Journal of Rural Development, Vol. 32 No. (4) pp. 347-365
NIRD, Hyderabad.

FARMERS' INDEBTEDNESS IN HARYANA: A STUDY

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ABSTRACT

Farmers' Indebtedness in the State emerged as a central issue. This is because, the problem of indebtedness, damaged the social status of a farmer and triggered to commit suicide. In India, on an average, there is one farmer suicide in every 30 minutes since 2002 [Sainath: 2008a], while in case of Haryana, the suicide number of farmers is 4.8 per one lakh farmers [NCRB]. Therefore, the issue of farmers' indebtedness becomes a matter of intense debate for whole of the country and as well as for Haryana. In this background, the present study is conducted to assess the status of farmers' indebtedness in the State in detail. The results of the study indicate that the informal mechanism of credit delivery is playing an important role for marginal and small farmers in meeting their credit requirements in the State. Seventy one per cent loans to total loan were used in productive activities in Haryana, while in case of India the same ratio was 73.10 per cent. Marriage and other ceremonies were the major unproductive expenses in Haryana, which were higher as compared to aggregate India and it is more in SC and BC community in the State. In addition, maximum indebtedness was found to be ₹25289 on the 615-775 MPCE class farm households in the State and the status of Scheduled Caste and Backward Class farm households is not better, while on an average the status of farm households belonging to other social group of farming community is better in the State as compared to India as aggregate. The size of landholding is also negatively associated with informal borrowing. On the basis of foregoing analysis, we suggest that the State government should monitor the informal mechanism of credit, increase the awareness among farmers in general and marginal and small in particular, about the disadvantages of utilisation of loan in unproductive activities, and strengthen the cooperative movement in the State.

Introduction

In Haryana, the contribution of agriculture sector in total Net State Domestic Product [NSDP] decreased over the period due to high growth in manufacturing and service industry, and slower rate of growth in agriculture sector of the State. The Central Statistical Organisation [CSO] data indicate that the ACGR of agriculture NSDP of the State was 4.86 per cent during the period from 1983 to 1994 and decreased to 1.77 per cent from 1993 to 2004. The share of agriculture employment also decreased due to expanding of non-farming activities[1] in the State. But, the absolute number of persons engaged in agriculture sector in the State increased significantly. The census of Haryana also shows that number of persons engaged in agriculture activity increased to 4322234 in 2001. Further, Situation Assessment Survey [SAS: 2003] revealed that in Haryana, aggregate 39 per cent farmer[2] [s] do not like farming due to many reasons such as- no-profitable, high risk, etc. In

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addition, National Crime Record Bureau [NCRB] indicates that the suicide rate among one lakh farmers in Haryana is 4.8 farmers. The proportion of farmers' suicide is 0.5 in comparison to general suicides of the State. The above symptoms indicate that the agriculture sector of the State has been shifting from accelerating to decelerating since 1990s. Although, there are a number of reasons [i.e., marketing, cost of cultivation, indebtedness, climate, surge in foodgrains prices, reduced per capita foodgrain availability, etc.] behind slow down in agriculture sector of the State, indebtedness of farmers in the State emerged as a central issue. This is because, the problem of indebtedness damaged the social status of farmers and triggered to commit suicide. In India, on an average, one farmer commits suicide every 30 minutes since 2002 [Sainath: 2008a], while in case of Haryana, the suicide rate of farmers is 4.8 per one lakh farmers [NCRB]. Therefore, the issue of farmers' indebtedness becomes a matter of intense debate for whole of the country as well as for Haryana. In this background, the present study is conducted to assess the status of farmers' indebtedness in the State in detail.

Objectives of the Study

1. To find out the status of indebtedness of farm households in Haryana in detail.
2. To study the contribution of different sources in farmers' indebtedness of the State along with India [as aggregate].
3. To study the relationship between size of landholding and farmers' indebtedness by informal source of credit.
4. To examine the utilisation pattern of loan by farm households in the State along with India [as aggregate].

Hypotheses of the Study

* There is a negative association between size of landholding and informal borrowing and
* There is no statistically significant difference in indebtedness among different MPCE Classes in Haryana and India [as aggregate].

Research Methodology

The nature of research is exploratory. The study was based on secondary data, which were collected from the Farmers Situation Assessment Survey [2003], Indebtedness of Farmer Households Survey [2003], National Crime Records Bureau [various issues], Census of India & Haryana [various issues], Economic Census of Haryana [1998 & 2005], and Agriculture Statistics at a Glance [2008].

The collected data have been transcribed into long sheets form, tables have been formulated and analysed using a wide range of appropriate techniques such as; mean, S.D., C.V and Regression Method.

Simple Linear Regression Analysis

The simple linear regression represents a logical extension of between two variables analysis. Under it one independent variable is used to estimate the values of a dependent variable. The simple regression equation describes the average relationship between two variables and this relationship is used to predict or control the dependent variable. The formula for calculating multiple regression is as follows

$$Y = a_0 + a_1X_1 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots [1]$$

Where X_1, is regressor variable, a_1 is the parameter to be estimated from the data, and e is the error term and it is based on following classical ordinary least square {OLS} assumptions i.e., the deviation e is assumed to be independent and normally distributed with mean 0 and standard deviation (σ)

Table 1 reveals that the rural and farm household[3] [s] in Haryana were 3147400 and 1944500 respectively, which was only 2.12 and 2.17 per cent of the total rural and farm households of India as a whole. The per cent share of farm households to total rural households in Haryana was 61.78 per cent, while the same ratio was 60.41 per cent in context of aggregate India in 2003. It means, the rural economy of the State is more dependent on farm activities as compared to aggregate rural economy of the country.

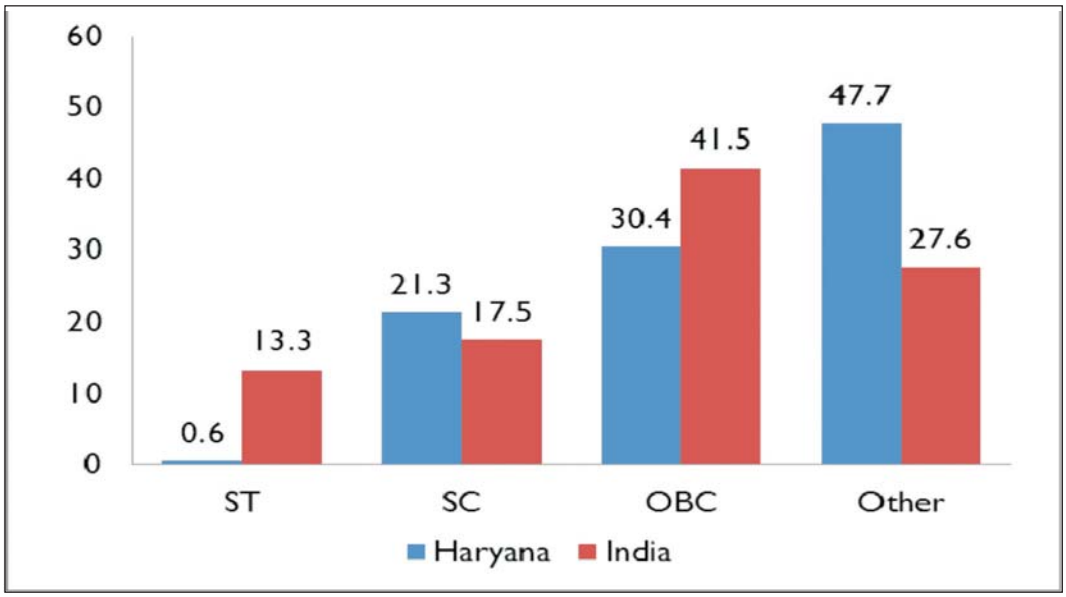
Table 1 : Estimated No. of Rural Households and Farm Households

Particulars	Estimated No. of Rural Households	Estimated No. of Farm Households
Haryana	3147400 [100]	1944500 [61.78]
India	147898800 [100]	89350400 [60.41]

Source: Calculated by Authors from the NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Figure 1 : Farmer Households According to Social Group in Haryana and India

[In per cent]



Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Figure 1 shows the farm households in Haryana and India according to the social groups. The figure clearly shows that only 0.60 per cent farm households belong to ST, 21.30 per cent to SC, 30.40 per cent to OBC and 47.70 per cent to Other category community in the State, while in case of India, these ratios of farm households were 13.30, 17.50, 41.50 and 27.60 per cent, respectively. Moreover, farm households which belong to other category of social group form a major and dominant part of rural farm households in Haryana, while farm households belonging to ST category appear to be negligible in the State.

Table 2 : Farm Households According to Size of Landholding

[In per cent]

Size of Landholding [In ha.]	Haryana	India
<0.01	0.38	0.13
0.01 to 0.40	30.50	29.90
0.41 to 1.00	18.00	29.80
1.01 to 2.00	18.30	18.90
2.01 to 4.00	19.70	12.50
4.01 to 10.00	08.80	06.40
Above 10.00	09.00	12.00
All Size	100.00	100.00

Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Table 2 represents the per cent share of farm households according to the size of landholding in Haryana and India. It is clear from Table 2 that majority of farm households have land size between 0.01 to 0.40 in Haryana and India. In addition, 86.88 and 91.23 per cent farm households possessed the size of land below 4 ha. in Haryana and India, respectively. It is clear from Table 2 that the marginal farm households are in majority in Haryana as well as in India.

Table 3: Indebted Farm Households

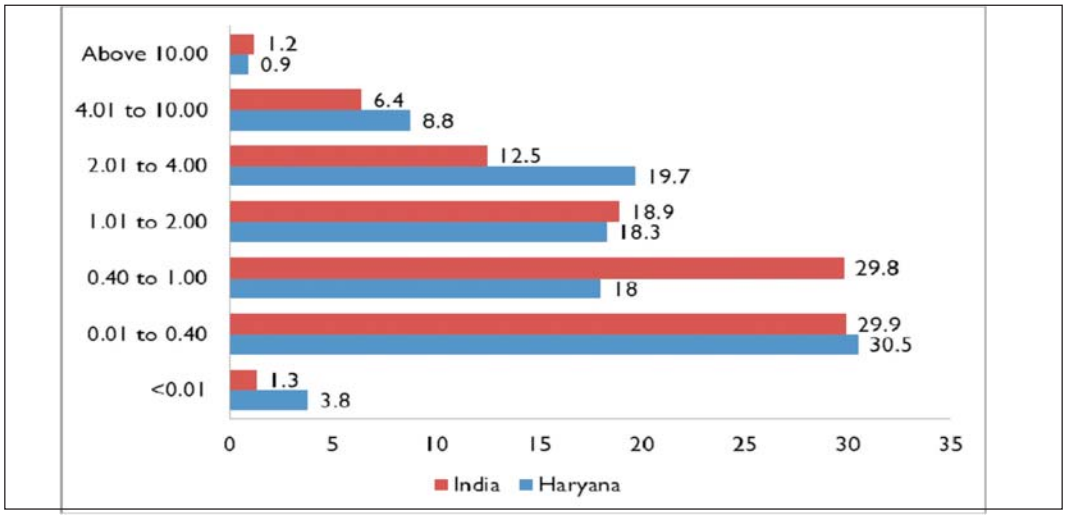
Particulars	Estimated No. of Indebted Farm Households	Indebted Farm Households as per cent to Total Farm Households
Haryana	1033000	53.00
India	43424200	48.60

Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Table 3 expresses the estimated number of indebted farm households' aggregate and indebted farm households as per cent to total farm households of Haryana and India. The ratio of indebted farm households as per cent to total farm households in Haryana was 53.00 per cent, while in case of India it was only 48.60 per cent. The NSSO Report No. 498 also shows that the incidence of indebtedness [proportion of households reporting debt] ranges from about 18 per cent in Assam to 82 per cent in Andhra Pradesh during the year 2003. The main cause for high indebtedness of farm households in Haryana is easy access of banking services as compared to other States and India [as aggregate]. The CMIE database [2010] shows that the population per bank office in Haryana is only 11145.07 as compared to 14107.23 of aggregate India.

Figure 2 : Incidence of Indebtedness [IOI] Across Landholdings: Formal and Informal Sources

[In Per cent]

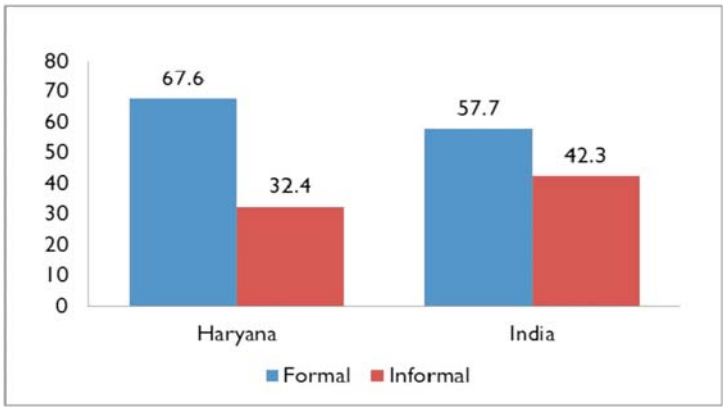


Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Figure 2 depicts the association between IOI and size of landholding in Haryana and India. It is clear from the above figure that the IOI was very high in farmers who possessed land between '0.01 to 0.40' ha. in Haryana and India, while ratio was minimum in farmers who possessed land above 10.00 ha. Further, the major causes behind the high IOI in the owner of low land size are 1] low productivity of land [due to the lack of implementation of modern technology in farming activities], 2] natural digesters, 3] lack of saving for future [due to lack of profit from farming activities], 4] high cost of borrowing[4] [the access of small and marginal to formal source of credit is very low], and 5] use of loan in unproductive activities [see Table 6].

