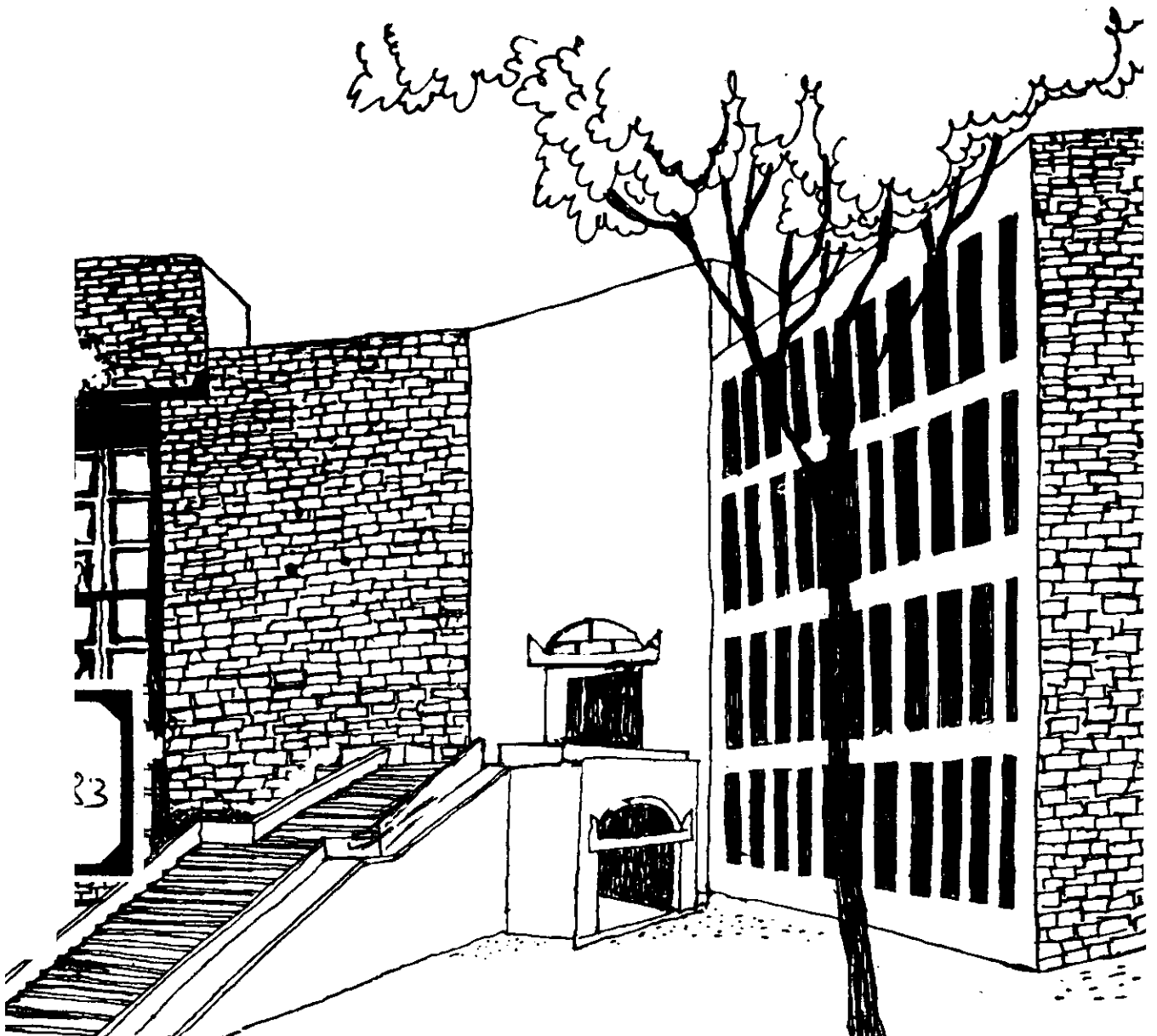


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INSTITUTIONAL CREDIT FOR GREEN REVOLUTION
AND DRY-FARMING AREAS IN INDIA

By

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INSTITUTIONAL CREDIT FOR GREEN REVOLUTION AND DRY-FARMING AREAS IN INDIA

B.M. Desai, V.K. Gupta and Gurdev Singh*

Introduction

This paper examines the relationship between the degree of agricultural progress and institutional credit. More specifically it examines the relationship between the proportion of area covered under HYVs of foodgrains and (a) the density of Rural Financial Institutions (RFIs), (b) various types of agricultural credit, and (c) default rate of 'direct' agricultural credit from the cooperatives. Moreover, it also examines the relationship between this default rate and various types of cooperative credit for agriculture. Before these objectives are studied, identification of green revolution and dry-farming areas and concepts of various types of agricultural credit are discussed.

Identification of Green Revolution and Dry Farming Areas

At the outset it may be mentioned that the credit data required for this study are available only for States. Hence the identification of green revolution (GR) and dry-farming (DF) areas had to be restricted to states. According to the agro-climatic definition of the semi-arid tropics (SAT), ten

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states of India could be classified as SAT states though parts of some of these states also consist of arid or humid areas (Bapna et al 1979). These states are Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh. More than 80 percent of the districts in these states fall under the semi-arid category. Moreover, Haryana, Punjab and Rajasthan have significant number of arid districts, too. These ten states account for 97 per cent of the total area under the five ICRISAT crops in India.¹ These states are divided into three groups to represent different degrees of agricultural progress achieved by them. This is done on the basis of proportion of area covered under HYVs of foodgrains during 1977-78 to 1979-80. Group I includes Punjab, Haryana and Tamil Nadu. Group II includes Uttar Pradesh, Gujarat, Andhra Pradesh and Karnataka. And Group III consists of Maharashtra, Madhya Pradesh and Rajasthan. This classification holds for all the three years except for 1977-78 in the case of Haryana and Uttar Pradesh only (see Table 1). For this exceptional year, Haryana can be categorized as Group II states, while Uttar Pradesh can be classified as Group I state. Despite this, categorization of ten states into three groups has been kept same for all the three years. This is because such categorization holds for two out of three years for these exceptional states, too.

