of 10 per cent and 12 per cent of the respective gross produce. It is noted that retentions are 12 per cent for groundnut, 10 per cent for rape and mustard and 12 per cent for linseed. It is 44 per cent for sesamum, but that includes retentions for oil extraction in the village. In this paper the retentions have been allowed at an average rate of 10 per cent for all oilseeds. In the case of sugarcane, seed retentions have been noted to be 12 per cent of gross produce. (See Government of India, Department of Commercial Intelligence and Statistics, Calcutta: "India, Handbook of Commercial Information", Vol. 3).
- 12 Government of India, CSO, Brochure on Revised Series of National Product, pp. 11-15.

The projections have been done with the help of (a) the index of agricultural production (Government of India, Ministry of Food and Agriculture; Index Numbers of Agricultural Production; agricultural year ended June 1950 = 100) and (b) the index of wholesale prices of the respective products. (Government of India: Ministry of Commerce and Industry. Office of the Economic Adviser: Index Numbers of Wholesale Prices: revised series, weekly, 1952 = 100. In this paper, however, the index has been expressed with 1960-61 = 100: these would be

referred to as the Economic Adviser's Index Number of Prices.) With respect to livestock products, viz., hides and skins, they have been considered under the separate heads of cattle hides, buffalo hides, goat-skins and sheep skins.

The number of livestock by the categories (a) cattle, buffaloes, sheep and goats have been noted for the years 1951, 1956 and 1961 (vide Government of India: CSO, Statistical Abstract of the Indian Union 1965, Table 22, p.72) and the rates of growth worked out for each category and for each of the periods 1951-56 and 1956-61. It was assumed that the derived growth rate for the period 1956-61 was true of the subsequent years 1961-66 too. With that assumption, the number of livestock by these categories was interpolated and extrapolated to cover the period of our study, viz. 1951-52 to 1965-66. Then, the value of production of these products in 1960-61 has been projected backwards and forwards with the help of (a) the actual number of livestock under the respective heads (i.e., number of goats for goat-skins) and (b) the index of wholesale prices of that product. (The Economic Adviser's index number of wholesale prices of hides has been used for cattle hides and buffalo hides; while the Economic Adviser's wholesale price series of skins has been used for goat-skins and sheep skins.) For wool, the indicators for projection have been (a) the estimated number of sheep in the different years and (b) the index number of wholesale prices of wool.

- 13 Government of India : National Sample Survey; Tables with Notes on Consumer Expenditure. Fourth and Sixteenth Rounds.
- 14 Vide note 8 and the assumption thereof.
- 15 The value of these non-agricultural inputs for 1960-61 have been taken from the CSO's Brochure on Revised Series (vide Table 5, p.17). This Brochure, however, does not give the estimates under the individual heads of "oilcakes and drugs, medicine and salt for work animals" but puts them all together with roughages, cereals and pulses fed to the animals. The author is grateful to the CSO for furnishing the details under these individual heads.

For 1951-52, the value of these inputs has been computed by the author, by projecting their respective values in 1955-56 with suitable indicators and indices. The 1955-56 values themselves are available in the CSO's publication "Proposals for a Revised Series of National Income Estimation 1955-56 to 1959-60". For the detailed method of estimation for 1951-52, Thamarajakshi, R: op.cit.

- 16 Government of India: Office of the Economic Adviser, Basic Statistical material, etc. op.cit.
- 17 It is observed that edible oil and some non-food items are imported.
- 18 A more appropriate method would be to consider the farm harvest prices (i.e., prices received by the farmers) and the retail prices of non-agricultural products (i.e., prices paid by the farmers). As time-series data of retail prices of individual products are not available, we shall consider only the wholesale prices in both cases, the implicit assumption being that the movements in farm harvest prices and retail prices of non-agricultural products are close with those in the wholesale prices of the agricultural and the non-agricultural products respectively.
- 19 It should be noted here that these composite indices of the prices of purchases of a sector from the other sector of inputs and therefore of inputs and final outputs do not include the prices of factors of production exchanged between the sectors.
- 20 Distinction may be made between the "favourableness or unfavourableness of terms of trade" and "improvement or deterioration of terms of trade". When the 'export' prices of a sector are higher than its 'import' prices, then the terms of trade are said to be favourable to that sector. Conversely, if the export prices are lower than the import prices, the exporting sector may be said to be faced with unfavourable terms of trade. On the other hand, the improvement or deterioration in the terms of trade is a concept referring to the "change" in the terms of trade which themselves may be favourable or unfavourable at any point of time. Thus even in the case of the terms of trade of a sector which are favourable to it, to start with,

the export prices may fall faster than the import prices, so that after this change in the prices of exports and imports, the terms of trade would have worsened or deteriorated, though they may continue to be favourable to that sector. Again, an unfavourable terms of trade may improve because the export prices rise faster than the import prices, and yet be unfavourable after this "improvement". Thus it should be noted that an improving terms of trade need not necessarily be favourable too; nor need a worsening terms of trade be unfavourable.

To the extent, the favourableness or the unfavourableness of terms of trade depends on the level of prices at any point of time, and as our study is in terms of indices of prices, we shall not indulge in conclusions regarding the favourableness or otherwise of intersectoral terms of trade. Rather, it will concern itself with changes in terms of trade.

- 21 The value of agricultural production in 1960-61 according to the CSO's Brochure on Revised Series (op.cit.) is Rs 8699.22 crores. With the help of the index of agricultural production (vide note 12) the value of agricultural production (at 1960-61 prices) in 1951-52 has been estimated to be Rs 5965.10 crores. On the basis of these data, the productivity of the non-agricultural inputs in agriculture has been estimated.