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Vol XIX
No. 1

ISSN 0019-5014

CONFERENCE
NUMBER

JANUARY-
MARCH
1964

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS



INDIAN SOCIETY OF
AGRICULTURAL ECONOMICS,
BOMBAY

The data indicate that in the area of relatively high productivity, there were cultivators who were having very low farm income, amounting to Rs. 71.55 per acre. The two low-income cultivators, who were practising dry farming, showed aversion to take credit for sinking well. With favourable attitude towards development, these cultivators could have increased their farm earnings through the investment of the borrowed capital on a well—a promising venture. However, with the development of lending institutions, credit will be used to a relatively greater extent than today by all types of cultivators.

The economic analysis of the data and the result obtained supported the hypothesis that the level of farm management including the capacity and willingness to borrow money for productive use, has been an important factor in accounting for regional differences in the growth of agriculture. Management as an input factor can diminish the regional differences.

PRODUCTIVITY OF PRINCIPAL CEREALS IN DRY AREA OF RAJASTHAN

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A balanced development of all the regions with particular emphasis on bringing the less developed regions to the level of relatively more developed regions becomes an important task of planned development. This is sought not only as a means of rendering economic justice to the people of under-developed regions but to provide suitable conditions for proper utilisation of natural bounties, local skills and capital resources of those regions so that they contribute more effectively to the overall economic progress of the country.

The dry region of Rajasthan which forms part of the great western desert of 'Thar' is the largest division of the State, occupying nearly 57 per cent of the total area in the nine districts of Barmer, Bikaner, Churu, Ganganagar, Jaisalmer, Jalore, Jodhpur, Nagour, and Pali. The area once formed part of the erstwhile Princely State of 'Marwar', locally called '*Marubhumi*' or '*Maroosthali*' the region of death on account of its barrenness and sterility. It presents a number of peculiar features such as the sand-hills locally called '*Dhora*' or '*Teeba*', shaped generally in long straight ridges resembling the ripple parks on a sea shore upon a magnified scale.¹ Another peculiar feature is that of 'Mirage' which presents its fantastic appearance, pleasing to all but the wearied traveller.² As result of its dry and barren soil earlier writers were provoked to proclaim that in this region 'there are more spears than spear grass-heads and blades of steel grow

1. (Col.) James Tod, 'Annals and Antiquities of Rajasthan' (London), Part (i), p. 14.

2. *Imperial Gazetteer*, Vol. XIV, p. 129.

better than blades of corn'.³ A study of the agricultural productivity of such a region must be of interest to all. In this paper an attempt has been made to study the productivity of principal cereals which account for 54.50 per cent of the total average cropped area of the region in 1959 and 1960, *vis-a-vis* the State as a whole and its constituent parts *inter se*. An analytical study of the contributory causes and the impact on the general economic prosperity of the region would explode the myth of its inherent barrenness and would also reveal its future potential.

The importance of agricultural productivity as a means of economic prosperity cannot be over-emphasised in a State where 79.51 per cent (India 71.28 per cent) of the total working force depends on agriculture and its allied sectors. The relative place of the State in respect to productivity has been shown in Table I by means of ranks.

TABLE I— RANK OF RAJASTHAN IN THE AVERAGE PRODUCTIVITY OF PRINCIPAL CEREALS IN THE STATES OF INDIA

Crops	Bajra	Jowar	Maize	Wheat	Barley	Rice	Small millets
Years							
1956-57	12	11	7	2	1	14	8
1959-60	7	10	5	2	1	4	6

Source : 'Statistical Abstracts of India, 1957-58 and 1960-61, Central Statistical Organization, Government of India.

Table I reveals that the productivity of *kharif* cereals is generally low on account of low average normal rainfall of 53.63 cms. in the State. Not only the rainfall is scanty it is uncertain ; it is difficult to rely on two good rains in succession. The productivity of *rabi* cereals such as barley and wheat on the other hand is high because they are invariably raised under conditions of irrigation. In spite of low ranks attained by the State in *kharif* cereals, there is an ascending tendency in all the cereals while the first and second ranks attained in barley and wheat respectively are being retained. This shows the improving trend of productivity despite an increase in the net sown area from 30.70 lakh acres in 1956-57 to 32.70 lakh acres in 1959-60.

In the context of the above, the average productivity of principal cereals in the dry area of the State has been shown in Table II. The two periods cover 1956-57 to 1958-59 and 1959-60 to 1960-61 respectively as the district-wise data for the earlier and later years are not available.

