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SOME ECONOMIC ASPECTS OF CROPPING PATTERN

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The economic aspects of cropping pattern can be considered both at micro and macro levels. The considerations influencing the cropping pattern at the macro level can be taken to be those relating to soil and climatic variations, development of markets, development of transport, demand and supply situations at the aggregate level, etc. At the micro level the important economic considerations are those like farm size, tenancy, irrigation, net return of crops and certain other considerations like food habits.

The present paper focuses attention mainly on the micro aspects influencing the cropping pattern. The farm management studies conducted during the first and second series in different regions of the country have provided valuable data on different economic aspects of cropping pattern. An attempt is made in this paper to study the influences of these factors on cropping pattern with the help of farm management data available for different regions. The paper starts with the hypothesis that the farms in the smaller size groups and the tenant operated farms are associated with a larger proportion of area under foodgrains and that the farms in the bigger size groups and owner operated farms are associated more with cash crop acreage.

The cropping pattern and its relation to farm size may be considered in the first instance.

Farm Size and Cropping Pattern

In U.P.,¹ sugarcane, an important commercial crop in this region, has occupied a relatively larger area both among the bigger and smaller farm size groups. The tendency for the foodgrains to be dominant in the smaller size groups and the cash crops to be dominant in the bigger size groups is very much evident in the years 1955-56 and 1956-57, even though it is not so significant in the year 1954-55. The area under foodgrains progressively decreased with the increase in farm size, thus revealing the importance of crops other than foodgrains in the bigger farm size groups.

The area under American cotton, an important commercial crop in the Punjab, progressively increased with the increase in farm size from about 14 per cent in the smaller size groups to about 20 per cent to 40 per cent in the bigger size groups. This tendency has been observed in all the three years of study, viz., 1954-55, 1955-56 and 1956-57. The data also indicate a larger concentration of

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1. Studies in the Economics of Farm Management in U. P., Reports for the years 1954-55, 1955-56 and 1956-57.

the area under fodder crops among the smaller size groups though such a tendency could not be seen in the case of U.P.²

In West Bengal, a larger percentage of area under foodgrains is in the lower size groups as compared with that in the bigger farm size groups. In the case of the important commercial crop of the region, *i.e.*, jute, the proportion remained more or less the same over the various farm size groups. In the case of vegetable crops like potato the smaller farm size groups devoted a fairly large percentage of area as compared with the corresponding area devoted by bigger farm size groups.³

In Bombay, commercial crops like groundnut and other non-food crops, which are mostly cash crops, occupy a higher percentage of area under bigger farm size groups than the smaller farm size groups. But the percentage area under foodgrains is relatively larger among the smaller farm size groups. The percentage area under fodder crops is also relatively higher in the smaller size groups in comparison with the area under fodder in the bigger size groups. These tendencies have operated in all the three years of the study, *viz.*, 1954-55, 1955-56 and 1956-57.⁴

It is interesting to note that in Madras⁵ even among the smaller farm size groups, a large percentage of cropped area is under commercial crops like cotton and groundnut. The larger farm size groups too have a large proportion of their area under these crops. The area under other crops which presumably includes other non-food and cash crops like chillies, turmeric, etc., increased with increase in farm size. The proportion of area under foodgrains was about 50 to 60 per cent in the smaller size groups and this decreased to about 40 to 50 per cent in the bigger farm size groups. Such tendencies have been noticed in all the three years of study.

Virginia tobacco, the most important commercial crop in Andhra⁶ occupied as much as 20 to 30 per cent of the total cropped area in the bigger farm size groups while in the smaller size groups it accounted for only about 2 to 3 per cent of the total cropped area. It is also seen that in all the three years of study the fodder and green manure crops accounted for a larger percentage of cropped area in the smaller size groups as compared with the corresponding area under the bigger farm size groups.

In Orissa,⁷ the percentage area under foodgrains in 1957-58 did not show much variation between different size groups. But during the next two years, *viz.*, 1958-59 and 1959-60 the percentage area under foodgrains to total cropped area

2. For detailed tables see Studies in the Economics of Farm Management in Punjab, Reports for the years 1954-55, 1955-56 and 1956-57.

