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Role of Credit in Farmers' Adjustment against Risk in Arid and Semi-Arid Tropical Areas of India

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Weather-induced instability of farming is the principal source of risk in agriculture in arid and semi-arid tropical areas of India. The problem presents itself in its most magnified form during drought years. During such occasions, which are quite frequent, farming fails to ensure even the minimum subsistence requirement of humans and livestock.

Through experience of generations, farmers have evolved several adjustment devices to manage their survival during the drought years. However, farmers' adjustment mechanisms against risk have a number of well-recognised weakness. [Jodha 1975, Sen 1976].

This paper examines the possibilities of strengthening farmers' adjustment mechanisms, particularly through credit. This calls for proper understanding of the adjustment mechanism itself and the prevailing role of credit therein.

WEATHER-INDUCED RISK

OF the well-recognised sources of risk in agriculture — namely, market, state policies, and weather — the last is the key source of risk in arid and semi-arid tropical areas. These areas, often described as drought-prone areas, cover nearly 61 per cent of India.¹

Of all the elements of weather, the most important for agriculture is rainfall. Rainfall is highly variable, as indicated by the coefficients of variation in the arid and semi-arid tropical tracts of India.² More importantly, intra-seasonal rainfall is also highly variable. Even years of normal annual rainfall are characterised by long dry spells during one or more parts of the crop season. The performance of rainfed crops is largely determined by the timely availability of rains during different phases of crop growth. Hence the information about failure of such rains, indicated by frequency of long dry spells during the crop season, can give an idea of potential risk of crop failures in these areas. The timings of occurrence of droughts *vis-a-vis* phases of the crop growth season affects crop performance and farmers' adjustment devices differently.

For instance, if they come at the beginning of the cropping season, droughts prolong the dry season, delay land preparation, and prevent timely sowing of crops — resulting in a decline in cropped acreage as well as changes in the cropping pat-

tern. Droughts occurring in mid-season, after the sowing of kharif crops, cause retardation of crop growth; in extreme cases they scorch off standing crops, wasting already invested resources and necessitating a variety of salvage operations, including partial resowing the break of the dry spell.³ The occurrence of drought towards the end of the wet season may cause withering of otherwise promising kharif crops and create adverse conditions for rabi (post-monsoon) crops.

In view of the above implications, the incidence of dry spells can be more meaningfully studied with reference to their occurrence during the crop season. The relevant analysis of weekly rainfall data in different meteorological sub-divisions of India is summarised in Table 1.

Accordingly, 13 per cent of the meteorological sub-divisions covering arid and semi-arid tropical tracts experienced early droughts at least once in 6 years. Exactly similar is the situation with respect to mid-season droughts. Similarly, nearly three-fourths of the sub-divisions faced mid-season droughts more than 25 per cent of the time. If early, mid-season, and late droughts are combined, more than one-half of the sub-divisions experienced drought once in less than 2 years. The proportion of subdivisions outside arid and semi-arid areas facing similar frequency of drought is quite small (Table 1).⁴

To repeat, occurrence of early, mid-season, and late droughts affect the crop in different ways, but their ultimate consequence is instability of crop yields and agricultural economy of the arid and semi-arid tropical area.⁵

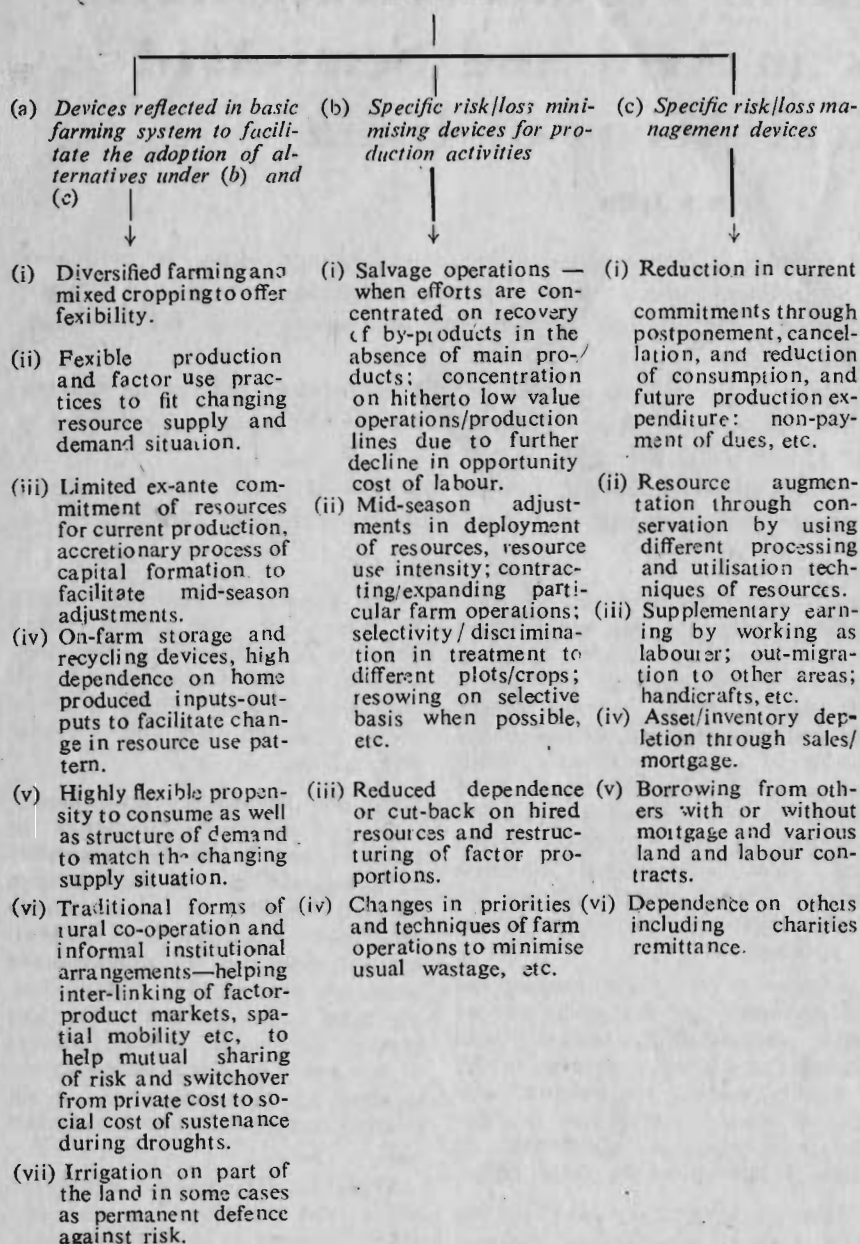
FARMERS' ADJUSTMENT MECHANISM

Details about the frequency of droughts and consequent instability of crop yields help in understanding the risky situation to which farmers (and other rural households depending on agriculture) in drought-prone areas are exposed. The farmer, having faced such situations during past periods, has evolved several measures to live with it. These measures, put together, may be described as the farmers' adjustment mechanism against risk.

The usual definition of risk revolves around variability of outcomes which lie below or above normal prospects. However, in keeping with the overall goals of the adjustment mechanism in drought years, risk, as defined in this paper, implies prospects which offer lower returns than normally received or expected. The adjustment devices against risk would thus involve measures aimed at minimising the probabilities of losses due to risk. Once losses have occurred, the next step consists of measures to supplement the lower returns by other sources of income, or manage with lower returns by curtailing current commitments. The extent to which the aforesaid devices can be

FIGURE

FARMERS' ADJUSTMENT MECHANISM AGAINST RISK AND UNCERTAINTY IN AGRICULTURE*



Note: *For specific illustrations see Jodha [1975].

readily adopted depends upon the extent to which farming systems have been prepared or adapted to face such eventualities. Accordingly, devices constituting the adjustment mechanism can be put under three broad categories:

- (a) Those which have acquired the form of permanent features of the farming system to facilitate adoption of alternatives to minimise potential losses from current production activities facing risk and to adjust to the losses once they have occurred.
- (b) Those designed to minimise

probable losses from current production activities.

- (c) Those designed for managing the consequence of inevitable or accomplished losses.

The adjustment devices, broadly separable on the basis of their immediate purpose and time of adoption, take the form of various farming and resource-use practices, as well as combination of enterprises and activities. The Figure illustrates types of activities that generally occur under the above three categories.

Of the three categories of adjustment devices, (a) and (b) are basic

to the farming system in arid and semi-arid tropical India. Though operative in both the long-term and short-term contexts, they operate so routinely within the system that they seldom catch the attention of outsiders. However, the devices under category (c) have clear-cut external manifestations. They are treated as distress signals for commencement of public relief works in drought-hit areas.⁶ One consequence of the said phenomenon is the lack of data and analysis of the variables under (a) and (b) in an integrated manner and in a form which may project them as a mechanism against risk.⁷ On the other hand, for variables under (c), one does come across data which can very sharply focus on the farmers' adjustment mechanism. Using such data, this paper illustrates the loss management devices adopted by rural households in different areas during drought years.⁸

As mentioned earlier, loss management during drought years is attempted in the first place through curtailment of current commitments. According to Table 2, the consumption expenditure during the drought years (compared to non-drought years) declined by nearly 8 to 13 per cent in the affected areas of Rajasthan and Gujarat.⁹

More importantly, the magnitude of decline varied significantly amongst the different expenditure categories. For instance, the decline in expenditure for total food items was the smallest of all categories. However, to prevent curtailment of overall food expenditure during a scarcity year, significant slicing down on other 'non-essentials' like protective foods (including milk, fats, sugar, fruits, etc), socio-religious ceremonies, clothing, education, medicine, etc, had taken place. The extent of such declines varied from 16 to 64 per cent in the case of Jodhpur, 15 to 48 per cent in Barmer, and 28 to 31 per cent in Banaskantha. However, in spite of maintaining the level of food expenditures for during the drought year nearer to that of the non-drought year, per capita foodgrain intake had declined from between 12 to 23 per cent in different areas. This was due to increased food prices and non-availability of home-produced foodgrains during the drought years.¹⁰

Another way of reducing current commitments as a function of loss management is reduction in assets (e.g. livestock) that have considerable

TABLE 1: FREQUENCY DISTRIBUTION OF METEOROLOGICAL SUBDIVISIONS COVERING ARID AND SEMI-ARID TROPICAL AREAS AND OTHER AREAS OF INDIA BY NUMBER OF EARLY, MID-SEASON, AND LATE DROUGHTS DURING 1908-1955.