Table II shows that the average productivity of *kharif* or rain crops is low due mainly to scanty rains, the normal average being 27.41 cms. (State 53.63 cms.) Not only the rains are just the half of the State's normal average they are subjected to wide fluctuations ranging sometimes to =15 cms., in some regions. Added to it the high sub-soil percolation and aeration and an absence of organic matter in soil, due to poor vegetation, conspire to keep the *kharif* productivity at a low level.

3. *Imperial Gazetteer*, Vol. XXI, p. 84.

TABLE II—AVERAGE PRODUCTIVITY OF PRINCIPAL CEREALS IN RAJASTHAN

(in lbs.)

Crops	1956-57 to 1958-59		1959-60 to 1960-61		Variation	
	Dry Area	Whole State	Dry Area	Whole State	Dry Area Col. 4 over Col. 2	Whole State Col. 5 over Col. 3
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bajra	137	179	139	182	+2	+ 3
Jowar	136	261	132	263	-4	+ 3
Maize	486	768	756	832	+270	+ 64
Wheat	875	798	963	956	+88	+158
Barley	715	1,012	1,276	1,030	+561	+ 18
Rice	546	725	776	817	+230	+ 92
Small Millets ..	307	332	313	396	+6	+ 64

Source: Calculated from the data of area and production furnished by Land Records Department of the Government of Rajasthan.

As against the above trend of *kharif* cereals the average yields of *rabi* or irrigated cereals such as wheat and barley, the former in both the periods, and the latter in second period alone have been higher than the overall yield of the State as a whole. This explodes the inherent barrenness of the soil. In fact, the only limiting factor in the region is the availability of irrigation water. A marked leap in the productivity of barley from 715 lbs. to 1,276 lbs. during above two periods reveal its suitability to the area especially, acidic soils. Barley should always be preferred where the conditions of soil and prospects of rain do not warrant raising of wheat which is more sensitive to natural environment and pests. Looking to the low yields of maize and rice in earlier period they have shown substantial improvement and further reveal that there is no inherent inhibition with the area as such. Where soil conditions and the supply of water is bit assured maize can assure better economic advantage to the farmer and should always be preferred.

The prospects of development of the area are quite bright if the irrigation facilities can be provided at a fast pace. It is keenly awaiting the completion of Rajasthan Canal. The progress so far has been only moderate. By 1958-59 irrigation facilities could extend to 8.1 per cent (State 11.4 per cent) of the total cropped area and that too was not properly utilised as the double cropped area was only 2.1 per cent of the total cropped area. The supply is still insufficient in many areas to warrant taking two crops.

Adequate attention does not seem to have been paid to land reclamation and soil conservation. In C. D. budget only 1 per cent in the First Plan and a negli-

gible portion in the Second Plan was allocated for land reclamation and soil conservation. For proper utilisation of scanty water resources it is necessary to prepare the soil before rains by levelling and bunding, resorting to multipurpose crop rotation with an automatic green manuring and an all-out effort for raising suitable plantation on every available patch of land. The initiative in the earlier stages for such schemes should come from extension agency in the area. It is too much to rely on the initiative of the farmer for such projects of unsure maturity. But unfortunately due to rapid expansion, the extension agency stands ill-equipped, with inadequately trained staff. It is difficult to achieve the desired results with such diluted efforts and resources.

The other factor responsible for the low yields in the region is the extensive method of cultivation. The size of the holding is big being 33 acres (State 16.2 acres) wherein it is not possible to make intensive efforts for soil preparation and other laborious cultural practices. Manuring of the soil is an exception and not the rule. As a result of general shortage of fuel in the region all valuable farm-yard manure is burnt as fuel to leave little which of course is applied to some valuable *rabi* crops.

Another factor contributing to the low productivity is the pre-occupation of most of the people in animal husbandry. It supplements and is supplemented by agriculture. The region having 30.5 per cent of the State's population enjoys both qualitatively and quantitatively better animal wealth (29.36 per cent of cattle, 24.19 per cent of the buffaloes, 44.36 per cent of the sheep and goats and 94 per cent of the camel). As a result of rich animal wealth the per capita income of the people in the region is Rs. 248.5 (State Rs. 238).⁴

Table III reveals that yields of *kharif* cereals in better watered districts such as Pali and Nagour with rainfall of 38.99 cms. and 31.93 cms. respectively, are higher than Barmer and Jaisalmer with normal rainfall of 17.91 cms. each.

Throughout the region bajra is main *kharif* crop occupying nearly 80 per cent to 90 per cent of the total cropped area with yields varying from 82 to 91 lbs. per acre in Ganganagar (dry parts) to 190 to 199 lbs. per acre in Pali. Even this low yield gives a fair economic advantage to the farmer of the region who with low input is assured of a staple food which can quench his appetite better than any other light staple cereal. It does not need long and tiring cultural practices; after the first regular fall of the rains, seed is sown broadcast to ripen in the routine course without manuring, weeding or interculture.