3. For detailed tables see Studies in the Economics of Farm Management in West Bengal, Reports for the years 1954-55, 1955-56 and 1956-57.

4. See Studies in the Economics of Farm Management in Bombay, Reports for the respective years.

5. Studies in the Economics of Farm Management in Madras, Reports for the years 1954-55, 1955-56 and 1956-57.

6. Studies in the Economics of Farm Management in Andhra, Reports for the years 1957-58, 1958-59 and 1959-60 (unpublished).

7. Studies in the Economics of Farm Management in Orissa, Reports for the years 1957-58, 1958-59 and 1959-60 (unpublished),

declined with increase in farm size. The percentage area under sugarcane increased with increase in farm size. A more or less similar tendency is seen in the case of groundnut. These tendencies are more pronounced in the years 1958-59 and 1959-60 though they are not so significant in the year 1957-58.

It is seen from the detailed tables on cropping pattern for Bihar⁸ that in North Monghyr the percentage area under chillies, a commercial crop of this region, increased with increase in farm size. Chilli is not an important crop in Central and South Monghyr. Among the *kharif* crops foodgrains occupied as much as 90 to 95 per cent of the cropped area in the smaller farm size groups while in the case of larger farm size groups they accounted for only about 70 to 80 per cent of the cropped area. In the case of *rabi* crops the percentage area under potato, an important vegetable crop, is very high among the smaller and medium size groups while it is relatively low in the bigger size groups. The reason for this concentration in smaller size groups appears to be due to the availability of abundant supply of family labour. This tendency is seen in all regions, North, Central and South Monghyr. In the case of *rabi* crops, the percentage area under foodgrains is relatively higher in the smaller size groups in North, Central and South Monghyr as compared with the position in the bigger size groups in these regions.

Closely related to the consideration of farm size are those factors relating to availability of family labour and fertility of land. It has been the general experience that the small farms concentrate on vegetable growing presumably because of the availability of plentiful supply of family labour on the farms—vegetables being a highly labour intensive crop.

Tenancy and Cropping Pattern

Another important consideration influencing the cropping pattern is tenancy. Unfortunately, detailed data are not available on this aspect for different farming regions. In the following section the data available in respect of some of the farm management centres are presented to illustrate the point.

Table I gives the tenancy-wise cropping pattern for Punjab.

A detailed study of the impact of different types of tenancies on cropping pattern cannot be made on the basis of the above data since data on cropping pattern are not available separately for owner cultivated and rented farms. The limited data given in Table I permit some broad conclusions. The percentage area under cotton, the important commercial crop of the region, does not show any significant variation between owned and cash-rented farms on one hand and *batai* rented farms on the other. The *batai* rented farms have a higher percentage of area under food crops than owned and cash rented farms. The percentage area under sugarcane is higher in owned and cash-rented farms as compared with *batai* rented farms.

The tenancy-wise cropping pattern in Madras is given in Table II.

It may be seen from Table II that owned cultivated holdings have a higher percentage of cropped area under commercial crops like cotton than the

8. Studies in the Economics of Farm Management in Bihar, Report for the year 1958-59 (unpublished)

TABLE I—PERCENTAGE AREA UNDER DIFFERENT CROPS IN PUNJAB
(AMRITSAR AND FEROZEPUR) : 1956-57

Crops	Owned and cash rented	<i>Batai</i> rented	Total
1	2	3	4
A. Food Crops			
Wheat	16.1	13.4	15.4
Wheat and Gram	17.1	20.8	18.2
Rice	5.2	7.1	5.7
Maize	4.1	2.8	3.6
Gram	8.3	8.7	8.6
Other Cereals and Pulses	2.0	0.6	1.7
Sugarcane	1.2	0.7	1.1
Others	4.7	7.6	5.5
Total	58.7	61.7	59.6
B. Oilseeds			
	3.6	3.4	3.6
C. Fibre Crops			
American Cotton	13.7	14.1	13.8
<i>Desi</i> Cotton	2.7	1.6	2.4
Others	0.2	0.1	0.1
Total	16.6	15.8	16.3
D. Fodders			
	21.1	19.1	20.5
E. Miscellaneous			
	—	—	—

Source : Studies in Economics of Farm Management in Punjab, Report for 1956-57.

fully rented or partially rented holdings. Area under foodgrains accounted for as much as 63 per cent of the total cropped area in the fully rented holdings while in the case of partially rented holdings and owner-cultivated holdings, the foodgrains accounted for only about 53 per cent of the total cropped area.

