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FACTOR SHARES IN INDIAN AGRICULTURE

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The main objective of this paper is to examine the extent of variation in factor shares in agriculture among the regions and also over a period of time and to find out the reasons for these variations. The analysis would help in understanding the impact of technological change, cropping pattern, forces of demand and supply of factors, etc., on the changes in factor shares.

The share of capital in the total cost should increase and that of labour and land should decline with the advance in the level of agricultural technology. The impact of technology, which is generally land-substituting, on the share of land may be partly nullified due to relatively faster increase in the value of land as compared to other category of factors mainly because of its scarcity, investment of capital in it and increase in its productivity. The share of labour would decline because both wage rate and the use of labour has been increasing at a much slower rate vis-a-vis other factors of production. Within a region, a technologically advanced crop would have a lower share of land and labour and a higher share of capital as compared to other crops. Under homogeneous agro-climatic conditions, the share of factors for a crop should not differ much among the regions.

DATA AND METHODOLOGY

The share of factors has been worked out in the total cost of production. This approach is based on the assumption that the returns to scale are constant and prices of various factors of production are proportional to their marginal value products. These are not very unreasonable assumptions in the context of Indian agriculture.

The factor shares in the total cost have been worked out under three broad categories of factors, *i.e.*, land, labour and capital. The labour is divided into human labour and bullock labour while capital is divided into working capital and fixed capital. The land includes rental value of owned land, rent paid for leased-in land and land revenue. The imputed wages for family labour and wages paid for hired labour are included under human labour. Bullock labour includes working cost of owned bullocks and payments made for hired bullock labour. The value of seed, manures, fertilizers, insecticides, expenditure on miscellaneous items, expenditure on irrigation and interest on working capital are included under working capital, whereas expenditure on machine labour, and depreciation and interest on fixed capital are included under the head fixed capital.

The data used for deriving factor shares come from the "Studies in the Economics of Farm Management" and the "Comprehensive Scheme for the Study of Cost of Cultivation of Principal Crops". The Farm Management Studies data have been used for three out of five districts for which the Studies

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were repeated. The analysis could not be done for two districts because of the problem regarding the comparability of data on certain items of costs between the two periods of time.

FACTOR SHARES

The factor shares at two points of time for the districts of Ferozepur, Ahmednagar and Coimbatore are presented in Table I. These districts represent

TABLE I—PERCENTAGE SHARE OF FACTORS FOR AGGREGATE OF CROPS IN FEROZEPUR, AHMEDNAGAR AND COIMBATORE DISTRICTS

Factors	Ferozepur (Punjab)		Ahmednagar (Maharashtra)		Coimbatore (Tamil Nadu)	
	1954-57	1967-70	1955-57	1969-72	1954-57	1970-73
1. Land	35·94	31·93	16·8	25·97	25·97	36·45
2. Labour						
(*i*) Human	27·03	27·01	34·1	26·40	20·80	22·02
(*ii*) Bullock	20·88	13·18	17·9	18·72	24·86	6·55
Total	47·91	40·19	52·0	45·12	45·66	28·57
3. Capital						
(*i*) Working	11·56	17·25	24·2	19·52	15·46	26·12
(*ii*) Fixed	4·59	10·63	7·0	9·39	12·91	8·86
Total	16·15	27·88	31·2	28·91	28·37	34·98
Grand total ..	100·00	100·00	100·00	100·00	100·00	100·00

Source: Government of India: Studies in the Economics of Farm Management in Different Districts, Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi.

different agro-climatic conditions and cropping pattern, and are at different levels of agricultural development. The data presented in the table relate to all crops, taken together, and are three years' averages. The periods covered are mid-fifties and late sixties for Ferozepur, and mid-fifties and early seventies for Ahmednagar and Coimbatore districts. The share of land declined from 36 per cent in the first period to 32 per cent in the second period in Ferozepur whereas it increased from 17 to 26 per cent in Ahmednagar and from 26 to 36 per cent in Coimbatore district. The decline in the share of land in Ferozepur in spite of the fastest increase in its value per hectare is mainly because of the sharp increase in the share of the capital in response to the adoption of new technology. It thus indicates that the share of land declines with the higher extent of adoption of modern agricultural technology. The share of human labour declined sharply from 34 per cent to 26.4 per cent in Ahmednagar, but remained constant at about 27 per cent in Ferozepur and increased marginally from 21 per cent to 22 per cent in Coimbatore district. The considerable increase in the area under labour intensive crops like paddy and groundnut could have been mainly responsible for the marginal increase in the share of

