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Vol XVIII  
No. 1

ISSN 0019-5014

CONFERENCE  
NUMBER

JANUARY-  
MARCH  
1963

# INDIAN JOURNAL OF AGRICULTURAL ECONOMICS



INDIAN SOCIETY OF  
AGRICULTURAL ECONOMICS,  
BOMBAY

The regional pattern shows that by the implementation of the new plan a kind of regional specialization is being encouraged. The South region would be specializing in cotton, groundnut and rice; the Middle region in cotton, wheat, groundnut and rice; the North region in bajri, cotton, jowar, wheat and gram; Saurashtra in groundnut and Kutch in cotton and groundnut. The benefits derived by different regions by the new plan are shown in Table VI. The maximum benefit is derived by the North region and next in order are Saurashtra and Kutch. This pattern helps in reducing inter-regional disparity in income. One of the goals of agricultural policy of the State as well as for the nation as a whole should be to decrease inter-regional or inter-State differences. This goal was stressed by Dr. Rao in his presidential address at the Twenty-first annual conference of agricultural economics.<sup>1</sup>

### *Efforts Required for Changing the Cropping Pattern*

The basis of the present analysis is that planning should start at the taluka level and it would be better if it is done at the village level. The taluka plan is to be prepared in co-ordination with the regional and the State plan. However, in this plan there is no rigidity or target-mindedness regarding a certain type of cropping pattern. The inter-taluka comparison of physical production gives indications as to which areas are more efficient in producing certain crops. The taluka administration which will be the Taluka Parishad in the new set-up of Panchayat Raj should be helped by the State Department in formulating a plan for the cropping pattern in the taluka. According to this plan certain crops are encouraged whereas others are discouraged. No direct acreage control is envisaged in this plan. Individual farmers are free to make their own choice. In order to accelerate the process of specialization in crops in which certain areas have comparative advantage in physical terms, the State should adopt the policies of differential treatments to crops which are to be encouraged. Liberal crop loans, subsidies in fertilizers and seeds, preferential treatments in providing storage facilities and propaganda for growing those crops would give good results. Price controls and direct acreage controls could be used as last weapons.

## ECONOMICS OF CROPPING PATTERN IN COTTON TRACTS OF INDIA

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The objectives of this paper are three fold: (1) to examine the rationale of the existing cropping pattern in cotton tracts of India; (2) to study the factors which determine the extent of cotton acreage in the total cropped area; and (3) to study the scope and advisability of any shifts in it on the basis of certain criteria.

Cotton is the major cash crop in India, the fortunes of which affect almost all the sections of the community in one way or other. The rising internal demand for cotton and the pressure on foreign exchange require a significant rise in cotton

1. V. K. R. V. Rao, "Agricultural Production and Productivity During the Plan Period," Vol. XVII, No 1, January-March, 1962.

