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will attract capital into agriculture. Another point for consideration is the question of providing loans by financial institutions on the basis of credit needs. To step up farm productivity it is essential to cover all the needs irrespective of the asset and liquidity situations. A system of marking funds for each farm with facilities for periodical withdrawal depending upon the needs of agricultural operations is worth examination by the financial institutions. The scope of much talked and written ways of moneylenders in the countryside is likely to be minimized and corrected by the healthy competition insisted by the institutional credit.

### *Conclusions*

In the developing economies, agricultural growth sets the tempo for economic development. Inter-sectoral imbalance in capital availability and supply retards the growth in agriculture which in turn inhibits economic development. If agriculture should rise, its appetite for capital should be satisfied by inter-sectoral capital mobility. To achieve this, the investment risks in agriculture should be minimized through measures such as insurance projects which will ensure sustained flow of capital into and off agriculture for an overall inter-sectoral balance and development.

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## INSTITUTIONAL FINANCE : PROBLEMS AND PROSPECTS IN ARID AGRICULTURE

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Nearly 3,12,490 sq. kms. of the land surface of India is characterized by arid or semi-arid conditions. Of this, about 63 per cent falls in the State of Rajasthan. The peculiar physical circumstances of arid region affecting the pattern of farm production present special problems for institutional financing of agriculture, which may not be fully appreciated while discussing the credit problems of agriculture in humid or sub-humid regions. The present paper deals with the problems and prospects of institutional financing of agriculture in the arid zone of Western Rajasthan.<sup>1</sup>

The erratic and inadequate (5" to 20") rainfall, widely fluctuating temperatures, desiccating winds, generally deficient soils, low and sparse vegetation and scant and generally saline sub-soil waters are the principal parameters affecting agriculture in this region. Because of these physical features, agriculture in this

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1. The arid zone covers nearly three-fifth of the State territory and is spread over eleven North-Western districts.

region is characterized by extremely low physical production possibilities, a high degree of production variability and subsistence and security oriented pattern of farm production. Consequently, the returns, repaying capacity and risk bearing ability of the desert farmers remain permanently depressed. This in turn not only makes the effective demand for institutional credit very low, but also makes the arid agriculture the least attractive field for credit institutions. Some important features inhibiting the working of lending institutions may be discussed briefly.

(a) *Instability Inherent in Arid Agriculture*

The programme of credit institutions and their lending policies are generally guided by their expectations regarding safety of the loan and margin of earnings. These expectations in turn depend upon the production performance of the borrowing firm. In a region where droughts and famines are a recurrent feature and farm production fluctuates violently, it is difficult to think of any production pattern which can serve as a dependable basis for normal expectations of the investors. The risk and uncertainty inherent in arid agriculture may be illustrated with the following indicators of production variability.

Firstly, the Western Rajasthan as a whole is one of the regions having the highest incidence of drought. The meteorological data for nearly fifty years indicate that there is a possibility of more than one drought in a period of five years.<sup>2</sup>

The records maintained by the Department of Famine Relief, Rajasthan (Table I) show that nearly 30 to 40 per cent of the villages of this region are hit by scarcity conditions due to rain failure, every second or third year, leading to loss of crop and animal production, large scale out-migration, and entailing huge expenditure on relief measures.

TABLE I—PERCENTAGE OF TOTAL VILLAGES IN THE ARID ZONE OF RAJASTHAN AFFECTED BY SCARCITY CONDITIONS DURING DIFFERENT YEARS

Year	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
Villages	40.23	43.08	31.29	9.59	21.22	38.70	15.75	—
Year	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
Villages	35.60	2.19	12.22	43.13	11.94	35.00	31.70	15.76

Source : Calculations based on the Records of the Department of Famine Relief, Government of Rajasthan, Jaipur.

2. A. K. Mallik and T. S. Govindaswamy, "The Drought Problem of India in Relation to Agriculture," *Annals of Arid Zone*, Vol. I, No. 1-2, 1962-63.

Secondly, the crop production data for the last fifteen years also indicate that the principal crops of the region are subject to a high degree of fluctuation in yield. (Variations were found significant according to the student's 't' test.) The information presented in Table II shows that in the case of bajri, which covers nearly 60 per cent of the cropped area, the range of yield variation is 181 kgs./ha. The coefficient of variation is 32.48. The extent of yield variability is much higher in the case of sesamum and jowar, the coefficients of variation being 47.16 and 42.74. *Kharif* pulses having higher drought resistance and better suitability to desertic conditions show relatively less variability. But taken together, the yield variability of these crops which cover more than 91 per cent of the total cropped area renders arid agriculture highly risky for institutional finance.