Jowar is fairly widely grown in the region but its yield varies greatly, from 31 to 56 lbs. per acre in Jodhpur district to 238 to 282 lbs. per acre in Bikaner district. This wide range is due to the purpose for which jowar is grown, the low yielding jowar is for '*Chari*' or fodder and the other being primarily for food-grains.

4. NCAER Estimate for 1955-56—vide 'Techao Economic Survey of Rajasthan, Table No. 1, p. 225.

TABLE III—DISTRICT-WISE PRODUCTIVITY OF PRINCIPAL CEREALS IN DRY AREA OF RAJASTHAN

		(in lbs.)								
Districts		Barmer			Bikaner			Churu		
Cereals		(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Bajra	160	151	- 9	99	102	+ 3	90	97	+ 7
Jowar	95	112	+ 17	238	282	+ 44	240	264	+ 24
Maize	621	851	+230	—	—	—	—	996	—
Wheat	832	1,146	+314	1,035	683	-352	899	818	- 71
Barley	1,007	1,335	+328	682	1,120	+448	547	1,329	+782
Rice	—	—	—	—	—	—	—	—	—
Small Millets	119	461	+342	—	—	—	—	—	—

Districts		Ganganagar			Jaisalmer			Jalore		
Cereals		(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Bajra	91	82	- 9	163	147	-16	182	152	- 30
Jowar	263	263	0	101	109	- 8	94	124	+ 30
Maize	781	828	+ 47	—	—	—	594	633	+ 39
Wheat	907	821	-86	427	842	-415	838	801	- 37
Barley	558	1,214	+656	1,208	1,949	+741	986	1,377	+391
Rice	496	794	+298	—	—	—	656	324	-332
Small Millets	173	395	+222	—	—	—	300	275	+ 25

Districts		Jodhpur			Nagour			Pali		
Cereals		(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
Bajra	77	104	+ 27	197	188	- 9	140	199	+ 59
Jowar	56	31	- 25	145	120	-25	142	157	+ 15
Maize	602	772	+170	519	735	+216	442	748	+306
Wheat	919	695	-224	661	447	-214	687	865	+178
Barley	990	1,352	+362	1,358	1,466	+108	860	1,280	+420
Rice	—	—	—	560	—	—	484	309	-175
Small Millets	295	684	+389	285	812	+527	327	440	+133

Source : Calculated from the data of area and production furnished by Land Records Department of the Government of Rajasthan.

(A)=Average for 1956-57 to 1958-59 ; (B)=Average of 1959-60 to 1960-61 ; (C)=Change in (B) over (A).

In conformity with the overall trend in the State the yields of wheat have uniformly fallen while that of barley have risen. The reasons already given do not in any way affect the earlier conclusions to make out a separate case for the region. On account of less vulnerability to acidic soils barley should be preferred in the region.

The district-wise productivity of the cereals has further confirmed the inverse relationship of area brought under cultivation and yield partly on account of the utilisation of marginal and sub-marginal lands and partly due to the normal tendency of dissipation of efforts and scant input factors over a wider area. The rise in the yields in the later period over the earlier period is more in case of cereals which have already not attained the normal level of productivity and stand to gain more. If this be so the low productivity of the area stand better chances of improvement since it has not yet attained the optimum level of productivity beyond which, of course, the productivity must coincide with the application of science and technology.

It may, therefore, be concluded that there is no inherent inhibition with the area as such. An optimum utilisation of the existing resources and systematic growth of new resources can give good results. The region with a low normal density of 81 persons per sq. mile (State 153 and India 373), with its vast unutilised land resources holds out greater promise for future development. The proper and speedy development of this area becomes all the more imperative due to fast rate of population growth both in the State and the country as a whole.

SOME ASPECTS OF REGIONAL VARIATIONS IN AGRICULTURAL PRODUCTIVITY AND DEVELOPMENT IN WEST BENGAL*

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Existence of regional variations in productivity and development is an important characteristic of economically underdeveloped countries especially those countries which had to undergo colonial exploitation. These western colonialists came to these countries and established large industries in few selected centres which were mainly export-oriented and consumer goods industries including few plantation industries. But the establishment of these industries was neither accompanied by urbanisation nor by the general reorganisation of agricultural

*N.B. : Tables presented in this paper are based on data on land utilisation, area under production of crop, agricultural machineries and irrigational implements, sources of irrigation, etc., published in Statistical Abstract—West Bengal 1960, by State Statistical Bureau of Government of West Bengal.