¹

These crops are Sorghum (jowar), pearl millet (bajra), pigeon pea (arhar or tur), chick pea (gram), and groundnut.

Table 1 : Data on Selected Indicators of Agricultural Progress of Ten SAT States in India

States and Groups	% of HYV area to total area under five foodgrains*			Value of Agrl. output per ha. of net sown area** (Rs)
	1979-80	1978-79	1977-78	
Punjab	89.0	86.7	83.8	3845
Haryana	69.9	65.3	60.4	2627
Tamil Nadu	69.0	70.5	71.8	2625
Group I	76.0	74.2	72.0	2986
Uttar Pradesh	48.2	54.2	61.9	1870
Gujarat	51.4	50.3	48.0	1257
Andhra Pradesh	43.4	45.8	43.7	1367
Karnataka	39.1	39.4	36.5	1158
Group II	45.5	47.4	47.5	1482
Maharashtra	36.8	35.4	35.9	858
Madhya Pradesh	19.2	26.6	25.9	785
Rajasthan	20.2	17.7	18.6	596
Group III	25.4	26.6	26.8	755

* Five foodgrains covered are paddy, wheat, jowar, baira and maize (corn).

** Average of five years ending 1979-80 at 1978-79 prices.

Data Sources:

- 1) Statistical Abstract of India, Central Statistical Organization Planning Commission, Government of India, various Issues.
- 2) Agricultural Productivity in Eastern India, vol.I, Report of the Committee on Agricultural Productivity in Eastern India, Reserve Bank of India, 1984.

Moreover, such classification holds when it is done on the basis of an average value of agricultural output per hectare of net sown area for five years ending 1979-80 at 1978-79 prices (see Table 1). Group I represents 'high' degree of agricultural progress. Group II represents 'medium' degree of this progress and Group III represents 'low' degree of agricultural progress. The analysis is carried out first for these three groups and then important features about individual states are highlighted.

Types of Agricultural Credit

Two types of agricultural credit are 'direct' and 'indirect' credit (RBI 1984, RBI 1984-85). Former is for the cultivators' farming operations and assets. Such credit may be designated as credit for Agricultural Production Sub-system (APS). 'Indirect' credit, on the other hand, is for developing agricultural infrastructure like inputs distribution and cooperative marketing and processing units. Credit for inputs distribution mainly includes such inputs as seeds, fertilizers, pesticides, implements, machineries, electricity, etc. It may, therefore, be termed as credit for Agricultural Inputs Sub-system (AIS). Credit for cooperative

2

This type of innovation in rural credit policies was introduced in late 1960s. India is perhaps the only developing country which has experimented with this innovative policy. From the literature on developed countries one gets an impression that these countries have also not attempted such policy innovation. 'Indirect' credit is also considered as priority sector lending.

marketing and processing may be termed as credit for³ Agricultural Processing and Marketing Sub-system (APMS). 'Indirect' agricultural credit also includes credit for farmers and the landless labourers through PACS/FSS/LAMPS adopted by the commercial banks, and through state-sponsored corporations. Such credit like the 'direct' credit may be termed as credit for APS.

Statewise data on 'indirect' credit from cooperatives can be conveniently classified into credit for the above mentioned three sub-systems. These data are available for the agricultural year July to June. But such data for the⁴ commercial banks for the comparable period are not available. Fortunately, however, these data are available in sufficient details for the calendar year so that they can be classified into credit for the earlier mentioned three sub-systems. These data on 'indirect' credit were used to find out percentage shares of credit for AIS, APMS and APS. These percentages were then applied to the annual 'indirect' credit

3

At present 'Indirect' credit for AIS and APMS carries commercial rates of interest ranging from 14 to 18 percent. Other type of such credit like 'direct' credit carries interest rates of about 10 to 15 percent, depending on the size of loan, and the type of farmers financed.

4

RBI may consider publishing these data since it has already published such data on an all-India basis for a period from 1969-70 till 1980-81 (July-June).

data covering July to June period to classify this credit separately for three sub-systems. Before discussing further classification of credit for APS it may be pointed out that credit for APS assists in generating demand for inputs and services from AIS and thereby helps achieve backward linkage (BWL) of the former with the latter sub-system. Achieving such a linkage is accelerated through credit for AIS, since it would encourage supply of inputs and thereby enable attaining forward linkage (FWL) of this sub-system with the APS. Credit for APS can furthermore assist in generating supply of output and thereby creating demand for services from the APMS. This process can help achieve FWL of APS with the APMS.⁵ Attainment of such a linkage is accelerated through credit for APMS as it would encourage supply of services and thereby enable achieving its BWL with the APS. These linkages are diagrammatically shown below :



These types of linkages are critical to achieving increases in agricultural productivity, production and value added.

⁵ Credit for AIS and APMS is also needed to forge these linkages for those farmers who self-finance their inputs and farm assets requirements. In 1979-80, institutional credit in India met only 28 percent of farmers' expenses on major cash inputs (which included fertilizers, diesel oil, electricity, irrigation charges, pesticides and insecticides, current repairs, maintenance of fixed assets and other operational costs, and hired labour) and 34 percent of the gross private capital formation in agriculture (Kahlon et al 1984).