TABLE II—PERCENTAGE AREA UNDER CROPS FOR OWNED AND RENTED HOLDINGS IN MADRAS (SALEM AND COIMBATORE)

Crops	Fully rented holdings	Partially rented holdings	Owned cultivated holdings
Paddy	8.5	9.2	13.6
Cholam	7.9	11.5	16.9
Ragi	7.5	21.3	13.3
Cumbu	39.1	11.7	9.8
Other crops	24.5	31.1	22.1
Cotton	11.2	6.5	13.0
Groundnut	1.3	8.7	11.3

Source : Studies in the Economics of Farm Management in Madras, Report for 1956-57.

Analysis of data on cropping pattern in Bihar showed that a large percentage of area under chillies, an important commercial crop, in North Monghyr, is under purely owned farms. The tenant operated farms have a relatively larger percentage of their cropped area under foodgrains as compared with the owned operated farms. Such a tendency is also seen in the case of Central and South Monghyr though to a smaller extent.

In Madhya Pradesh⁹ the proportion of area under important commercial crops like cotton and groundnut to total cropped area did not vary very much between the owner cultivated and tenant operated farms. But the tenant operated farms had a larger proportion of their cropped area under foodgrains than the owner cultivated farms.

Irrigation and Cropping Pattern

Irrigation is another important factor influencing the cropping pattern. The data on cropping pattern for irrigated and unirrigated crops separately are not available for all the farm management centres. These data are available for only two centres, Punjab and Madras. In the Punjab, the percentage area under food crops to total cropped area in 1954-55 was 55 per cent in irrigated area while it was 93 per cent in the unirrigated area. The variation was small in 1955-56, foodgrains occupying about 51 per cent in irrigated area and about 88 per cent in unirrigated area. The corresponding percentages for 1956-57 are 52 and 86 respectively.

In the irrigated area important commercial crops like cotton accounted for about 19 per cent of the total cropped area in 1954-55 and for about 18 per cent of the cropped area in 1955-56; while in 1956-57 these crops were not grown at all in the unirrigated area. These are broadly the major changes in cropping pattern between irrigated and unirrigated area. Moreover a large percentage of area under wheat-gram mixture was seen in unirrigated area in all the years, while the area under this crop in irrigated area was relatively small.

In Madras the proportion of area under cotton, an important cash crop, is larger in fully irrigated and partially irrigated holdings than in unirrigated holdings. Moreover, the proportion of area under paddy is also higher in the fully irrigated and partially irrigated holdings as compared with the area under this crop in unirrigated holdings.

9. Studies in the Economics of Farm Management in Madhya Pradesh, Reports for the years 1955-56 and 1956-57.

Net Return and Cropping Pattern

Another important factor that influences the choice of cropping pattern is the net return from the crops. It cannot be denied that some influence is definitely exercised by net return, especially in the introduction of new enterprises. It is also contended that, there is, in a large number of cases, sound economic justification (though sometimes interpreted in an aggravated form, such as, undue discounting of returns in the light of risk) for the farmers' production policies and practices.¹⁰ Subject to the restrictions of growing some crops to meet the food and fodder requirements of the family the farmer has still a choice between some of the crops that compete for his resources. It is here that the criterion of net return becomes more relevant. The net return from the competing crops depends both on the yields of the crops and the prices of the concerned commodities. The importance of net return is sought to be illustrated with the help of data available from the farm management studies.