Occurrence of Droughts during 48 years	Proportion of Meteorological Subdivisions ^a Experiencing Types of Droughts in ^b							
	Arid and Semi-Arid Tropical Areas				Other Areas			
	Early Drought Only	Mid-Season Drought Only	Late Drought Only	All Types	Early Drought Only	Mid-Season Drought Only	Late Drought Only	All Types
(no)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
<3	40	—	40	—	91	9	46	9
3-5	47	—	33	—	—	9	27	—
6-10	13	13	27	—	9	—	9	9
11-15	—	20	—	7	—	46	18	—
16-20	—	20	—	20	—	9	—	28
21-25	—	7	—	20	—	18	—	18
26-30	—	26	—	7	—	9	—	18
31-35	—	7	—	26	—	—	—	18
≥36	—	7	—	20	—	—	—	—

Notes: a Data pertain to the 26 meteorological subdivisions in India, 15 of which cover arid and semi-arid tropical states of Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh, Karnataka, and Tamil Nadu from 1908 to 1955. Number, names, and boundaries of subdivisions have been changed lately.

b Criteria used are: (i) a wet season consists of weeks with normal rainfall of more than 5 mm; (ii) a week of 'drought' is one in which actual rainfall equals half of or less than half the normal rainfall; and (iii) 'drought' has really serious repercussions on crop growth only when it extends over 4 or more consecutive weeks. Occurrence of such prolonged dry spells at the very commencement of the (kharif) cropping season and at the very end of the cropping season are termed as early drought and late drought. Drought occurring during the middle of crop season is termed mid-season drought. For details, see Malik and Govindaswamy [1962-63].

carrying cost, which may partly contribute to asset depletion in drought years.¹¹ Of course, the main reason for asset depletion through distress sales is augmentation of liquid resources to supplement meagre income during drought years. In addition to deliberate disposal, asset losses due to death of animals and theft of items is quite common during such stress periods.

As a result of combined operation of the factors stated above, the asset position of rural households in different areas had declined in comparison with respective pre-drought years by 15 to 42 per cent during drought years (Table 3). Further, the decline in assets in all but one area has been highest in the case of livestock (ranging from 21 to 60 per cent) followed by financial assets, including jewellery (ranging from 13 to 32 per cent).

Yet another step in the loss-management mechanism is to increase liabilities. In these areas, the incidence of indebtedness indicated by amount of debt outstanding had increased by 64 to 224 per cent within a single drought year (Table 3).

More details of sources which contributed to sustenance requirements¹² of drought-affected households are

presented in Table 4.¹³

Accordingly, wage income from government-operated relief works, along with free help in kind from public and private charitable institutions in some cases, accounted for the largest proportion of the total amount of sustenance income in different areas. Sale of assets and other miscellaneous sources — like earning through emigration, remittance, attached labour, handicrafts, etc — were the next important sources of sustenance income. Current borrowings did not contribute more than 13 per cent of sustenance income in any area.

A closer look at Tables 2, 3 and 4 reveals that the farmers' adjustment mechanism against risk is not as strong or fool-proof as sometime assumed [Morris 1975]. The weakness of the adjustment mechanism can be viewed both in terms of its inadequacy in sustaining households during the drought and in its failure to protect the production potential for post-drought years.

Table 4 clearly indicates, for example, that in the absence of government-operated relief works and institutional help in some cases (which jointly accounted for largest proportions of sustenance income), farmers'

own adjustment mechanism would have completely collapsed. Sale of assets, curtailment in consumption, and borrowing would not have sufficed to meet the deficit due to absence of relief works. The relative position of areas (Table 4) shows that the strain on the adjustment mechanism — at least in terms of disposal of assets — is negatively associated with the extent of relief work and institutional help.

Furthermore, the depletion of assets is more severe in the case of productive assets such as livestock (Table 3), which adversely affects the production potential in terms of draft power and production of milk, wool, etc, in post-drought years. This is more so because only a fraction of the assets depleted in the drought year could be recouped during the post-drought year (Table 3). In all probability, by the time the depleted assets are fully recouped the next drought occurs and initiates the next run of resource depletion-recoupment cycle. In the long run, this leads to permanent under-investment in these areas.

The situation described above are only some manifestations of failure of the adjustment mechanism.¹⁴ The basic weaknesses of the adjustment mechanism is the result of many causes.

First, viewed in the temporal context, the adjustment mechanism is a 'zero-sum' effort. Asset accumulation just compensates for asset depletion over a period of good and bad years. This remains a zero-sum game or might become a positive-sum game in certain circumstances, as long as drought years are not recurrent. Once droughts come in succession, the farmers' capacity for loss management breaks down, and the adjustment mechanism becomes a negative-sum exercise.¹⁵ Similarly, the adjustment mechanism in terms of emigration, mutual sharing of risk through various informal institutional arrangements, etc, lose their strength if the drought situation is spatially more widespread [Jodha 1975, 1978].

Secondly, the adjustment mechanism derives its existence from the possibility of successful exchange operations. Even the extreme subsistence farmer, whose production and consumption activities are integrated, has to resort extensively to exchange (including barter) during the drought period. This is so because, except for curtailment of human consumption and under-feeding or starvation of animals, there is hardly

TABLE 2: CHANGES IN CONSUMPTION EXPENDITURES AND FOODGRAIN CONSUMPTION OF HOUSEHOLDS DURING DROUGHT AND NON-DROUGHT YEARS IN THREE AREAS

Details	Areas (Districts with States)								
	Jodhpur (Rajasthan)			Barmer (Rajasthan)			Banaskantha (Gujarat)		
	63-64† ^a A	64-65* B	(B-A)/B	69-70† A	70-71* B	(B-A)/B	69-70† A	70-71* B	(B-A)/B
	(Rs)	(Rs)	(%)	(Rs)	(Rs)	(%)	(Rs)	(Rs)	(%)
Per-household consumption expenditure on ^b									
Total food items	1181	1200	-1.6	1183	1153	+2.6	1701	1805	-5.8
Protective foods ^c	291	409	-28.8	235	406	-42.1	501	694	-28.3
Clothing, fuel, etc	274	327	-16.2	269	316	-14.8	334	483	-30.9
Socio-religious ceremonies ^d	54	148	-63.5	57	110	-48.2	61	88	-30.7
Others ^e	168	259	-35.2	102	175	-41.7	127	98	+29.6
Total	1677	1934	-13.3	1611	1754	-8.2	2223	2474	-10.2
Consumption per adult unit per day ^g									
Total foodgrains	514	594	-13.9	535	606	-11.7	567	740	-23.4
Superior cereals ^f	112	58	+93.1	40	7	+82.5	42	27	+35.7

Notes : a † Drought years. * Post-drought (normal) years.

b To facilitate comparisons, all rupee values in this and the subsequent Tables have been converted into 1972-73 value of the rupee, using index of general prices for agricultural labourers in the respective states.

c Include milk, fats, sugar, jaggery, fruits, etc. These are included in total food items, also.

d Socio-religious ceremonies related to deaths, births, marriages, and festivals.

e Includes education, medicine, recreation, travel, payment to village functionaries for day-to-day services, remittances to children studying outside, etc.

f Mainly wheat available through fair-price shops during the drought year.

Source: See Table 3.

any device in the adjustment mechanism which such a farmer can effectively adopt on his own. He cannot sell an asset unless there is a buyer, he cannot borrow unless there is a willing lender, he cannot hire himself out unless there is someone to employ him, so much so that he cannot emigrate unless institutional circumstances are conducive to it.¹⁵ This is not to imply that there are no willing partners to help in the farmers' adjustment mechanism. The real problem is that, depending upon the intensity and spread of the drought situation, the conditions of exchange become quite unfavourable to the farmer. As mentioned earlier, the farmer engages in what is described as an asset depletion/replenishment, cycle over a run of bad and good years. But, because of the special conjunction of demand and supply factors, in the process of exchange the farmer is hit as a seller in the buyers' market during the drought year and as a buyer in sellers' market during the post-drought year.