TABLE II—YIELD VARIABILITY OF PRINCIPAL FIELD CROPS OF ARID ZONE OF RAJASTHAN

Crops	Bajri	<i>Kharif</i> pulses	Sesamum	Jowar
Area covered (per cent of total cropped area)* .. .. .	59.73	21.34	5.72	4.69
Average yield (kgs./ha.) .. .. .	168.58	142.08	123.08	116.60
Range of yield variation (kgs./ha.) ..	181.12	100.39	192.28	191.65
Coefficient of variation .. .. .	32.48	21.97	47.16	42.74

\* Average of five years (1961-62 to 1965-66). Remaining area is covered by 18 small crops. Total cropped area is 66,06,790 hectares.

Source of Data : Dy. Director, Revenue Records (for 1951 to 1955) and Statistical Abstract of Rajasthan (1956-1967), Directorate of Economics and Statistics, Jaipur.

#### (b) *Non-monetized and Stagnant Agriculture*

Besides uncertainty of farm production, two other factors which would adversely affect the working of institutional financing in arid agriculture are lack of strong cash nexus and overall stagnation of agriculture.

The very fact of low and unstable production imparts subsistence and security orientation to agriculture in this region. Farmers' first concern is security of human (and also animal) subsistence. The predominance of food crops (Table II) in the cropping pattern is by itself an indicator of subsistence farming. The area under sesamum, the only major cash crop of the region accounts for only 6 per cent of the total cropped area.

Moreover, in the face of such low yields (Table II) and frequent crop failures, it is unrealistic to expect any surplus generation or existence of large marketable and marketed supplies. During a survey of 13 Community Development Blocks (covering 1,118 villages) in the Luni river basin in Western Rajasthan by the Central Arid Zone Research Institute (C.A.Z.R.I.), Jodhpur, it was discovered that more than 44 per cent of the farmers did not sell any agricultural produce during the reference year.<sup>3</sup>

3. A. B. Bose, *et al.*, "Agriculture in Central and Lower Luni Basin in Western Rajasthan," *Annals of Arid Zone*, Vol. 4, No. 2, September, 1965.

Apart from the unfavourable production conditions, the prevailing marketing arrangements are also not conducive to monetization and market orientation of arid agriculture. Mainly owing to poor accessibility (road mileage being 7.2 miles per 100 sq. miles of geographical area), most villages in the interior are literally isolated from towns and trading centres and virtually form closed economy. The village *mahajan* (trade-cum-moneylender), is their only link with the outside world and practically the only marketing agency for both crop and animal products.<sup>4</sup> Since barter suits best to his requirements, the extent of cash transactions is extremely limited.<sup>5</sup> Yet another indicator of backward marketing system is the fact that there is not a single regulated market in this region. Even the number of traditional *mandis* is limited (one *mandi* per 85 thousand hectares of cropped area).

In contrast to crop farming, production conditions in the case of livestock raising are more favourable for monetization and market orientation. This is because of the very nature of the products as well as comparatively greater stability. But here again, except in the case of the villages nearer the towns, the marketing facility is either non-existent or highly unorganized. It is again because of the *mahajan*, who is a main trading agency, not only the stockmen fail to get due returns and adequate incentives, but also the process of monetization is unduly impeded.<sup>6</sup>

## II

### *Performance of Credit Co-operatives*

The circumstances described above make the arid agriculture highly unsuitable for institutional financing. This conclusion is corroborated by the performance of co-operative credit institutions in this region.<sup>7</sup> Table III presents some of the important indicators of the performance of co-operative credit institutions. The information about the wet region has also been placed along with the dry region so as to give some comparative picture. The performance of co-operatives in the wet region is none too encouraging, but the situation in the arid region is still worse.

Not only could the agricultural credit co-operatives not cover even one-fourth of the rural population, but about 39 per cent of the co-operatives are now dormant. The share capital and working capital per society or per member in the arid region is nearly half of their counterparts in the wet region. The reserves

4. *ibid.*

5. The Reserve Bank of India study also found predominance of barter transactions in desert regions. The cash transaction constituted only 21 per cent of total transaction in the Barmer district. See Rural Credit Follow-Up Survey, 1959-60, General Review Report, Reserve Bank of India, Bombay, 1962.

6. A. B. Bose, *et al.*, "Animal Husbandry in Arid Zone — Some Socio-Economic Aspects," *Annals of Arid Zone*, Vol. 3, No. 1 and 2, 1964 and Vol. 5, No. 1, 1966.