Credit for APS can be for various purposes. Considering the available data, these purposes can be classified into three broad categories (RBI 1976, Jodha 1981). These are :

1. Current Production/Income Loss Management (CPL)
2. Current Production/Income Maintenance Management (CPM),
and
3. Current Production/Income Stability and Growth
Management (CPSG)

Each of these purposes may be sub-divided as follows :

1. Current Production/Income Loss Management (CPL)
 - 1.1 Conversion of past loans into term loans
 - 1.2 Debt redemption
2. Current Production/Income Maintenance Management
 - 2.1 Short-term 'cash' loans
 - 2.2 Loans for purchase of plough animals and/or
carts
 - 2.3 Loans for undertaking soil and moisture
improvement works
3. Current Production/Income Stability and Growth
Management
 - 3.1 Short-term loans in 'kind'
 - 3.2 Loans to dig wells and tanks
 - 3.3 Loans to purchase lift irrigation devices
 - 3.4 Loans to purchase farm implements and
machineries

3.5 Loans to construct farm structures and
regulated market yards⁶

3.6 Loans for supplementary activities like dairying,
poultry, sheep rearing, etc.

Relationship between the Degree of Agricultural Progress and
Density of RFIs

Table 2 provides the relevant data. It shows that the degree of agricultural progress is positively associated with the density of RFIs. Thus, the coefficient of correlation between the proportion of HYV area and the density of RFIs worked out to 0.9640 for 1977-78, 0.6819 for 1978-79 and 0.7144 for 1979-80. The RFIs' density was the highest in Group I, followed by that in Group II and then Group III in all the three years.

It is noteworthy that the differences in density of RFIs between the three groups narrowed over time. This was particularly the case for differences between Groups I and II and Groups I and III.

Density of RFIs was lower than the group average in Harvana from Group I, Uttar Pradesh and Karnataka from Group II, and Madhya Pradesh and Rajasthan from Group III. Finally, over the three years in some of the states the density of RFIs has declined. This is mainly due to reorganization of small sized PACS into large sized societies. Notable among these

6

Strictly speaking loans for the latter purpose should be classified as credit for APMS. This could not be done because of non-availability of required data.

Table 2 : Density of Rural Financial Institutions*
in GR and DF Areas : 1977-78 to 1979-80

(no. per 1000 ha. of net sown area)

States and Groups	1977-78	1978-79	1979-80
Punjab	2.607	1.047	1.024
Haryana	0.830	0.834	0.881
Tamil Nadu	1.004	1.025	1.055
Group I	1.433	0.982	1.002
Uttar Pradesh	0.626	0.660	0.758
Gujarat	0.944	0.944	0.932
Andhra Pradesh	0.851	0.780	0.858
Karnataka	0.676	0.673	0.682
Group II	0.751	0.746	0.800
Maharashtra	1.099	1.114	1.119
Madhya Pradesh	0.435	0.405	0.437
Rajasthan	0.361	0.385	0.455
Group III	0.646	0.645	0.688

* RFIs include Primary Agricultural Credit Societies (PACS), branches of Cooperative Land Development Banks (CLDBs), branches of Regional Rural Banks (RRBs), and rural and semi-urban branches of commercial banks. This excludes dormant PACS.

Data Sources:

- 1) Statistical Statements relating to Cooperative Movement in India, Part I, Reserve Bank of India, various issues.
- 2) Statistical Tables relating to Banks in India, Reserve Bank of India, various issues.
- 3) Statistical Abstract of India, Central Statistical Organization, Planning Commission, Government of India, various issues.

states is Punjab where density declined significantly. But, as can be seen from Tables 3 and 5, this has not reduced the amount of credit from all RFIs or from cooperatives in this state.

Relationship between the Degree of Agricultural Progress and Credit Outstanding for AIS, APS and APMS from all RFIs⁷

Table 3 provides the data on shares and size of outstanding credit for the three sub-systems from all RFIs for 1977-78 to 1979-80. RFIs covered in this and subsequent tables do not include RRBs due to non-availability of data.⁸ Following findings may be highlighted from Table 3.

One, the degree of agricultural progress is positively associated with the amount of agricultural credit per hectare of net sown area. This is the case in all the three years. The coefficient of correlation between the percentage of area

FIGURE 3: AGRICULTURAL CREDIT
 IN THE INSTITUTE OF MANU, BANGALORE
 (1977-78 TO 1979-80)

7

The amount of credit for AIS and hence the total agricultural credit considered here is underestimated. This is because 'indirect' credit for Rural Electrification Corporation could not be covered due to non-availability of state-wise data on this credit in published form. RBI may consider overcoming this lacuna in data base for rural credit.

8

RRBs data may also be published utilizing the classification of various types of agricultural credit discussed earlier in this paper.

Table 3 : Shares and Size of Outstanding Credit for AIS, APS, and APMS from all RFIs in GR and DF Areas : 1977-78 to 1979-80

(Size in per hectare of net sown area)

Groups & States	1977-78				1978-79			
	% Share of Credit for			Amount (Rs./Ha)	% Share of Credit for			Amount (Rs./Ha)
	AIS	APS	APMS		AIS	APS	APMS	
Punjab	12.4	85.2	2.4	699.8	7.7	90.4	1.9	835.8
Haryana	5.9	85.8	8.3	646.6	2.3	90.5	7.2	806.3
Tamil Nadu	4.4	93.2	2.4	836.4	5.2	94.8	-	971.4
Group I	6.9	89.4	3.7	747.0	5.2	91.8	3.0	888.3
Uttar Pradesh	10.0	89.5	0.5	316.3	7.0	89.0	4.0	415.7
Gujarat	5.1	91.2	3.7	445.6	6.8	88.6	4.6	500.2
Andhra Pradesh	1.3	98.6	0.1	464.3	2.9	97.1	4.6	572.9
Karnataka	3.2	91.1	5.7	446.9	6.4	89.6	2.5	481.4
Group II	5.0	98.6	2.4	403.3	5.7	91.6	2.7	482.8
Maharashtra	3.5	74.7	21.8	487.7	3.0	73.0	24.0	534.7
Madhya Pradesh	4.1	93.8	2.1	161.5	5.2	91.0	3.8	191.0
Rajasthan	2.5	97.5	1.0	125.1	2.4	96.7	0.9	156.2
Group III	3.4	81.9	14.7	264.9	3.4	80.7	15.9	300.0

Data Sources : Same as those listed in table 2.