Figure 3 : Indebtedness of Farm Households by Source

[In per cent]



Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.

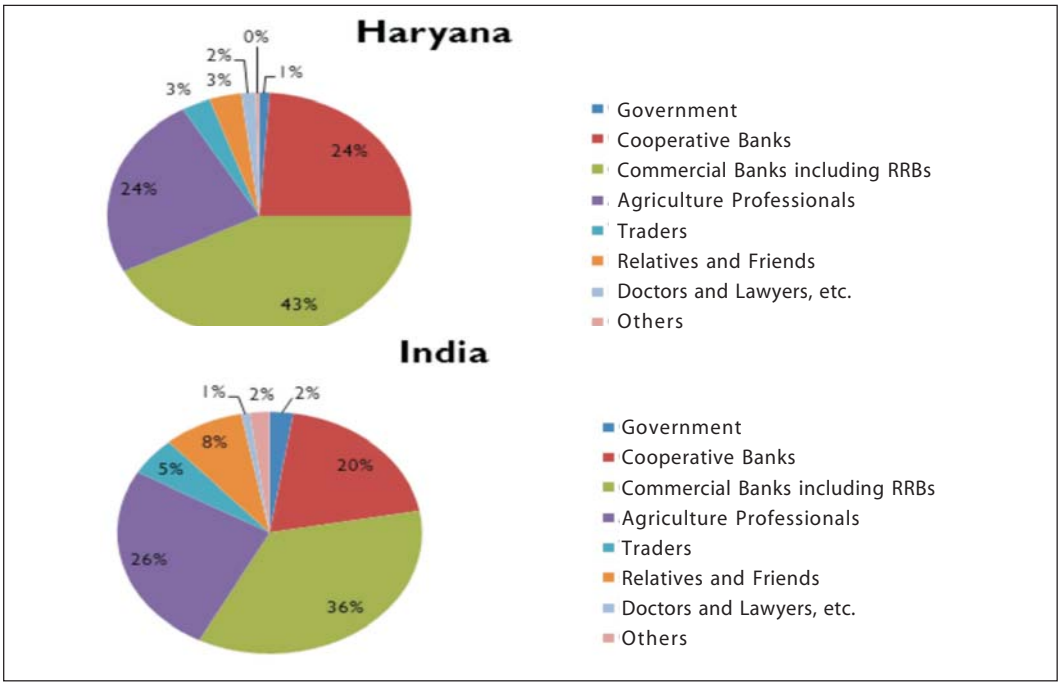
Table 4: Indebtedness of Farm Households by Different Sources

Source of Indebtedness	Haryana		India	
	Amount	%	Amount	%
Government	11	1.62	25	4.33
Cooperatives Banks	239	35.35	196	33.96
Commercial Banks including RRB's	426	63.01	356	61.69
Formal Total	676	100	577	100
Agriculture Professionals	241	74.15	257	60.61
Traders	31	9.53	52	12.26
Relative and Friends	34	10.46	85	20.04
Doctors and Lawyers, etc.	15	4.61	9	2.12
Others	4	1.23	21	4.95
Informal Total	325	100	424	100

Source : Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.
Note : Per 1000 rupees distribution of outstanding loan taken by farmer households in different States by source of loan.

Figure 4 : Share of Different Source of Credit in Farmers Indebtedness

[In Per cent]



Source : Calculated by Authors from NSS Report No. 498: Indebetedness of Farmer Households, 2003.

Figure 3 shows the contribution of formal and informal sources[5] of credit in indebtedness of farm households in Haryana along with India. It is clear from Figure 3 that the contribution of formal source of credit in farmers' indebtedness [Total] was 67.60 per cent in Haryana and 57.70 per cent in India in 2003.

Further, NSS Report No. 498 [Indebtedness of Farmer Households: 2003] also shows that the commercial banks are dominant in formal source of credit in Haryana as well as India, while agriculture professional moneylenders have also dominated in informal source of credit in both places. The contribution of commercial banks in total formal debt is 63.01 and 61.69 per cent in Haryana and India, respectively; while in case of informal debt the contribution of agriculture professional moneylenders is 74.38 per cent in Haryana and 60.75 per cent in aggregate India in total informal supply of credit in 2003.

Table 4 shows that the share of government, cooperative banks and commercial banks [including RRB's] was 1.62, 35.35 and 63.01 per cent, respectively in farmers' [only formal sources] indebtedness in the State, while in case of India as aggregate the same ratios were 4.33, 33.96 and 61.69 per cent, respectively in the year of survey. Further, the contribution of agriculture professionals, traders, relatives and friends, doctors and lawyers and others was 74.15, 9.53, 10.46, 4.61 and 1.23 per cent, respectively [in case of informal indebtedness] in the State and in case of India as aggregate the same ratios were 60.61, 12.26, 20.04, 2.12 and 4.95 per cent, respectively in reference period.

Figure 4 depicts that the contribution of government, cooperative banks, commercial banks [including RRB's], agriculture professionals, traders, relatives and friends, doctors and lawyers, etc., and others in farmers' indebtedness was 1.10, 23.90, 42.60, 24.10, 3.10, 3.40, 1.50 and 0.40 per cent, respectively in Haryana, while in case of India as aggregate the ratios were 2.50, 19.60, 35.60, 25.70, 5.20, 8.50, 0.90 and 2.10 per cent, respectively in the same period.

Table 5 : Size of Landholdings and Indebtedness by Source

[In per cent]

Size of Land-holding	Haryana			India		
	Formal	Informal	Total	Formal	Informal	Total
<0.01	14.60	85.4	100	22.60	77.4	100
0.01 to 0.40	46.50	53.5	100	43.30	56.7	100
0.40 to 1.00	71.00	29.0	100	52.80	47.2	100
1.01 to 2.00	62.00	38.0	100	57.60	42.4	100
2.01 to 4.00	86.40	13.6	100	65.10	34.9	100
4.01 to 10.00	59.40	40.6	100	68.80	31.2	100
Above 10.00	74.70	25.3	100	67.60	32.4	100
Average	59.23	40.77	100	53.97	46.03	100
Minimum	14.60	13.60	100	22.60	31.20	100
Maximum	86.40	85.40	100	68.80	77.40	100
C.V.	39.46	57.33	0.00	30.65	35.94	0.00

Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Table 5 depicts the loan taken by different size of landholder farm households by different sources [i.e., formal and informal] in terms of per cent. It is clear from Table 5 that the informal mechanism of credit supply is playing a significant role for the farm households having size of landholding up to 0.40 acre in Haryana as well as India. Jointly, both categories [i.e., <0.01 and 0.01 to 0.40] farm households fulfil their 70 [Haryana] and 67 [India] per cent credit requirements[6] by informal mechanism of credit supply in general and agriculture/professional moneylender in particular [54.25 per cent in Haryana and 39.55 in aggregate India].

To know the impact of average size of landholding on indebtedness by informal source, we have applied simple regression equation model. A log-linear regression model[7] has been designed to explain it. The model is

$$Y = a + \beta_1 x_1 + \varepsilon \ldots\ldots\ldots [2]$$

Where

Y = (Informal borrowing as per cent to total borrowings)

X1 = average size of landholding, and

ε : stands for error term

Box : 1 Association Between Informal Borrowing and Size of Landholding

Dependent Variable: Ratio of Informal Borrowing
Independent Variable: Size of Landholding in Ha.
Sample Period: 2003
Type of Data: Cross Sectional
Sample: 7 Categories of Land Size

Particulars	Coefficient	t-Statistics	p-value
Constant	1.541*	21.75	.000
IFI	-0.180*	-02.447	.058
R-Square	0.545/54.50		
Adj. R-Square	0.454/45.40		
F-Statistics	5.987		.058
SE of the Estimate	0.18702		

The regression equation reveals that the average size of landholding is negatively associated with informal borrowings in the State. The value of R^2 is 0.545 or 54.50 per cent. It means 54.50 per cent variation in informal borrowing is arising due to the average size of landholdings. So, for popularising the formal borrowing the State should reduce the value of collateral security, develop the low cost financial products for marginal and small farmers [Chhikara and Kodan: 2011]; and reduce paper work and lowering the costs of access {transaction costs, especially in terms not only of fee and charges but also requirements for documentation are the main area for attention in the context of formal financial exclusion} [Johnson and Zarazua: 2011]. In short, we can say that the informal credit in general and agriculture professional moneylenders in particular, play a significant role to farmer community in general and marginal and small farmers in particular for lending in India as well as Haryana. In this context, strengthening of the Cooperatives may be a possible step. Because, on one hand Cooperatives will fight against professional moneylenders in villages and it will also increase the supply of formal credit in villages on the other. Moreover, the rate of interest of Cooperative loan/advances is less by 1 per cent as compared to commercial banks loan.

Table 6 : Loan Utilisation Pattern of Farm Households in Haryana

[In Per cent]

Size of Landholding	Source of Credit		Purpose of Usage	
	Formal*	Informal	Productive**	Unproductive
<0.01	14.60	85.40	26.50	73.50
0.01 to 0.40	46.50	53.50	26.60	73.40
0.40 to 1.00	71.00	29.00	76.00	24.0
1.01 to 2.00	62.00	38.00	67.50	32.50
2.01 to 4.00	86.40	13.60	83.00	17.00
4.01 to 10.00	59.40	40.60	77.20	22.80
Above 10.00	74.70	25.30	98.60	1.40
Average	59.22	40.77	65.05	34.94
Minimum	14.60	13.60	26.50	1.40
Maximum	86.40	85.40	98.60	73.50
CV	39.46	57.32	42.95	79.97

Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.
Note: * Percentage of amount of formal loan outstanding of total amount of loan outstanding.
** Percentage of total amount of loan used for income generating purposes out of total loan amount outstanding.

Table 7 : Loan Utilisation Pattern of Farm Households in India

[In Per cent]

Size of Landholding	Source of Credit		Purpose of Usage	
	Formal*	Informal	Productive**	Unproductive
<0.01	22.60	77.40	28.50	71.50
0.01 to 0.40	43.30	56.70	35.10	64.90
0.40 to 1.00	52.80	47.20	57.10	42.90
1.01 to 2.00	57.60	42.40	69.20	30.80
2.01 to 4.00	65.10	34.90	78.20	21.80
4.01 to 10.00	68.80	31.20	83.20	16.80
Above 10.00	67.60	32.40	81.40	18.60
Average	53.97	46.03	61.81	38.19
Minimum	22.60	31.20	28.50	16.80
Maximum	68.80	77.40	83.20	71.50
CV	30.65	35.94	36.23	58.65

Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.
Note: * Percentage of amount of formal loan outstanding of total amount of loan outstanding.
** Percentage of total amount of loan used for income generating purposes out of total loan amount outstanding.

The study of loan utilisation pattern is a very important aspect in the context of indebtedness measurement since, the level of indebtedness on a person depends on the utilisation pattern of debt. Tables 6 and 7 reveal the loan utilisation pattern of farmers in Haryana. These Tables clearly show that jointly on an average 65.05 per cent loan amount was used in farm activities [including capital, current expenditure and non-farm activities] by the farm households in the State, while in case of India the ratio was 61.81 per cent in 2003. Additionally, through the Table we can also observe that the size of landholding is positively associated to the productive use of loan in Haryana and India.The farm expenditure [capital and current] was the common purpose of loan taken by different sizes of landholding farmers in Haryana along with India.The next important purpose of loan taken by marginal [23.70 per cent], small [20.70 per cent] and large [8.50 per cent] farmers was marriage and other ceremonies, while other expenses [9.70 per cent] was important purpose of loan taken by medium farm households in Haryana in 2003. In case of India, the next important purpose of loan taken by marginal [18.60 per cent], small [90.90 per cent] and medium [8.90 per cent] farmers was also marriage and ceremonies except large farmers [5.35 per cent to total loan was taken for consumption] in the same period [See detailed NSS Report No. 498: Indebtedness of Farmer Households, 2003].

Further, the NSSO Report reveals that jointly 18.80 and 19.10 per cent amount of loan was used in consumption and marriage & other ceremonies by the farmers of the State and aggregate Indian farmers, respectively during the same period. At aggregate level of India, 8 per cent amount of loan was used on education, while in case of Haryana the expenditure was nil during the period under consideration.

Table 8: Link Among Formal & Informal Loans, Productive & Unproductive Usages in Haryana

Particulars	Formal Loan	Informal Loan	Productive	Unproductive
Formal Loan	1	-1.000**	.856**	-.856**
Informal Loan	-1.000**	1	-.856**	.856**
Productive	.856**	-.856**	1	-1.000**
Unproductive	-.856**	.856**	-1.000**	1

Source: Authors Calculations.

Note: **. Correlation is significant at the 0.01 level (1-tailed).

Table 9 : Link Among Formal & Informal Loans, Productive & Unproductive Usages in India

Particulars	Formal Loan	Informal Loan	Productive	Unproductive
Formal Loan	1	-1.000**	.958**	-.958**
Informal Loan	-1.000**	1	-.958**	.958**
Productive	.958**	-.958**	1	-1.000**
Unproductive	-.958**	.958**	-1.000**	1

Source: Authors Calculations.

