



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Vol XVIII  
No. 1

ISSN 0019-5014

CONFERENCE  
NUMBER

JANUARY-  
MARCH  
1963

# INDIAN JOURNAL OF AGRICULTURAL ECONOMICS



INDIAN SOCIETY OF  
AGRICULTURAL ECONOMICS,  
BOMBAY

# ECONOMICS OF CROPPING PATTERN OF GUJARAT STATE

D. K. DESAI\*

*Economist*  
*Division of Agricultural Economics*  
*Indian Agricultural Research Institute, New Delhi*

## *Changing Cropping Pattern*

During the last decade rapid changes have taken place in the cropping pattern of certain regions of the State and this has been reflected in the cropping pattern of the State as a whole. Table I shows the details of changes in the cropping pattern.

TABLE I—CHANGES IN CROPPING PATTERN

Year	Percentage to Gross Cropped Area		
	Food crops	Cotton	Groundnut
1951-52	59.90	14.14	9.80
1952-53	65.24	12.58	8.18
1953-54	66.19	13.05	7.82
1954-55	57.38	16.36	12.55
1955-56	64.29	18.45	9.38
1956-57	54.30	18.04	12.85
1957-58	48.47	18.76	13.46
1958-59*	49.47	18.68	13.35
1959-60*	48.26	17.30	14.82
1960-61*	44.63	17.38	17.91

Source : Basic Statistics of Gujarat State (1960).

\* Provisional figures from the Office of the Director of Agriculture, Gujarat State.

The area under groundnut has more than doubled and the area under food crops has decreased by 15.27 per cent. This shows the dynamic aspect of agriculture and also the progressive commercialization of agriculture. The change has been brought about by economically rational attitude of Gujarat farmers. They

\*The views expressed in this paper are personal views of the author.

have been very careful in substituting groundnut for crops which are less remunerative. From the point of view of the State policy, this substitution has not caused any worry because the overall production of foodgrains has not been affected by the substitution.

In spite of the dynamism and progressive commercialization of agriculture, the overall productivity of Gujarat agriculture is at a very low level. Compared with the average yield per acre of different crops at All-India level, the yields in Gujarat are lower in almost all crops except cotton and bajra.

In the present paper an attempt is made to locate the weak points in the existing cropping pattern and to suggest ways and means for removing these weak points and to increase the technical efficiency in agricultural production of Gujarat State.

### *Method of Analysis*

The method of analysis is based on the theory of comparative advantage. The theory suggests that firms, group of firms, areas, regions and nations should try to specialize in products in which they have the greatest advantage. In the present analysis we are not viewing the problem of specialization from the micro-level of firms but from the macro-level of the State as a whole.

While using the theory of comparative advantage several simplifying assumptions are made:

(1) Homogeneous areas which we have called as zones are formed on the basis of soil, climate and physical production possibilities.

(2) Within each zone the marginal rate of substitution between products is assumed to be constant.

(3) Within each zone there is homogeneity in commodity and factor prices.

(4) The conclusions based on "comparative advantage" relationships in physical terms would not change if the price ratios are applied to physical quantities.

(5) Yield per acre is taken as an indicator of comparative advantage in physical terms.

### *Use of Data*

For the analysis we have used data collected for Season and Crop Reports of Gujarat State for the years 1956-57 to 1958-59. The data are collected by the talatis (village officers) at the primary level and sent to Mamlatdars (taluka officers) who send them to the Director of Agriculture in standardized tables for Season and Crop Reports. The data used here are collected from these tables from the Office of the Director of Agriculture, Gujarat State. As these data were not completely scrutinized at the time of collection, the figures should be considered as 'provisional.' However, as there would not be material difference between these provisional figures and finally revised figures, the conclusions would not be materially affected.

*Natural Regions of Gujarat State*

For the formation of homogeneous zones, the Gujarat State is divided into five natural regions as follows:—

- I. *South region* : This comprises of all talukas, south of the river Narmada and Hansot, Ankleshwar, Jhagadia, and Valia Taluka of Broach district.
- II. *Middle region* : This comprises of all talukas between the rivers Narmada and Sabarmati except the talukas of Broach district included in the South region.
- III. *North region* : This comprises of areas north of the river Sabarmati including Bayad, Bhiloda, Himmatnagar, Modasa, Meghraj, Malpur and Prantij Talukas.
- IV. *Saurashtra region* : This comprises of all districts of Rajkot division except Kutch district.
- V. *Kutch region* : This comprises of Kutch district only.