production. As is well known, the production of any crop can be raised either by increasing its yield per acre, or by placing more area under the crop. Let us first take the yield of cotton together with that of other principal crops. Table I shows the average yield of principal crops during the two trienniums ending with 1957-58 and 1960-61 in relation to the average yield during the years 1952-53 to 1954-55. Contrary to the popular notions of that the yield of cotton has not risen appreciably, the figures make a striking revelation. While all the crops have recorded a decline in yield rates during the first quinquennium, cotton alone has registered a rise of 2.3 per cent. In the next triennium, the increase of 10.5 per cent in its yield compares well with that of any other crop, excepting groundnut. So, there is not much basis to the belief that cotton yields have not improved significantly; probably, it is based on the wild year to year fluctuations in its total production as well as per acre of yield. Although, there is still much scope to increase its yield per acre, it would not be prudent to expect any significant rise in the next few years, especially when its yield in the past few years has improved well above the rise attained by most of the principal crops. This situation demands the bringing of more and more areas under cotton to relieve the difficult situation prevailing now. Such a step seems to be the logical solution in the national interest, at least in the short run. With this in the background, let us study the trend in its acreage. The area under the crop was 12.2 million acres in 1949-50 and it steadily rose to 20 million acres in 1955-56. Thereafter, it was stationary around this level for four years before declining to 18.8 million acres in 1959-60. The figures for the two subsequent years show that not even a part of the fall has been regained. Having seen the yearly figures, let us turn our attention to the figures in Table I, where the four-year period, 1955-56 to 1958-59, has been preferred over the triennium, as the cotton acreage was not only stationary during this period but also the highest ever recorded.<sup>1</sup> Among the nine major crops, only jowar and bajra have lost a part of their acreage during the first period, whereas in the next two years the area under cotton has also declined along with these crops. On the other hand, groundnut has considerably improved its acreage. We shall study the behaviour of the acreages of these four crops in detail in the subsequent sections. A cursory glance at the table would show that the *kharif* acreage has risen by only 3.9 per cent during these 9 years as against 21.4 per cent for *rabi* acreage. This puts a great limitation on the expansion of cotton acreage. The absolute rise is also higher for *rabi* crops than for *kharif* crops, the respective figures being 13.5 million acres and 8.5 million acres. Such a situation can arise out of two ways; either more of area newly brought under cultivation finds its way to *rabi* crops or there is a shift of area from *kharif* to *rabi* crops. As there are more cultivable wastes in colder regions suitable for growing *rabi* crops, it is natural that the newly reclaimed lands are placed under *rabi* crops. The existence of the second possibility has been brought out in another study<sup>2</sup> wherein it was shown that the fall in area under jowar and bajra in certain selected districts of Madhya Pradesh has been accompanied by a corresponding rise in wheat acreage. The two major factors causing such a shift of jowar acreage were found to be the relative prices of jowar (bajra) with respect to wheat and new irrigation. It may be worth mentioning that cotton is grown widely in mixture with jowar and bajra and the fortunes of jowar and bajra (other

1. The district-wise figures also conform to this trend.

2. 'Shift of Area under Tur,' C. Muthiah and M. P. Rao, in *Agricultural Situation in India*, July, 1962.

small millets as well) would greatly affect the area under cotton also. These discussions have shown the need for evolving suitable measures to increase the area under cotton and so, a study of the cropping pattern in the cotton growing tracts is very useful.

TABLE I—TRENDS IN ACREAGE AND YIELD OF PRINCIPAL CROPS IN INDIA

					Percentage rise or fall over the average yield between 1952-53 to 1954-55		Percentage rise or fall over the average area between 1952-53 to 1954-55	
					1955-56 to 1957-58	1958-59 to 1960-61	1955-56 to 1958-59	1959-60 to 1960-61
Wheat	..	..	..	..	— 8.6	+ 6.2	+17.7	+21.3
Gram	..	..	..	..	— 2.6	— 0.4	+17.1	+19.6
<i>Rabi</i> Crops	..	..	..	..	—	—	+15.6	+21.4
Sugarcane	..	..	..	..	—	—	+22.5	+30.0
<i>Kharif</i> Crops	..	..	..	..	—	—	+ 2.7	+ 3.9
Rice	..	..	..	..	— 1.4	+10.0	+ 5.3	+ 9.6
Maize	..	..	..	..	— 3.1	+ 9.2	+ 5.5	+15.8
Bajra	..	..	..	..	— 9.6	— 3.4	— 5.8	— 6.8
Jowar	..	..	..	..	— 5.0	+ 9.1	— 2.8	— 3.9
Cotton	..	..	..	..	+ 2.3	+10.5	+14.9	+ 8.6
Groundnut	..	..	..	..	— 2.6	+25.3	+17.9	+22.8

