IMPACT OF CO-OPERATIVE LOAN ON AGRICULTURE SECTOR: A CASE STUDY OF E.G.DISTRICT OF ANDHRA PRADESH

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ABSTRACT

East Godavari district is an agriculturally developed district where the paddy farms up to 53 % of the total cultivated area. In the district, Cooperatives are functioning in most efficient manner by providing adequate, cheap and timely credit to agriculture and allied sector. They spread to the remote areas of the district in order to serve the needy farmers. The Cooperative Bank accepts deposits and lends both short-term and long-term credit for production and investment purpose through Primary Agricultural Co-operative Societies and also directly to the farmers. On this backdrop, an attempt is made to analyze the impact of cooperative credit on the agricultural sector by taking East Godavari district for sample study.

Keywords: cooperative credit, District Central Cooperative Bank (DCCB), Primary Agricultural Cooperative Societies (PACS), irrigation, yield, crop and term-loans, High yield varieties (HYV), allied sector, livelihood

INTRODUCTION:

East Godavari is one of the north-eastern districts of Andhra Pradesh. It shares the distinctions of "Rice Bowl of Andhra Pradesh" by producing paddy of 2625 kg per acre. As it is situated on the coastal side of Andhra Pradesh, majority of the East Godavari district people depend on agriculture and allied sectors for their livelihood. It is one of the highest population density regions, as agriculture is well developed. Rice, tobacco, pulses and coconut etc are the major crops of this district.

The net area cultivated with crops forms about 41 % of the total geographical area of the district. Out of the net area sown a large portion of the area is irrigated by the network of irrigation canals in the district. The Godavari Irrigation System (GIS) irrigates all the mandals in delta region. Paddy forms 53 % of the total area sown with an average yield of 2625 kgs. / Acre in the district. The district stands first in the cultivation of the coconut and bananas. Out of the total production of bananas and coconuts in the state 36 % and 57 % of the production is from this district only.

In this district Cooperatives are functioning in most efficient manner by providing adequate, cheap and timely credit to the agriculture and allied sector. Cooperative Credit institutions at district level are serving the agriculture and allied sector to a great extent in the East Godavari District. They spread to the remote areas of the district in order to serve the needy farmers. The Government of Andhra Pradesh set up Cooperative Central Bank at district level in Kakinada in the year 1987. The East Godavari District Cooperative Central Bank Ltd., Kakinada (DCCB) is one of the biggest Cooperative Central Banks in Andhra Pradesh catering the needs of the agriculturists. It performs all the banking functions as per the Banking Regulation Act 1949. Now the bank is rendering services with 47 branches and 293 Primary Agricultural co-operative Societies in the district.

The bank accepts deposits and lends both short-term and long-term credit for production and investment purpose through Primary Agricultural Co-operative Societies and also directly to the farmers. As on 31st March 2010 there were 48 branches including head office, 1534 Primary Agricultural Cooperative Societies with a membership of 47,532. These institutions mobilized deposits of Rs. 43, 236 Crores and issued short-term loans of Rs. 67,937 lakhs and non-agricultural loans of Rs. 6325 lakhs. It earned a profit of Rs.324 lakhs for the year 2009-10.

REVIEW OF LITERATURE:

As agriculture forms the backbone of the Indian economy, The Government of India recognized the importance of free flow of credit to agriculture and allied sectors. Sharma (1967) stated that for agricultural development, credit is an important input which ensures adequate working capital as well as infrastructural development. Adequate credit increases the agricultural output. Agricultural credit and agricultural development goes by hand in hand, hence the farmer should be provided adequate and cheap credit (Dutta and Sundaram, 2005). It is supported by Kanthimathinadhan (2005) and suggested that without cheap credit is not possible for small and marginal farmers to survive. Shetty (2004) and Shivaloganathan suggested in their work that better institutional credit facilities is highly essential for agricultural growth. Shivaloganathan suggested multi-agency approach in order to fill gap between supply and need of credit in agricultural sector. Pathania (1987) analyzed the utilization of cooperative credit in agricultural sector and concluded that with the proper utilization of Cooperative credit the farmers can increase their productivity. It was strongly supported by Sharma (1989), Modi and Rai (1993), Sathey (1996) and Patnaik (1999). Mamoria and Tripathy (2003) rightly stated that the agricultural output and efficiency largely depened upon the inputs applied and methods adopted. B.Subrahmanyam (2005) viewed that Cooperative rural credit delivery system has been farmer-friendly and has out reached to serve agriculture. Calvert (1996) aptly argued that Cooperative credit is the practical alternative to usury. Subbaiah & Selvakumar (2005) observed that the institutional finance to agriculture which has contributed 22.1 % of GDP in 2002-03. He also found that the Government has estimated the credit flow from all lending institutions for the year 20003-04 at Rs. 80000 crores and has planned to enhance the level of flow to Rs. 105000 crores for the year 2004-05 which represents an increase of 30 % over the previous year. Vilasrao Deshmukh (2005) said that the Cooperatives in India account for more than half of industrial finance advanced to agriculture and one-fifth of private capital formation. Sharma (2005) observed that an Advisory Committee on Rural credit was constituted by the RBI to accelerate the flow of credit to the agricultural sector. It had been proposed that co-operatives