labour in Coimbatore. The increase in the use of labour, and higher level and faster increase in wage rate could have been responsible for maintaining the share of labour at the same level in Ferozepur. The share of bullock labour declined drastically from 25 per cent to 7 per cent in Coimbatore and from 21 per cent to 13 per cent in Ferozepur. In the case of Ahmednagar, it however increased from 18 per cent to 18.7 per cent. In all the three districts, the use of bullock pair days declined uniformally by about two-thirds. In spite of this, the share of bullock labour did not decline in Ahmednagar because the working cost of bullocks per day increased at a very fast rate in the district. The share of capital increased from 16 per cent to 28 per cent in Ferozepur, and from 28 per cent to 35 per cent in Coimbatore, but it declined from 31 per cent to 29 per cent in Ahmednagar district. It is worth noting that the share of capital had not only been much higher in Ahmednagar and Coimbatore districts than in Ferozepur in mid-fifties but it also continues to be higher in the later period. It appears surprising that the share of capital has been lower in a relatively more developed district as compared to those relatively less developed. It would be pertinent to note here that the extent of irrigation has been much higher in Ferozepur than in the other two districts, both quantitatively and qualitatively. If the share of capital invested in irrigation, both on private and public account, is separated from the share of land and added to the share of capital, the latter would go up considerably whereas the former would go down. To illustrate this point, we present in Table II the share of factors for households having different levels of irrigation.

TABLE II—FACTOR SHARES FOR HOLDINGS WITH DIFFERENT EXTENT OF IRRIGATION IN 1956-57, COIMBATORE AND SALEM DISTRICTS, TAMIL NADU

Holdings with different levels of irrigation	Percentage share without adjustment				Percentages share with adjustment for irrigation			
	Land	Labour	Capital	Total	Land	Labour	Capital	Total
Fully unirrigated ..	24·59	45·80	29·61	100·00	24·59	45·80	29·61	100·00
20 per cent to 30 per cent irrigated ..	25·07	46·40	28·53	100·00	12·91	46·40	40·69	100·00
45 per cent to 55 per cent irrigated ..	32·89	41·41	25·70	100·00	8·01	41·41	50·58	100·00
70 per cent to 80 per cent irrigated ..	25·03	43·12	31·85	100·00	5·00	43·12	51·88	100·00

Source: Government of India: Studies in the Economics of Farm Management in Madras, Report for the Year 1956-57, Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi, 1962.

It is clear from Table II that the share of land was about 25 per cent and that of capital about 30 per cent for all the categories of holdings except the one with 45 to 55 per cent irrigated area. When the rent and rental value of

land per acre for the fully unirrigated holdings are taken to represent roughly the real cost of land for its natural fertility, etc., uniformly on all the categories of holdings and the difference between this and the actual amount of rent and rental value per acre on holdings with different levels of irrigation is added to capital, the share of land declines very fast from about 25 per cent to 5 per cent and that of capital increases very fast from 30 per cent to 52 per cent respectively for holdings fully unirrigated and those having 70 to 80 per cent irrigated land. If such corrections could be applied to the data in Table I, the decline in the share of land and increases in the share of capital would be much faster in Ferozepur than in Ahmednagar and Coimbatore districts. It is thus clear that unless the share of capital invested in land is separated from it, the share of land would always be over-estimated and that of capital under-estimated.

The percentage share of factors in total cost for rice in Andhra Pradesh and Orissa, for wheat in Punjab and Uttar Pradesh and for jowar in Maharashtra are presented in Table III. These are the State level data but belong

TABLE III—PERCENTAGE SHARE OF FACTORS FOR RICE, WHEAT AND JOWAR CROPS IN CERTAIN STATES IN 1971-72

Factors	Rice		Wheat		Jowar
	Andhra Pradesh[a]	Orissa[b]	Punjab[c]	Uttar Pradesh[d]	Maharashtra[e]
1. Land	38·01	32·98	32·03	29·83	38·51
2. Labour					
(*i*) Human	22·43	30·19	19·57	18·79	21·79
(*ii*) Bullock	7·18	17·36	9·35	16·39	18·22
Total	29·61	47·55	28·92	35·18	40·01
3. Capital					
(*i*) Working	24·94	14·52	26·48	25·12	8·64
(*ii*) Fixed	7·44	4·95	12·57	9·87	12·84
Total	32·38	19·47	39·05	34·99	21·48
Grand total ..	100·00	100·00	100·00	100·00	100·00

Source: *a.* "Cost of Production of Paddy in Andhra Pradesh during 1971-72", *Agricultural Situation in India*, Vol. XXIX, No. 5, August 1974.

b. "Cost of Production of Paddy in Orissa", *Agricultural Situation in India*, December 1974.