The situation is clearly illustrated by Table 5, which presents the price situation faced by the farmer and the extent of losses sustained during a short cycle of asset depletion and replenishment in some villages of Rajasthan. In the process of asset depletion/replenishment, affected farmers nominally lost around Rs 557

per pair of bullocks, Rs 225 per camel, Rs 392 per cow in milk, Rs 33 per sheep, and Rs 310 per bullock-cart. The amount of losses, in most cases, increases significantly if the price of assets sold and those paid while buying back the assets are deflated by the prices of food and fodder items prevailing in the respective years (Table 5). This is a clear illustration of what is described as "failure of exchange entitlement" [Sen 1976], in which the prices of what a household can sell decline relative to what it wants to purchase. If the losses suffered in the process of asset depletion/replenishment are expressed in 1972-73 prices and compared with details in Table 2, it will be revealed that losses on disposal of single units of some assets like cows in milk, bullock-pairs, or bullock-carts were more than one-third of the average consumption expenditure during the drought year, as was the case in the Rajasthan areas.¹⁷ Furthermore, the potential losses of farmers who sell out or mortgage assets (including land) and fail to regain them for want of resources are still greater. Conversion of such people into tenants, bonded, or free agricultural labourers, and the associated consequences, represent yet other facets of pauperisation due to failure of the adjustment mechanism.¹⁸ Credit could play a major

role in preventing the rather extreme measures of asset depletion and pauperisation adopted by the farmers in drought years.¹⁹

ROLE OF CREDIT IN ADJUSTMENT AGAINST RISK

In keeping with the categories of adjustment devices stated in the Figure, the role of credit can be discussed in terms of (i) credit for 'drought proofing' of the farming system to make it less vulnerable to risk, (ii) risk- or loss-minimising credit, and (iii) loss-management credit.

The first category of credit indirectly strengthens the risk-minimising and loss-management devices. This forms part of the general or wider strategy of resource transfers to drought-prone areas, and we do not intend to discuss it here. Such credit need not come in response to actual or probable occurrence of droughts.

Resource transfers taking place under the Drought Prone Area Programme, etc, are governed both by equity/welfare and productivity/efficiency considerations. Welfare/equity considerations hardly need elaboration as the drought-prone areas are among the poorest regions. The productivity considerations stem from the following factors. It is agricultural performance in drought-prone areas which largely accounts for periodical fluctuations in the nation's

TABLE 3: CHANGES IN ASSET AND LIABILITY POSITION OF DROUGHT-AFFECTED HOUSEHOLDS IN FIVE DROUGHT-PRONE AREAS OF INDIA

Particulars	Average Per Household Value of Assets and Liabilities ^a in (A) Pre-Drought Years (B) Drought Years and (C) Post-Drought Years in :													
	Jodhpur (Rajasthan)			Barmer (Rajasthan)			Banaskantha (Gujarat)			Sholapur (Maharashtra)			Aurangabad (Maharashtra)	
	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)
	62-63 ^b	63-64	64-65	68-69	69-70	70-71	68-69	69-70	70-71	71-72	73-74	73-74	71-72	72-73
	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)
Assets														
Livestock ^c	1546	849	1230	1287	786	837	1565	1222	1498	2096	1707	1549	732	464
(% change) ^d		-(45.1)	+(44.9)		-(60.4)	-(6.5)		-(21.2)	+(22.6)		-(18.6)	-(9.3)		-(36.3)
Agri. implements ^e	409	372	389	202	201	201	645	638	635	496	465	483	751	685
(% change)		-(9.0)	+(4.6)		-(0.5)	—		-(1.1)	-(0.5)		-(6.3)	+(3.9)		-(10.1)
Consumer durables ^f	658	459	486	175	167	164	292	284	284	106	73	85	NA	NA
(% change)		-(30.2)	+(5.9)		-(4.6)	-(1.8)		-(2.7)	—		-(31.1)	+(16.4)		NA
Financial assets ^g	1239	840	726	1226	947	921	1668	1398	1380	310	216	190	296	258
(% change)		-(32.2)	-(13.6)		-(22.7)	-(2.7)		-(16.2)	-(1.3)		-(30.3)	-(12.0)		-(12.8)
Total assets	3852	2520	2831	3590	2101	2123	4170	3542	3797	3008	2461	2307	1779	1407
(% change)		-(34.6)	+(12.3)		-(41.5)	+(1.1)		-(15.0)	+(7.0)		-(18.2)	-(6.3)		-(20.9)
Indebtedness^h														
Debt outstandings	189	552	637	498	873	949	111	360	302	375	613	651	NA	NA
(% change)		+(192.0)	+(15.4)		+(75.3)	+(8.7)		+(224.3)	-(16.1)		+(63.5)	+(6.2)		

Notes : a value of assets and liabilities (in Rs) expressed in terms of 1972-73 prices, Assets exclude land and buildings.

b Pre-drought year indicates the situation at the beginning of the drought year.

c Draft animals, milch stock, sheep, goat, etc.

d Percentage change over the preceding period. The change is composed of sales, gifts, losses (of animals due to death, etc).

e Farm equipments, tools, machinery, and handicraft tools.

f Consumer durables—only important items like radio, watch, bicycle, and modern furniture included.

g Includes jewellery, co-operative shares, LIC policies, etc. In Aurangabad, only jewellery is included.

h Average per household amount of debts outstanding net of repayments. In Sholapur it excludes old debts imposed on farmers as bunding loans, well loans disbursed under Zaveri Scheme and Zilla Parishad fodder grants during the past droughts. This amount comes to Rs 723/ per household at 1972-73 prices.

N A : Not Available

Source : Jodhpur area (Jodha 1975), Barmer and Banaskantha areas (Chaudhari and Bapat 1975), Aurangabad area (Borkar and Nadkarni 1975), Sholapur area—data collected under ICRISAT Village Level Studies (Jodha *et al* 1977). For details of number of sample households see Table 4.

food supplies [Jodha 1973]. These areas account for most of the country's production of livestock products like milk, wool, and mutton; crops such as pulses, coarse grains, and some oilseeds such as groundnuts, castor, and sesamum, etc, and have a comparative advantage in certain lines of production [Arora *et al*, 1974]. Strengthening the resource base already suffering from permanent under-investment can better help exploit their potential, stabilise production, and reduce the need for substantial and recurring expenditure on famine relief. When considering resource transfers to make these areas 'drought proof' or less vulnerable to risk, it is important to note that it is not only volume that matters — composition is also important.²⁰ Measures like more irrigation (particularly intensive versus protective type of irrigation), soil-moisture-conservation devices, infra-structural facilities for crop and livestock enterprises, etc, have different potentials for strengthening the capacity of farmers to effectively withstand risk.²¹

Regarding risk-minimising credit, it may be mentioned that credit data are collected, or at least reported, in terms of credit for the whole season and for broad purposes. Time-specific or detailed input-specific data on credit use are not available. Such detailed data could help in broadly segregating normal production credit from risk-reducing credit. Similarly, a detailed temporal record of credit flow during a crop season juxtaposed with intra-seasonal risk-causing fluctuations of weather can help segregate risk-reducing borrowing from other credit for crop production. However, such a record is not readily available.

Comparatively, more micro-level data sets are available about credit for loss management following crop failure. This again consists of two categories. First, there is credit in terms of rescheduling past dues. The amount of credit in cash or kind is not received for managing the sustenance of the farm enterprise and the family, but the postponement of recoveries of dues does help in minimising current commitments dur-

ing a drought year.²²

The second category of loss-management credits consists of actual payment in cash or kind received by drought-affected households. Furthermore, loss-management credit may consist of borrowing for sustenance during the drought year and the borrowing for resumption of normal production activities in the post-drought year. In the following section these categories of credit are discussed.

Table 4 presents the source contributing to sustenance income of sample rural households during severe drought years.²³ Credit did not account for more than 13 per cent of the sustenance income in any area. This is quite understandable in view of the fact that, both by design and intent, credit cannot be expected to play a massive welfare role in such distress situations. Furthermore, lenders are exposed to more than usual risk under such circumstances. Despite these factors, credit can play a specific role under drought conditions. To understand this, a number of other features — besides volume — need to be exa-

TABLE 4: SOURCES OF SUSTENANCE INCOME OF RURAL HOUSEHOLDS DURING DROUGHT YEARS IN FIVE DROUGHT-PRONE AREAS OF INDIA

Details	Areas (Districts with States)				
	Jodhpur (Rajasthan)	Barmer (Rajasthan)	Banaskantha (Gujarat)	Aurangabad (Maharashtra)	Sholapur (Maharashtra)
Drought year	1963-64	1969-70	1969-70	1972-73	1972-73
Sample households (No)	144	100	100	128	80
Average amount of sustenance income (Rs/household) ^a	3133	2996	2627	2715	2944
Percentage share of sources in suste- nance income					
Cultivation ^b	2.1	—	—	6.8	14.4
Animal husbandary	10.2	7.2	4.8	NA	1.0
Wage income from relief works	24.9	22.4	25.3	56.2	46.5
Institutional help ^c	NA	30.4	6.4	NA	NA
Sale of assets	25.9	12.5	24.9	13.5	17.3
Borrowings (cre- dit) ^d	10.4	12.8	11.7	6.3	7.9
Others ^e	26.5	14.7	26.9	17.2	12.9

Notes : a Sustenance income defined as total inflow of cash and kind including borrowing, except term-loans unrelated to sustenance during the drought. Value of sustenance income is expressed in terms of 1972-73 prices.

b In Aurangabad villages, income is from all household production including cultivation.

c This includes free or subsidised supplies of foodgrain and fodder, including those provided by charitable institutions and the government during the period of migration. In some cases, the help also included milk powder, vitamin tablets, medicine, clothing, transport facilities, and water supply, etc.

d All borrowings—in cash or kind—taken against mortgage or labour land-lease contract and others. This does not include the credit in terms of postponement or cancellation of recovery of land revenue and other dues from the farmers. This also excludes term-loans not related to loss management during the drought years.

e Includes income from other casual or agricultural wage employment (including during the out-migration), handicrafts, transport, remittances and free help from well-off relatives, etc. In the case of Jodhpur villages it includes value of old stocks of foodgrain and fodder.