might waive security requirements for agricultural loans from Rs. 10,000 to Rs. 50,000.Subrahmanyam (2005) in his study observed that the government of India examined the flow of agricultural credit and related issues in consultation with RBI, NABARD and announced the farm credit package to ensure doubling the flow of agricultural credit in the next three years more particularly to ensure 30 percent increase over the previous year. Sri Rajnath Singh (2006) called upon the Government. to take necessary steps so that farmers may not have to pay more than 6 % interest on the agricultural loans.

METHODOLOGY:

The objective of the present study is to analyze the impact of cooperative loans on agriculture in the East Godavari district of Andhra Pradesh. The present study is an attempt to analyze the impact of cooperative credit on the beneficiaries of the district. Its' focus is regional and pertains to E.G. District only. In view of this, an attempt has been made to study the role of the District Central Cooperative Bank, Kakinada and Primary Agricultural Cooperative Societies working under it for the growth and development of agricultural sector in the East Godavari District of Andhra Pradesh. Agricultural development in the present work has been assessed through the flow of Cooperative credit to farm sector. In order to study the impact of cooperative credit, the credit supplied by the DCCB, Kakinada through PACS to different sections of the agricultural sector has been analyzed. The credit supplied by the cooperative banks to different sectors such as short-term credit, long-term credit and credit to agricultural sector has also been analyzed. The growth in the usage of agricultural inputs also is analyzed to study the objective. The trend of deposits, the ratio of fixed and savings deposits in inculcating the saving habit among the customers which in turn enhances the capital formation and credit deployment was also be considered for the analysis.

The study is based on two sets of data viz., Primary and Secondary. The primary data relating to socio-economic background, credit structure, incomes, use of fertilizers and HYV seeds, yield per acre, employment generation, and land infrastructure etc. are collected from 432 sample beneficiaries of East Godavari District by direct personal interview method. The sample beneficiaries were selected by stratified random sampling method. The secondary data relating to the growth and development of cooperative banks in the district was collected from the various publications & websites of the Directorate of Economics and Statistics. Data relating to DCCB, Kakinada was obtained from the annual reports & websites of DCCB, Kakinada.

The collected data was suitably classified and tabulated for the purpose of analysis and interpretation with simple statistical tools of analysis like ratios, percentages, etc. To test the hypotheses, t test and Paired t test etc. were used. To assess the impact of Cooperative credit on the beneficiaries of agricultural sector, the data relating to pre-loan and post-loan period was collected.

One of the major limitations of the study is that it has been confined to E.G. District only, which is rather not a representative unit for realistic data acquisition and virtual comparisons of the performance of various similar DCCBs. Only paddy cultivation has been taken for the present study as paddy cultivation is the main staple of agriculture in E.G. District. While collecting the primary data recall method was employed. As the sample respondents have no habit of maintaining records of their operations especially income, output etc., there may be chances of errors in the data collected.

ANALYSIS:

The Green Revolution results in remarkable changes in agricultural sector. The Revolution initiated through the changes in the approach of the Fourth Five Year Plan envisaged that modernizing agriculture is more or less a technology of inputs and its judicious management on scientific basis. This new situation calls for greater financial investment on the part of farmers for purchasing of the inputs. Consequently the provision of credit to farmers on liberal terms and conditions become sine qua non of agricultural development in the country. The development of Cooperative credit in the form of catalyst has accelerated the pace of agricultural development.

In the district of East Godavari, Cooperatives are functioning in most efficient manner by providing adequate, cheap and timely credit to agriculture and allied sector. The District Central Cooperative Bank ,Kakinada being a farmer's bank in the district covered all 1327 villages and 54 Revenue Mandals by its wide network of 47 branches and 310 Primary agricultural Cooperative Societies providing services from the last 88 years. The District Central Co-operative Banks are playing very crucial role in serving the

rural peasants of the state as a whole and E.G. District in particular.