#### *Behaviour of Cotton Acreage in 64 Districts*

It was seen in the previous section that the increase in cotton acreage during the last decade was much less than the area added by most of the principal crops during the same period; further, it has also shown a tendency to fall down during the last three years (including 1961-62) along with the other two coarse *kharif* cereals (jowar and bajra), with which it is commonly grown as a mixture. On the other hand the area under groundnut and wheat has risen considerably during the last decade. The varying behaviour of these five principal crops gives us a clue for finding out the factors which have caused a set-back in cotton acreage. To see whether this situation has been influenced by the fall in cotton acreage throughout the country or in only a few regions, 64 districts which contribute at least a quarter per cent to the total cotton acreage have been studied. The cotton acreage in these districts formed 93 per cent of the total acreage under the crop in the entire country during 1955-56 to 1958-59. The area under cotton in all the districts, barring 13, shows a similar behaviour to the all-India acreage. (In eight—mostly from Madhya Pradesh—the area has started falling down even during 1955-56 to 1958-59.) Even among those districts which did not record a fall in area during the last two years (1959-60 and 1960-61), the rise has been

only very nominal. A few of these districts are in the newly irrigated regions like Punjab and Ganganagar while four are from Madras State where cotton is grown in *rabi* season (September-October to March-April). These 64 districts were further divided into three groups; one having a quarter to one per cent of the national total (29 districts), one with between 1 per cent to  $2\frac{1}{2}$  per cent (21 districts) and another with more than  $2\frac{1}{2}$  per cent (14 districts). These three groups formed respectively 17, 30 and 46 per cent of the total national acreage under the crop. The behaviour of cotton acreage in these three groups is almost uniform.

#### *Behaviour of Cotton Acreage in Major Cotton Growing Districts*

We shall take only the last group of 14 districts for a detailed study of their cropping pattern. It is of interest to know that in none of these districts irrigation is given to cotton. These 14 districts group themselves into three distinct categories and they disclose much regional sympathy and identity. The movement of the cotton acreage in the three regions is summarised in Table II. The three Mysore districts have shown the least increase in cotton acreage between the years, 1949-50 and 1958-59, the percentage rise being 24 per cent as against the phenomenal growth of 65 per cent recorded by the Gujarat districts. Although the Maharashtra districts have registered only a moderate rise of 40 per cent, they have managed to get stabilized over this level during the succeeding years. On the other hand, the area under cotton in Gujarat and Mysore districts have declined by 6 to 7 per cent during the last two years. The varying behaviour of cotton acreage in different States together with the varying behaviour of acreages of different crops gives us the clue to look for possible factors which determine the crop pattern in the principal cotton tracts of India.

TABLE II—TRENDS IN COTTON ACREAGE IN SELECTED REGIONS

Region and Districts	Indices of area with 1949-50 to 1951-52 acreage as base		
	1952-53 to 1954-55	1955-56 to 1958-59	1959-60 to 1960-61
Gujarat—4 districts .. .. .	128.1	164.7	153.8
Maharashtra — 7 districts .. .. .	129.7	140.3	137.2
Mysore—3 districts .. .. .	108.1	124.2	113.7
All-India .. .. .	120.2	138.6	132.1

#### Districts included :

Gujarat: Ahmedabad, Baroda, Broach, Surendranagar.

Maharashtra: Akola, Amaravati, Buldana, Yeotmal, East Khandesh, Aurangabad, Parbhani.

Mysore: Bijapur, Dharwar, Raichur.

*Considerations and Criteria to Assess Crop Shifts*

The main considerations that will be borne in mind while suggesting the shifting of area under one crop to another are: (1) satisfaction of the country's needs and national interest, (2) physical potentialities of land, (3) the maximum produce per unit of land (4) minimum expenditure per unit of produce, (5) requirements of labour and other main inputs, (6) requirements of crop rotations and (7) satisfaction of cultivator's consumption needs, as far as possible. Items (3) and (4) are not easily manageable, as different crops have different levels of outputs; for example, the average yield of jowar is around 450 lbs. as against less than 100 lbs. for cotton and 700 lbs. for groundnut. The possibility of taking the money value of receipts is ruled out as the prices of all the crops are neither determined purely by the market forces nor on the basis of cost of cultivation of crops. Moreover, there is the difficult problem of determining the proper cost of cultivation. Items (2), (5) and (6) are only operational factors which can be easily taken care of at the time of suggesting the shifts in area. Item (7) should be accommodated as far as possible, without much conflict with the other considerations just enumerated. What now remains to be discussed is the important consideration of satisfaction of country's needs and national interests. The national interests are taken to be satisfied if a crop which gives a higher yield than its corresponding national average should be grown in the place of a crop which gives a lower yield than its corresponding national average. Suppose, if both the crops give a higher (or lower) yield than the corresponding national average, the crop which exceeds by a larger percentage should be chosen. But, while applying this criterion, care is to be taken to avoid any conflict with the country's needs for particular crops at a particular time. In a few cases, a compromise may have to be made by satisfying either of these two criteria.