7. Besides co-operative institutions, the other agency for agricultural financing has been the Government itself, which provides *taccavi* loans. This region receives a larger share of distress *taccavi* as a relief measure during famines. In the case of development *taccavis* (now proposed to be handled by land development banks), the arid region rarely gets due share, because the priority projects such as construction and renovation of wells, installation of oil engines or even tractors do not have much scope in this region. Neither the commercial banks nor special financial agencies created by Government have involved themselves in the arid region for justifiable reasons.

and other funds per society comes to only Rs. 34 per society in the arid region. The corresponding figure for the wet region is Rs. 505. The inadequacy of operational resources, obviously, makes the co-operatives ineffective as credit agencies.

TABLE III—SOME INDICATORS OF PERFORMANCE OF AGRICULTURAL CREDIT CO-OPERATIVES IN THE DRY AND WET REGIONS OF RAJASTHAN DURING 1962-1965

Particulars	Dry region			Wet region		
	Over-all	Per society	Per member	Over-all	Per society	Per member
A. Loans advanced per 100 hectares of cropped land :						
(i) Short-term ..	190	—	—	440	—	—
(ii) Medium-term ..	13	—	—	24	—	—
(iii) Long-term ..	3	—	—	16	—	—
B. Rural Population covered (per cent) .. .. .	24	—	—	39	—	—
2. Dormant societies (per cent)	38	—	—	25	—	—
3. Share capital (Rs.)	—	1,783	20	—	3,168	42
4. Reserve and other funds (Rs.) ..	—	34	0.57	—	505	4.08
5. Deposits (Rs.) ..	—	551	7	—	796	10
6. Working capital (Rs.)	—	7,719	101	—	13,528	135
7. Loan advanced (Rs.)	—	4,863	53	—	6,678	87

Source : Calculated from Annual Progress Reports of Co-operative Movement in Rajasthan, Co-operative Department, Rajasthan.

The marginal role of co-operative credit in agriculture may also be seen by looking into short, medium and long-term loans advanced by the co-operative institutions in the arid region. The three types of loans per 100 hectares of cropped area during 1962-1965, amount to Rs. 190, Rs. 13 and Rs. 3 respectively. This performance is highly depressing.

### III

The foregoing discussion indicates that the whole problem of institutional financing in arid agriculture consists of (i) making arid agriculture more congenial for successful working of credit institutions, and (ii) making suitable adjustments in institutional financing itself, in the light of the present situation as well as in the context of development needs of arid agriculture. This means a two pronged reorganization process. The rest of this paper deals with these two basic issues.

#### *Measures for Improving Agricultural Situation*

In concrete terms, the reorganization of arid agriculture for making it more suitable for institutional financing would mean (a) injection of greater stability into farm production, (b) growth of agriculture sector and (c) imparting market

orientation to farm production. The three are very much inter-related. In the context of arid agriculture, the measures which inject stability into farm production would also ensure a higher rate of production. Given the adequate infrastructure facilities, high and stable production may also make farm production market-oriented. Therefore, the whole problem has been approached as one of making farm production more stable.

The principal factor responsible for instability (and also stagnation) of arid agriculture is the paucity of usable moisture. The two alternatives to meet this situation are (i) development of the water resources of the region and (ii) conservation of available moisture. Regarding the former, it hardly needs mention that the low rate of precipitation and absence of streams from outside leave no scope for surface water resources in this region. On the other hand, the available geohydrological data are not complete as yet so as to offer decisive and encouraging guide-line about ground water potential.

In the absence of assured water supply, the second best alternative for improving moisture condition for stable and higher farm production is conservation and efficient utilization of each drop of water available from rains. The modern conservation technology has helped in the evolution of various farm forestry techniques and agronomic and range management devices whereby greater moisture conservation, better plant growth and higher farm production (in the case of crop as well as animal production) are ensured. These conservation measures, which are the only hope of ill-watered areas consist of provision like shelterbelts, sand dune stabilization, micro-wind breaks, bunding, etc., to affect soil moisture regime as well as crop yields. They also include measures for pasture improvement such as range fencing, stock-watering points, moisture conservation measures on range land, reseeding of range lands, etc. The C.A.Z.R.I. experiments in this respect are also quite encouraging.<sup>8</sup>

### *Reorientation of Institutional Financing*

In the light of the highly unfavourable agricultural situation in the arid region as at present and its development needs, the system of institutional financing calls for certain readjustments. The needed readjustments may be discussed separately in the context of (i) short-term credit needs of the arid agriculture in its present situation, and (ii) long-term investment requirements of the measures needed for stabilization and growth of arid agriculture.