In order to study the impact of Cooperative credit on agriculture, the entire district was grouped into three stratas depending upon the factor of irrigation viz., Irrigated (V_1), Semi-irrigated (V_2) and Non-irrigated (V_3) pockets. The impact of Cooperative credit was analyzed by the modernization of agricultural process during the pre-loan and post-loan periods.

To know the impact of agricultural credit on borrowers, the study is divided into two categories viz,

(i) Impact on Agricultural Crop loan (ii) Impact on Agricultural Term loan. Benefits derived by agricultural crop loans and term loans are analyzed on the basis of the following parameters:

a) Impact on irrigation
b) Impact on cropping pattern
c) Impact on use of fertilizers, pesticides and manures etc.
d) Impact on labour cost
e) Impact on Production and yield per acre
f) Impact on income per borrower and income per acre of holding.

To know the impact on Agricultural crop and term loans again, the borrowers are classified on the basis of caste and operational holdings.

1) IMPACT ON AGRICULTURAL CROP LOAN:

The short-term loans are disbursed in the form of 'A' and 'B' components, such that 'A' comprises cash portion to meet the costs of agricultural operations and 'B' comprises kind portion to meet the costs of seed, fertilizer, pesticides etc., supplied to members through the co-operative deposits. The interest for crop loan is about 11 percent till 2007-08. But now the interest rate is going to decrease to a rate of 4 percent from this year onwards. The short-term loans are sanctioned for all crops including local, improved and HYV as per the scale of finance. These loans help the cultivators to meet the working capital needs and to generate surplus for agricultural development.

The farmers are classified into three groups basing on the size of land holdings-small (below 2.5 acres), medium (2.5-5 acres) and large farmers (above 5 acres)

Table 1: Distribution of sample beneficiaries on the basis of size of land holdings

Village	Size of land holding in Acres			
	Small (0-2.5)	Medium (2.5-5)	Large (above 5)	Total
V_1	11 (25.0)	24 (54.5)	9 (20.5)	44 (100)
V_2	23 (54.7)	10 (23.8)	9 (21.4)	42 (100)
V_3	19 (34.5)	23 (41.8)	13 (23.6)	55 (100)
Total	**53 (37.6)**	**57 (40.4)**	**31 (22.0)**	**141 (100)**

The figures in brackets indicate percentage to total;

Sources: Compiled from Questionnaires.

Table1 reveals that 37.6 %t beneficiaries belong to small and marginal farmers; the percent is highest in V_2 *i.e.,* 54.7 %. Large farmers occupy 22 percent share in total holdings of the district.

According to the size of family, the beneficiaries are categorized into small (1-3), medium (4-5) and big (above 5) families.

Table 2: Distribution of sample beneficiaries on the basis of their size of Family

Village	Size of Family in number of members			
	Small (1-3)	Medium (3-4)	Large (above 5)	Total
V_1	23 (52.2)	12 (27.3)	9 (20.5)	**44 (100)**
V_2	6 (14.3)	26 (61.9)	10 (23.8)	**42 (100)**
V_3	7 (12.7)	29 (52.7)	11 (34.5)	**55 (100)**
Total	**36 (25.5)**	**67 (47.5)**	**38 (27.9)**	**141 (100)**

The figures in brackets indicate percentage to total; ***Sources***: Compiled from Questionnaires.

Of the total beneficiaries medium size families come to 47.5 % and small families constitutes 25.5 %. Of the three sample groups V_3 consists of more big families constituting 34.5 %.

1.1 IMPACT ON IRRIGATION:

The irrigation facilities include river, ponds and canals, pump sets, dug wells, drip irrigation, well with pump set etc. During the study it is found that there is no impact on irrigation in V_1 strata, but there is a great change in V_2 and V_3 groups after obtaining loans. The size of net cropped area is increased due to installation of pump sets, dug wells and well with pump set etc.

1.2 IMPACT ON CROPPING PATTERN:

A change in cropping pattern needs more crop loans to enable the farmers to reap the benefits of advanced technology. The impact of Credit Cooperatives' finance on cropping pattern in the present study is assessed on the basis of area cultivated under High Yield Variety (HYV) by comparing the post-loan with pre-loan periods. At the same time the use of non-HYV in pre-loan and post-loan period is also compared. It is evident that the crop loan has less impact on V_2 villages when compared to V_1 and V_3 sample groups. The use of HYV is more in V_1 group both in pre-loan and post-loan periods as their lands are naturally fertile and irrigated. Hence the sample borrowers spent their borrowed funds on use of HYV seeds. So far as the size of the farmers is concerned the impact is more in small farmers as compared to other farmers. The increase in the adoption of HYV is statistically significant. It is observed that the t value of sample groups is 4.68, 5.63 and 3.9 respectively which are statistically significant at 0.1 percent level.
These observations lead to a conclusion that the agricultural crop loan financed by DCCB, Kakinada has probably facilitated the adoption of new technology in East Godavari District.