NA : Not Available.

Source : See Table 3.

mined. Details of borrowing by households during drought years and in some cases post-drought years (Table 6) can prove helpful in this respect. During drought years, most of the credit is used for sustenance — i.e., current consumption as well as maintenance of livestock. Of course the maintenance of livestock has been included with 'current production' under section C of Table 6. Thus, if the Aurangabad area (where credit accounted for just 6 per cent of sustenance income) is excluded, current consumption accounted for between 52 and 82 per cent of borrowings in different areas. The figure increases substantially once livestock maintenance is included. This has two implications. This high proportion of consumption credit tends to discourage formal credit agencies, such as co-operatives, from lending to drought-hit people, as their lending policies do not provide for consumption credit. For private credit agencies like pro-

fessional moneylenders, large farmers, etc., lending becomes doubly risky. Lending during a drought year is unusually risky and it becomes more risky when the purpose of borrowing is not related to immediate income generation conducive to easy recovery of the loan. In consequence, the cost of credit becomes higher for the borrowers. As shown by data from the Rajasthan and Gujarat areas, the average rate of interest (ranging from 20 to 27 per cent) during the drought years was more than 50 per cent higher in comparison with the corresponding post-drought years. During the drought year, the highest proportion of borrowings in Rajasthan areas and a substantial proportion of borrowings in Gujarat area were transacted under an interest rate exceeding 20 per cent. The proportion of such borrowings, for understandable reasons, declined in the post-drought years.²⁴

There are some cases where interest is not formally or openly charged.

But 'zero' interest does not mean a cost-free loan. Except in the case of very close relatives, credit is seldom available at zero cost. At best, it is a deferred and concealed cost. The real cost of the 'zero-interest' loans is usually in terms of informal contracts involving land leases, share cropping, bonded labour for specific seasons or periods or jobs, and a number of unpaid services by the borrower to the lender. In real terms, this cost far exceeds the formal interest rate of 20 per cent. Of course, tying other obligations is sometimes a feature of interest-bearing loans, also, in which cases the real cost of credit exceeds the formal interest rates.

Besides the purpose and cost of borrowing, Table 6 provides information about sources of borrowing. In the Rajasthan area, which is arid and hence more drought-prone and backward in terms of co-operative movements, institutional credit accounted for a very small proportion of total borrowing in both drought and non-drought years. In Gujarat and Maharashtra with a well-developed co-operative network, institutional credit accounted for the largest share.²⁵ Of course, notwithstanding the above regional differences, the relative share of institutional credit during drought years declined in each of the areas. Private credit agencies separated on the basis of their main occupations, jointly improved their relative contribution to total lending during drought years in all areas.²⁶

CREDIT IN TWO PHASES OF ADJUSTMENT

Drought may be a single-year event, but its consequences are enduring. Providing sustenance during the drought year itself is only one part of the adjustment mechanism. The second part consists of initiating normal production activities in the post-drought year. Whether a drought year initiates the pauperisation process for a given household will largely depend on its capability to re-initiate normal production following the drought year. Credit agencies have a crucial role in rehabilitating drought-affected households. It is difficult to assess the contribution of credit in comparison with the farmer's conserved (left over) capacity to face the post-drought situation.²⁷ In the absence of increased dependence on others for sustenance requirements, the extent of credit in absolute terms has been

TABLE 5: PRICE OF FARM ASSETS AND PRODUCTS IN SELECTED VILLAGES IN DROUGHT AND NON-DROUGHT YEARS AND LOSSES IN THE ASSET DEPLETION / REPLENISHMENT PROCESS

Items	Nominal Prices during Years ^a						Total Losses Per Unit Using :		
	1962 - 63	1963 - 64	1964 - 65	Nominal Prices	Deflated Prices ^b	At 1972-73 Prices ^c			
	(Rs)	(No)	(Rs)	(No)	(Rs)	(No)	(Rs)	(Rs)	(Rs)
(1) Bullocks (per pair)	875	(30)	431	(66)	988	(38)	557	631	1060
(2) Camel (per animal)	684	(15)	515	(27)	740	(21)	225	393	680
(3) Cow (in milk-per animal)	422	(18)	220	(35)	612	(41)	392	354	612
(4) Cow (dry) (per animal)	220	(12)	45	(44)	195	(9)	175	195	337
(5) Sheep (per animal)	42	(238)	17	(780)	50	(465)	33	32	55
(6) Goat (per animal)	35	(85)	47	(205)	40	(317)	—	9	16
(7) Bullock Cart (per cart)	630	(7)	380	(13)	690	(4)	310	415	718
(8) Pearl millet grain (per 100 kg)	32		51		43				
(9) Pearl millet stalk (per 400 bundles)	11		29		11				
(10) Sorghum stalk (per 400 bundles)	24		57		26				
(11) Ghee (per kg) ^d	5		9		8				
(12) Milk (per litre)	0.25		0.70		0.40				
(13) Dung cakes (per 300)	8		5		8				

Notes : a Prices for items 1 to 7 are averages of the actual sale/purchase transactions involving the number of units (indicated in brackets). They include the items transacted in the cattle fairs as well as the items purchased on credit by the emigrating farmers during the drought year. Bullock-carts (item 7) were carts with rubber tyres. For items 8 to 12, average of prices that prevailed throughout the year in the villages are presented. Goat is the only animal whose value rises during drought year, as it can remain productive with negligible maintenance cost.

b Assets were deflated using an index based on prices of products (items 8 to 12) during the 3 years. The weighted price index used for deflation was 1962-63=100, 1963-64=117, and 1964-65=128.

c The real losses indicated by deflation procedure (b), expressed in 1972-73 prices.

d Clarified butter.

Source : Adapted from Jodha [1975]. Data were collected from three villages selected one each from Jodhpur, Jaisalmer, and Nagaur districts in Rajasthan for a study of "Capital Formation in Arid Agriculture". The year 1963-64 was a severe drought year; the remaining years were normal years in the selected areas.

small (in the case of sample households) during the post-drought years. As shown by Table 6, the credit situation in post-drought years — i.e., during the second phase of adjustment to drought — was qualitatively different from that of the drought years or the first phase of adjustment to drought. In three out of four areas, the share of credit for capital investment increased after the droughts and accounted for the highest proportion of total credit use. Of course, the asset replenishment (through credit) accounted for a small fraction of the total assets sold during the drought year. These results are in keeping with well-known features of the weather induced asset depletion and replenishment cycle characterising drought-prone areas.

The qualitative differences in the credit situation during two phases of adjustment to drought are reflected also in terms of cost of borrowing and the source of borrowing. As shown by Table 6, traders as lenders performed better during drought years while others — like large farmers, professional moneylenders and co-operatives — did better in post-drought years. The differences can be explained in terms of the agency's comparative advantage and flexibility of lending policies. The

lending policies of formal credit agencies (e.g. co-operatives) encourage borrowing for apparently productive purposes, and hence they have to remain almost dormant during the drought years when the bulk of borrowing is for sustenance and for capital expenditures not related to usual production activities. The post-drought years present a completely different situation and provide greater scope for co-operative lending, as suggested by the increased share of co-operative lending during post-drought years in all areas except Barmer.²⁸

The different private credit agencies' comparative advantages in lending during drought or post-drought years are closely linked to the nature of their respective main occupations — namely trading, farming, etc. This is because lending by the private credit agencies is largely carried on to facilitate expansion and increase in profitability of their main occupations.

For example, most of the demand for credit during the drought years is in kind (Table 6). Borrowers prefer credit in kind in order to escape facing the seller's market twice: once for borrowing the money and second while buying the consumables to sustain themselves during the scarcity

period. The preference for kind loans during the droughts is also higher because, in the process, the borrowers minimise the risks of not finding goods already in scarce supply [Desai 1977]. Traders having stocks can readily meet this demand, which explains the higher share of traders in the lending business during drought years and corresponding lower share in the post-drought years. Furthermore, lending in kind indirectly helps turnover of their trading business (Table 7).²⁹ Large farmers (as lenders), generally respond better to credit demand in terms of draft animals, hiring out of bullocks and implements, seed supply, etc, during a non-drought year and this improves their share in the lending during the post-drought year. The opportunity of linking credit to land-leasing or labour supply from the borrower during a non-drought year induces the large farmers from the supply side to extend more credit. The professional moneylender falls in between the trader and large farmer. Unlike the trader, he cannot supply substantial amounts of goods on credit, nor can he take as much advantage of the land and labour of the borrower as can the larger farmer. The professional moneylender too, may have small shops and some land to cultivate. But

TABLE 6: CREDIT RECEIVED BY DROUGHT AFFECTED HOUSEHOLDS DURING DROUGHT YEAR AND POST-DROUGHT YEAR IN FIVE DROUGHT-PRONE AREAS OF INDIA.