c. "Cost of Production of Wheat in Punjab during the 1972-73 Crop Season", *Agricultural Situation in India*, November 1974.

d. "Cost of Production of Wheat in Uttar Pradesh during the 1971-72 Crop Season", *Agricultural Situation in India*, October 1974.

e. "Cost of Cultivation of Jowar in Maharashtra during 1971-72", *Agricultural Situation in India*, January 1975.

to individual (although predominant) crops only. The factor shares for wheat are remarkably close in Punjab and Uttar Pradesh. The relatively lower share of bullock labour in Punjab as compared to Uttar Pradesh is explained

by higher level of mechanization in the former which is evident from its higher share of fixed capital. The closeness of shares of individual factors in the two States is quite understandable in view of similarity in agro-climatic conditions and the extent of adoption of new technology of wheat in them. On the other hand, the share of individual factors differ widely for rice between Andhra Pradesh and Orissa. This is not unexpected as agro-climatic conditions under which rice is cultivated and the extent of adoption of its new technology in these two States differ widely. The share of labour is considerably higher and that of capital is considerably lower in Orissa as compared to Andhra Pradesh. The backwardness of agriculture in Orissa could greatly be attributed to its much lower share of capital. The factor shares for rice in Andhra Pradesh appear to be relatively closer to those of wheat in Punjab and Uttar Pradesh, plausibly because of its higher level of agricultural development. It appears from the table that land, labour and capital account for about one-third each of the total cost in the case of wheat. The factor shares for rice in Andhra Pradesh also come relatively close to these. But in the case of rice in Orissa, land accounts for about one-third, capital for about one-fifth and labour for about 48 per cent of the total cost. So far as jowar in Maharashtra is concerned, land and labour account for about two-fifths each and capital for about one-fifth of the total cost.

In order to examine the recent trends in the factor shares, two-point data of the seventies for Punjab and of late sixties and early eighties for Cuttack (Orissa) are presented in Table IV.

TABLE IV—PERCENTAGE SHARE OF FACTORS AT TWO POINTS OF TIME IN PUNJAB AND ORISSA

Factors	Wheat crop in Punjab*		Aggregate of crops in Cuttack (Orissa)†	
	1970-71	1976-77	1968-69	1980-81
1. Land	35·10	27·68	25·10	31·46
2. Labour				
(*i*) Human	19·84	17·88	35·00	30·95
(*ii*) Bullock	8·64	9·61	19·74	15·18
Total	28·48	27·49	54·74	46·13
3. Capital				
(*i*) Working	22·68	30·91	15·68	18·05
(*ii*) Fixed	13·74	13·92	4·48	4·36
Total	36·42	44·83	20·16	22·41
Grand total ..	100·00	100·00	100·00	100·00

Source: * Agricultural Prices Commission: Report on Price Policy of Wheat for 1973-74 and for 1978-79 Season, Government of India, New Delhi.

† Nirmal Kumar Panda, "Agricultural Growth and Income Distribution in Orissa", Ph.D Thesis in progress.

The data for Punjab relate to wheat crop only whereas those for Orissa (Cuttack district) relate to the aggregate of crops. The two States are at two extremes of agricultural development, Punjab being the most developed and Orissa the least developed. It is important to note from the table that the share of land declined from 35 per cent to 28 per cent in Punjab whereas it increased from 25 per cent to 31.5 per cent in Orissa. Although the share of human labour declined in both the States, it still remained to be much higher (about 31 per cent) in Orissa as compared to Punjab (18 per cent). Similarly, the share of bullock labour has been much lower in Punjab than in Orissa at both the points of time, but it showed a decline (from 20 to 15 per cent) in Orissa and an increase (from about 9 to about 10 per cent) in Punjab. The overall share of labour declined marginally from 28.5 to 27.5 per cent in Punjab but the decline was substantial in Orissa (from 55 to 46 per cent). The share of capital increased from 36.5 to 45 per cent in Punjab whereas it increased from 20 to 22.5 per cent only in Orissa. Thus, the share of capital in Punjab is about double of that in Orissa and this may mainly account for the difference in agricultural performance between the two States.

CONCLUSION

It is clear from the above analyses that the share of land has declined and that of capital has increased in regions with better agricultural performance. The share of land is over-estimated and that of capital is under-estimated unless the capital invested in land is separated from it. The share of labour declined in all the regions. The factor shares for wheat are found to be quite close between the major wheat growing States whereas they differ widely for rice between the major rice growing States. This is because the agro-climatic conditions and the extent of adoption of new technology are fairly similar in the major wheat growing States but differ widely among the major rice growing States. Capital is found to be the most important factor in Punjab whereas labour is found to be the most important in Orissa.