Table 3 (contd.)

(Size in per hectare of net sown area)

Groups & States	1979-80			Amount (Rs./Ha)
	% Share of Credit for			
	AIS	APS	APMS	
Punjab	8.9	90.6	0.5	1079.4
Haryana	3.1	96.0	0.9	965.7
Tamil Nadu	6.7	93.2	0.1	1088.4
Group I	6.1	93.0	0.9	1054.5
Uttar Pradesh	6.9	91.8	1.3	506.6
Gujarat	6.2	91.2	2.6	543.1
Andhra Pradesh	2.5	97.4	0.1	745.2
Karnataka	2.6	95.2	2.2	517.7
Group II	4.2	94.0	1.8	569.4
Maharashtra	4.0	78.7	17.3	566.4
Madhya Pradesh	3.6	92.2	4.2	239.1
Rajasthan	1.0	98.4	0.6	218.1
Group III	3.4	85.5	11.1	350.8

under HYV foodgrains and this amount worked out to 0.8135 for 1977-78, 0.8875 for 1978-79, and 0.9334 for 1979-80. Two, the size of credit per hectare was lower than the group-average in all the three years for Haryana from Group I, Uttar Pradesh from Group II, and Madhya Pradesh and Rajasthan from Group III.

Three, the degree of agricultural progress is positively associated with the share of credit for AIS in all the three years. Thus, the coefficient of correlation between these two variables worked out to 0.7699 for 1977-78, 0.4399 for 1978-79 and 0.779 for 1979-80. The share of credit for AIS was the largest in Group I, followed by that in Group II, and then in Group III in these years. Moreover, Haryana from Group I, Andhra Pradesh and Karnataka from Group II, and Rajasthan from Group III had the share of this type of agricultural credit lower than their respective group-averages in at least two out of three years under study.

Four, surprisingly, no systematic relationship was found between the HYV coverage and the share of credit for APS, though this share was invariably larger for first two groups as compared to Group III. The coefficient of correlation between the proportion of HYV area and the share of credit for APS worked out to -0.4034 for 1977-78, +0.0723 for 1978-79, and -0.0340 for 1979-80. This unexpected result may be because all types of credit for APS does not necessarily encourage adoption of new HYV foodgrains technology. Examples of such credit include conversion of past loans into

term-loans, debt redemption, short-term 'cash' loans etc. which merely minimize loss in or maintain current production level. It is hypothesized that the degree of agricultural progress would be positively associated with the share of APS credit for stability and growth of current production. Due to non-availability of required data this relationship could not be validated.¹⁰ However, it would be subsequently examined for cooperative credit advanced during the year. Five, the degree of agricultural progress is inversely related to the share of credit for APMS. Thus, the coefficient of correlation between these two variables worked out to -0.1528 for 1977-78, -0.2106 for 1978-79, and -0.3066 for 1979-80. A relatively larger share of this credit in Group III and to some extent in Group II as well as in some of the individual states in the three groups could be because these areas have larger share in acreages under crops like cotton and/or sugarcane which require processing soon after harvest. But within these areas these crops account for a very small share in their cropping pattern. Consequently, larger share of credit for APMS benefit smaller area and perhaps smaller number of farmers indirectly. This raises an

9

Examples of such credit mainly include short-term 'kind' loans in the form of yield-increasing/saving inputs, irrigation loans, farm implements and machinery loans, and loans for supplementary activities.

10

RBI may also consider overcoming this lacuna.

important question as to what type of 'indirect' credit may be promoted on a priority basis to accelerate the rate of adoption of new technology. To this we now turn.

Relationship between the Degree of Agricultural Progress and the Share of Credit for AIS in 'Indirect' Agricultural Credit from all RFIs

Since the share of credit for AIS in total agricultural credit is positively associated with the proportion of HYV area, it would be useful to now examine this relationship. Table 4 provides the relevant data. As can be seen from this table the share of AIS credit in 'indirect' credit was much higher in first two groups as compared to that in the third group in all the three years. In one of the three years it was the highest in Group I followed by that in Group II, and then in Group III. The coefficient of correlation between this share and the proportion of HYV area was positive for all the three years. Indeed, in two of these three years it was little over 0.50. Lastly, Haryana from Group I, Andhra Pradesh and Karnataka from Group II, and Maharashtra from Group III had the share of AIS credit in 'indirect' credit which was lower than their respective group-averages.

Relationship between HYV Coverage and Cooperative Credit Advanced to AIS, AFS and APMS

Cooperative credit accounted for a sizable share in total institutional credit in the ten states under study; it ranged from 49 percent in Punjab in 1979-80 to 77 percent in Gujarat in 1977-78. 'Direct' and 'indirect' credit advanced by the

cooperatives during a particular year can also be classified into credit for the three sub-systems. Before these data are analysed it may be noted that PACS as well as CLDBs advance only 'direct' rural credit. 'Indirect' credit is advanced by the State and the District Central Cooperative Banks to PACS, and intermediate and apex level cooperative federations.