1.3 IMPACT OF USAGE OF FERTILIZERS, PESTICIDES AND MANURES:

The Green Revolution induced the farmers to use fertilizers and pesticides to get high productivity**.** Increase in irrigation facilities, intensive use of HYV seeds and increase in infrastructural facilities automatically induced them to spend more on fertilizers and pesticides to have more output per acre. Agricultural crop loans enabled the farmers to apply proper dose of fertilizers, pesticides etc. at right time and to keep pace with the change in the new farm technology in agriculture. Supplying adequate loans at right time by the DCCB to the beneficiaries act as motivating factors.
There is a significant impact on sample borrowers in consumption of manures and pesticides over pre- loan to post-loan period which is statistically significant. The t value of V_1 group is 3.27 which is statistically significant at 1 % level where as the t value of V_2 and V_3 are 5.47 and 4.83 respectively which is statistically significant at 0.1 % level.

1.4 IMPACT ON LABOUR COST:

Labour cost occupies a major share in the cost of production. Labour plays a very important and constructive role in changing cropping pattern of agriculture because the changing cropping pattern demands more labour. With the help of the agricultural crop loans the cultivators are able to meet the labour cost at right time.
It is observed that the percentage increase over pre-loan to post-loan period is 67 %. The average expenditure on labour cost per acre of large farmer is high i.e., 95 percent when compared to other size of farmers. However it is clear that there is a significant impact of crop loans on labour cost. It is also observed that the labour cost is more in V_1 group as the sample borrowers depend more on manual labour only. The t value of sample groups is 5.19, 6.8 and 3.9 respectively and is statistically significant at 10 % level. Hence above analysis indicates that the agricultural crop loan has a positive impact on labour cost in post-loan period.

1.5 IMPACT ON PRODUCTION:

The important aspect of the impact of crop loan is the positive change in production. By comparing the yield of paddy of borrowers in the post-loan with that of pre-loan period, it can be noted that there is an improvement in the yield in all sample groups irrespective of size of holdings, and other factors of the beneficiaries.

Table 3: Yield rate of paddy per acre of different size of farmers during pre-loan and post-loan period

Size of cultivators	Yield per acre in bags*		Growth in percentage (%)
	Pre-loan	Post-loan	
Small (0-2.5)	18	24	33.3
Medium (2.5-5)	21	29	38.1
Large (above 5)	25	38	52.0
Total	22	32	45.5

Sources: Compiled from Questionnaires; * A bag contains 75 kg of paddy.

Table 4: Yield rate of paddy per acre of different Groups of farmers during pre-loan and post-loan period

Village	Yield per acre in bags*		Growth in percentage (%)
	Pre-loan	Post-loan	
V_1	28	36	28.6
V_2	20	28	40.0
V_3	15	24	60.0
Total	**22**	**32**	**45.5**

Sources: Compiled from Questionnaires; * A bag contains 75 kg of paddy.

It can be concluded from the above tables 3 and 4 that there is a significant increase in the output per acre over pre-loan to post-loan period. The t value of sample groups is 5.01, 3.86 and 7.38 respectively which are statistically significant at 10 % level. It is observed that the yield rate has increased irrespective of the size of holdings. This might be due to the change in cropping patterns, intensive use of fertilizers and labour etc., which can be resulted by the provision of adequate credit in time by DCCB, Kakinada and its affiliated PACS.

1.6 INCOME PER BORROWER:

It can be concluded from the tables 5 and 6 that the income per borrower of different size of holdings and sample group villages has a positive growth. Their incomes have increased from Rs.15, 337 to Rs.25,336 constituting 65.2 % growth. It is clear from the table 6.21 that the percentage growth in income of small farmers is more than that of medium and large farmers. Table 6.23 reveals that the income per borrower of V_1 sample group is more than that of $V_2$and V_3. But the percentage growth is high in case of V_3.