*Crop Pattern in Gujarat Districts*

The three major crops grown in the four districts of Gujarat (as well as in other two States) are jowar, bajra and cotton. In the earlier years upto 1958-59, more and more area was transferred from jowar and bajra to cotton.<sup>3</sup> Later on, the area under cotton has shown a tendency to decline. Although the extent of fall was only nominal, the significance of the situation would be well understood if we compare the rate of growth of groundnut acreage during the same period. This oilseed crop was occupying a very negligible area in all the districts excepting Baroda. Now, it has some significant area in all the districts. This shift of land from cotton (including the land which would have otherwise gone to cotton) in favour of groundnut in the recent years was again due to the relatively higher prices prevailing for groundnut.

On the other hand, the decline in jowar acreage has been arrested during the last three years.<sup>4</sup> Let us now turn to the advisability of increasing the area under

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3. Because of the relatively higher prices obtained by cotton during these years.

4. The relatively favourable prices for jowar and bajra in relation to cotton prevailing during the last three years is brought out clearly by the Economic Adviser's Index Numbers:

Year	Jowar	Bajra	Cotton	Groundnut
1958-59	105	126	99	117
1959-60	119	126	106	131
1960-61	122	130	112	146

cotton in these districts. It was seen earlier that the country's needs demand the placing of more area under cotton. Now, let us take up the question of national interests. In Surendranagar, the yield per acre of cotton is close to the national average while the yields of the other three substitutable crops (jowar, bajra and groundnut), are well below the national mark. In Ahmedabad and Baroda cotton yields much more than the country as a whole while the three crops yield less. In Broach, both jowar and cotton yield above the national average; but, the percentage difference is more in the case of cotton. Thus, as per our criteria of country's needs and national interests, measures should be taken to increase the cotton acreage in these districts at the expense of the other three crops. Of course, the other considerations (2, 5, 6 and 7) should also be satisfied.

By a similar process, it has been found that it is worth while to transfer some area to cotton from jowar in Bijapur, Aurangabad, Parbhani and East Khandesh and to groundnut in Raichur and Dharwar. Of the four districts belonging to Marathwada, Amaravati and Yeotmal have shown no fall in the area under cotton, while in the other two districts the decline was only nominal. In all these four districts, the yield of cotton is lower than the national average while jowar yields are higher. Here the national interests and country's needs seem to be clashing with each other. This can be solved by deciding either way on the basis of profitability to the farmer. The Farm Management Studies conducted in Akola and Amaravati reveal a higher net income to the farmers from the cultivation of cotton combination than from the jowar combination.<sup>5</sup> The net income per acre for cotton combination is Rs. 23 as against only Rs. 7 for the jowar combination. The family labour income and farm business income are also higher, the respective figures being Rs. 30 and Rs. 50 for cotton combination and Rs. 17 and Rs. 35 for jowar combination. Thus, we have to decide in favour of cotton in the case of these 4 districts.

In certain cases, the application of these criteria would lead to some monetary loss to the cultivators. Whenever the loss is appreciable incentives may be given in the form of either higher relative prices or through subsidy of inputs like seeds and fertilizers or by increasing the facilities for growing, processing and marketing of crops which they are recommended to grow. Suitable adjustment of water rates in irrigated areas so as to be favourable to the particular crop in question would also be helpful.

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5. As reported in Indian Agriculture in Brief, 5th edition, p. 74.