Table 5 provides the data on size and shares of cooperative credit advanced to the three sub-systems during the three years under study. The size of credit was the largest in Group I. In two out of three years it was second largest in Group III. This was mainly due to the large amount of credit advanced in Maharashtra. The coefficient of correlation between the proportion of HYV area and the size of credit per hectare worked out positive for all the three years; it being 0.6882 for 1977-78, 0.6629 for 1978-79, and 0.6989 for 1979-80. Thus, it can be concluded that the degree of agricultural progress had a positive association with the amount of cooperative credit per hectare of net sown area. Two, an examination of size of credit in individual states within each group reveals some interesting findings. From Group I Tamil Nadu had size of credit which was lower than its group-average in all the three years. Similar was the case for Andhra Pradesh and Karnataka from Group II and Madhya Pradesh and Rajasthan from Group III. Uttar Pradesh from Group II had such size in two out of three years. Three, the share of credit for AIS was substantially larger in Group I as compared to that in the other two groups. This was

Table 4 : Share (%) of Credit for AIS in 'Indirect' Agricultural Credit from All RFIs in GR and DF AREAS : 1977-78 to 1979-80

States and Groups	1977-78	1978-79	1979-80
Punjab	52.7	38.6	53.0
Haryana	28.5	16.5	17.9
Tamil Nadu	48.8	62.3	71.5
Group I	44.4	40.2	48.9
Uttar Pradesh	92.9	50.5	55.5
Gujarat	43.1	47.5	45.6
Andhra Pradesh	20.3	35.6	32.1
Karnataka	22.2	39.9	20.6
Group II	47.2	44.4	40.3
Maharashtra	11.0	9.0	14.3
Madhya Pradesh	45.4	45.2	38.3
Rajasthan	26.3	37.8	14.4
Group III	14.5	14.1	17.2
Co-efficient of correlation between Proportion of HYV Area and this share	0.5022	0.1702	0.5075

Data Sources: Same as those listed in Table 2

particularly the case in Punjab and to an extent Haryana where green revolution is wide-spread. The coefficient of correlation between the proportion of HYV area and the share of AIS credit is positive for all the three years; it being 0.3154 for 1977-78, 0.2053 for 1978-79 and 0.7482 for 1979-80. Four, the share of AIS credit in individual states was lower than the group-average in all the three years in Tamil Nadu from Group I, Andhra Pradesh and Uttar Pradesh from Group II, and Maharashtra from Group III. Five, Table 5 reveals that the share of credit for APS was the largest in Group II, followed by that in Group I, and then Group III. Indeed, in one out of three years the coefficient of correlation between the degree of agricultural progress and the share of APS credit was negative, though it was substantially small; it being -0.0805 in 1979-80. In the remaining two years though it was positive its magnitude was very small; it being 0.0609 in 1977-78 and 0.1019. This suggests that there was no systematic relationship between the proportion of HYV area and the share of APS credit. As discussed earlier this may be because all types of APS credit does not necessarily encourage achieving higher degree of agricultural progress. Hence, the coefficient of correlation was recomputed after excluding credit for CPL (current production loss management) and CPM (current production maintenance management) from total APS credit. In other words, this coefficient was computed for the relationship between HYV coverage and the share of credit for SGCP (stability and growth of current production management) in

Table 5 : Shares and Size of Co-operative Credit Advanced to AIS, APS and APMS in GR and DF Areas : 1977-78 to 1979-80

(Size in per hectare of net sown area)

States and Groups	1977-78				1978-79				1979-80			
	% Share of Credit for			Amount (Rs. / hect.)	% Share of Credit for			Amount (Rs. / hect.)	% Share of Credit for			Amount (Rs. / hect.)
	AIS	APS	APMS		AIS	APS	APMS		AIS	APS	APMS	
Punjab	11.7	78.3 (61.7)	10.0	305.2	19.1	71.9 (45.5)	9.0	397.0	22.9	73.3 (55.0)	3.8	695.6
Uttar Pradesh	27.2	59.3 (32.0)	13.6	416.8	24.2	62.2 (18.2)	13.6	502.4	6.5	72.9 (40.6)	20.6	430.4
Tamil Nadu	2.1	83.1 (38.6)	14.8	256.7	3.0	84.9 (18.7)	12.1	207.2	6.9	67.2 (35.2)	25.9	117.7
Group I	13.5	73.5 (42.7)	13.0	312.4	16.7	71.7 (26.3)	11.6	340.1	15.8	72.3 (47.9)	11.9	370.1
Uttar Pradesh	0.6	95.9 (64.7)	3.5	122.4	1.1	94.7 (38.4)	4.2	126.4	2.1	83.2 (46.0)	14.7	181.1
Gujarat	3.3	72.0 (25.0)	23.9	190.9	2.7	63.0 (11.9)	33.4	228.1	2.7	70.5 (39.0)	26.0	211.1
Andhra Pradesh	0.3	99.0 (49.6)	0.7	123.1	0.1	99.4 (24.7)	0.5	129.6	0.2	99.3 (44.4)	0.5	146.1
Karnataka	5.6	65.0 (31.3)	28.6	115.0	12.9	69.0 (11.5)	17.3	109.1	4.0	72.2 (30.8)	23.0	118.1
Group II	2.3	84.5 (44.4)	13.2	132.1	3.3	82.1 (22.1)	14.6	143.4	2.2	81.3 (42.4)	16.5	165.1
Maharashtra	1.1	37.0 (19.1)	61.9	251.3	1.0	29.0 (0.0)	69.2	329.3	0.8	29.5 (17.7)	69.7	398.1
Madhya Pradesh	6.8	77.5 (37.0)	15.7	51.1	10.6	72.0 (13.5)	17.4	73.3	3.6	70.5 (31.7)	25.9	99.1
Rajasthan	2.2	95.1 (41.4)	2.7	51.9	14.8	83.1 (13.4)	2.1	65.5	2.2	95.6 (39.1)	2.2	76.1
Group III	2.1	50.4 (24.5)	47.5	121.3	4.3	43.1 (9.5)	52.6	159.9	1.5	43.0 (22.6)	54.7	200.1

Figures in brackets are shares of APS Credit for SGCP (Stability and Growth of Current Production) in total co-operative credit.