Particulars	Area and State									
	Jodhpur (Rajasthan)		Barmer (Rajasthan)		Banaskantha (Gujarat)		Sholapur (Maharashtra)		Aurangabad (Maharashtra)	
	63-64†	64-65* ^a	69-70†	70-71*	69-70†	70-71*	72-73†	73-74*	72-73†	
(A) Amount of credit (Rs)b (Average per household)	363	180	384	262	256	97	231	137	174	
(B) % Share of agencies in (A)										
Institutionse	8.2	12.5	7.7	5.3	36.5	64.1	55.1d	83.8	NA	
Money lender	23.4	22.3	22.8	40.5	2.3	7.4	2.2	3.1	NA	
Trader	46.3	13.4	61.4	37.3	33.0	19.7	NA	NA	NA	
Large farmers	10.1	36.3	2.4	6.5	—	—	24.3	3.5	NA	
Relatives	12.0	15.5	5.7	10.4	28.1	8.8	18.4	9.6	NA	
(C) % share of purposes of credit*										
Current productione	18.2	32.3	15.5	27.3	14.3	8.8	31.1	32.8	49.3	
Capital investmentf	12.1	47.4	3.0	—	32.9	62.4	16.5	49.3	42.9	
Current consumption	69.7	20.3	81.5	72.7	52.8	28.8	52.4	17.9	7.8	
Proportion (%) of kind loans	63.2	34.3	76.0	52.1	45.5	28.8	48.0	16.8	NA	
(D) Proportion (%) of credit obtained at different rates of interest :										
"Zero"s	18.6	24.0	10.0	12.5	29.8	11.0	NA	NA	NA	
1-10 per centh	8.2	12.3	7.7	5.3	36.6	64.2	NA	NA	NA	
11-20 per cent	9.5	30.3	8.2	16.1	4.4	7.1	NA	NA	NA	
>20 per cent	63.7	33.4	74.1	66.1	29.2	17.7	NA	NA	NA	
Average rate of interest	23.3	14.8	26.9	16.7	19.6	12.6	NA	NA	NA	

Source : Table 3. Post-drought year data are also taken from the same sources.

Notes : a† Drought years; *Post-drought normal years; NA : Not Available.

b Includes loans (cash/kind) from different sources. It excludes term-loans. In the case of Sholapur village, it also include subsidised and in some cases free supply of fodder by Zilla Parishad, which was reported as a part of loan. The amounts of credit are expressed in 1972-73 prices.

c Includes co-operatives and in a few cases government agencies.

d Consists of free/subsidised fodder supplies (26.0%) and co-operative loans (28.9%).

e Includes maintenance of livestock, handicrafts, and cultivation, etc.

f Purchase of animals, tools, implements, deepening of wells, etc. Excludes capital investment through term loans for pump-set on well, etc.

g 'Zero' rate of interest is a misnomer. It conceals more than what it reveals. There is no formally agreed-upon rate of interest in most of such cases. The cost of such loans is in terms of future labour contract or leasing of land or otherwise obligating borrower to lender in various other forms which may make the real rate of interest substantially higher than 20 per cent. Hence, the amount borrowed at 'zero' interest has been excluded while calculating the average interest rate.

h Only institutional loans fall under this category.

this does not put him at par with the trader and large farmer in the matter of using trading or farming as advantageous tools in the credit business and *vice versa*. Since he can finance asset replenishment during the post-drought years, his share also increases in such years.

LENDING AGENCIES

The features of rural financial markets in drought-prone areas, as revealed by analysis of borrowings, are strongly supported by data from lending agencies (Tables 7, and 8) which cover a small number of lenders in the Jodhpur area.³⁰

Lending was but one of four or five occupations or sources of income for most lenders.³¹ Because of their loan-recovery procedures, each had been able to acquire lands through their lending business. Large farmers who loaned acquired 33 hectares of land compared to only 3 hectares in the case of traders. This is quite understandable as one of the major goals of

large farmer in lending is to add to his land estate. The trader, on the other hand, is interested in boosting his trading turnover through credit activities.

The relative share of different agencies in the total lendings during drought and non-drought years (Table 7), further confirms the hypothesis (Table 6) that traders perform better during drought years while large farmers, moneylenders, and co-operatives do more lending during post-drought years as compared to drought years.

Lending and recovery in kind (evaluated in terms of money, using current prices) are important features of the credit market. Large farmers and traders, because of the nature of their respective main occupations, are better placed to conduct kind transactions. Kind transactions tend to aid recovery, as indicated by negative association between extent of recovery in kind and the extent of overdues.³² This is quite understandable as kind transactions impart a considerable degree of flexibility in terms of number of

options available to borrowers and lenders in the credit market. For example, in a kind-transaction-dominated credit market, the borrower can take credit in terms of any product — cloth, foodgrain, seed, bullock on hire, or even custom hire services — without waste of time or need for passing through different exchange intermediaries. Similarly, recovery can be made in terms of foodgrain, fuel, fodder, labour services, etc — whichever product the borrower is in position to spare at different points of time. Valuation at the time of initial borrowing and settlement of dues is, however, generally made in terms of current prices even though real goods may be physically exchanged. This provides a great facility to both the borrower and the lender.

The extent of flexibility in terms of options as to form (or number) of items and instalments through which lending is made and recovery effected by different agencies is presented in Table 8. The extent of flexibility, as

TABLE 7: DETAILS ABOUT THE BUSINESS OF LENDING AGENCIES IN VILLAGES OF JODHPUR DISTRICT, RAJASTHAN, 1956 TO 1965.

	Lenders ^b	Occupations Per Lender ^b	Proportion of Kind Transactions in: ^c			Average Land Acquired ^e	Lending during Drought Years/ Non-Drought Years ^f		
			Lending	Recovery	Overdues ^d		Pre-Drought Years	Drought Years	Post-Drought Years
	(no)	(no)	(%)	(%)	(%)	(ha)	(%)	(%)	(%)
Professional moneylender	8	4	3.5	30.3	33.4	12	28.7	17.1	29.2
Trader	7	5	88.7	66.8	27.5	3	18.3	49.9	16.8
Large farmer	11	4	60.2	82.5	14.3	33	37.6	24.4	40.3
Co-operative	1	—	15.4	21.8	67.8	Nil	16.4	8.6	13.7

Notes : a Data relate to a small number of purposively selected private credit agencies in villages in Jodhpur district. They include only those lenders (i) who were doing lending business during both of the severe drought periods of 1963-64 and 1957-58, and (ii) who acquired land of borrowers through lending business. Details of co-operative society were collected from records.

b Occupations or sources of income, including remittances.

c Proportions of total value of lendings and recoveries, respectively, during 1956-57 to 1964-65.

d Overdues as proportion of outstanding as of June 1965. In the case of co-operatives, the overdues exclude 'conversions of defaults' into rescheduled loans.

e Average amount of land acquired per lender from lending to borrowers in the past.

f 1957-58 and 1963-64 were severe drought years. Lending data during the two years have been pooled. Similarly, lending data during two pre-drought years (1956-57 and 1962-63) and post-drought years (1958-59 and 1964-65) have been pooled separately. Percentage share of each agency in the total lending during three sets of years has been presented.

stated above, is also more visible in the case of the large farmer and the trader when compared with the professional moneylender and credit co-operative. This flexibility is responsible for their high recovery/lending ratio during both drought and post-drought years.³³

Table 8 also reveals that the number of instalments, both in lending and recovery, by all agencies was higher than the corresponding number of items used in kind transactions in the case of all agencies (except co-operative society) in drought and non-drought years. The large number of lending instalments partly indicates the degree of responsiveness of lenders to time-wise and commodity-wise spread of credit demands, both for consumption and production purposes. This also reflects their caution against lumpsum lending, where the loan may exceed the genuine need of the borrower. The large number of instalments for recovery reflects both the facility with which the borrower can repay the loan in small parts and the capacity and tactics of the lender to effect recovery even during a drought year.

Circumstances during drought years compel both the lenders and borrowers to multiply the numbers of instalments of loan and recovery. This is clearly shown by the large number of instalments during 1963-64 as compared to 1964-65. In the case of the number of items in which loans or recoveries are transacted, the situation is quite opposite. This indicates that, there are available, during non-drought years, more items or products or activities, in

terms of which credit is demanded and recovery is made.

In summary, private credit agencies appear to perform better than institutional credit agencies during drought years. The private agencies are able to do successful business in highly risk-prone areas because they possess mechanisms to adjust to the lending risks evident in such areas. The important mechanisms are:

- (i) Ability to charge high-risk premiums through flexible rates of interest. The interest rate is variable, depending upon riskiness of the purpose, period of lending, and assets of the borrower.
- (ii) Availability of multiple sources of income with the lenders. This diversification of sources of income, some of which like income from remittances are not dependent on local crop conditions, make some of the lenders better-equipped to bear the losses, if any, sustained in making loans.
- (iii) Ability to be flexible in regard to number of instalments and number of items involved in lending and recovery. These features minimise default risk. Furthermore, risk-induced losses are compensated or over-compensated through the transactions of inter-linked factor-product-credit markets where the creditor always has stronger bargaining power.³⁴
- (iv) Credit (with most private lenders) is treated more as an instrument to directly or indirectly strengthen and augment gains from their main occupation — trading, farming, etc.

Hence, there is an incentive to continue in the lending business.

POLICY IMPLICATIONS FOR CREDIT PROGRAMMES

The preceding discussion shows that farming in drought-prone areas is highly risky. Farmers try to adjust to risk in various ways. However, their adjustment mechanism is not as strong or as fool-proof as normally assumed. The adjustment mechanism needs strengthening through various means, including an improved credit programme. It is admitted that, in view of the massive nature of drought-induced distress, credit alone can hardly provide full sustenance to drought-affected people. However, in a more selective and qualitative way, credit in co-ordination with other programmes for drought-prone areas can play a very effective role in risk minimisation and loss management over drought and post-drought years.