Table 5: Income per borrower per acre of different size of farmers during pre-loan and post-loan period

Size of cultivators	Income per borrower in Rs.		Growth in percentage (%)
	Pre-loan	Post-loan	
Small (0-2.5)	12,140	20,637	69.9
Medium (2.5-5)	15,234	25,222	65.6
Large (above 5)	19,836	31,228	57.4
Total	**15,337**	**25,336**	**65.2**

Sources: Compiled from Questionnaires.

Table 6: Income per borrower of different Groups of farmers during pre-loan and post-loan period

Village	Income per borrower in Rs.		Growth in percentage (%)
	Pre-loan	Post-loan	
V_1	22,483	34,612	53.9
V_2	18,921	29,514	55.9
V_3	10,223	18,112	77.2
Total	**15,337**	**25,336**	**65.2**

Sources: Compiled from Questionnaires.

However, it can be concluded that there is a significant impact of bank credit on income per borrower in all categories and sample groups which should be a positive growth in all cases.

1.7 INCOME PER ACRE:

There is a significant raise in income per acre of sample beneficiaries. The following tables 7and 8 reveal the fact that the growth percentage per acre on the basis of caste, size of holdings and sample groups.

Table 7: Income per acre of different size of farmers during pre-loan and post-loan period

Size of cultivators	Income per Acre in Rs.		Growth in percentage (%)
	Pre-loan	Post-loan	
Small (0-2.5)	6,218	10,466	68.3
Medium (2.5-5)	7,215	11,823	63.8
Large (above 5)	8,300	13,284	60.0
Total	**6,730**	**11,117**	**65.2**

Sources: Compiled from Questionnaires.

Table 8: Income/acre of different Groups farmers during pre & post-loan periods

Village	Income per Acre in Rs.		Growth in percentage (%)
	Pre-loan	Post-loan	
V_1	7,980	12,164	***52.4***
V_2	5,130	9,369	***82.6***
V_3	8,940	14,383	***60.8***
Total	**6,730**	**11,117**	**65.2**

Sources: Compiled from Questionnaires.

From the tables 7 and 8 it is clear that the income per acre is high in case of large farmers and growth rate is high in case of small and marginal farmers. The impact of crop loan on all size of farmers is statistically significant. It is observed from the table 8 that the income per acre of sample groups has significant raise over pre-loan to post-loan period. It is clear that the income per acre is high in V_3. But the percentage growth rate is high in V_2 group than that of other sample groups. Though V_3 has high income level per acre, its percentage growth rate is low as the farmers are in high cost burden. This is due to low fertility and less irrigation facilities. The farmers have to spend more on irrigation and fertilizers etc. But the output is not increasing in the same proportion to cost. Another cause for low incomes of this sample groups is they are producing only one crop for a year. However the t values of sample groups are 4.32, 7.13 and 5.02 respectively which are statistically significant at 0.1 % level. Hence it can be concluded that the agricultural crop loans have a direct significant impact on the income of the borrower and per acre over pre-loan to post-loan period.

2. IMPACT OF AGRICULTURAL TERM LOANS:

The agricultural term loans are meant for long-term perspective and are used for development and investment purposes. Such loans can be payable over a number of years and helps the cultivators to proper infrastructure for agricultural development.

Table 9: Distribution of sample beneficiaries on basis of size of land holding

Village	Size of land holding in Acre			Total
	Small (0-2.5)	Medium (2.5-5)	Large (above 5)	
V_1	26 (53.1)	14 (20.6)	9 (18.4)	**49 (100)**
V_2	29 (54.7)	13 (24.5)	11 (20.8)	**53 (100)**
V_3	17 (41.4)	10 (24.4)	14 (34.1)	**41 (100)**
Total	**72 (50.3)**	**37 (25.9)**	**34 (23.8)**	**143 (100)**

The figures in brackets indicate percentage to total;

Sources: Compiled from Questionnaires.

Table 10: Distribution of sample beneficiaries on the basis of Family size

Village	Size of Family in number of members			
	Small (1-3)	Medium (3-4)	Large (above 5)	Total
V_1	11 (22.4)	14 (28.6)	24 (41.0)	**49 (100)**
V_2	8 (15.1)	29 (54.7)	16 (30.2)	**53 (100)**
V_3	-	18 (43.9)	23 (56.1)	**41 (100)**
Total	19 (13.3)	61 (42.7)	63 (44.0)	**143 (100)**

The figures in brackets indicate percentage to total; ***Sources***: Compiled from Questionnaires.