Note: **. Correlation is significant at the 0.01 level (1-tailed).

To study the link among formal & informal loan, productive & unproductive usages in Haryana and India, Pearson correlation was used and the results of the test are presented in Tables 8 and 9. It is clear from the Tables that formal loan is positively linked to productive usage,

while informal loan is positively linked to the unproductive usage in Haryana and India. Further, the Pearson correlation coefficient reveals that the formal loan is more productive in aggregate India as compared to Haryana.

Table 10 : Indebtedness on Farm Households: According to the Different Monthly Per Capita Expenditure Classes

MPCE Class	Haryana		India		Col. [2] - Col. [4]
Col. [1]	Col. [2] [In. ₹]	Col. [3] [In %]	Col. [4] [In ₹]	Col. [5] [In %]	Col. [6] [In ₹]
0-225	4489	1995.11 [11]	4446	1976.00 [12]	43
225-255	2701	1125.42 [12]	6127	2552.92 [9]	-3426
255-300	14812	5337.66 [4]	8591	3095.86 [3]	6221
300-340	23237	7261.56 [1]	8544	2670.00 [8]	14693
340-380	16629	4619.17 [6]	9100	2527.78 [10]	7529
380-420	10764	2691.00 [10]	9510	2377.50 [11]	1254
420-470	25159	5653.71 [3]	12873	2892.81 [7]	12286
470-525	32248	6482.01 [2]	15178	3050.85 [4]	17070
525-615	20195	3542.98 [8]	16529	2899.82 [6]	3666
615-775	35289	5081.21 [5]	20537	2957.09 [5]	14752
775-950	34586	4012.30 [7]	27630	3205.34 [2]	6956
950+	26109	2748.32 [9]	39058	4111.37 [1]	-12949
Average	13970.14	4097.66	8455.86	2584.70	5514.29
Minimum	2701.00	1125.42	4446.00	1976.00	-3426.00
Maximum	25159.00	7261.56	12873.00	3095.86	14693.00
C.V.	61.72	54.09	31.50	13.96	119.99

Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003.
Note: In % = Indebtedness in ₹ /Average MPCEC and Rank also assigned and shown in brackets.

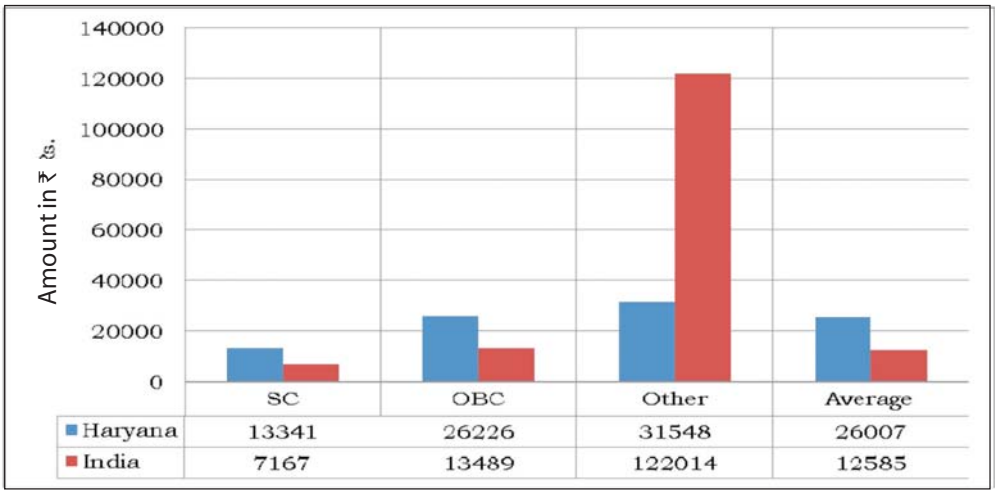
Table 10 expresses the indebtedness on farm households in ₹ and in per cent of according to Monthly Per Capita Expenditure[8] [MPCE] classes of farmers in Haryana along with India. Obviously, the indebtedness was low on farmers who belonged to '225-255' and '950+' MPCEC in the State as compared to India, while in remaining MPCE C's indebtedness was high as compared to same in 2003.

Further, Table 10 also shows that the indebtedness was high on farmers who belonged to '300-340' followed by '470-525', '420-470' and minimum on '225-255' in the State, while in case of India it was high on '950+', followed by '775-950, 225-300 and minimum on '0-255' MPCE Class during the reference period.

The Pearson correlation coefficient was found positive and significant between high debt burden on farmers and high MPCE class in India as well as in Haryana. To compare the status of farmers' debt burden in Haryana and India, t-test was applied. The calculated value of t-test is 2.226, while tabulated value is 2.09. Therefore, to conclude, we can say that there is no statistically significant difference in debt burden among different MPCE Classes in Haryana and India [as aggregate], but the problem of indebtedness of Haryana farmers is somewhat worse as compared to India as aggregate.

Figure 5 : Average Indebtedness on Farm Households: According to the Social Groups

[Amount in ₹]



Source: NSS Report No. 498: Indebtedness of Farmer Households, 2003.

Figure 5 illustrates the average indebtedness [in ₹] on various social groups' farmers of the State along with India. It is clear from Figure 5 that the status of Scheduled Caste [SC] and Backward Class [BC] farmers was not better, while in case of Other Class farmers was better as compared to the same social group of Indian as aggregate farmers in the context of indebtedness. The major explanation behind the worse status of SC and BC farmers was mis-utilisation of loan [i.e. marriage, consumption, etc.] and possession of low size of landholding.

The SAS [2003] data show that 19.00 and 21.10 per cent loan was used in marriages and other ceremonies by SC and BC farmers, respectively of the State, while in case of aggregate India, 17.30 and 12.10 per cent, respectively loan was used in the same head by the same social groups of farmers.

Further, SAS [2003] also reveals that 26.40 and 62.0 per cent loan was used by SC and BC farmers in productive activities [either farm business or non-farm business] in Haryana, while in case of aggregate India, the same ratio of SC and BC farm households was 50.0 and 62.20 per cent, respectively during the period under consideration.

Moreover, the SAS [2003] depicts that the maximum indebtedness was on SC, BC and Other social group of farmers belonging to 470-525, 775-950 and 0-225 MPCE class, respectively, while minimum indebtedness was on SC, BC and Other social group of farmers belonging to 470-425, 775-950 and 615-775 MPCE class, respectively in the State. In case of India, the maximum and minimum indebtedness on farmers, according to the same social groups belonging to 225-255, 0-225 & 0-225, respectively and 950+, 950+ and 775-950 MPCE Classes, respectively.

Table 11: Status of Indebtedness of Farm Households in Haryana as Compared to India [According to the Different Monthly Per Capita Expenditure Classes and Caste]

[In Per cent]

MPCE Cs	SC Farmers	BC Farmers	Other Farmers
0-225	-39.80 [12]	69.56 [1]	-49.90 [12]
225-255	-5.68 [9]	-11.60 [10]	-27.10 [10]
255-300	-5.20 [8]	68.53 [2]	2.40 [6]
300-340	35.32 [1]	37.72 [5]	55.50 [1]
340-380	33.41 [2]	42.63 [3]	-12.70 [9]
380-420	6.92 [6]	12.23 [8]	-27.30 [11]
420-470	13.06 [5]	-11.00 [9]	50.89 [2]
470-525	30.50 [3]	42.60 [4]	14.00 [3]
525-615	15.86 [4]	-16.60 [12]	2.32 [7]
615-775	-0.40 [7]	15.13 [7]	10.46 [5]
775-950	-6.37 [10]	15.33 [6]	-7.75 [8]
950+	-7.49 [11]	-15.90 [11]	11.27 [4]
Average	5.84	20.72	1.84
Minimum	-39.80	-16.60	-49.90
Maximum	35.32	69.56	55.50
C.V.	21.52	31.39	30.55

Source: Calculated by Authors from NSS Report No. 498: Indebtedness of Farmer Households, 2003.
Note: The following procedure was adopted to calculate the status of indebtedness of Haryana farm households: [Concern Average MPCE Classes of Haryana – Concern Average MPCE Classes of India]/ Concern Average MPCE class *100.

Table 11 expresses the status of indebtedness of different communities' farm household in Haryana [as compared to India] in term of percentage. It is clear from the above Table that the status of indebtedness of SC farmers were better [as compared to India] who belonged to '0 -225', '225-255', '255-300', '615-775','775-950' and '950+' MPCE Cs, while in case of BC farming community, '225-255', '420-470', '525-615', and '950+' MPCE Cs farm households in 2003. While, in case of other community farm households of the State, the status of indebtedness was better, who belonged to '0-225','225-255','340-380','380-420' and '775-950' MPCE Cs in same time.

Major Findings of the Study

1. Through the study, we analysed the problem of farmers' indebtedness/debt burden in Haryana in detail and also compared the status of Haryana farmers to Indian [as aggregate] farmers in the milieu of indebtedness with the help of Situation Assessment Survey [2003] data along with appropriate statistical tools and techniques.
2. The data show that jointly 62.20 per cent loan amount was used in farm activities [either capital or current expenditure], while total 71 per cent loan to total loan taken was used by Haryana farmers in productive activities [i.e., farm and non-farm activities]. But, the ratio was low as compared to aggregate India [73.10 per cent]. Definitely, farm expenditure [capital and current] was the common purpose of loan taken by different sizes of landholding farmers in Haryana, but, marginal and small farmers used a significant amount of loan in marriages and ceremonies expenditure, that was 23.70 and 20.70 per cent, respectively to total amount of loan taken.
3. The IOI was very high in farmers who have possessed land between '0.01 to 0.40' ha. in Haryana and India, while ratio was minimum in farmers who have possessed land above 10.00 ha.
4. The contribution of commercial banks [including RRB's] was 63.01 per cent in Haryana and 61.69 per cent in aggregate India, while the contribution of cooperative banks was 35.35 and 33.96 per cent in Haryana and India, respectively in total formal indebtedness of farm households in 2003. Further, the share of agriculture professionals was 74.15 and 60.61 per cent in Haryana and India in total informal indebtedness of farm households during the same period. Moreover, the contribution of commercial bank was 43, cooperative was 24 and agriculture professionals was 24 per cent in total farmer indebtedness [formal and informal] in Haryana, while in case of aggregate India the contribution of same institutions were 36, 20 and 26 per cent during the period under consideration.
5. On an average 65.05 and 61.80 per cent loan was utilised in productive activities in Haryana and India during the period of survey. Further, 73.50 and 71.50 per cent was utilised in unproductive activities by the farmers who possess the land size up to 0.01 ha. in Haryana and India, respectively. Maximum loan [98.60 per cent] was utilised by farmers who possess the land size above 10 ha. in Haryana, while in case of India maximum [83.20 per cent] loan was used in productive activities who possess the land size between 4.01 to 10 ha.
6. The study also found that the average size of landholding and informal credit lending are negatively associated, while due to population growth and single family trends, the average size of landholding has been decreasing in the State as well as in aggregate India, which is a matter of concern.
7. The majority of formal borrowing is skewed towards large land holders' farm households in Haryana and India.
8. Further, the debt burden on farm households which belong to 950 + MPCE Classes in India

was more, while in case of Haryana, it was high in 615 to 775 MPCE Class farmers. The Pearson correlation co-efficient confirmed a positive and significant relationship between high indebtedness on farmers and high MPCE classes in India as well as in Haryana, although no significant difference was found between indebtedness on farmers of Haryana and India according to the different MPCE Classes. The status of Scheduled Caste [SC] and Backward Class [BC] farmers are not better, while Other Classes [OC] farmers of Haryana were found to be better as compared to the same social group of aggregate Indian farmers in case of debt burden.

9. The status of indebtedness of SC farmers were better [as compared to India] which belonged to '0 -225', '225-255', '255-300', '615-775', '775-950' and '950+' MPCE Cs, while in case of BC farming community,'225-255', '420-470', '525-615', and '950+' MPCE Cs farm households in 2003. While, in case of other community farm households of the State, the status of indebtedness was better, which belonged to '0-225', '225-255', '340-380', '380-420' and '775-950' MPCE Cs in same time.

Suggestions

1. The State government should monitor the informal mechanism of credit, because the contribution of the mechanism is 32.50 per cent in Haryana and 42.40 per cent in India in total indebtedness. Further, the involvement of agriculture professionals in total informal landing is 74.15 and 60.61 per cent in Haryana and India, respectively.
2. Increase the awareness among farmers in general and marginal and small in particular, about the disadvantages of utilisation of loan in unproductive activities and motivate them for use of loan in productive purposes.
3. The NSSO Report No. 498 [Indebtedness of Farmer Households, 2003] also reveals that 62 per cent rural households are not the member of cooperatives societies and further, only 9 per cent members of the same do not use the services of the same institutions in the State. Moreover, seeds and fertiliser services are most commonly availed by the cooperatives societies in the State. Therefore, strengthening the cooperative movement in the State is the need of the hour.
4. In addition, the government should also strengthen the self-help group movement in the State, as only one per cent of farmer households belong to a self-help group [SHG] while, indebted farmer households holding land up to 2 hectare are 70 per cent in the State.
5. The government should boost the dairy farming in the State as it is more suitable to marginal and landless farmers in support of income generation.
6. Banks should implement low-cost financial products through the generalised use of electronic payment methods, which enable financial institutions to improve their efficiency ratios, facilitate the use of low-cost distribution channels and enable application of credit risk monitoring system that decrease the default rate.
7. The RBI should take strict action against banks that do not achieve the prescribed target of agriculture sector each year. For this, RBI should make the provision of penalty on those banks that do not fulfill the prescribed target of agriculture credit in specific time.
8. The State government should also set up credit counseling centres with the help of commercial banks for advising public on gaining access to financial systems.
9. Income, Expenditure and Productive Assets of Farmer Households Survey [2003] reveals that farmers belonging to the lowest

monthly expenditure class or the poorest category have only 31 buffaloes per 100 households, whereas the highest monthly expenditure class has 113 buffaloes per 100 households in India. Therefore, the government of the State should also boost the animal husbandry as a profession among poorest people through providing better atmosphere, subsidised cattle feed, better health treatment for animals, better training of animal husbandry, etc. in the State. Because, dairy farming activities will generate some income for farmers and farmers could use this income for removal of the debt burden.