*Crop Zones*

Each region is further classified into different zones based on the cropping pattern. For this purpose eight important crops of the State, *viz.*, rice, jowar, bajri, wheat, gram, sugarcane, cotton and groundnut, were selected. They formed 78.51 per cent of the gross cropped area of the State. A taluka was taken as the smallest geographical unit for noting down the area under these crops. The average area for the years 1956-57 to 1958-59 was worked out for an individual crop as well as the aggregate of eight crops in each taluka of the State. If the percentages of two or more crops to the total of eight crops in a taluka constituted more than 50 per cent, the taluka was classified as belonging to a crop zone formed by a crop or a combination of crops. The distribution of crop zones in different regions of the State is given in Table II.

TABLE II—DISTRIBUTION OF CROP ZONES

Region	Number of Crop Zones	Number of Talukas*
South	5	26
Middle	17	43
North	17	32
Saurashtra	12	69
Kutch	4	11

\*The data of certain talukas were not available and hence not included here.

*Productivity Classification of Talukas*

Talukas within a crop zone were classified into different productivity groups for each major crop. For the eight major crops taluka-wise area and production for the three years (1956-57 to 1958-59) were noted and yields per acre were worked out. Means of area and yield per acre for each taluka were worked out. If  $\bar{X}$  denotes the area under the crop per taluka and  $\bar{Y}$  is the yield per acre in the taluka, the productivity classification of talukas was as follows:—

Productivity group	Area in the Taluka	Yield per acre in the Taluka
AA	$> \bar{X}$	$> \bar{Y}$
AB	$> \bar{X}$	$< \bar{Y}$
BA	$< \bar{X}$	$> \bar{Y}$
BB	$< \bar{X}$	$< \bar{Y}$

Table III gives the details of distribution of talukas according to productivity groups.

TABLE III—DISTRIBUTION OF TALUKAS ACCORDING TO PRODUCTIVITY GROUPS

Crop	..	..	..	AA	AB	BA	BB	Total
Rice	..	..	..	30	24	41	56	151
Jowar	..	..	..	14	39	41	33	127
Bajri	..	..	..	18	47	44	44	153
Wheat	..	..	..	19	19	61	72	171
Gram	..	..	..	16	15	61	71	163
Sugarcane	..	..	..	17	25	23	58	123
Cotton	..	..	..	34	34	30	67	165
Groundnut	..	..	..	49	8	80	27	164

*Mal-adjustment in the Cropping Pattern*

According to the theory of comparative advantage a taluka falling in AA group for a particular crop has greater advantage in that crop than other crops. A taluka falling in AB group for a particular crop suggests that farmers have already shown a preference to this crop over others in the taluka; but the technical efficiency of production is lower than other talukas falling in AA or BA groups.

Unless attempts are made to raise the productivity of the crop falling in AB group, the next best alternative is to substitute it by a crop of AA or BA group which shows higher production potential. The crops in BB group are mal-adjustments in the cropping pattern and should be discouraged. They should be re-

placed either by BA or AA group crops of the taluka or the adjacent taluka in the same crop zone. Although we have assumed that application of prices would not alter the conclusion derived from the comparative advantage of a crop in physical terms sometimes we would find exceptions in case of high profit crops like sugarcane. But such cases would be rare and the suggestion for replacing BB crops with BA or AA crops will hold good in general.

### *New Cropping Plan*

A statement was prepared giving details of each taluka in the State regarding its classification according to productivity groups for eight major crops. A new cropping plan for the taluka was prepared by substituting a BA or AA crop for BB crop. Production estimates were framed on the basis of this substitution and raising the productivity of AB group to the level of AA or BA group of the adjacent taluka in the crop zone.

### *Comparative Economics of the Existing and New Cropping Pattern*

The comparison of the new cropping pattern with the existing one shows the nature of adjustments required to be made. The changes in income and production likely to be effected as a result of these adjustments were studied. The average production of eight crops were weighted by the average harvest prices during the period of three years for which the production figures were obtained and the gross income for the taluka was estimated. The gross income of the new plan was obtained by utilizing the same prices and the estimated production on the basis of planned area and increased productivity.