2.1 IMPACT OF IRRIGATION:

During the study it is found that there is no impact of agricultural term loans on irrigation in V_1 strata, but there is a great change in V_2 and V_3 groups after obtaining loans. The size of net cropped area has increased due to installation of pump sets, dug wells and well with pump set etc. As a result of various irrigation activities facilitated by agricultural term loans, the proportion of net cropped area of sample borrowers increased from 26.2 % to 56.3 %with a growth of 30.1 %.

2.2 IMPACT ON CROPPING PATTERN:

An assured supply of water and other infrastructure facilities enables in showing cropping pattern in favour of more remunerative crops like HYV of paddy. The agricultural term loan has a great role in providing the infrastructural facilities to agriculture. It is observed that the agricultural term loan has a significant impact on the small and marginal farmers in the adoption of HYV seeds over pre-loan to post-loan period. The impact is more in case of medium farmers than small farmers. In pre-loan period the medium farmers have adopted HYV seeds on 44 percent of Gross Cropped Area. In post loan period the percentage is increased 84.3 %. The variation in percentage is 40.2 %. It is known from the field survey that about 26 % of small farmers did not utilize the loan in productive purposes. Due to this reason the impact on small farmers is probably less on the adoption of HYV seeds as compared to medium farmers in post-loan period.

2.3 IMPACT ON USAGE OF FERTILIZERS, PESTICIDES AND MANURES:

Increase in irrigation facilities, intensive use of HYV and increase in infrastructural facilities induce the cultivators to use more fertilizers. The consumption of fertilizer per acre has significantly increased in all sample groups over pre-loan to post-loan period. The consumption of fertilizer is more in V_3 group indicating 108.3 % due to low fertile lands (Tylands). Hence, these villages need more funds to increase the fertility of the soil. The increase in the consumption of fertilizer and a pesticide per acre is statistically significant.

2.4 IMPACT ON LABOUR COST:

The agricultural term loan has a significant impact on labour cost per acre of all size of farmers irrespective of the size of family/ holdings. It is evident from the study that large farmers spent more on labour cost than small and medium size farmers. With the help of agricultural term loans the borrowers might have earned a sound infrastructural base for cultivation. That might have probably induced the borrowers to increase the expenditure on labour cost per acre.

2.5 IMPACT ON PRODUCTION:

Increase in irrigation facilities, adoption of HYV seeds, intensive use of fertilizers, pesticides etc. increase the yield rate of paddy. With the effect of these factors the yield rate of paddy has increased in all sample groups of villages irrespective of the size and caste of the cultivators. From the field survey it is observed that the term loan for the purchase of ploughs, bullocks and other implements have played an important role in increasing the yield of crops. This helps the borrowers to get timely service. The farmer who had taken loans for dug well, or pump set or dug well with pump set or land development is able to facilitate irrigation and to convert fallow land to agricultural field and thus increase their yield.

Table 11: Yield rate of paddy per acre of different size of farmers during pre-loan and post-loan period

Size	Yield per acre in bags* in Rs		Growth in percentage (%)
	Pre-loan period	Post-loan period	
Small (0-2.5)	21	28	***33.3***
Medium (2.5-5)	25	32	***28.0***
Large (above 5)	25	38	***52.0***
Total	**24**	**34**	**41.7**

Sources: Compiled from Questionnaires; *A bag contains 75 kg of paddy.

Table12: Yield rate of paddy per acre of different Groups of farmers during pre-loan and post-loan period

Village	Yield rate per acre in bags*		Growth in percentage (%)
	Pre-loan period in Rs	Post-loan period in Rs	
V_1	28	38	***35.7***
V_2	20	28	***40.0***
V_3	15	26	***73.3***
Total	**24**	**34**	**41.7**

Sources: Compiled from Questionnaires; A bag contains 75 kg of paddy

The increase in yield of paddy of pre-loan to post-loan period is also statistically significant in all sample villages. The t value of sample groups is 6.51, 4.15 and 5.3 respectively, which are statistically significant at 1 % level.

2.6 IMPACT ON INCOME LEVEL:

Change in income level is the best indicator of the impact of bank loan on sample beneficiaries. Irrigation facilities, change in cropping patterns and increase in yield rate eventually increase the income of the borrowers. For the analysis of agricultural term loan on income level of the borrower, two factors viz., income per borrower and income per acre have been taken into consideration. For computation of the income of sample borrowers, the prevailing market price of paddy has been taken into consideration. In order to compute income per acre the total income is to be divided by the total acres of land whether own or leased. When the total income is divided by the number of sample borrowers, it gives the income per borrower.