10. In this study, we also found inverse relation between size of landholding and informal lending. In this context, Joint Liability Groups [9][JLG's] may be a possible step. Because, under JLG's programme, marginal and small farmers can present more land in banks as collateral against loan, and thus bank will not feel any hesitation in sanction of more credit for the marginal and small farm households. Therefore, the governments [i.e., Central and State] should motivate farmers to join the Joint Liability Groups [JLG's].

11. The State government should also boost the Non-Farming Activities in the State for enhancing the income of farmer-households for sustainable livelihood.

12. The NSS Report No. 496: 'Some Aspects of Farming' [2003] also reveals that 41 per cent farmers are not aware about crop insurance and 42 per cent said that the facility of crop insurance has not been available. Therefore, the government should provide the crop insurance facility for the farmers in general and marginal and small in particular without delay.

13. High administrative cost, lack of economics of scale in lending activities and invertebrate database of potential rural borrowers in general and farmers in particular are the major problems in delivery of rural credit system in the country and the State. For popularising the formal borrowing, the State government, Central government and RBI should make sincere efforts for reducing the value of collateral security, develop the low cost financial products for marginal and small farmers [Chhikara and Kodan: 2011]; and reduce paper work and lowering the costs of access {transaction costs, especially in terms not only of fee and charges but also requirements for documentation are the main area for attention in the context of formal financial exclusion} [Johnson and Zarazua: 2011]. Further, in this context, banks can also hire a local person for collection of the information of potential borrower/ farmers and monitoring the use of loan by the same. Thus, a sound database will be generated in one hand and NPLs also reduced in other hand.

Concluding Remark

Today, the farmer community faced many challenges i.e., marketing, high cost of cultivations, indebtedness, an adequate supply of money at affordable cost, climate, etc., and out of these factors, provision of proper supply of credit is one of the most critical issues for the sustainable development of the sector [Chhikara and Kodan: 2011; Golait: 2007]. Because, in case of agriculture, credit provides control over resources and facilitates the needed liquidity to the farmers.

The access to credit affects households welfare through two key channels [1] alternative capital constraints on households in general and farm households in particular. This can significantly improve the ability of households to procure need agriculture input and will also reduce the opportunity cost of capital incentive assets encouraging labour saving technology and raising labour productivity[10], and [2] credit access increase the risk bearing capacity of households to pursue promising but risky technologies and will be

better able to avoid risk reducing but insufficient livelihood strategies. Moreover, it capitalises farmers to undertake new investments as an adaptation of new technologies in practice of farming.

Additionally, the Reserve Bank of India [2012] has also made a quick assessment to find out the relationship between institutional credit and agriculture growth. The study found that positive and statistically significant elasticity- every 1 per cent increase in real agriculture credit results in an increase in real agriculture GDP by 0.22 per cent with one year lag. Further, the Granger casualty test [based on lag length of 1] also indicates that the casualty was unidirectional from agriculture credit to agriculture GDP. Thus, credit is one of the critical inputs for agricultural development.

Further, the provision of timely, affordable and adequate quantity of credit to the farming community is also important for the purpose of food security of the country. Because, the food security of the country depends to a large extent on the output generated by the farmers of the country.

In nutshell, the rural credit delivery system must be compatible with the goal of higher growth with better equity.

Notes

1. Rural Non-Farm Activities: The rural non-farm activities [RNFA] are generally defined as comprising all those non-agricultural activities, which generate income to rural households [including income in kind and remittances], either through wage work or in self-employment. In other words, it includes all economic activities in rural areas except agriculture, hunting and fishing *[Lanjouw and Lanjouw: 2001]*. Since it is defined negatively, as non-agriculture, it incorporates a wide range of activities including manufacturing, petty trading, services, as well as transfer payments and remittances from temporary or seasonal migration to rural areas *[Davis and Pearce, 2001]*. The census of Haryana indicates that only 2.60 per cent of total main workers were engaged in non-farm sector in 1971 which increased from 23.52 in 1981, 26.23 in 1991 to finally 35.00 per cent in 2001].
2. Farmer may be defined as a person who operates some land [owned or taken on lease or otherwise possess] and also engaged in agricultural activities on that land in the last 365 days.
3. Generally, a farm household can be defined as a household having a farmer as its member.
4. The Report for the Technical Group to Review of Legislation on Money Lending and the Survey of Small Borrower Accounts (RBI:2004] shows that the rate of interest in informal lending is 18 to 36 per cent. While in case of formal lending it lies between 6 to 20 per cent.
5. The formal sector of rural credit is the sector in which loan transactions are regulated by legislation and other public policy requirements. The institutions in this sector include commercial banks, cooperative banks, RRBs and other registered financial institutions. The informal sector of credit is not regulated by public authorities, and the terms and conditions attached to each loan are personalised and therefore, it differs according to the bargaining power of borrowers and lenders in all cases.
6. In this study we have assumed that outstanding debt on farm household was the debt requirement of the farm households in Haryana and India.
7. Both variables [i.e., ratio of informal borrowing to total borrowing and average size of landholding] have been taken in the form of natural logarithm for econometric estimation. Because, on theoretical and empirical grounds the log linear form is superior to the linear form. A log-linear

form is more likely to find evidence of a restraint than linear form. So, the transformed natural log form of the model is i.e., $Log\ IB = a + b_1 log\ [ASLH] + å$

8. Typically, Monthly Per Capita Expenditure [MPCE] class expresses as the level of total consumption expenditure of a household for one month.
9. The National Bank for Agriculture and Rural Development (NABARD) has launched a Joint Liability Group (JLG) scheme to provide access to institutional credit to small, marginal, tenant farmers, oral lessees and share-croppers. The JLG is an informal group comprising 4 to 10 individuals coming together for the purpose of availing of bank loan on individual basis through group mechanism against mutual guarantee, a press here said.
10. Productivity is construed as the ability and willingness of an economic unit to produce maximum possible output with given inputs and technology. Higher the outpur per unit of input, higher is the productivity.

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Journal of Rural Development, Vol. 32, No. (4) pp. 367-381
NIRD, Hyderabad.

STRENGTHENING CREDIT SERVICES TO LIVESTOCK SECTOR FOR INCLUSIVE RURAL GROWTH

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ABSTRACT

The present study was carried out to analyse the members' valuation of different attributes associated with credit delivery through dairy SHGs. The study was carried out on a sample of 60 women members of dairy SHGs formed under SGSY programme of Government of India. Conjoint analysis was carried out to have a quantitative estimate of members' valuation of different credit attributes. The findings revealed that poor respondents had obtained credit for maximum number of times during the last three years as compared to their richer counterparts and they also had high debt balance yet to be repaid. 'Interest rate' emerged as the most important credit related attribute valued by member respondents, followed by 'timeliness', 'credit amount' and 'purpose' of loan. Overall members preferred 'lower interest rate in comparison to market rate', 'shorter time-to-loan decision', 'full loan amount', and 'loan for production purpose'. Some policy suggestions are given towards strengthening credit services delivery through SHGs.

Introduction

Credit plays a crucial role in agriculture and rural economy and is an integral part of the process of modernisation of agriculture and commercialisation of the rural economy (Sidhu *et al*, 2008). In this context, access to financial services becomes a pre-condition for agricultural development. Appropriate savings and credit systems that address the particular needs and constraints of the poor are important tools for increasing production among the rural poor (IFAD, 2004). The negative impact of lack of access to credit services on agricultural and non-agricultural productivity, income generation, farm profit, farm investment and household welfare in developing countries has been reported extensively in earlier studies (Diagne and Zeller, 2001; Okoruwa and Oni, 2002; Carter and Olinto, 2003; Foltz, 2004; Balogun and Yusuf, 2011; Bogale and Genene, 2012).

In India, a multi-agency approach to agricultural credit is in place since several decades comprising cooperatives, commercial banks and regional rural banks (RRB's). Several initiatives over time have been undertaken to improve farmers' access to institutional credit by strengthening the institutional mechanism of rural credit system. However, in spite of considerable efforts to streamline, reinforce, expand and institutionalise the agricultural credit system, achievements fall short of proclamations, policies and programmes. Ailing cooperatives, backtracked Regional Rural Banks (RRB's) and commercial banks with waning interest in rural credit have contributed to the ineffectiveness of the multi-agency system, hampering credit delivery (Kumar *et al*, 2010). There are evidences that suggest that the poor and marginal sections of the rural community still remain excluded from the formal credit delivery mechanism

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(Satyasai, 2008). The NSSO's household survey to ascertain the status of farming and farmers in India in 2003 estimated that about 51 per cent of total farm households have been financially excluded. Only about 28 per cent of the total farm households in the country access credit from institutional sources with wide regional variations. The persistence of moneylenders in the rural credit market is still a major concern.

The post-liberalisation period saw a paradigm shift in the banking sector which coincided with the growth of a silent micro-finance revolution in rural India. The genesis of this was a National Bank of Agriculture and Rural Development (NABARD) - initiated pilot, the Self-Help Group (SHG)-Bank linkage project in 1991, which focused on Self-Help Groups (SHGs) as a channel for delivery of micro-finance (Satish and Mehrotra, 2009). Micro-finance provides credit support in small doses along with training and other related services to people who are resource-poor but are unable to undertake economic activities. The main objective is to bring about socio-economic upliftment of rural poor by providing them income-generating assets through a mix of bank credit and governmental subsidy.

The livestock sector is emerging as one of the fastest growing agricultural sub-sectors in India and the expectations are that this growth could further accelerate due to growing urbanisation, rising incomes and the high income elasticity of demand for livestock products. This offers significant opportunities for the reduction of poverty among poor households on account of relatively equitable distribution of livestock. However, flow of institutional credit to livestock sector in the country has not been commensurate with its share in agricultural gross domestic product (AgGDP). While the share of the livestock sector to AgGDP has increased from around 14 per cent in 1981-82 to 24 per cent in 2010-11 (GoI, 2012a), the average share of the sector in total term loans advanced to the agricultural sector was only about 10 per cent in 2009-10. After 2005-06, there has been very slow growth in credit flow to this sector. Its share in total agricultural credit (short-term and long-term) has hardly ever exceeded 5 per cent (GoI, 2012b).

Livestock in India not only holds promise for a more balanced development of the rural economy but also emancipation of rural women through their social and economic empowerment as 71 per cent of workforce engaged in livestock farming are women as against a share of only 33 per cent in crop husbandry. As many as 75 million women are engaged in the livestock sector as against 15 million men (GoI, 2010). Successful capitalisation of opportunities in this sector requires a policy regime that facilitates growth in productivity at the farm level. Access to quality credit services to the women workforce engaged in livestock activity will be one of the most critical avenues in this regard.

The potential of SHG movement in the socio-economic development of rural women had been recognised since its inception and positive correlation of women empowerment and SHG membership has been reported in several earlier studies (Tankha *et al*., 2005; Venkatarao, 2009 and Vimala, 2009). Livestock activity, especially, dairying has all along been promoted as a key economic activity in the SHG movement. However, the performance of SHGs, with dairying as a key activity, has been skewed in favour of only a few States and the beneficial impact of them in terms of social, economic, political and cultural empowerment of women has not been seen uniformly across the country.

There is a pressing need to address the problem in credit provision from demand side as such analyses would provide information pertaining to ways of overcoming challenges in credit accessibility. Most of the existing literature on provision of rural credit has focussed largely on the supply side of credit with little attempts to explore household demand for credit (Mpuga,

2008). Understanding exactly what the borrowers require or desire from their credit providers is a challenge for the institutional lenders. Little research has been done on the importance borrowers place on various attributes involved in the provision of financial services (Bard *et al*, 2002), more so in the case of livestock sector. Knowing the relative importance of credit product attributes, in addition to what credit attributes are important to a borrower, can help lenders provide the desired services. Few studies have been carried out with primary data from farm households in order to document the nature of demand for agricultural credit (Pandit *et al*, 2007; Anjugam and Ramasamy, 2007), but as such the findings of these studies cannot be generalised to the livestock sector.

The present study intends to fill this gap in the literature and to provide empirical estimates of borrowers' valuation of different attributes associated with credit services.

Materials and Methods

The study was carried out in Uttarakhand State of India. Livestock activity specially, dairy husbandry, forms a source of livelihood for almost all the households in the State, with each household possessing 1-2 animals. Over 80 per cent of all livestock species are owned by small holders (landless agricultural labourers, marginal and small farmers). Livestock is thus considered to have high prospect to enhance the level of living of the poorest of the poor in the State.