### *Short-term Credit*

From the view-point of short-term and medium-term credit, agricultural credit co-operatives constitute practically the only source of institutional financing. However, their present procedures hardly fit well with the circumstances obtaining in the region.

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8. Scientific Progress Reports, C.A.Z.R.I., Jodhpur, since the year 1961. The calculations based on the experimental data of C.A.Z.R.I. showed the following cost-benefit ratios for different measures : Sand dune stabilization 13.6, micro-wind breaks (wind strip cropping) 4.5, contour furrowing on range lands 6.8, reseeding of range lands 2.3. *Vide* N. S. Jodha ; Capital Formation in Arid Agriculture, Ph.D. Thesis, University of Jodhpur, 1967.

Firstly, the criteria used expressly or tacitly for the determination of maximum credit limit, such as cost of crop production or amount of share money or size of land holding can never assure adequate supply of credit at the farm level. This is so because it is difficult to have a complete idea of the cost of crop production where the family and the farm are closely linked. Consequently, arbitrary determination of cost of production is bound to keep the maximum credit limit low. Similar is the case with the criterion of share money, because this expects an increase in share holding to precede the increase in maximum credit limit, which most desert farmers cannot afford.

The criterion of value of owned land holding also keeps the maximum credit limit at low level. It is because of the poor productivity and low value of the desert lands as well as lack of land market. Besides, land constitutes only a small part of the total asset value of farmers in the desert.<sup>9</sup>

Thus in order to raise the maximum credit limit, some weight should be given to some unconventional types of farm cost (e.g., maintenance cost of family work force). Similarly, livestock should also be considered as farm asset while determining creditworthiness of the desert farmer.

The procedures relating to repayment of loans also ignore the circumstances in arid agriculture. The insistence on repayment (at least 60 per cent of loan) on the due date as a pre-condition for fresh loan, irrespective of crop conditions, makes the system quite unworkable. The failure of borrowers to abide by such condition, particularly during a famine year, debars them from co-operative loans during the post-famine years, when the assistance is needed most. Ultimately, the farmer is shunted back to his traditional creditor, i.e., the village moneylender and the co-operatives are left with huge overdues. Under such circumstances linking of repayment with crop conditions may serve the purpose better, though it will call for a strong capital base of the co-operatives, some refinance arrangements with apex agencies and consideration of animal production along with crop production in respect of short-term credit.

### *Investment Financing*

With the transfer of development *taccavi* loans to the land development bank, the latter remains virtually the only agency to deal with long-term farm credit. The long-term investment credit would be needed mainly for boring or digging of wells and the adoption of conservation measures.

In the case of wells, the chances of striking no water or saline water make these ventures highly risky for the desert farmer as well as for the land development bank. In order to facilitate water resource development in such circumstances, some system of sharing risk would be required. The State can do this by way of standing partial guarantee for such loans advanced by the land development bank.

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9. According to the Follow-Up Survey of the Reserve Bank of India, 1959-60, land constituted only 33 per cent of value of total recorded assets of farmers in the dry district of Barmer. Livestock constituted 45 per cent of total asset-value.

The problem of financing the conservation measures is rather peculiar. As far as provision of funds is concerned the land development bank on its own or working at the instance of Government or the Agricultural Refinance Corporation or with their financial help, may arrange the finance. But the very nature of these projects (*i.e.*, their macro-economic or aggregative character) complicates disbursement as well as actual utilization of funds.

In fact the adoption of any of these measures is but a specific conservation treatment of lands on a 'catchment' basis. Consequently, a large number of people or their groups, owning or operating the areas within the 'catchment' are essentially involved. This very fact results in the non-applicability of loaning policies and procedures followed by the land development bank, while treating the individual farm operators. One of the remedies could be channelization and utilization of the funds by a collective body of the 'catchment' concerned.<sup>10</sup> This body will also be able to make the farmers adhere to the approved farm practices to be synchronized with the adoption of the conservation measures. This implies a preference for catchment's 'conservation co-operative society,' for management of both the funds and physical work. Those who are disillusioned by the performance of co-operative farming in this country may doubt the workability of co-operatives for resource conservation. However, the latter differ fundamentally from co-operative farming. The most important difference is that it would have the least psychological resistance on the part of the farmers, who will be collectively getting some additional rights in land, as in the case of stabilized sand dunes or pastures (and certain hitherto non-existent income and employment benefits), without disturbing their existing relation with land.

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10. N. S. Jodha, "A Case for Co-operative Financing of Desert Reclamation" in Co-operative Financing for Agricultural Development (Seminar Papers), D. N. Elhance (Ed.), Faculty of Commerce, University of Jodhpur, 1968.