Data Sources: Same as (1) listed in Table 2

total institutional credit. It worked out not only positive but significantly larger in size; it being 0.4869 for 1977-78, 0.6849 for 1978-79, and 0.5527 for 1979-80. In two out of three years the share of credit for SGCP was the highest in Group I, followed by that in Group II and then in Group III. In the remaining one year this share was about the same in first two groups and larger than that in Group III (see bracketed figures under column on APS in Table 5). The share of SGCP credit in total credit was lower than the group-average in all the three years in Tamil Nadu from Group I, Gujarat and Karnataka from Group II, and Maharashtra from Group III. Haryana from Group I had such a share in two out of three years. Six, the share of credit for APMS was the largest in Group III, followed by that in Group II and then Group I. This suggests an inverse relationship between the degree of agricultural progress and the share of credit for APMS, as was found in examining the data on all RFIs. Thus, the coefficient of correlation worked out to -0.2061 for 1977-78, -0.1853 for 1978-79, and -0.1957 for 1979-80. This may be due to the same reasons discussed earlier in the section on all RFIs. Such a relationship raises an important question as to what type of 'indirect' credit may be promoted on a priority basis to encourage attaining higher degree of agricultural progress. This is examined in the section that follows.

Relationship between the Degree of Agricultural Progress and the Share of AIS Credit in 'Indirect' Cooperative Credit

Since the share of credit for AIS in total cooperative credit is positively associated with the proportion of HYV area, it would be useful to now examine this relationship. Table 6 provides the relevant data. This table reveals that the share of AIS credit in 'indirect' cooperative credit was the highest in Group I, followed by that in Group II and then Group III in all the three years. This indicates that the degree of agricultural progress is positively associated with the share of AIS credit in 'indirect' credit. This inference is supported by the coefficient of correlation between these two variables in two out of three years; it being 0.1958 for 1977-78 and 0.7728 for 1979-80. For the remaining one year it was almost zero. Lastly, Tamil Nadu from Group I, Gujarat from Group II, and Maharashtra from Group III had the share of AIS credit in 'indirect' cooperative credit lower than their respective group-averages.

Relationship between the Degree of Agricultural Progress and the Shares of Three Different Types of APS Credit in 'Direct' Credit from Cooperatives

Table 7 provides the data related to this aspect. It shows that the share of credit for SGCP was the highest in Group I, followed by that in Group II and then Group III in all the three years. Thus, the coefficient of correlation between HYV coverage and this credit share was 0.6486 for 1977-78, 0.7379 for 1978-79, and 0.7649 for 1979-80. Secondly, the share of credit for SGCP was lower than the group-average

Table 6: Share(%) of Credit for AIS in 'Indirect'
Cooperative Credit in GR and DF Areas:
1977-78 to 1979-80

States and Groups	1977-78	1978-79	1979-80
Punjab	54.0	68.0	86.0
Haryana	66.6	64.0	30.7
Tamil Nadu	13.8	20.2	20.9
Group I	50.9	59.0	57.1
Uttar Pradesh	15.3	19.8	12.7
Gujarat	12.3	7.5	9.0
Andhra Pradesh	32.6	23.6	24.3
Karnataka	16.4	42.6	14.3
Group II	14.7	22.4	11.7
Maharashtra	1.7	1.5	1.2
Madhya Pradesh	30.4	37.8	12.3
Rajasthan	45.3	87.7	49.4
Group III	4.2	7.5	2.6
Coefficient of Correlation between proportion of HYV area and this share	0.1958	-0.0025	0.7728

Table 7 : Shares of 'Direct' Cooperative Credit for SGCP, CPL, and CPM Purposes for APS in GR and DF Areas: 1977-78 to 1979-80* (Figures in Percentages)

States and Groups	1977-78			1978-79			1979-80		
	SGCP	CPL	CPM	SGCP	CPL	CPM	SGCP	CPL	CPM
Punjab	78.8	1.1	20.1	79.5	0.1	20.4	75.1	0.6	24.3
Haryana	55.5	1.5	43.0	54.1	0.9	45.0	55.7	1.8	42.5
Tamil Nadu	46.5	0.3	53.2	47.0	0.2	52.8	51.6	0.3	48.1
Group I	58.1	0.9	41.0	60.6	0.4	39.0	66.2	0.9	32.9
Uttar Pradesh	67.5	1.5	31.0	63.6	2.5	33.9	57.4	15.0	27.6
Gujarat	35.5	21.0	43.5	43.2	12.8	44.0	55.1	5.6	39.3
Andhra Pradesh	50.0	9.5	40.5	49.8	1.8	48.4	44.6	1.8	53.6
Karnataka	47.5	2.9	49.6	40.6	0.8	58.6	42.7	1.2	56.1
Group II	52.8	8.3	38.9	52.0	4.5	43.5	52.2	7.7	40.1
Maharashtra	51.4	4.4	44.2	51.7	8.0	40.3	60.0	2.0	38.0
Madhya Pradesh	47.7	3.3	49.0	43.3	4.6	52.1	44.2	17.5	38.3
Rajasthan	43.5	5.1	51.4	40.2	2.0	57.8	40.9	9.6	49.5
Group III	48.6	4.3	47.1	47.0	5.5	47.5	51.5	7.8	40.7

* SGCP = Stability and Growth of Current Production/Income Management

CPL = Current Production/Income Loss Management

CPM = Current Production/Income Maintenance Management

For more detailed purposes covered under each of these, see section on 'Types of Agricultural Credit'.

Data Source: Same as (1) listed in Table 2.

share in the case of Haryana and Tamil Nadu from Group I, Andhra Pradesh, Gujarat and Karnataka from Group II, and Madhya Pradesh and Rajasthan from Group III in at least two of the three years under study. Thirdly, the share of credit for CPL was higher in Group III or II as compared to that in Group I in all the three years. Indeed, this share was less than 1 per cent in Group I in these years. The coefficient of correlation between the HYV coverage and the CPL credit share worked out to -0.2579 for 1977-78, -0.3140 for 1978-79 and -0.5903 for 1979-80. Fourthly, such negative association was also found between the HYV coverage and the share of credit for CPM. Thus, the coefficient of correlation between these two variables was -0.7661 for 1977-78, -0.6633 for 1978-79, and -0.2440 for 1979-80. Such negative associations may be interpreted to suggest that CPL and CPM credit shares did not encourage adoption of HYV foodgrains technology, as was indicated earlier. The preceding findings imply that the portfolio of 'direct' cooperative credit was development-oriented for the most progressive area as obtained in Group I and especially for Punjab from this group.