### *Changes in the Cropping Pattern*

As a result of adoption of new cropping plans at the taluka level the changes which will take place in the cropping pattern of the State as a whole are given in Table IV.

The suggested changes are more or less in conformity with the trend of changes in the cropping pattern of the last decade. Thus the new plan takes into account farmers' attitude towards future change and also tries to put the cropping pattern on more rational basis.

A detailed comparison between the existing and new cropping pattern at the regional levels (Table IV) indicates the crops and regions where changes should be effected. Major changes in crop areas are suggested in Saurashtra where groundnut should be substituted for bajri. In the South region area under cotton should be reduced and that under groundnut should be increased. The recent trend in the cropping pattern of the region shows that such change is taking place.

However, when Kakrapar project will have its full impact on this region, perhaps more area would come under sugarcane and vegetables and fruits. In the Middle zone also shift is towards groundnut. In the North zone there are potentialities of increasing area under paddy. For the State as a whole areas under groundnut, gram and rice should be increased whereas areas under bajri, jowar, wheat and cotton should be decreased.

TABLE IV—REGION-WISE COMPARISON BETWEEN THE NEW AND EXISTING CROPPING PATTERNS

(in lakh acres)

Region		Rice	Jowar	Bajri	Wheat	Gram	Sugar-cane	Cotton	Ground-nut	Total
South	B	3.49	2.88	0.14	0.27	0.12	0.05	7.12	0.63	14.70
	A	3.50	3.06	0.21	0.00	0.28	0.04	6.51	1.10	14.70
	D	0.01	0.18	0.07	-0.27	0.16	-0.01	-0.61	0.47	—
Middle	B	7.58	5.30	4.96	4.64	1.60	0.01	15.75	3.81	43.65
	A	7.59	4.96	5.28	4.34	1.85	0.00	14.46	5.17	43.65
	D	0.01	-0.34	0.32	-0.30	0.25	-0.01	-1.29	1.36	—
North	B	1.01	7.38	13.10	2.56	0.51	0.06	4.73	2.58	31.93
	A	2.07	7.02	12.46	2.92	0.65	0.06	4.00	2.75	31.93
	D	1.06	-0.36	-0.64	0.36	0.14	—	-0.73	0.17	—
Saurashtra	B	0.49	16.62	19.83	3.06	0.77	0.23	13.88	27.14	82.02
	A	0.44	16.52	15.83	3.20	0.56	0.29	13.23	31.95	82.02
	D	-0.05	-0.10	-4.00	0.14	-0.21	0.06	-0.65	4.81	—
Kutch	B	—	2.35	2.83	0.27	—	0.006	1.68	0.22	7.35
	A	—	2.35	2.68	0.23	—	0.005	1.46	0.63	7.35
	D	—	—	-0.15	-0.04	—	—	-0.22	0.41	—
Gujarat State	B	12.57	34.53	40.86	10.80	3.01	0.36	43.16	34.38	179.66
	A	13.60	33.91	36.46	10.69	3.35	0.40	39.66	41.60	179.66
	D	1.03	-0.62	-4.40	-0.11	0.34	0.04	-3.50	7.22	—

A — New Plan ; B — Existing Plan ;  
D — Difference between New and Existing Plans.

#### *Changes in Production and Gross Income*

Although it is suggested that areas under certain crops should be decreased, it is observed that even with the decreased area, higher production could be achieved if the productivity of inefficient talukas could be raised to the level of efficient talukas. A comparison between the production and gross income figures of the existing and new plan (Tables V and VI) shows that it is possible to increase production of all the eight crops. The gross income could be increased by 39.25 per cent.



The maximum increase could be had in groundnut and next in turn is cotton. Thus the contribution of cotton and groundnut in the increase of gross income of eight crops of the State is 54.43 per cent. A surprising observation is that though the area under bajri is reduced by 4.4 lakh acres production could be increased by 3.76 lakh tons. Though the area under wheat in the existing as well as the new plan remains the same the new plan shows possibilities of increasing production from 3.01 lakh tons to 5.41 lakh tons.