2.7 INCOME PER BORROWER:

It can be concluded from the tables 13 and 14 that the income per borrower has increased in all cases irrespective of caste, size of holdings and sample group villages. However the growth of medium farmers' income is more than the small and big farmers i.e., 54.9 %. The growth percentage is less in case of large farmers i.e., 39.5 %.

Table 13: Income per borrower per acre of different size of farmers during pre-loan and post-loan period

Size of cultivators	Income per borrower in Rs.		Growth in percentage (%)
	Pre-loan period	Post-loan period	
Small (0-2.5)	13,890	19,473	***40.2***
Medium (2.5-5)	15,750	24,396	***54.9***
Large (above 5)	18,915	26,386	***39.5***
Total	**16,250**	**23,884**	**47.0**

Sources: Compiled from Questionnaires.

Table 14: Income per borrower of different Groups of farmers during pre-loan and post-loan period

Village	Income per borrowers in Rs.		Growth in percentage (%)
	Pre-loan period	Post-loan period	
V_1	18,365	25,638	***39.6***
V_2	15,490	22,414	***44.7***
V_3	13,675	22,317	***63.2***
Total	**16,250**	**23,884**	**47.0**

Sources: Compiled from Questionnaires.
However, it can be concluded that there is a significant impact of bank credit on income per borrower in all categories, castes and sample groups which should be a positive growth in all cases.

2.8 INCOME PER ACRE:

There is a significant rise in income per acre of sample beneficiaries. The following tables 15 and 16 reveal the fact that the agricultural term loan has the impact on increase in income per acre on the sample beneficiaries irrespective of holdings and sample groups.

Table 15: Income per acre of different size of farmers during pre-loan and post-loan period

Size of cultivators	Income per Acre in Rs.		Growth in percentage (%)
	Pre-loan period	Post-loan period	
Small (0-2.5)	6,478	10,332	***59.5***
Medium (2.5-5)	7,873	10,699	***35.9***
Large (above 5)	8,416	11,975	***42.3***
Total	**7,896**	**11,607**	**47.0**

Sources: Compiled from Questionnaires.

Table 16:Income per acre of different Groups of farmers during pre-loan and post-loan period

Village	Income per Acre in Rs.		Growth in percentage (%)
	Pre-loan period in Rs	Post-loan period in Rs	
V_1	8,115	11,256	***38.7***
V_2	7,267	10,341	***42.3***
V_3	6,626	10,582	***59.7***
Total	**7,896**	**11,607**	**47.0**

Sources: Compiled from Questionnaires.
From the tables 15and 16 it is clear that the income per acre has increased from Rs. 7,896 to Rs.11,607 at percentage growth of 47 over pre-loan to post- loan period. The percentage growth rate is highest in case of small farmers. The increase in income per acre in all size of the farmers is significant. The't' value of sample groups are 5.1, 4.15 and 6.52 respectively which are statistically significant at 0.1 percent level. From this it may be concluded that the agricultural term loan has a direct significant impact on the income levels of the borrowers. The positive trend in raising income per borrower and income per acre of holding has been a constant feature in all categories, caste and groups of farmers.

CONCLUSION:

It is clear from the above study that there was no significant impact of crop loans in irrigated villages, whereas there was a significant impact on Semi-irrigated and non-irrigated villages. When compared to semi and non-irrigated villages, the crop loans played a very significant role in non-irrigated villages. The impact of Co-operative credit was analyzed by the modernization of agricultural process during the pre-loan and post-loan periods. There was an enormous increase in the usage of HYV seeds, modernized inputs, fertilizers and pesticides from pre-loan to post-loan period. The modern process of agriculture increased the yield per acre and also the income per acre which in turn increased the income of the sample borrowers. The farmers of the district were greatly benefited by the credit provision of the DCCB, Kakinada. The farmers have taken loans not only to increase the productivity, but to develop the process of cultivation as a whole.
The present study clearly enunciated the advantages enjoyed through improved technology with the efforts of the bank for the beneficiaries in terms of high production, increased net returns and subsidiary incomes. The results further emphasized the need to enlighten the farmers about the superiority and profitability of improved technology through the extensive credit services. By and large the role of DCCB is highly impressive and clearly exhibited in the socio-economic development gained by the beneficiaries. Finally it can be concluded that the cooperative credit has a significant impact on the agricultural sector in the district by providing adequate & timely credit to the farmers.