Sampling : The State has two administrative divisions, viz. Kumaon and Garhwal. Kumaon division was selected for the study on account of higher livestock density (Bardhan *et al*, 2010). Nainital district was then selected from Kumaon division purposively as the district has the highest number of SHGs in Kumaon region of the State. In Nainital district, SHGs generally come under Swarnajayanti Gram Swarozgar Yojana (SGSY) and National Bank of Agriculture and Rural Development (NABARD) models II (SHGs formed by NGO and financed through bank) and III (SHGs financed by banks using NGOs as financial intermediaries). The SGSY model - promoted by Ministry of Rural Development, Government of India - has subsidy component and has a mandate of including at least 70-80 per cent of its members from people living below poverty line. The NABARD model does not have such specifications. The SGSY model was selected for the study so as to emphasise more on the role of SHGs in livelihoods of poor people. Out of total eight blocks in Nainital district, Haldwani block was selected on account of having the highest number of women dairy SHGs, which are linked to the banks and are in existence for at least three years.

A list of all women dairy SHGs of Haldwani block of Nainital district was prepared and the SHGs were then stratified into low, medium and high performing groups on the basis of savings made by the groups in one year using Cumulative Square root of Frequency method. A total of 15 women dairy SHGs were selected for the study having representation from each stratum on proportionate basis.

A complete enumeration of all members of selected SHGs was conducted for the purpose of developing a sampling frame. All the members were classified according to their wealth status into rich, medium and poor categories on the basis of annual household income by using cumulative square root of frequency method. Four members were selected randomly from each SHG having representation from different wealth categories on proportionate basis, thus making a sample size of 60 members.

The data for the study were collected through personal interview method with the help of a well-structured, comprehensive and pretested interview schedule. Respondent in this study pertains to the female member of sample household who was also the member of SHGs. Descriptive and tabular analysis were carried out to derive meaningful inferences

about socio-economic profile, institutional support structure, and credit seeking and repayment behaviour of members.

Valuation of Different Attributes of Credit Services by Members of SHGs : The analytical procedure of Conjoint Analysis was used to analyse members' preferences for various attribute combination of credit provisions through SHGs. Conjoint analysis is a statistical technique with a long history in marketing research and environmental economics (Sayadi *et al,* 2005).

Conjoint analysis is based on the decompositional approach where respondents react to a set of "total" profile descriptions, and the part-worths for the individual attributes, given some type of composition rule (e.g., an additive one) are estimated. In other words, an individual's utility for a product or service is decomposed into some combination of part-worth utilities defined for the relevant characteristics, or attributes, of the product.

The number of attributes and attribute levels used for the analysis has significant implications for the data collection part of conjoint analysis.The attributes need to address the appropriate dimensions of the product or service, and the attribute levels need to be varied enough to generate differentiation in responses. However, if too many attributes and attribute levels are considered, the number of possible product profiles becomes very large and infeasible for a participant to answer.

In this study, each respondent was presented with a limited set of full-attribute profiles.The key attributes in credit services and their associated levels was identified by referencing experts and presenting a pre-survey to respondents.The key attributes and their levels are presented in Table 1.

Table 1: Attributes and Their Levels Associated with Credit Services

S.No.	Attributes of credit services	Levels of attributes
1.	Time it takes for the bank to make a decision about the loan	i) Approval for a loan in <15 days ii) Approval for a loan in >15 days
2.	Interest rate charged on the loan	i) Interest rate equal to market rate, ii) Interest rate <1-2 per cent of market rate iii) Interest rate >1-2 per cent of market rate
3.	Getting the needed loan amount	i) Getting 50 per cent of the needed loan amount ii) Getting 100 per cent of the needed loan amount
4.	Purpose of the borrower to spend loan	i) Production purpose ii) Consumption purpose

A total of 24 combinations of attributes of credit services and their levels were presented to the members of SHG and they were asked to rank them as per their choice of preference to various combinations. In the next step conjoint analysis was carried out with the help of regression function.

The part-worth utilities, and thus the overall utility, can be estimated with numerous econometric methods. Ordinary least squares (OLS) technique was employed for the analysis in order to estimate the part-worth utilities.

In the multiple regression analysis the dependent variable was the rank from 1 to 24 as given by the respondents. The levels of the attributes were the independent variables expressed in a dummy form (0, 1); 0 meaning the absence of the level and 1 its presence. In

this study, the reference credit service concept is represented by the following combination: 'Interest rate equal to market rate', 'Amount of credit equal to 50 per cent , 'Time to have loan <15days' and 'purpose of credit consumption'. The part utilities of other levels of attributes using the regression analysis are relative to these reference attribute levels which are assumed to have a part utilities of '0'. The resulting OLS regression was as follows:

$Y= b_0 + b_1$ IRLT+ b_2 IRMT + b_3 AMT + b_4 MT15 + b_5 PP

Where, Y is the respondent's preference for the attribute combination

b_0 is the constant or intercept term

b_1 through b_5 are beta weights (part-worth utilities) for the individual attribute level

MT15 represents the "fifteen days or more to make loan decision",

IRLT represents the "interest rate 1-2 per cent less than market rate",

IRMT represents the "interest rate 1-2 per cent less than competition",

AMT represents the "100 per cent of loan amount",

PP represents the "Production Purpose".

In this formulation of the model, coefficients for the reference levels are equal to zero and hence these reference levels are not shown in the model.

The usual statistical tests (R^2 and F-test) were used to assess the reliability of the statistical results and to test the null hypothesis of no association between the dependent variable and the different explanatory variables. Student t-test was used to test the statistical significance of the regression coefficients.

Results and Discussion

Table 2 elicits the socio-economic profile of member respondents across different wealth status categories. The average age of member respondents across all wealth categories was 40 years. There were no significant differences in age of member respondents across different wealth status category households. Members had studied on an average up to high school level. No significant differences were observed across different wealth status category households in regard to level of education. Highest proportion of households (67 per cent) for overall category belonged to scheduled caste category, followed by general category (31 per cent) and scheduled tribe category (2.5 per cent). Significantly higher proportion of poor households belonged to scheduled caste category than their richer counterparts. On the other hand, significantly higher proportion of rich and medium households belonged to general category than poor households. Main occupation of member respondents was significantly dependent upon wealth status. The proportion of respondents who pursued agriculture as main occupation was significantly higher for rich households than their medium and poor counterparts. Overall, 43 per cent of member households had agriculture as their main occupation. On the other hand, about 22 per cent of households belonging to overall category pursued animal husbandry as their main occupation. However, animal husbandry was a source of subsidiary income for highest

Table 2: Socio-economic Profile of Member Respondents

S. No.	Particulars	Members			
		Rich	Medium	Poor	Overall
A.	**Respondent - specific Characteristics**				
1.	Age	38.46±1.88	39.92±1.70	38.67±1.24	39.82±0.94
2.	Education*	4.23±0.32	4.04±0.29	3.76±0.21	4.00±0.16

* Education: Illiterate-0; Read &Write-1; Primary School-2; Middle School-3; High School-4; Intermediate-5; Graduate and above-6;

(Contd...)

Table 2: *(Contd...)*

3.	Caste (% of respondents)				
	General	38.46	34.62	19.05	30.71
	SC	53.85	65.38	80.95	66.73
	ST	7.69	-	-	2.56
	OBC	-	-	-	-
4.	Main Occupation (% of respondents)				
a.	Agri.	61.54[ab]	38.46[a]	38.10[b]	43.33
b.	Agri.+ AH	-	23.08[a]	9.52[a]	13.33
c.	Agri.+ Other	7.69	3.85	-	3.33
d.	Agri. Labour	7.69	11.54	19.05	13.33
e.	Govt. Service	-	3.85	-	1.67
f.	AH	23.08	19.23	23.81	21.67
g.	AH + other	-	-	9.52	3.33
h.	Pensioner	-	-	-	-
5.	Subsidiary Occupation (% of respondents)				
a.	Agri.	7.69	15.38	-	7.69
b.	Agri.+ AH	-	-	-	-
c.	Agri.+ Other	7.69	-	14.29	7.33
d.	Agri. Labour	7.69	-	19.05	8.91
f.	AH	23.08	15.38	33.33	23.93
g.	AH + other	-	3.85	-	1.28
h.	Pensioner	15.38	3.85	-	6.41
B.	**Household-specific Characteristics**				
1.	Family size (Adult Equivalent)**	3.91±0.47	3.21±0.20	3.55±0.38	3.56±0.35
2.	Family type (% of respondents)				
a.	Joint	30.77	23.08	28.57	27.47
b.	Nuclear	69.23	76.92	71.43	72.53
3.	% of respondent HH's having at least one member with NFI	76.92[a]	69.23	57.14[a]	67.76
4.	Annual HH Income (₹)	1, 86, 069± 7461.45[a]	1, 34, 663± 1817.52	94, 086± 2779.06[a]	1, 31, 598.83± 4825.87
C.	**Farm Characteristics**				
1.	Operational land(acres)	0.39±0.26	0.41±0.16	0.28±0.17	0.36±0.11
2.	Land used for dairying (acres)	0.03±0.02	0.05±0.02	0.05±0.02	0.04±0.01
	(% of operational land)	(7.69)	(12.20)	(17.86)	(11.11)
3.	Herd size(SAU)	4.88±0.44	4.65±0.48	4.52±0.26	4.68±0.23

** 4 children=3 adult women=2 adult men , Given: Average±S.E.Figures having same superscripts across rows are significantly different up to 5% level of significance.

proportion (24 per cent) of overall category of households as compared to any other source of livelihood. Average family size across all wealth status categories was 3.5 adult equivalents. Family type among member households was mostly nuclear (72.5 per cent). About 68 per cent of all member households had at least one non-farm income source. Significantly higher proportion (77 per cent) of richer households had at least one non-farm income source than poor households (57 per cent). Annual income of overall category of member households was ₹ 1, 31, 598. Rich households had significantly higher income (₹ 1, 86, 069) as compared to poor households (₹ 94, 086). Average landholding size for member households was 0.36 acres. Average herd size for member households was 4.68 SAU[1]. There were no significant differences in size of landholding and herd size across different wealth categories.

Credit Seeking and Repayment Behaviour : Table 3 elicits the credit seeking and repayment behaviour of member respondents. Regarding frequency of taking loans, highest proportion (62 per c ent) of member respondents had obtained credit twice in the last three years from the time of the survey. Twenty three per cent of respondents had obtained credit thrice during the last three years, while lowest proportions (15 per cent) of respondents had accessed credit only once during the same reference period. Wealth category analysis revealed that significantly higher proportion (29 per cent) of poor farmers had obtained credit three times during the last three years than their rich counterparts (15 per cent). The above findings thus provide some indications that frequency of obtaining credit increased with decline in wealth status.

Table 3: Credit Seeking and Repayment Behaviour of Members

S.No.	Particulars	Rich	Medium	Poor	Pooled
1.	**No. of loans taken in last three years**				
	One	3	3	3	9
		(23.08)	(11.54)	(14.29)	(15.00)
	Two	8	17	12	37
		(61.54)	(65.38)	(57.14)	(61.67)
	Three	2	6	6	14
		(15.38)[a]	(23.08)	(28.57)[a]	(23.33)
2.a.	**Credit amount (INR)**				
	15,000-30,000	2 (15.38)	12 (46.15)[a]	2 (9.52)[a]	16 (26.67)
	30,000-40,000	7	9	15	31
		(53.85)	(34.62)[a]	(71.43)[a]	(51.67)
	40,000-65,000	4	5	4	13
		(30.77)	(19.23)	(19.05)	(61.90)

(Contd...)

Table 3: *(Contd...)*

b.	**Amount repaid so far (INR)**				
	20,000-40,000	3	12	2	17
		(23.08)	(46.15)[a]	(9.52)[a]	(28.33)
	40,000-50,000	5	9	15	29
		(38.46)	(34.62)[a]	(71.43)[a]	(48.33)
	50,000-85,000	5	5	4	14
		(38.46)	(19.23)	(19.05)	(23.33)
c.	**Balance if any (INR)**				
	1,000-5,000	1	3	2	6
		(7.69)	(11.54)	(9.52)	(10.00)
	5,000-11,000	1	1	4	6
		(7.69)[a]	(3.85)[b]	(19.05)[ab]	(10.00)
3.	**Time taken for Repayment**				
	Early	2	0	0	2
		(15.38)	(0.00)	(0.00)	(3.33)
	Timely	9	21	13	43
		(69.23)	(80.77)	(61.90)	(71.67)
	Delayed	0	1	2	3
		(0.00)	(3.85)	(9.52)	(5.00)
	Still has to repay	2	(15.38)	4	(15.38)
	(28.57)	12	(20.00)		

Figures in parentheses indicate percentage.
Figures having same superscripts across rows are significantly different up to 5% level of significance.

Regarding amount of credit obtained by the respondents, 62 and 52 per cent of respondents belonged to the categories of high volume (₹ 40, 000- 65, 000) and medium volume (₹ 30, 000-40, 000) credit takers, respectively. Only 27 per cent of respondents had taken low volume (₹ 15, 000-30, 000) of credit. Puhazhendi (2002) had reported a smaller volume of loan taken by SHG members, the average loan being ₹ 3, 976. Significantly higher proportion (46 per cent) of medium members had taken low volume of credit than their poor counterparts (10 per cent). On the other hand, significantly higher proportion (71 per cent) of poor respondents had taken medium volume of loan than medium category respondents (35 per cent). It can be inferred from the above analyses, that to some extent, not only the frequency of obtaining credit but the volume of credit obtained also increased with decline in wealth status.