TABLE V—REGIONAL CHANGES IN PRODUCTION (IN LAKH TONS)

Region		Rice	Jowar	Bajri	Wheat	Gram	Sugar-cane	Cotton	Groundnut
South	B	1.393	0.565	0.029	0.044	0.018	0.139	2.519	0.145
	A	1.576	0.619	0.048	0.000	0.054	0.077	2.880	0.416
	D	0.183	0.054	0.019	-0.044	0.036	-0.062	0.361	0.271
Middle	B	2.874	0.715	1.068	1.029	0.276	0.029	3.741	1.378
	A	3.232	0.722	1.161	2.363	0.409	0.014	4.491	1.789
	D	0.358	0.007	0.093	1.334	0.133	-0.015	0.750	0.411
North	B	0.412	1.345	2.092	0.786	0.075	0.264	1.319	0.631
	A	0.501	2.393	4.655	1.263	1.218	0.264	1.993	0.718
	D	0.089	1.048	2.563	0.477	1.143	—	0.674	0.087
Saurashtra	B	0.210	1.004	2.313	1.081	0.068	0.518	4.459	6.867
	A	0.254	1.563	3.226	1.697	0.084	0.875	5.297	11.375
	D	0.044	0.559	0.913	0.616	0.016	0.357	0.838	4.508
Kutch	B	—	0.169	0.358	0.072	—	0.010	0.504	0.039
	A	—	0.223	0.529	0.089	—	0.014	0.665	0.129
	D	—	0.054	0.171	0.017	—	0.004	0.161	0.090
Gujarat State	B	4.889	3.789	5.860	3.012	0.437	0.960	12.542	9.060
	A	5.563	5.520	9.619	5.412	1.765	1.244	15.326	14.427
	D	0.674	1.722	3.759	2.400	1.328	0.284	2.784	5.367

A — New Plan ; B — Existing Plan ;  
D — Difference between New and Existing Plans.

TABLE VI—REGIONAL CHANGES IN GROSS INCOME (IN LAKH RUPEES)

Region	Rice	Jowar	Bajri	Wheat	Gram	Sugar-cane	Cotton	Ground-nut	Increase in Total Gross Income	Percentage Increase
South	B	570.33	228.86	12.64	27.17	36.74	75.68	2783.77	68.09	3803.28
	A	645.26	250.74	20.92	—	55.88	41.92	3182.72	195.35	4392.79
	D	74.93	21.88	8.28	-27.17	19.14	-33.76	398.95	127.26	589.51
Middle	B	1136.61	252.94	431.31	546.32	111.58	23.68	3541.49	622.59	6666.52
	A	1278.19	255.41	468.87	1254.56	165.34	11.43	4251.49	808.29	8493.58
	D	141.58	2.47	37.56	708.24	53.76	-12.25	710.00	185.00	1827.06
North	B	195.43	504.67	859.37	427.51	28.08	126.99	1192.28	289.62	3623.95
	A	237.65	897.90	1912.23	686.96	456.08	126.99	1801.53	329.55	6448.89
	D	42.22	393.23	1052.86	259.45	428.00	—	609.25	39.93	2824.94
Saurashtra	B	92.93	382.32	1099.28	571.98	26.15	257.89	3701.86	3202.56	9334.97
	A	112.29	595.19	1533.19	897.92	32.30	435.63	4397.57	5304.96	13309.15
	D	19.46	212.87	433.91	325.94	6.15	177.74	695.71	2102.40	3974.18
Kutch	B	—	60.08	159.15	39.67	—	6.26	724.84	539.40	1529.40
	A	—	90.30	235.17	49.04	—	8.76	956.39	772.11	2111.77
	D	—	30.22	76.02	9.37	—	2.50	231.55	232.71	582.37
Gujarat State	B	1995.30	1428.87	2561.75	1612.65	202.55	490.50	11944.24	4722.26	24958.12
	A	2273.49	2089.54	4170.36	2888.48	709.60	624.73	14583.70	7410.26	34756.18
	D	278.19	660.67	1608.63	1275.83	507.05	134.23	2645.46	2688.50	9798.06

A — New Plan ; B — Existing Plan ; D — Difference between New and Existing Plans.

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

C. Muthiah

*Research Officer*

*Agro-Economic Research Centre for Madhya Pradesh, Gwalior*

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

---

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