The following two issues have been prominent in the credit policy debate in the past. Private credit agencies have dominated loss-management and other credit lines in drought-prone areas. However, owing to their exploitative features — as reflected through the farmer's pauperisation process — they are criticised. State policies, on the other hand, have in the past tried to build up credit programmes mainly through co-operatives which aim at gradual displacement of private credit agencies. This discussion on policy implications in the present paper can be thus profitably confined to these issues.

TABLE 8: DETAILS INDICATING THE FLEXIBILITY OF CREDIT BUSINESS BY LENDING AGENCIES IN VILLAGES OF JODHPUR DISTRICT, 1963-64 AND 1964-65

Credit Agencies	Per Borrower Number of Instalments in Which				Per Borrower Number of Items in Which				Recovery/Lending Ratio ^a	
	Loans Given		Recovery Effected		Loans Given		Recovery Effected		1963-64	1964-65
	63-64	64-65	63-64	64-65	63-64	64-65	63-64	64-65		
Moneylender	3.7	2.5	4.9	3.5	1.8	2.2	2.1	3.3	.1	.4
Trader	7.5	4.1	6.4	4.4	2.5	3.7	3.5	4.2	.2	.6
Large farmer	5.5	4.8	7.3	5.8	3.1	4.2	4.9	5.5	.3	.5
Co-operative	1.4	1.3	1.1	2.7	1.0	1.6	1.5	2.3	.0	.3

Notes : Recoveries as proportion of current lending during two years.

Source : See Note a, Table 7.

PRIVATE LENDING AGENCIES

The plain fact about private credit agencies is that, owing to features mentioned in the preceding section, they are well-adapted to the risky situation of drought-prone areas. Hence, unless there is an equally flexible and well-adapted new source of credit, these agencies cannot be displaced. Their main problem is that they operate with limited resources. Even their pooled resources do not suffice to meet loss-management credit requirements during drought years. The excess of demand over supply offers private lenders an opportunity to over-exploit the situation. The solution to this particular problem lies in augmenting overall supplies during the stress period. This can be done by provision of supplies through public agencies, such as the fodder supplied by Zilla Parishad in Sholapur, and providing for additional earnings through relief works. Such provisions would reduce dependence on private moneylenders during the distress period, and ultimately reduce the potential for exploitation by them. Alternatively, private lenders could be integrated into the overall relief strategies and their services and competence could be used for lending and distribution of augmented supplies to drought-affected people.

The more important and most damaging feature of private credit activities takes the form of land and other asset transfers from borrower to lender over the period of bad and good years. One of the ways to restrict this tendency is to make the drought-induced acquisition of assets by lenders illegal on the same pattern as the legal restrictions on acquisition of lands of scheduled castes and other weaker sections in several states in India.

CO-OPERATIVES

In regard to promotion of credit programmes through co-operative ac-

tion in drought-prone areas of India, both in terms of policies and procedures, these institutions are not conducive to loss-management type of credit in cushioning farmers' adjustment against risk.³⁵ The All-India Rural Credit Review Committee (Reserve Bank of India, 1967) closely examined the progress and problems of rural credit and invariably blamed droughts as the principal cause of failure of co-operatives in drought prone areas.³⁶ Furthermore, credit institutions in the past have operated at least informally as discriminating against the more risk-averse borrower — the small farmer [Lipton 1976].

Any programme — be it an adult literacy programme or an employment guarantee scheme — cannot succeed in drought-prone areas, unless it adapts to the dictates of variable weather conditions. Credit co-operatives have been compelled to adapt at least partially to the conditions of unstable agriculture. They have done so through various formal or informal practices like: 'conversion loans' involving repeated re-scheduling of repayments,³⁷ adjustment of membership fees and share capital from the sanctioned loan itself, degeneration to a mere formality of the 'supervision' or 'inspection' of loans to prevent diversion to unintended uses, and (as mentioned by Rural Credit Committee, Reserve Bank of India, 1969) at times deliberate non-adherence to standardised financial management norms supplied by the government and the Reserve Bank of India. Some of these adaptive devices have been legitimised by provisions like creation of Agricultural Credit (stabilisation) Funds to help co-operatives remain in business despite mounting drought-induced defaults. The formal state partnership in co-operative institutions following the recommendations of the All-India Rural Credit Survey Committee Report can be interpreted as one adaptation device which facilitated survival of co-operatives

despite massive overdues.

However, most of the above devices appeared to be only artificial means to protect co-operatives from complete collapse under the weight of overdues, and help them to co-ordinate their recovery with good crop years. They are unable to impart the degree of flexibility and adaptability necessary for making institutions viable and less risk prone.

RISK-DEFUSING CREDIT STRATEGY

The crux of the problem thus becomes the making of credit (or rather credit institutions) less risk-prone in order to facilitate their effectiveness in aiding farmers to adjust to risk. Broadly speaking, there are two approaches for reducing the risk of lending in drought-prone areas.³⁸

The first relates to reduction of farmers' risk in agriculture, as it is the farmers' risk which is transmitted to the lender through defaults. There are several measures, ranging from irrigation to drought-resistant seed technology, as well as soil and moisture conservation devices and improved agronomic practices, which can impart stability to agriculture and thus indirectly reduce the risk to lenders also. Credit agencies can help themselves through financing such risk-defusing measures.

The second approach for reducing lending risk is to make credit agencies, through reorientation, less risk-prone. The reorientation of institutional credit policies to facilitate their adaptation to risky lending can draw upon the experience of private credit agencies, which within their means are able to do successful business despite the riskiness of agriculture in drought-prone areas. To repeat, the three interlinked factors conducive to the successful working of private agencies are: (i) flexibility of procedures, timing, as well as service-mix, and repayment components; (ii) ability to benefit from traditional interlinking of factors and pro-

duct markets; and (iii) conduct of the credit business as a one of a multiple of occupations and more as a device to serve the interests of their main occupations. However, the experience of informal agencies may not be bodily lifted by formal agencies. This is because, even with the best of efforts, credit institutions cannot have as high a situation-specific degree of informality as private agencies; such informality is an essential ingredient of flexibility. Secondly, being public institutions, they cannot absorb the exploitative feature, which are part of the credit business of the informal agencies. For example, unlike private lenders, co-operatives can neither charge exorbitant interest rates during droughts, nor can they acquire assets of drought-distressed borrowers.

In order to make the formal credit institutions multi-functional in place of uni-functional, as at present [Desai 1976], and to link their operations to existing or improved factor-product markets, a high degree of informality and exploitativeness are not necessary preconditions. What is required is a restructuring of policies and procedures as well as capacities of the credit institutions to operate in factor and product markets and diversify their service-mix to match the diversified demands and diversified means and methods of repayment on the part of the borrowers in both drought and non-drought years.³⁹ In simple terms, such restructuring will mean inclusion of provisions like supply of consumption credit and recovery through hiring of labour services.⁴⁰ The effective diversification of activities of credit institutions add to their viability and utility.⁴¹ What is doubtful is the ability of co-operatives, or for that matter better-equipped commercial banks, to handle a complex of activities on their own. The solution lies in linking their activities with other agencies working in factor and product markets, rather than undertaking all activities on their own. Their links with agro-service centres or rural works programmes, employment guarantee schemes, crop insurance schemes [Dandekar 1976], milk and other marketing agencies, relief organisations (who also manage fodder banks), development departments, etc. can ensure their direct or indirect involvement in the factor and product markets. Development and management of social capital like village pasture, run-off collection tanks (to stabilise agriculture through protective irrigation), seedling nurseries (to guard against early season droughts), etc. can add

other dimensions to a new and diversified set of activities. They can be a source of earning for the credit agencies and can help initiate technological transformation of agriculture in these areas. In the process, farmers' risk is reduced — and hence lenders' risk also.⁴² Viewed differently, the above suggestion amounts to an approach to integrated development of drought-prone areas, with credit or credit agencies playing a central role. But this is essential, since credit as a conventional 'single' function apparently has not contributed adequately towards supporting farmers in risky environments.

Notes

[The author wishes to thank James G. Ryan, Hans P. Binswanger, G. D. Bengtson, B. M. Desai, and M. D. Desai for their valuable comments and suggestions during the preparation of the paper. They, of course, are absolved of any blame for errors of omission and/or commission which remain. The author is grateful to ICRISAT for providing research facilities for preparing this paper. However, the views expressed not necessarily those of ICRISAT.]

1 Broadly speaking, areas having less than 500 mm of annual average rainfall and where rainfall exceeds potential evapotranspiration (PET) for less than 2.5 months during the year are defined as tropical arid areas. The semi-arid tropical areas have 500 to 1,500 mm of annual rainfall and the rainfall exceeds PET for 2.5 to 7 months in a year [Krantz and Kampen 1973]. For distribution of arid and semi-arid tropical areas, in India see Krishnan (1968) and Ryan and Associates (1974).