Highest proportion (48 per cent) of all respondents had repaid medium amount of their debt (₹ 40, 000-₹ 50, 000) followed by 28 and 23 per cent, who had repaid low (₹ 20, 000-₹ 40, 000) and high (₹ 50, 000- ₹ 85, 000) amount of their debt, respectively. Significantly higher proportion (71 per cent) of poor respondents had repaid their medium amount of debt than their medium category counterparts (35 per cent). On the other hand, significantly higher proportion (46 per cent) of medium category respondents had repaid their low volume debt than that of poor category (10 per cent).

Ten per cent of respondents for overall category, each, had low (₹ 1, 000- ₹ 5, 000) and high (₹ 5, 000- ₹ 11, 000) debt balance yet to be repaid. Significantly higher proportion (19 per cent) of poor respondents had high debt balance yet to be repaid than their rich (8 per cent) and medium (4 per cent) category counterparts. This might be because of higher resource endowments and income level of richer farmers which enable them to repay their debts fully.

Seventy two per cent of members had repaid their loan timely while 20 per cent of members had still to repay it. Fifteen per cent of rich respondents had repaid their loan earlier than the date of repayment while no respondent from medium and poor categories had repaid earlier. Higher proportion of poor farmers (29 per cent) had yet to repay their loans than their richer counterparts (15 per cent), although the difference in proportions was not statistically significant.

Purpose for which Credits were Obtained : Table 4 elicits the distribution of respondents according to different purposes for which they obtained credit. Cent per cent of the respondents reported that they had obtained loan for animal husbandry activities. Substantially lesser proportion of respondents had borrowed money for other activities. Thus, while 15 per cent of the SHG members reported that they borrowed money for household expenditures, 13 per cent of them, each, reported that they had obtained credit for expenditures related to house construction/repair, social functions and small business activities. Twelve per cent of them, each, borrowed money for meeting expenditures pertaining to education and agricultural activities. Only 8 per cent of the respondents had taken loan for meeting health related expenditures. The findings are in contrast to those of Batra (2012), who reported from Haryana State of India that higher proportion (43 per cent) of SHG members had used their credit

Table 4 : Distribution of Respondents According to Different Purposes for which Credits were Obtained

S. No.	Utilisation by members in	% of respondents			
		Rich	Medium	Poor	Pooled
1.	Health	15.38	7.69	4.76	8.33
2.	Education	30.77^{ab}	7.69^{a}	4.76^{b}	11.67
3.	House construction/repair	7.69^{a}	11.54	19.05^{a}	13.33
4.	Agricultural activities	23.08^{ab}	7.69^{a}	9.52^{b}	11.67
5.	Social functions	7.69	11.54	19.05	13.33
6.	Livestock (in AH)	100.00	100.00	100.00	100.00
7.	Small business	15.38	11.54	14.29	13.33
8.	Household expenditure	15.38	11.54	19.05	15.00

Figures having same superscripts across rows are significantly different up to 5% level of significance.

for marriage and social events, than investment in livestock (27.8 per cent).

Significant differences were observed among different wealth categories of respondents in regard to specific purposes for which they had borrowed money viz. meeting expenditures related to education, house construction/repair and agricultural activities. Significantly higher proportions (31 and 23 per cent) of rich farmers had borrowed money for expenditures pertaining to education and agricultural activities than their medium (8 per cent each) and poor (5 and 10 per cent) category counterparts, respectively. On the other hand, significantly higher proportion (19 per cent) of poor respondents had borrowed credit for home construction/repair than rich respondents (8 per cent). The findings show that while the poor respondents needed credit for basic needs like shelter, their richer counterparts mostly met higher order needs with the credit they borrowed, like educating their children and augmenting their scale of agricultural activities.

Valuation of Different Attributes of Credit by Members of SHGs **:** The results of the conjoint analysis run as regression analysis to ascertain the respondents' valuation of different attributes associated with credit services are presented in Table 5.The regression coefficients for all variables of different regression models run for various wealth categories were all statistically significant.

Table 5: Results of Conjoint Analysis Run as Regression Function

Source	Rich	Medium	Poor	Overall
	Values			
Intercept	16.583***	15.833***	17.333***	16.333***
	(0.773)	(0.937)	(0.789)	(0.899)
Less than market rate interest rate	2.000*** (0.546)	2.375*** (0.662)	2.875*** (0.558)	2.875*** (0.636)
More than market rate interest rate	- 6.500*** (0.546)	-7.625*** (0.662)	-7.375*** (0.558)	-7.375*** (0.636)
100 per cent credit amount	3.833*** (0.446)	3.333*** (0.541)	4.667*** (0.456)	4.000*** (0.519)
More than 15 days time to loan decision	-10.167*** (0.446)	-8.500*** (0.541)	-9.500*** (0.456)	-9.167*** (0.519)
Production purpose	4.167*** (0.446)	5.500*** (0.541)	1.167*** (0.456)	3.500*** (0.519)
R^2 (Coefficient of determination)	0.975	0.981	0.973	0.981
F- values	138.750	188.958	127.482	181.084

Significant at ***1% level of significance.
Figures in parentheses indicate S.E.

It can be observed from Table 5 that the explanatory variables included in the models explained 97.5, 98.1, 97.3 and 98.1 per cent of variations in the valuation of credit attributes for rich, medium, poor and overall categories, respectively. Thus the above R^2 values indicate that all the four regression models are good fit. The estimated F-values were statistically significant ($P<0.05$) for all the four regression models implying that the null hypothesis of no association between dependent variable and different explanatory variables can be rejected.

The probability that we would find a relationship among the variables due to chance is less than or equal to 5 per cent, which is an acceptable level of error.

The regression coefficients associated with the individual variables represent the part utility of each level of attribute. For example, for overall category 'interest rate of less than that of market rate' has a part utility equal to 2.875. Similarly, the utility for variable 'interest rate more than that of market rate' is equal to -7.375. The utility values of these two levels of the attribute 'interest rate' are relative to the utility of zero for the third level of interest rate, i.e. 'interest rate equal to that of market rate' (reference level). Similarly, the utility of the variable '100 per cent of credit amount needed' is 4.000, which is relative to the utility value of zero for the second level of the attribute, 'credit amount', i.e. '50 per cent of credit amount needed' (reference level). For the attribute, 'time required to take a decision to provide loan', 'time of more than 15 days' has a utility of -9.167 relative to zero utility value to the 'less than 15 days for loan decision' level (reference level). Finally, for 'purpose for which loan is required', the attribute 'production purpose' has utility of 3.500 relative to zero utility of 'consumption purpose' attribute (reference level).

The utility values of different levels of various attributes associated with credit services are compiled in Table 6. As indicated by different utilities, the members of dairy SHGs preferred 'shorter time-to-loan decision', 'full loan amount', 'lower interest rate in comparison to market rate' and 'loan for production purpose'. Rich, medium and poor category members also preferred the similar levels of different credit attributes.

Table 6: Part Utilities of Different Levels of Various Attributes

S. No.	Attributes	Rich	Medium	Poor	Overall
1.	**Interest Rate**				
	Equal to market rate	0	0	0	0
	Less than market rate	2.000	2.375	2.875	2.875
	More than market rate	-6.500	-7.625	-7.375	-7.375
2.	**Credit Amount**				
	50 per cent of needed amount	0	0	0	0
	100 per cent of needed amount	3.833	3.333	4.667	4.000
3.	**Timeliness**				
	In <15 days	0	0	0	0
	In >15 days	-10.167	-8.500	-9.500	-9.167
4.	**Purpose**				
	Consumption	0	0	0	0
	Production	4.167	5.500	1.167	3.500

Among the four attributes, 'interest rate' emerged as the most important attribute for overall category of respondents as indicated by the range of utility values (Table 7). The relative importance of this attribute was 38 per cent. 'Interest rate' was closely followed by 'timeliness' attribute with relative importance of 34 per cent. 'Credit amount' and 'purpose' were attributes with relatively lower importance rates (15 and 13 per cent, respectively). Disaggregated analysis revealed same order of importance ascribed to different attributes for all wealth categories. The only major difference in relative valuation of different credit attributes across various wealth categories was observed in case of 'purpose of credit'. 'Purpose of loan' was given more importance by richer respondents than their poor counterparts. On the other hand, the poor respondents gave more importance to 'interest rate' and 'credit amount' than richer respondents.

Table 7: Importance of Different Attributes

S. No.	Attributes	Rich		Medium		Poor		Overall	
		Absolute	Relative (%)	Absolute	Relative (%)	Absolute	Relative (%)	Absolute	Relative (%)
1.	Interest Rate	8.500	31.87	10.000	36.59	10.250	40.06	10.250	38.08
2.	Credit Amount	3.833	14.37	3.333	12.19	4.667	18.24	4.000	14.86
3.	Timeliness	10.167	38.13	8.500	31.10	9.500	37.13	9.167	34.06
4.	Purpose	4.167	15.63	5.500	20.12	1.167	4.56	3.500	13.00

Table 8 shows the difference in part utilities with change of one level in each attribute. Change from 'equal' to 'less than' market rate, induced an increase of 2.9 units in utility. On the other hand, 'less' to 'more than' market rate of interest led to decrease of 10.25 units of utility. Change from '50 per cent' to '100 per cent credit amount' increased utility by 4 units. 'Time to loan decision' caused a drastic drop of 9.2 units of utility from 'less than 15 days' to 'more than 15 days time period'. Finally change of 'purpose of loan' from 'consumption' to 'production' led to an increase in utility by 3.5 units. All the results of this Table correspond to what we have observed in Table 5.11 showing part utilities of different levels of attributes of credit through SHGs.

Table 8: Change in Part Utilities while Moving to Next Level of Different Attributes

S. No.	Particulars	Rich	Medium	Poor	Overall
1.	**Interest Rate**				
	Equal to less than market rate	2.000	2.375	2.875	2.875
	Less to more than market rate	-8.500	-10.000	-10.250	-10.250
2.	**Credit Amount**				
	50 to 100% amount	3.833	3.333	4.667	4.000
3.	**Timeliness**				
	<15 days to >15 days	-10.167	-8.500	-9.500	-9.167
4.	**Purpose**				
	Consumption to Production	4.167	5.500	1.167	3.500

Conclusion

The present study aimed at better understanding of the preferences of the women members of dairy SHGs formed under SGSY programme implemented by Government of India so as to provide crucial insights for policy decisions regarding effective ways of designing and delivering credit services that are appropriate for poor livestock keepers. The study provided the first quantitative estimates of borrowers' relative valuation of different attributes associated with credit services.

Most of the respondents belonged to the categories of high volume and medium volume credit takers. The findings of the study revealed that not only the frequency of obtaining credit but the volume of credit obtained also increased with decline in wealth status. Evidence also emerged that the poor respondents require more time for repaying their debts than their richer counterparts.

The members of dairy SHGs preferred 'shorter time-to-loan decision','full loan amount', 'lower interest rate in comparison to market rate' and 'loan for production purpose'. Among the four attributes, 'interest rate' emerged as the most important attribute for overall category of respondents followed by 'timeliness', 'credit amount' and 'purpose'. 'Purpose of loan' was given more importance by richer respondents while the poor respondents gave more importance to 'interest rate' and 'credit amount'.

Policy Implications

For better adaptation to the needs and requirements of the SHG members, Government agencies, banks and other financial institutions should consider developing a credit package incorporating the components of 'nominal interest rate', 'shortened duration of credit delivery' and providing cent per cent of the required amount. Also, the banks should reorient their micro-credit programmes to the production needs of the members rather than their consumption needs. These measures would ensure greater acceptability and spontaneous uptake on the part of members of the micro-finance services and ultimately help in scaling up of the micro-finance movement.

There are differences in credit seeking and repayment behaviour across different wealth status categories. Poor members need loans more frequently and also they need more time in meeting their debt obligation. Hence, the Government agencies rather than developing a uniform credit package for all sections of the rural community, may consider designing separate packages keeping in mind the requirements and repayment capacity of the specific classes of borrowers.

End Notes

1. The following standards were used to standardise herd size of the farm households (Kumbhare *et al*, 1983):

Milch buffalo	1.30
Milch Crossbred cow	1.40
Milch Indigenous cow	1.00

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Journal of Rural Development, Vol. 32, No. (4) pp. 383-394
NIRD, Hyderabad.

73RD CONSTITUTIONAL AMENDMENT AND WOMEN'S EMPOWERMENT- AN EMPIRICAL STUDY IN TRIBAL AND NON-TRIBAL DISTRICTS, ODISHA

Aparajita Sarangi and
*Gitanjali Mishra**

ABSTRACT

Empowerment of women is viewed as all round development in the status of women that can be realised through several inter-related and mutually reinforcing components such as awareness development in regard to Socio-Economic Status, discrimination, rights and opportunity towards gender equality, which ultimately develop their ability to plan and pursue economic activities, participate in the decision-making process at all spheres.

The present study undertakes re-examination of the relationship between the socio-economic status of women vis a vis political participation in tribal and non-tribal districts of Odisha. Besides, it also suggests suitable measures towards policy formulation for ensuring effective participation of women.