Relationship between the Degree of Agricultural Progress and the Share of Loans in 'kind' in Short-term Crop Loans from Cooperatives

As mentioned earlier, short-term crop loans in 'kind' can perform the role of stability and growth in current production/income. This is because such loans take the form

of inputs like seeds, fertilizers, diesel, pesticides etc. which are either yield-increasing/saving in nature. Yet another reason why such loans are preferred is that they directly create an access to physical inputs and thereby reduce the chances of diverting loans to other uses. It is therefore necessary to know the nature of relationship between the degree of agricultural progress and the share of 'kind' loans in ST crop-loans. Table 8 provides the relevant data on this. As can be seen from this table the share of 'kind' loans was the highest in the most progressive area as obtained in Group I in all the three years. This share was second largest in Group II area in two out of three years. The positive association between this share and the degree of agricultural progress is also indicated by the positive value of coefficient of correlation; this value being 0.6168 for 1977-78, 0.7244 for 1978-79, and 0.6823 for 1979-80. Secondly, Table 8 also reveals that the share of this type of 'direct' credit was the highest in Punjab; it ranged from 65.1 per cent in 1977-78 to 79.2 per cent in 1978-79. Thirdly, this share was lower than the group-average in the case of Haryana and Tamil Nadu from Group I, Andhra Pradesh and Karnataka from Group II, and Maharashtra and Rajasthan from Group III in all the three years.

Relationship between the Default Rate of 'Direct' Agricultural Credit to APS and the Shares of SGCP Credit, 'kind' Loans in ST Crops Loans and Inputs Distribution Credit in 'Indirect' Credit

It may be first mentioned that these relationships could be

Table 8 : Share of 'Direct' Loans in 'Kind' in Short-term Crop Loans in GR and DF Areas: 1977-78 to 1979-80

States and Groups	1977-78	1978-79	1979-80
 Per cent		
Punjab	65.1	79.2	65.4
Haryana	33.9	39.0	33.3
Tamil Nadu	35.0	35.0	31.3
Group I	44.5	51.6	51.4
Uttar Pradesh	39.9	44.1	35.9
Gujarat	30.9	39.7	49.5
Andhra Pradesh	17.4	14.4	14.7
Karnataka	39.9	26.9	28.8
Group II	30.7	33.1	32.5
Maharashtra	42.9	38.7	40.5
Madhya Pradesh	31.8	29.9	23.1
Rajasthan	22.5	22.8	20.2
Group III	35.5	32.5	30.9
Coefficient of Correlation between proportion of HYV area and this share	0.6168	0.7244	0.6823

Data Sources: Same as (1) and (3) listed in Table 2.

studied only for cooperative credit as the data required on credit from commercial banks were not available.¹¹ Default rate was measured by subtracting the percentage of loans recovered to loans due for recovery from 100.

From the discussion in preceding sections it may be expected that the three types of relationships under study must be inverse in nature. This is because of several reasons. One. SGCP and 'kind' loans facilitate increasing farmers' capacity to repay loans through their potential to improve productivity of capital at the farm-level. Two, even inputs distribution credit may also facilitate achieving this through its role in promoting better linkages between AIS and APS. And three, as was seen earlier, the shares of SGCP credit, 'kind' credit and inputs distribution credit are positively associated with the degree of agricultural progress. And higher this degree the lower would be the default rate. These hypothesized relationships are borne out by the data given in Table 9. Thus, the default rate of 'direct' credit to APS was the lowest in Group I in two out of three years. Even in the remaining one year it would be the lowest if the group-average is computed after excluding Tamil Nadu where there was an unusually high default rate due to widespread draught in that year. The default rate for

11

It is suggested that such data on commercial bank credit should also be published for an agricultural year (i.e. July-June) on a continuing basis. Various purposes for this credit should also be same as those for cooperative credit.

Group II worked out smaller than that for Group III, but larger than that for Group I. The coefficient of correlation between the default rate and the proportion of HYV area worked out negative in all the three years. Similarly, such coefficients for the relationships between the default rate and the earlier mentioned three types of shares of agricultural credit are also negative for all the three years (see Table 9).

This table further reveals that over a period of three years in ten states there are 15 cases in which the default rate was lower than their respective group-averages. In 14 of these 15 cases the share of each of the three types of credit or the share of inputs distribution credit was higher than their respective group-averages (see Tables 6 to 8). From among the remaining 15 cases where the default rate was higher than the group-average only in 6 cases the share of one or at the most two of the three types of agricultural credit was higher than their respective group-averages. Thus, the states in which the inverse relationship is found are as diverse as Punjab, Haryana, Uttar Pradesh, Andhra Pradesh and Rajasthan. This suggests that the three types of credit covered in this section have important role to play in lowering default rate in widely different environment from highly irrigated to highly semi-arid and arid areas.

Table 9 : Default Rate (%) of 'Direct' Cooperative Credit to APS and its Relationship with the Three Types Agricultural Credit and the Degree of Agricultural Progress : 1977-78 to 1979-80

Details	1977-78	1978-79	1979-80
Punjab	24.1	23.0	25.8
Haryana	26.4	23.8	26.4
Tamil Nadu	40.4	56.9	79.4
Group I	32.7	39.8	51.0
Uttar Pradesh	42.7	41.8	42.7
Gujarat	47.6	47.4	53.0
Andhra Pradesh	33.0	34.7	41.0
Karnataka	46.0	45.9	48.3
Group II	43.2	43.0	46.0
Maharashtra	50.7	47.7	53.0
Madhya Pradesh	55.8	53.1	56.9
Rajasthan	41.9	41.8	46.4
Group III	50.8	48.2	53.0
Coefficient of Correlation between Default Rate and			
(a) Share of SGCP Credit to 'Direct' Credit to APS	-0.6680	-0.6490	-0.4125
(b) Share of Credit in 'kind' in ST Credit to APS	-0.2429	-0.4472	-0.2926
(c) Share of Inputs Distribution Credit to 'Indirect' Credit	-0.7350	-0.5424	-0.5106
(d) HYV Coverage	-0.6649	-0.4738	-0.3224

Data Sources: Same as (1) and (3) listed in Table 2.