REFERENCES:

[1] Annual Reports, Department of Agriculture and Cooperation (DAC), Govt. of India
[2] Calvert, H., Co-operation in the colonies, London, 1945.
[3] Dantwala, M.L., Rural Credit Restructuring System, Economic Times, March 30, 1990
[4] Deshmukh Vilasarao., Need to recognize Co-operatives in Planning Process, Co-operative Week Report, December, 2005.
[5] District Statistical Handbooks (1994-2006)
[6] Dutta, R. and Sundaram, K. P. M., India economy, Sultan Chand & Sons, New Delhi, 2005.
[7] Kanthimathinathan, S., Rural Credit at Cross Road, Kurukshetra, Vol. 43, No.5, February, 2004.
[8] Kulwant Singh Pathania, Cooperative Agricultural Credit utilization in Himachal Pradesh (Unpublished Ph.D. thesis), Himachal Pradesh University, Shimla 1987.
[9] Kurien, Co-operation: an effective tool for rural development, The Co-operator, Vol. 41, No.5, November, 2003.
[10] Manmohan Singh., Co-Operatives- Some Issues, The Co-operator, Vol. 42, No.8, February, 2005.
[11] Modi, M.K. and Rai, K.N., Credit Utilization pattern in different categories of farms in district of Haryana, Indian Co-operative Review. Vol. 30, No. 3, January, 1993
[12] P.S. Tewari, Co-operative movement in India, Urban Credit, Vol. 27, No.1, April to June,2005
[13] Pathania, K.S. and Verma, Y.S., Impact of agricultural technology and Co- operative credit utilization, Indian Co-operative Review, 1987.
[14] Rajnath Singh, Co-operation key to India's Economic Development", The Co- operator, Vol. 41, No.1, July, 2003.
[15] Rajnath Singh, Interest for farmers should not be more than 6%, The Co- operator, Vol. 43, No.9, March, 2006.
[16] Ramana, Cooperation in India, (A Critical analysis of the Co-operative movement in India's planned economy), Kurukshetra, Vol. 49, No.1, October, 2001.
[17] Ranjana Kumar, Strengthening the Co-operative movement, The Co-operator, Vol. 41, No.12, June, 2004.
[18] Sanjay Jog, Central Co-operative Banks: Pros & Cons, The Co-operator, Vol. 41, No.12, June, 2004.
[19] Sanjeev Kumar Hota, Co-operatives in Rural Economy", Kurukshetra, Vol. 48, No. 11, August, 2000.
[20] Sharma & Prasad, Rural Co-operatives & Agricultural Development, The Co-operator, Vol. 37, No.5, November, 1970.
[21] Sharma, P.S. Agriculture & Co-operatives in Liberalized Era, NCDC Bulletin, Vol.36, No. 4, October, 2002.
[22] Shetty, S.L., Distributional issues in Bank Credit Multi pronged strategy for correcting past neglect, Economic and Political Weekly, July 17, 2004.
[23] Sisodia, Development of Agricultural Co-operatives in India", The Co-operator, Vol. 43, No.2, June, 2006.
[24] Sivaloganathan, Problem in the recovery of Rural Credit, Kurukshetra, February, 2004.
[25] Srivastava, Strengthening of Primary Agricultural Co-operative Societies, The Co-operator, Vol. 42, No.2, August, 2004.
[26] Subhayya and Selva Kumar, Development strategies for DCCBs, Kurukshetra, Vol. 54, No.3, December, 2005.
[27] Subrahmanyam, Analysis of Union Budget 2003-04 pertaining to Cooperative Credit, The Co-operator, Vol. 40, No.10, April, 2003.
[28] Subrahmanyam, Co-operative credit, The Co-operator, Vol. 41, No.2, August, 2003.
[29] Subrahmanyam, New Financial package pertaining to flow of rural credit, The Co-operator, Vol. 42, No.1, July, 2004.
[30] Subrahmanyam, Primary Agricultural Co-operative Societies- A statistical profile, The Co-operator, Vol. 41, No.12, June, 2004.
[31] Subramanyam., Union Budget 2005-06: A view point, The Co-operator, Vol.42, No.9, March, 2005.
[32] Sukhpal Singh., The New Generation Cooperative, The Cooperator, Vol. No. 42, No.5, November, 2005.
[33] Surendra Patnaik., Co-operative banking in India, Kurukshetra, Vol. 37,No. 5, November,1999.
[34] Tangirala, New generation Co-operatives versus traditional Co-operatives, Kurukshetra, Vol.53, No.7, May, 2005.
[35] Thanikodi, Co-operative central banks in India: Problems & Remedies, The Co- operator, Vol. 42, No.12, June, 2005