Introduction

The empowerment of women is viewed as allround development in the status of women and manifestation of their potential in all walks of life. This is realised through several inter-related and mutually reinforcing components. These are awareness building in regard to their socio-economic status, discrimination, rights and opportunity towards gender equality; skill development and capacity building in order to acquire ability to plan and pursue economic activities; participation in the decision-making process in the home as well as in the society and promoting actions for achieving gender equality. In other words, empowering them socially, economically and politically can enhance the status of women. Constitution of India confers equal rights on men and women. Due to developmental effort, the country has witnessed improvement in the status of women in many spheres- such as health, nutrition, education, social and economic participation. But the gender disparity still persists, which is evident from declining sex ratio, insignificant participation in the economic activities and gaps in the life expectancy, mortality rates between men and women and nutritional indicators for women. Low literacy and education among females, lack of skills and awareness, social taboos and conventions and above all lack of economic independence and lack of participation in the decision-making process among them are the principal reasons for inequality between men and women. The scenario in Odisha is no different from the rest of the country. Inequality between men and

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women were responsible for not only lower socio-economic growth but also for a large-scale discontentment among women. Empowerment of women is, therefore, a crucial issue, which would enable women to realise their full identity and potential and contribute effectively to the growth of the society.

73rd Constitution Amendment Act 1992- A Big Leap for Political Empowerment of Women

During the post-Independence period many States in India enacted legislation to constitute Panchayati Raj Institutions (PRIs) in accordance with Article 40 of the Indian Constitution in the Directive Principles of State Policy. This Article states that the State should take steps to organise village Panchayat and endow them with such power and functions so as to enable them to function as units of local self-government. But the PRIs in many States were not uniform in structure and functions and they failed in many instances to acquire the status and dignity required for viable and responsive people's institutions due to absence of regular elections, prolonged supersession and inadequate representation of women and weaker sections and insufficient devolution of power and lack of financial resources. Therefore, there was rethinking on reviving the PRIs which resulted in constitution of different committees to study the PR systems and make recommendations to strengthen these grassroot democratic institutions. The important committees were, Balwant Ray Mehta Study Team (1957), Asoka Mehta Committee (1977), G.V.K Rao Committee (1985), and L.N Singhvee Committee (1986). All these committees recommended the need to evoke local initiatives and participation and therefore, recommended to reengineer the PRIs by giving them the Constitutional status and making them responsible for planning, implementation and monitoring of the rural development schemes. The attempt to consolidate the PR System resulted in the Seventy-third Constitutional Amendment Act,1992. The most notable feature of the Act is that it gave specific Constitutional mandate to the State Government for the establishment of three-tier structure for local self-governance. The landmark feature of the Seventy-third Constitutional Amendment is that not less than one-third of the total number of offices of the chairpersons and members of various PRIs has to be reserved for women. This was a big leap towards women empowerment which provided them the scope and opportunity to participate in public life as well as in the decision-making and nation-building process.

So far as ensuring women's representation in the PRIs, the State of Odisha took pioneering initiatives to implement one-third reservation of seats for women at a time, when the Union Government was still deliberating on the issue. Moreover, even among the reserved seats for SCs and STs, one-third are set aside for women candidates belonging to the SCs and STs. Another radical step was that, according to 73rd Constitution (Amendment) Act, 1992, Odisha Government had not only made one-third of the seats reserved for women, but also went a step ahead in reserving the post of vice-president for women in the Panchayats at all levels, if the chairperson elected was not a woman.

The State of Odisha has 30 Zilla Parishads (ZPs) and 314 Panchayat Samitis (PSs) and 6234 Gram Panchayats (GPs). Most of the seats reserved for women witnessed multi-cornered contest. The reservation policy at the decentralised level is a big achievement in the area of women's participation in the democratic process.

Objectives of the Study : The paper has the following objectives:

- ☞ to assess the level of awareness among the elected women members about their roles, responsibilities and various development programmes; their participation in the activities of the Panchayat

- ☞ to critically analyse the extent of participation of women members in the decision-making process and
- ☞ to suggest suitable measures to ensure their effective participation in the activities of the PRI and the decision-making process.

Research Design

Selection of the Study Area and Respondents : A multi-stage mixed sampling design was adopted for the study. The sample comprised 2 ZPs, 4 Panchayat Samitis (PSs)- 2 from each of the ZPs and 16 Gram Panchayats (GPs) -4 from each of the PSs. The criterion for selection of the districts was that one should be from among the Scheduled Tribe (ST) districts and the other from among the non-ST districts having women member as president of ZP. In each of the sample districts, two blocks were selected- one from among the ST and the other from non-ST blocks, having a woman chairperson. Four GPs having women-sarpanch from each of the sample blocks were selected following SRS technique. From each of the selected PRIs at different levels, 4-5 women members including the chairperson were selected to collect information on their socio-economic profile, level of awareness, participation and decision-making powers. The samples (elected women representatives) were selected as 64 numbers @ 4 per Gram Panchayat, 20 numbers @ 5 per Panchayat Samiti and 10 numbers @ 5 per Zilla Parishad.

The district of Keonjhar belongs to the Northern Plateau region of the State. The sex ratio of the district stood at 977 which is better than the State average. The district belongs to the scheduled area having an ST population of 44.52 per cent and SC population of 11.49 per cent of the total district population. The district shares 5.33 per cent of the Odisha's land mass and accounts for 4.26 per cent of the total population. Puri district belongs to the fertile coastal plain area of the State. The sex ratio of the district stood at 968 which is lower than the State average. The district has negligible percentage of ST population (0.27 per cent), but has a significant composition of SC population (18.56 per cent). It shares 1.96 per cent of the Odisha's land mass and accounts for 4.08 per cent of the total population.

The literacy percentage of the State stood at 63.61 while the corresponding figures are 59.75 in tribal Keonjhar and 78.40 in the non-tribal Puri district. The male -female difference in literacy is quite significant in both the districts (Census 2001).

Data Analysis and Interpretation : The information on the level of socio-economic status, level of awareness on PR system, level of participation in the PRIs activities and decision-making process, perception of the respondents and perception of male PRI members and officials on women's empowerment due to their involvement in the Panchayats were obtained through well-designed interview schedules.

The socio-economic status (SES) of the respondents were assessed on the basis of information relating to the family structure, educational level, type of dwelling house, value of the household's assets, income of the respondents and her husband and their (respondent and her husband) membership in local organisations. The qualitative data on these aspects were converted into scores according to socio-economic status (SES) scale (Parek & Trivedi, 1965). Similarly, scores on the attributes of the respondents such as 'Awareness', 'Participation','Decision-Making' were computed as per the scoring procedure. On the basis of average scores the attributes were classified as 'poor' if average score is less than equal to 50, 'fair' if the average score is between 50-60,'good' between 60-70,'very good' between 70-80 and 'outstanding' if the score is greater than 80. These average scores were also analysed following appropriate statistical techniques such as

frequency tables, computation of descriptive statistics such as mean, standard deviation, median, and mode. In order to test the significance of difference between the levels of the attributes of tribal and non-tribal districts, 'Z' test for large sample was applied.

In order to assess whether the attributes- 'awareness', 'perception' and 'decision-making' are independent of the level of education, family income and caste have been studied by constructing Bivariate Frequency Tables and applying Chi-square test for independence of attributes.

Findings of the Study

Socio-economic and Political Profile of the Respondents : The age composition of the elected women PRI members revealed a younger age composition in both the tribal and non-tribal districts. About 30 per cent of the respondents are in twenties and 43 per cent in thirties and 27 per cent in forties.

The caste composition revealed socially and economically backward characteristics with about 44 per cent belonging to SCs and STs and about 40 per cent to OBCs. The SCs and STs are represented in the PRI bodies more than their proportions in the population.

More than two-thirds (60.65 per cent) of the respondents have education only up to primary level which reflected low educational level amongst the women PRI members. However, 24.5 per cent of the respondents have education up to high school level.

The elected women PRI-members were primarily housewives (80 per cent) and engaged in low productive areas such as cultivation and agricultural labour. A miniscule of them was engaged in business or jobs. The occupational structure of the husbands was also characterised by low productive activities like cultivation, agricultural wage employment and daily casual labour. The income level of the respondents and the husbands depicted a very low economic profile where three-fourths of the respondents have a meagre monthly income less than or equal to ₹ 500, half of the respondents' husbands have a low monthly income of less than ₹ 1000. The non-tribal Puri district depicted a better picture than the tribal Keonjhar district. One-sixth of the respondents have no houses and 50 per cent have kutcha houses. In terms of values of assets such as land, agricultural implements, cattle and electronic goods, the scenario is also not encouraging. About one-seventh were landless, 43 per cent have land value worth less than/equal to ₹ 20,000. About one-third of the respondents do not own cattle and two-thirds have cattle worth ₹ 5000 or less. About 87.23 per cent respondents and 63.66 per cent of respondents do not possess any agricultural implements and electronic goods, respectively. The occupational structure, monthly family income of the respondents and the possession of different types of assets such as land, cattle, agricultural implements, electronic goods and type of dwelling houses depicted a low socio-economic profile of the respondents.

The elected women PRI members were found to be associated with organisations such as Self-Help Groups, Watershed Committees, Village User's Committees and other committees. Nearly 40 per cent were not members of any such organisation. However, members have acquired some minimal knowledge on the Panchayati Raj System due to their reference to print and electronic media and political/local meetings.

The classification of the respondents according to socio-economic status on the basis of average score and some descriptive statistics of the average scores are furnished in Tables 1 and 2, respectively. According to the SES score, 89.5 per cent of the respondents belonged to poor, 7.4 per cent fair and 3.2 per cent good SES category.

Source: Field Survey.

Table 1 : Classifications of the Respondents According to Socio-economic Status Scale

District	N	Percentage of Respondents According to Socio-economic Status on the Basis of Average Score				
		Poor (<= 50)	Fair (50-60)	Good (60-70)	Very Good (70-80)	Outstanding (> 80)
Puri (Non-ST)	47	89.4	4.3	6.4	0.00	0.00
Keonjhar (ST)	47	89.5	10.5	0.00	0.00	0.00
Total	94	89.5	7.4	3.2	0.00	0.00

The mean score was 31.81, the median 27.59 and the mode 17.24. The low values of the central tendencies revealed a poor socio-economic status of the respondents.The normal Z test for large sample for significance of difference of mean scores of Puri and Keonjhar districts revealed no significant difference between the SES of women PRI members of the tribal and non-tribal districts.The high value of the C.V of the scores indicated that there is high degree of variations in the SES among the respondents.

Table 2 : Descriptive Statistics of Average Scores of Respondents on SES

District	N*	Min.	Max.	Range	Mean	Med.	Mode	S.D	C.V.	Normal 'Z'
Puri (Non-ST)	47	13.79	68.97	55.18	32.03	27.59	17.24	14.69	45.86	
Keonjhar (ST)	47	10.34	58.62	48.28	31.85	32.76	37.93	12.74	40.00	0.61
Total	94	10.34	68.97	58.63	31.81	27.59	17.24	13.68	43.01	

* N = Sample Size.

Training is an important component for capacity building but it was found that about four-fifths of the respondents have not received any training. This important aspect has been neglected and needs proper attention. But due to their exposure to print/ electronic media, political meetings, interaction among members, they have been able to acquire whatever knowledge they have on the Panchayati Raj system.

Level of Awareness of Elected Women PRI Members

The awareness of the women PRI members on PR system was assessed by putting them 26 questions on different aspects of PRIs such as election procedure, meeting procedure, administrative matters, financial matters and developmental activities. The responses were given scores- 1 for correct and 0 for wrong response.Then the average scores of individual respondents on percentage scale were computed to have an objective view on the level of awareness.

While the women PRI-members were found to have better awareness on some aspects of the Panchayati Raj System, their awareness on some other aspects was lacking. They have very good awareness on election procedure, administrative matters and developmental activities undertaken in the area. But their awareness was found grossly inadequate on meeting procedures, financial matters, funding provisions under developmental schemes of the Government.

The classification of the respondents according to the scores and some descriptive statistics of the scores are furnished in Tables 3 and 4, respectively. Nearly one-fourth have poor or fair awareness while three-fourths have good/ very good/ outstanding level of awareness. Interestingly, the level of awareness of the respondents in the tribal Keonjhar district was significantly better than the non-tribal Puri district. In spite of the overall low educational However, in certain areas, the awareness of the respondents was found lacking and there is certainly need for bridging the gap and increasing the level of awareness of the respondents who are found lacking it. In view of the divergence between the districts, area-specific approach has to be formulated to increase the awareness level of the respondents.

The mean average score, the median score were computed as 73 each and the value

Table 3 : Classification of the Respondents According to the Level of Awareness

District	Percentage of Respondents According to Level of Awareness on the Basis of Average Score of the Respondents					
	N	Poor (<= 50)	Fair (50-60)	Good (60-70)	Very Good (70-80)	Outstanding (> 80)
Puri (Non-ST)	47	14.89	17.02	21.28	17.02	29.79
Keonjhar (ST)	47	4.26	8.51	21.28	10.64	55.32
Total	94	9.57	12.77	21.28	13.83	42.55

of the modal score was 69. The high value of statistical averages indicated better level of awareness among the PRI-members. However, the co-efficient of variation, i.e., the measure of variability, was 21.73 indicating high variability in the level of awareness of the women PRI members. Level of awareness in the tribal Keonjhar district was fairly better than the non-tribal Puri which was evident from higher level of mean scores of Keonjhar.. The normal 'Z' test for large sample revealed significant difference between the level of awareness of non-tribal Puri and tribal Keonjhar districts.