2 Rainfall data of a number of districts for the last 30 to 70 years analysed by S. M. Virmani, agro-climatologist at ICRISAT, indicate average rainfall (mm) and coefficients of variation of annual rainfall (percentage indicated in parentheses) as follows: Akola: 824 (27), Hyderabad: 788 (27), Sholapur: 704 (29), Kurnool: 628 (26), Deesa: 579 (51), Anantapur: 577 (28), Bijapur: 562 (33), Ajmer: 536 (29), Bhuj: 335 (69), Jodhpur: 361 (53), Hissar: 328 (39) and Barmer: 277 (62). The above data broadly indicate that the lower the rainfall the greater is rain-induced risk. In other words, the poorer the area due to aridity, the greater is the risk it faces.

3 India has three distinctive agricultural seasons. *Kharif* is the rainy, or monsoon season; the bulk of the rainfall occurs during this time. *Rabi* is the post-rainy season; crops growing during this season must depend on residual soil moisture. During the third season, the hot dry sum-

mer months, crops must be irrigated.

4 Details in Table 1 in a way under-report the incidence of droughts in arid and semi-arid areas, since the Table deals with number of meteorological sub-divisions rather than their area, and hence it treats the large arid and semi-arid sub-divisions (where droughts are more frequent) at par with smaller sub-divisions in the good rainfall regions.

5 For analysis of instability of crop yields in different parts of arid and semi-arid tropical areas of India, see Jodha and Purohit (1971), Ryan and Associates (1974), Dandekar (1976).

6 For instance, famine codes of the different states clearly mention indicators for consideration while determining the incidence of scarcity situation. These are sudden migration of cattle, unusual movement of human labour to towns in search of employment, sudden increase in crimes (particularly petty grain thefts and begging), decrease in civil litigation, arrival of assets for sale/mortgage to town-based moneylenders, factors indicating malnutrition among children, deterioration in the health of cattle and rise of cattle mortality, sudden fall in agricultural wages and price of cattle, increase in foodgrain prices, and other factors relating to crop conditions, fodder stocks, water level in wells and tanks, etc.

7 For instance, we have detailed studies of farm management, share-cropping, tenancy, cropping patterns, and resource use, investment and indebtedness, migration and settlement, etc. but their risk-minimising focus is seldom projected.

8 For want of sufficient and comparable data from different areas, it has not been possible to cover all aspects of adjustment mechanism such as migration, occupational shifts, informal transfers of property, incidence of drought-induced crimes, extent of destitution, cattle and human mortality, etc. For a discussion on some of these issues see Singh (1975), Subramanian (1975) and Jodha (1975).

9 The non-drought year in this paper mostly refers to post-drought years. In view of the prolonged impact of drought during the post-drought years, the latter may not reflect the situation of really normal years. However, in the absence of pre-drought year data on different aspects, the post-drought year has been used as a reference point. In Maharashtra 1972-73 was a severe drought year, but in the years 1971-72 and 1973-74 the state also suffered from mild droughts.

10 Another study which compared drought year (1972-73) situation with normal year (1967-68) situation in Maharashtra areas found

a decline of 17 per cent in the per capita intake of foodgrains during the drought year. The total consumption expenditure at (1972-73 prices) declined more than 11 per cent during the drought year [see Subramanian 1975, pp 442-443].

- 11 All assets may have notional carrying cost in terms of interest on invested capital and depreciation during the idling period. However, in the case of livestock the maintenance cost is not just notional.

- 12 The term 'sustenance' is used here in a very broad sense. It is defined to include human consumption, maintenance of animals, minimum of capital, and current production expenditure to ensure production activities like handicrafts, or using bullock cart on relief work for water supply or deepening of well to have some crop during the drought year. Thus the term sustenance does not mean bare minimum consumption. Furthermore, sustenance income means the total resource inflow in cash or kind including borrowings.

- 13 The amount of "sustenance income" under Table 4 contributed by sale of assets or borrowings may not compare with the value of assets depleted or extent of increased indebtedness indicated by Table 3. Table 4 excludes the asset depletion due to loss or gifts. It also excludes term-loans, such as those for buying of pump-sets for wells, negotiated long before the commencement of drought and having nothing to do with management of sustenance during the drought.

- 14 For some more details about reduced efficacy of adjustment mechanism involving changing role of seasonal emigration, market forces and traditional forms of rural co-operation, etc, see Jodha [1978].

- 15 This is partly reflected through continuation of the resource-depletion process in the Sholapur area (Table 3), where 1973-74 was also a mild drought year. Yet another set of data collected by ICRISAT showed that, as a consequence of severe drought in 1972-73 and mild droughts in the following 2 years (which did not permit recoupment of assets), the average number of bullocks in 1975-76 in Sholapur villages was only two per 10 hectares. The corresponding number of bullocks in the Akola (Maharashtra) and Mahbubnagar (Andhra Pradesh) villages, not affected by recurrent droughts, ranged between three to five. Another consequence of recurrent droughts has been that, in the Sholapur villages, 39 per cent of the farm households had leased out all of their lands. The corresponding extent of farm households in the Akola and Mahbubnagar villages, ranged between 3

and 7 per cent [Jodha, Asokan, and Ryan 1977].

- 16 In 1969-70, the bulk of the livestock in drought-affected Barmer and its neighbouring districts in Rajasthan perished because farmers' traditional migration routes to canal areas in Sind (Pakistan) — which remained informally operative even after the partition of India in 1947 — suddenly were blocked after the 1965 struggle between India and Pakistan [Jodha 1975].

- 17 Of course, there is a need for discounting these losses once it is recognised that disposal of assets with high carrying cost, e.g, livestock, results in savings on fodder, etc, available at relatively higher prices during the drought and lower prices during non-drought years. The higher prices of foodgrain, fodder, and livestock products during the drought year may compensate the farmers for some losses, due to lower price of assets. But most farmers in fact suffer on account of these high prices as they do not have these products and are on the buying side. Large farmers, on the other hand, do benefit from this. For details of differences in the adjustment mechanisms of small and large farmers and their positions as net buyer or seller during drought and post-drought years. See Jodha [1978].

- 18 The case histories of 7 poor rural households in the Jodhpur area very sharply revealed the consequences of failure of adjustment mechanism during six drought years between 1938-39 and 1963-64. As a consequence of droughts their average land holding size declined from 17.3 to 1.9 hectares; the average number of cattle owned declined from 27 to 2; average number of goats — the poor man's cows — increased from nil to 11; average number of members per family working as casual labour and attached labour increased from nil in both cases to six and three, respectively. [See Jodha 1975].

- 19 This is not to suggest that credit is missing in the adjustment mechanism at present. The real problem is its inadequacy and its exploitative character in some cases. Credit from conventional sources has an exploitative character in the sense that lenders set to it that initial mortgages (against loans) are converted into delayed but permanent disposals of assets. In such cases, credit has proved an instrument in accentuating the pauperisation process [Jodha 1975].

- 20 Under the World Bank financed projects for six drought-prone districts in India, the project proposal reports have actually been entitled "Drought Proofing of Districts" X, Y, etc.

- 21 For instance, intensive irrigation schemes designed to serve high-water requiring crops such as paddy, sugarcane, or wheat create small pockets of prosperity within the drought-prone areas; extensive irrigation schemes which provide protective or supplementary irrigation to less water-consuming-crops like sorghum or millet offer stability to the economy of larger areas and larger numbers of farmers [Jodha 1976].

- 22 According to the famine codes governing the management of famine relief, dues for land revenue, institutional loans, and government-development levies are formally postponed during declared drought years. The repayment of dues to private credit agencies also often is informally postponed during severe drought years.

- 23 An important limitation of Table 4 is that it does not reflect the value of resources saved through curtailment, cancellation, postponement, etc, of consumption and other activities; or of help received in terms of postponement of recovery of dues, etc. The data presented are not for farmers alone — they include a small number of labourers or non-land operators (including farmers who leased out their total lands). Furthermore, inter-class differences of adjustment devices discussed elsewhere [Jodha 1978], have not been discussed here.

- 24 Viewed differently, the higher interest rates during drought years and greater proportion of loans transacted under highest interest rates reflects the extent to which lenders exploit the situation of distress caused by droughts.

- 25 The higher proportion of institutional credit in the Sholapur area has to be discounted because reporting farmers included as loans the free or subsidised fodder supplies provided more as grants than credit by Zilla Parishad (the district government). The Zilla Parishad fodder supplies constituted slightly less than one-half of the institutional borrowing.

- 26 The informal or private lending agencies or private lenders — trader, moneylender, and large farmer — have been listed separately on the basis of their main occupations. They perform several functions; lending is one of the occupations, and their main occupations differ (Table 7). As their main occupations are different, their classification on this basis makes them mutually exclusive.