For the present purpose net return is taken as the surplus of gross income over and above Cost A, which includes all cash and kind expenses in production. Table III gives the net return for some of the competing crops in the different regions.

TABLE III—GROSS AND NET RETURN FOR COMPETING CROPS*

Centres and Crops	Gross Income (Rs.)	Cost A (Rs.)	Net return or surplus of gross income over Cost A
U. P.			
Sugarcane planted	461	230	231
Sugarcane ratoon	371	111	260
Wheat irrigated	205	141	64
Punjab			
Wheat irrigated	173	99	74
American Cotton	182	87	95
Desi Cotton	136	67	69
West Bengal			
<i>Aman</i> Paddy: (i) Hooghly	228	115	113
(ii) 24 Parganas.. .. .	196	72	124
Jute : (i) Hooghly	227	129	98
(ii) 24 Parganas.. .. .	208	81	127
Madras			
<i>Cholam</i> irrigated	192	78	114
Cotton irrigated	197	99	98
Madhya Pradesh			
Cotton combination	91	41	50
Jowar combination	72	37	35
Groundnut combination	89	68	21

* Data relate to the average of 1954-55, 1955-56 and 1956-57. In Madhya Pradesh it relates to the average of 1955-56 and 1956-57.

Source : Indian Agriculture in Brief, Fifth Edition, Ministry of Food and Agriculture, Government of India, New Delhi.

10. H. S. Singh, 'Changes in Cropping Pattern—Economic Criteria', *The Economic Weekly*, Vol. XIV, No. 24.

It may be seen from Table III that as far as net return is concerned sugarcane enjoys comparatively better position than wheat irrigated in U. P. In Punjab, American cotton yields a better net return than wheat irrigated. In West Bengal, jute gives a better return than paddy in one district though it is otherwise in another district. Even though *cholam* irrigated yields a higher net return than cotton in Madras, it is mainly raised for home consumption and fodder purposes. In this sense, it may be said that it does not effectively compete with cotton. In Madhya Pradesh, cotton yields a much higher return than the other two competing crops, jowar and groundnut. As has been explained earlier the profitability of one crop *versus* another depends both on the relative yield levels and price levels of the crops concerned.

Mixed Cropping

Another important economic aspect of cropping is the growing of mixed crops. Mixed cropping has been in practice in this country since long. Even though mixed crops occupy about 30 per cent of the total cropped area in the country, not enough attention has been paid in recent years to the economic aspects of mixed cropping. In some regions mixed cropping has been found to be more profitable than pure cropping. Evaluation of the costs and incomes of mixed crops *versus* pure crops in various regions is rendered difficult owing to paucity of data. Table IV gives some data on the economic aspects of mixed and pure crops in Madhya Pradesh.

TABLE IV—GROSS INCOME AND COST OF MIXED AND PURE CROPS IN
MADHYA PRADESH : 1955-56

Crops	Value of yield per acre	Cost A (Actual Cash and Kind Expenses)	Cost C (Actual and Imputed)
Cotton (Pure)	40.2	37.4	51.4
Cotton (Mixed)	74.0	35.5	57.6
Jowar (Pure)	35.4	25.5	43.0
Jowar (Mixed)	58.7	33.3	53.8
Wheat (Pure)	91.5	37.9	63.4
Wheat (Mixed)	96.0	49.4	69.3
Groundnut (Pure)	55.6	42.6	65.5
Groundnut (Mixed)	102.0	67.0	80.6

Source : Studies in the Economics of Farm Management in Madhya Pradesh, Report for 1955-56.

The above table illustrates the profitability of mixed crops as against the pure crops. In the case of all the crops, *viz.*, cotton, jowar, groundnut and wheat the mixed crops have yielded a higher gross and net return. The growing of leguminous crops like pulses in mixture has been found to be increasing the manurial contents of the soil in various experiments. Besides, mixed cropping also serves as an insurance against wholesale crop losses and also helps in utilising profitably the limited land space available with the cultivator.¹¹

11. A. K. Yegna Narayana Iyer, 'Mixed Cropping', *Indian Journal of Agricultural Science*, Vol. 19.