Conclusions and Recommendations

Three basic conclusions and their implications which emerge from the above analysis are as follows:

- 1) Two types of factors related to institutional credit are associated with the degree of agricultural progress. These are (a) density of RFIs or/and overall amount of credit per hectare, and (b) various types of agricultural credit. While the former was invariably positively associated, not all types of agricultural credit had such association. For example, the share of credit for APMS from all RFIs or from the cooperatives was inversely related to the degree of agricultural progress. Similarly, cooperative credit for CPL and CPM was inversely associated with the HYV coverage. Yet another example is that no systematic relationship was found between the share of APS credit from all RFIs or from the cooperatives and the degree of agricultural progress. But the share of credit for AIS from all RFIs or from the cooperatives was positively associated. Even the share of this credit in 'indirect' credit had such association. Similar was the case for the share of SGCP credit in total cooperative credit or in 'direct' cooperative credit for APS. This was also true of the share of 'kind' credit in ST crop loans from the cooperatives.

- 2) The default rate of 'direct' cooperative credit for APS was inversely related to the share of (a) AIS credit in 'indirect' credit, (b) SGCP credit in 'direct' credit for APS, and that of (c) 'kind' credit in ST crop loans for APS from the cooperatives. Thus, what type of agricultural credit may be promoted is an extremely critical question to answer in making decisions on rural credit policies.
- 3) The preceding two findings form the basis to suggest that the shares of the three types of credit mentioned in (2) above may be increased in dry-farming or rainfed areas. This strategy has a potential to improve (a) factor productivities and loan recoveries at the farm-level, (b) growth rate in agricultural production and value added, and (c) viability of RFIs. This strategy may be followed for all the ten states except Punjab which seems to already have such a strategy. Suggestions on how to improve the shares of the above mentioned three types of agricultural credit are now offered.

To achieve higher share of 'kind' credit in ST 'direct' credit it is recommended that not only the higher ratio is required, but the organizational and credit arrangements need to be improved. Three types of such improvements are recommended. One, the RFIs should transfer the funds sanctioned against the 'kind' component of crop loans

directly to the inputs dealers. In order that they can do this the field-level RFIs like PACS and branches of commercial banks and RRBs should place indents of inputs required by their farmer-borrowers with these dealers. When the inputs against these indents are supplied, the funds sanctioned against the 'kind' component should be directly transferred to the concerned inputs dealers on behalf of those farmer-borrowers who would get these inputs. Two, wherever it is not possible to make these arrangements the top two tiers of cooperatives, commercial banks and RRBs should advance inputs distribution credit to the inputs dealers like PACS, other institutional channels and private agencies so that they can stock the inputs and make them available to the farmer-borrowers who would purchase them by utilizing cash received against their 'kind' crop-loans. Three, some of these dealers may even require storage facilities and for which also the RFIs should make available credit. Furthermore, some of them especially PACS, may even require to obtain agencies directly from the state or national level inputs suppliers so that they can get higher commission which would make their business viable.

With the higher ratio of and better organizational and other arrangement for 'kind' crop-loans, the share of credit for SGCP in 'direct' rural credit would also improve. It may also be increased by identifying opportunities to provide loans for irrigation, other farm assets including improved implements like seed-cum-fertilizer drill, soil and moisture

conservation works on watershed basis, and for allied agricultural activities like dairying, sheep-rearing etc. When the share of credit for allied agricultural activities which produce perishable commodities like milk, eggs, and fish is increased it is suggested that the farmers financed are made an integral part of APMS relevant for these commodities and for which if extra credit for this sub-system is needed, it may also be provided. This would improve the viability of farm-level (i.e. APS) activities, besides creating an opportunity for higher value added and productivity through backward and forward linkages of APS and APMS.

The share of inputs distribution credit in 'indirect' credit would increase wherever there is a need to adopt the above discussed recommendation of achieving higher share of 'kind' crop-loans in ST loans through providing credit to the inputs dealers. The share of this third type of agricultural credit should also be improved to enhance the availability of inputs at the farm-gate level for those farmers who do not borrow from RFIs but require these inputs. This type of credit may be promoted among those agencies which are engaged in selling seeds, fertilizers, pesticides, diesel, electricity, implements, and even custom-services. In order that these agencies have incentives to increase their demand for credit it may be necessary to periodically review existing policies

for interest rate, refinance facilities,¹² credit guarantee cover, margin, duration and collateral required for such institutional loans.¹³ This is particularly important for those dry-farming areas where farmers' revealed demand for the modern inputs is small though the potential demand is large.

12

Such facilities are at present provided by the RBI/NABARD on a selective basis to the commercial banks and more generally to the cooperative banks. There are three reasons why these facilities may be created on a continuing basis. These are: one, the time at which individual banks receive requests for inputs distribution credit does not match well with the time at which they can mobilize deposits. Two, refinance for this credit would help converge the input supply forces with the forces of demand for inputs arising from the refinance provided by the RBI/NABARD for 'direct' rural credit. And three, refinance for inputs distribution credit may not necessarily be inflationary, since inputs financed have a potential to increase farm output. Trading business for fertilizers, pesticides, etc. is very different from such business for final consumer goods or agricultural commodities.

13

For similar suggestions derived from micro-level studies. see Desai et al 1987, Government of Gujarat 1983, Sikdar 1977, and FCI 1968.

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