- 27 Whether credit demands will be more or less during the post-drought year will depend upon the extent to which productive resource depletion has taken place during the drought year and the

- extent to which it needs to be replenished in the immediate post-drought year to enable re-initiation of normal production. Furthermore, very severe resource depletion may convert the borrower into a more risky proposition, even from the point of view of private lenders. This may, from the supply side, depress the extent of credit in the post-drought year.
- 28 In Barmer area, such a situation is not visible because (owing to almost complete loss of draft animals and other wherewithal to re-initiate cultivation in the post-drought year) the government had a large programme of planting crops on behalf of farmers through pooling tractors from other districts. Much of this government help was free of cost to the farmer. The same factor explains the absence of increase in credit for current production and capital investment in Barmer during the post-drought year.
- 29 Lending and recovery transactions are made in kind, but valuation is done in terms of money. Hence, through lending in terms of high-priced foodgrains during the droughts and subsequent recovery in terms of low-priced foodgrain, not only is the possibility of loss eliminated but substantial gains are ensured.
- 30 Data presented in Tables 7 and 8 relate to a small number of purposively selected private credit agencies. It is hard to get accurate information from private moneylending agencies. However, the task was facilitated by the author's stay in the same villages for more than two years (around 20 days each month) while working for the Central Arid Zone Research Institute, Jodhpur. The initial purpose of rather intensive investigations was to examine drought-induced land transfers leading to pauperisation of farmers. Hence, the first criterion for selection of private lending households was their acquisition of some land through lending operations. The second criterion was their presence in the lending business during the 1963-64 drought period and also the previous drought period of 1957-58. Data of 10 or more years' experience in the lending business were collected both from their records as well as through long interviews. For more details, particularly from the borrowers' side, see Jodha [1975]. Features of the lenders selected are broadly in keeping with the features of informal credit agencies observed elsewhere [see Donald, 1976, ch 8].
- 31 These occupations or sources of income invariably included one or more sources like remittances, permanent job or business of one or more members of household in towns or in irrigated areas. This not only helped establish or strengthen urban-rural links of the lending agencies, but ensured stability of incomes.
- 32 The term overdues in the case of private credit agencies may not mean much as there is no rigid time schedule for repayment. The moment any rigidly fixed repayment date (if any) arrives, the lender can with various means acquire the assets of the borrower to settle the dues. This has actually been done by lenders, as indicated by their land acquisitions (Table 7).
- 33 This flexibility imparts greater comparative advantage to the large farmer and helps him increase his share of agricultural lending in the normal years. This factor explains the increased share of large farmers (described as 'agricultural moneylenders', different from professional moneylenders), at the macro-level from about 25 per cent of total lending to farmers in 1951-52 to 36 per cent during 1961-62 in the country as a whole as revealed by All-India Rural Credit Survey (1951-52) and All-India Rural Debt and Investment Survey (1961-62) by the Reserve Bank of India. The share of trader cum commission agents during the corresponding period has increased from 5.5 to 8.8 per cent of the total lending to the farmers. The share of all private lenders (put together) has declined from 92.7 to 81.3 per cent during the same period.
- 34 For a detailed analysis on this aspect, see Bharadwaj [1974].
- 35 Of late, some nationalised banks and the recently created Rural Banks have entered some of the drought-prone areas. Details of their performance are not readily available.
- 36 In the absence of region-wise data for different states, the following data for states with substantial arid and semi-arid tropical areas illustrate the point. (i) proportion (percentage) of dormant credit co-operative societies to total societies and (ii) the proportion of overdues to total loans outstanding for the societies respectively during 1966-67 were as follows: Andhra Pradesh: Dormant Societies (percentage) 17 and overdues (percentage) 42; Gujarat 7 and 26; Karnataka 13 and 43; Madhya Pradesh 3 and 37; Maharashtra 2 and 37; Rajasthan 32 and 45; and Tamil Nadu 30 and 34. For details, see Reserve Bank of India (1969, chapter 8). It should be noted that 1965-66 was a severe drought year in most of the areas.
- 37 For instance, in the case of Central Co-operative Banks of some districts covered by Table 5, ratios of conversion loans outstanding to short-term loans outstanding during the period of 4 to 5 years ranged as follows: Jodhpur 0.9 to 1.22; Barmar 0.15 to 2.10; Banaskantha 0.06 to 0.22; Sholapur 0.19 to 0.96. (Ratios computed from data given in Statistical Statements Relating to Co-operative movement in India, an annual publication of the Reserve Bank of India.)
- 38 For a detailed discussion of approaches to reduce the risk aversion of farmers as well as credit agencies, and risk-reducing credit lines helpful to both borrowers and lenders, see Lipton [1976].
- 39 In fact, some of diversification was introduced through multi-purpose co-operative societies which performed some trading functions besides disbursement of credit. However, most co-operatives literally became state agencies to distribute scarce commodities like sugar, kerosene, rationed foodgrains, and cloth, with little involvement in village level factor-product markets. Even the crop loan scheme which tried to link co-operative credit/recoveries to market surpluses sold to marketing co-operatives failed partly for want of proper linking of the scheme with the other factor-product markets.
- 40 Some nationalised banks have already initiated action along these lines. Recovery of livestock loans through milk supply to milk collection centres of dairy development agencies in some states is one case in point. The State Bank of India in Maharashtra has authorised some of its branches to give consumption loans even to the landless, where recovery is linked to wage income of borrowers working under employment-guarantee schemes [see Khanna 1977]. Also see FAO [1975], chapter 3.
- 41 That diversification can bring about success is revealed by case studies of primary co-operative credit societies in three (two of them semi-arid tropical) districts of Gujarat. Societies which, on an average, had seven functions, including credit and trading, has average profit of Rs 13,000 per year. On the other hand, societies with an average of 3 functions earned Rs 2,000. The audit classifications put the former in the category of 'best' societies, while the latter were put under the 'poor' category, [see Jodha 1974].
- 42 These technological possibilities can help multiply the alternatives available to the farmer and widen the scope of his adjustment mechanism.

References

- Ajora, D. and D S Mehra (1974), 'Productivity Levels of Major Crops in Drought-Prone Area Programme Districts', *Agricultural Situation in India*, Volume XXIX (5).
- Bharadwaj, Krishna (1974), "Production Conditions in Indian Agriculture", Cambridge University Press.

- Borkar, V V, and M V Nadkarni (1975), "Impact of Drought on Rural Life" Popular Prakashan, Bombay.
- Chaudhuri K M and M T Bapat (1975), "A Study of Impact of Famine and Relief Measure in Gujarat and Rajasthan", Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Gujarat.
- Dandekar, V M (1976), 'Crop Insurance in India', *Economic and Political Weekly*, Volume XI (26), (Review of Agriculture).
- Desai, B M (1976) 'Formal and Informal Credit Sources in Tribal Areas: A Case of Dharampur Taluka', *Artha Vikas*, Volume XII (2).
- Donald, Gordon (1976), "Credit for Small Farmers in Developing Countries", Westview Press, Boulder, Colorado.
- Food and Agriculture Organisation (1975), "Agricultural Credit in Asia", Report on the Regional Seminar for Asia on Agricultural Credit for Small Farmers, Bangkok 7-18 October, FAO, Rome.
- Jodha, N S and S D Purohit (1971), 'Weather and Crop Instability in the Dry Region of Rajasthan', *Indian Journal of Agricultural Economics*, Volume XXVI (4).
- Jodha, N S (1973), 'Prospects for Coarse Cereals: Permanent Constraints of Jowar and Bajra', *Economic and Political Weekly*, Volume VIII (52), (Review of Agriculture).
- Jodha, N S (1974), 'A Study of Co-operative Short-Term Credit Movement in Selected Areas of Gujarat' in "Serving the Small Farmer: Policy Choices in Indian Agriculture", Editors: Guy Hunter and A F Bottrall, Croom Helm, London.
- Jodha, N S (1975), 'Famine and Famine Policies: Some Empirical Evidence', *Economic and Political Weekly*, Volume X (41).
- Jodha, N S (1976), 'Technological Approaches to Development of Dryland Farming: Achievements, Obstacles and Prospects', in "Agricultural Development in India: Policy and Problems", Editors: C N Vakil and C H Shah (forthcoming).
- Jodha, N S, M Asokan and Ryan J G (1977), "Village Study Methodology and Resource Endowments of the Selected Villages in ICRISAT's Village Level Studies" Occasional Paper 16, Economics Programme, ICRISAT.
- Jodha, N S (1978), 'Effectiveness of Farmers' Adjustment to Risk', *Economic and Political Weekly*, Volume XIII (25) (Review of Agriculture).
- Khanna, K C (1977), 'Credit for Rural Growth: The Compulsions of Circumstances', *The Times of India*, March 1.
- Krantz, B A and J Kampen (1973), 'Water Management for Increased Production in the Semi-Arid Tropics' paper presented at "National Seminar on Water Resources in India and Their Optimum Utilisation in Agriculture", Water Technology Centre, IARI, New Delhi.
- Krishnan A (1968), 'Distribution of Arid Areas in India', in "Symposium on Arid Zone under the Auspices of XXI International Geographical Congress" Jodhpur (mimeo).
- Lipton, Michael (1976), 'Agricultural Risk, Rural Credit and the Inefficiency of Inequality', paper presented at "ADC Conference on Uncertainty and Agricultural Development", March 9-13, at CIMMYT, Mexico.
- Mallik, A K and Govindaswamy (1962-63), 'The Drought Problem of India in Relation to Agriculture', "Annals of Arid Zone" Volume I (1 and 2).
- Morris, M D (1974), 'What Is Famine?' *Economic and Political Weekly*, Volume IX (44).
- Reserve Bank of India (1969), "Report of the All-India Rural Credit Review Committee", RBI Bombay.
- Ryan, J G and Associates (1974), 'Socio-Economic Aspects of Agricultural Development in the Semi-Arid Tropics' (in International Workshop on Farming Systems, November 18-21) ICRISAT, Hyderabad.
- Sen, Amartya (1976), 'Famine as Failures of Exchange Entitlements', *Economic and Political Weekly*, Volume XI (31-33).
- Singh, K S (1975), "The Indian Famine 1967: A Study in Crisis and Change", Peoples' Publishing House, New Delhi.
- Subramanian, V (1975), "Parched Earth: The Maharashtra Drought 1970-73" Orient Longman Limited, Bombay.