Table 4: Descriptive Statistics of Average Scores of Respondents on Awareness

District	N	Min.	Max.	Range	Mean	Med.	Mode	S. D.	C.V.	Normal ' Z'
Puri (Non-ST)	47	38.46	96.15	57.69	69.07	69.23	73.08	15.96	23.11	
Keonjhar (ST)	47	23.08	100.0	76.92	77.01	80.77	69.23	14.91	19.36	2.49
Total	94	23.08	100.0	76.92	73.04	73.08	69.23	15.87	21.73	

Participation of the Respondents in the Activities of the PRIs

The level of participation of women PRI members on different activities of the PRIs was assessed by canvassing a questionnaire of 47 questions on different activities such as business of the Panchayat, developmental activities and community mobilisation. In order to assess the level of participation of the women PRI respondents, their responses to different activities were given scores- "0" for non-participation and "1" for participation' and their average scores on percentage scales were computed.

The level of participation of women PRI members was not found to be encouraging. In carrying out the Panchayat business, the participation was a mixed one. While in some areas such as circulating notice about meetings, participating in the meetings, women members actively participated, but in important activities like discussions of the annual budget and expenditure of the Panchayat, the participation has been poor. In the developmental activities, while the respondents have better participation in the creation of infrastructure, their participation was lacking in areas like preparation of developmental plans, resource mobilisation, etc. The community mobilisation is an important activity for effective local self-governance. But in the organisation of community programmes like immunisation, eye camps, health camps, literacy campaigns etc., the participation of women PRI-members was found unsatisfactory.

The classification of the respondents' participation according to the percentage scores and some descriptive statistics of the scores are furnished in Tables 5 and 6, respectively.

The analysis revealed that 39.36 per cent of the respondents have poor participation (less than 50 per cent marks), 26.60 per cent have fair participation and slightly more than one-third have good, very good and outstanding participation in the PRIs activities.

Table 5 : Respondents' Classification According to Level of Participation in the PRIs' Activities

District	Percentage of Respondents According to Level of Participation on the Basis of Average Score of the Respondents					
	N	Poor (< =50)	Fair (50-60)	Good (60-70)	Very Good (70-80)	Outstanding (> 80)
Puri (Non-ST)	47	48.94	19.15	8.51	19.15	4.26
Keonjhar (ST)	47	29.79	34.04	14.89	10.64	10.64
Total	94	39.36	26.60	11.70	14.89	7.45

The high value of CV (29.19) revealed that level of participation of individual respondents widely varied among respondents. It is required that all the women PRI-members should participate uniformly for smooth delivery of services. The mean average scores of the respondents on participation was found to be 54.53, the median and the modal scores were 51.06 each. The mean average score in tribal Keonjhar (57.58) was slightly higher than that of non-tribal Puri (51.47). In order to know whether this difference was significant or arised due to sampling fluctuation, the normal ' Z-statistic' was computed as 1.88 which is less than the tabulated ' Z' value of 1.96 at 5 per cent level of significance. Thus, there was no significant difference in the level of participation of women PRI members of Keonjhar and Puri districts.

Table 6 : Descriptive Statistics of Average Scores of Respondents on Participation in the PRIs' Activities

District	N	Min.	Max.	Range	Mean	Med.	Mode	S. D.	C.V.	Normal ' Z'
Puri (Non-ST)	47	23.40	89.36	65.96	51.47	51.06	51.06	17.33	33.67	
Keonjhar (ST)	47	36.17	91.49	55.32	57.58	55.32	55.32	13.89	24.12	1.88
Total	94	23.40	91.49	68.09	54.53	53.19	38.30	15.92	29.19	

The real empowerment of women will take place only when women are adequately represented in the PRIs, they become aware of the system and actively participate in the activities of the PRIs.

The participation of women-PRI respondents in the activities of local self-governance was grossly inadequate. Moreover, the variations found in the level of participations of the respondents signify that, some elected women PRI-members are participating in some activities and some are not though cohesive and coherent participation in the activities by all elected women PRI-members is necessary to deliver the benefits to the people.

Participation in the Decision-making Process

Participation of women in the decision-making process is an important parameter for assessing the empowerment of women. The level of participation of women PRI members in the decision-making process at the house-hold level and PRI level was assessed by canvassing a questionnaire of 31 questions relating to decision-making at the household level, decision-making at Panchayati Raj level such as interference, conflict management, administration, financial aspects, etc. In order to assess the level of participation in the decision-making process of the women PRI respondents, their responses to different activities were given scores- "0" for non-participation and "1" for participation' and their average scores on percentage scales were computed.

It is encouraging to find that 97.87 per cent of the women PRI members take decision in sending children to school, 93.62 per cent opined that they are giving equal privileges and freedom to their daughter (93.62 per cent) and 89.23 per cent have freedom to decide about family planning. But in other aspects of household matters the findings are not very encouraging. Half of the women PRI members said that their opinion is not sought for in domestic matters, they did not have the freedom to express their feelings and experience at home (44.68 per cent), their 'going out of home' is not appreciated by the family members (70 per cent) and they have to take permission of household/other family members(54.26 per cent) to move out of home.

As regards their participation in the decision-making process at the Panchayat level, a majority of the female PRI respondents (65.96 per cent) admitted that their husbands do interfere in their decisions and 70.21per cent expressed that other male PRI members tried to influence their decisions.

Majority of the respondents (62.77 per cent) expressed that female members were not actively involved in the decisions of the Panchayats. Scenario in both the districts was similar. This is really an issue of serious concern and can be considered as an impediment in the path of empowerment.

Exploration was made about their ability of conflict management. Majority of the respondents said that they are able to resolve conflicts during Gram Sabha meetings (59.57 per cent) and during Panchayat meetings (72.34 per cent). In this aspect the tribal Keonjhar district depicted a better picture than the non-tribal Puri district.

The abilities of the women PRI members in the administrative matters was studied. About 62 per cent said that they were able to get the task done by their staff, 71.28 per cent said that they were able to conduct meetings as per the procedures, 44.68 per cent able to enforce disciplinary actions. The comparison revealed that the women PRI respondents of the tribal Keonjhar were ahead of the non-tribal Puri district in this regard. However, 19.15 per cent expressed that resolutions were passed against their decisions- 25.53 per cent in Keonjhar and 12.77 per cent in Puri.

The scores of the respondents on participation in the decision-making process both at the household and Panchayati Raj level and some descriptive statistics are presented in Tables 7 and 8. The average scores of the respondents in percentage scale were computed and the respondents were classified according to their level of participation in the decision-making process both at the household and PRI-levels taken together. It was found that 19.15 per cent of the respondents have poor participation (average score<50 per cent), 17.02 per cent have fair participation (average score 50 to 60 per cent), 63.83 per cent have good, very good or outstanding participation in the decision-making process.

Table 7 : Classifications of the Respondents According to Participation in the Decision-making Process

District	Percentage of Respondents According to Level of Participation in the Decision-making Process on the Basis of Average Score					
	N	Poor (< =50)	Fair (50-60)	Good (60-70)	Very Good (70-80)	Outstanding (> 80)
Puri (Non-ST)	47	17.02	23.40	19.15	17.02	23..40
Keonjhar (ST)	47	21.28	10.64	29.79	31.91	6.38
Total	94	19.15	17.02	24.47	24.47	14.89

Mean average score of the respondents in the decision-making process was found to be 65.85. The median and modal scores were computed at 70 each. Higher values of central tendencies indicated better participation of women PRIs in the decision-making process. But this should be borne in mind that the high value of mean score was based on their participation in the decision-making process both at the household level and PRI level. However, a segregated look on their participation in the decision-making process at the household level and PRI-level has been presented clearly in the above paragraph. The high value of C.V.(24.28) indicated wide variations in the level of participation in the decision-making process among the respondents. The mean average score in non-tribal Puri was 67.31 per cent and that of the tribal Keonjhar (64.40 per cent). However, the normal 'Z-statistic' for difference of mean revealed that the scenario of women empowerment in the decision-making process is quite similar in both the districts (Table 9).

Table 8 : Descriptive Statistics of Average Scores of Respondents on Participation in the Decision-making Ability

District	N	Min.	Max.	Range	Mean	Med.	Mode	S.D.	C.V.	Normal 'Z'
Puri (Non-ST)	47	33.33	100.00	66.67	67.31	66.67	60.00	17.48	25.97	
Keonjhar (ST)	47	33.33	83.33	50.00	64.40	70.00	73.33	14.40	22.36	0.88
Total	94	33.33	100.00	66.67	65.85	70.00	70.00	15.99	24.28	

Association 'Between the Attributes'

The association between the attributes have been analysed through the Pearson's Bivariate Co-relation analysis by the use of SPSS (Statistical Package of Social Science). The co-relation co-efficient have been computed for both the districts combined and presented in Table10. The socio-economic status of the

respondents got positive co-relation with the level of awareness, level of participation, and level of participation in the decision-making process of the respondents. These co-relation co-efficient are highly significant at 1 per cent level. The awareness of the respondent has also got significant co-relation with the level of participation of the respondent at 1per cent level of significance. The 'Awareness' and 'Participation in the PRIs' activities' are significantly co-related at 1per cent level. But the awareness and decision-making do not exhibit any association.

Table 9 : Bivariate Pearson's Correlation Co-efficient Between the Attributes (Both the Districts Combined)

	SES	Awareness	Participation	Decision-making
SES				
Awareness	.329** (.001)			
Participation	.515** (.000)	.522** (.000)		
Decision-making	.429** (.000)	.201 (.052)	.562** (.000)	

* * Co-relation is significant at the 0.01 level (2 – tailed).

* Co-relation is significant at the 0.5 level (2 – tailed).

Study of Inter-dependence of Attributes

An exploration was made whether there is inter-dependence between factors of socio-economic status such as education, caste, and family income with attributes such as Awareness, Participation and Involvement in the decision-making process. Chi-square tests for independence of attributes have been applied on the pairs of attributes like, 'Awareness & Education', ' Awareness & Family Income', 'Awareness & Caste',' Participation & Education', 'Participation & Family Income','Participation & Caste','Decision-making & Education','Decision-making & Family Income', 'Decision-making & Caste'.

The bivariate frequency analysis for each pair of attributes reflects that the level of education and family income has a direct bearing on the level of awareness. But the level of awareness of the respondents was independent of the caste. Similarly, the level of education of the respondents and the level of participation of the respondents in the PRI activities are inter-dependent. But the level of participation in the PRI activities is independent of the level of family income and caste of the respondents. Besides, the level of education has a bearing upon the participation of women PRI members in the decision-making process at the PRI level and household level. But the caste and income level have no bearing upon the participation in the decision-making process. It emerged that in a State like Odisha education is the most important determinant, which influences the level of awareness, the level of participation in PRI activities and the level of participation in the decision-making process of the elected women PRI members. The level of participation in the Panchayat bodies and the level of participation in the decision-making process of the elected women PRI members is independent of family income and caste.

Summary and Suggestions

The overall participation of the women PRI-members in the activities of Panchayati Raj Institutions in the recent elections was found to be very much inadequate. Each of the attributes- 'Awareness','Participation in the activities of PRIs', 'Participation in the decision-making process',has significant positive co-relation with the SES. Further, a deeper analysis revealed that the level of participation of the respondents (women PRI-members) in the PRI activities and in the decision making process depend upon the 'level of education', but independent of 'family income'

and 'caste'. This made it clear that level of education is the most important determinant of the level of participation.

The level of awareness and the level of participation have significant positive association. Therefore, the awareness of women PRI respondents will definitely contribute to an increase in the level of participation in PRIs' activities and decision-making process.

Interestingly, the 'level of education' and the 'level of family income' have a direct bearing on the 'level of awareness'. But the' level of awareness' is independent of 'caste'.

In order to increase the level of participation, the level of education and the level of awareness of women PRI-members are required to be improved.

The women PRI-members of Odisha are characterised by low level of education but younger age composition. One way of increasing the level of education of women PRI-members is to create an atmosphere and environment so that the educated women will come forward to represent in the PRIs.The other way is to educate women PRI-members through training, exposure visits and workshops. These two things have to be done simultaneously. An intensive research study is required in order to decide the strategies to induct more educated women to participate in local self-governance.

In order to design effective training module and training programme for educating the less educated women PRI-members so that they can effectively participate in the PRI activities and positively contribute to the development process, a 'training need assessment'(TNA) is essential.The TNA will help to identify the educationally weaker groups among the women PRI-members and their training requirements. Adequate infrastructure supports in terms of hardware and software have to be created for the purpose.

Another important finding was that the awareness was found to be grossly inadequate on meeting procedure, financial matters and funding position under developmental schemes. In order to develop the level of awareness, the area-specific approach need to be adopted. And there should be specially designed package of training programmes, workshops, exposure visits and development of IEC materials for women PRI-members.

Majority of the women PRI-members opined that the present devolution of power is inadequate and there is a need for proper devolution of power for effective participation of PRI members in the Panchayati Raj bodies. The Government of Odisha have recently taken an initiative to devolve more powers to the Panchayati Raj bodies in respect of 11 developmental departments. But there is a need to assess the specific areas of devolution of power in respect of functions, functionaries and finance in respect of different developmental programmes implemented by various departments. The perception of different stakeholders such as people, PRI-members and government officials, NGOs for evolving a realistic framework for devolution of power in respect is essential.Therefore, there is a need for intensive research in the area.

The Government is implementing a good number of schemes for development of rural people and also specifically for rural poor women.The implementation of these schemes would be successful if there is cooperation from the officials, participants and monitoring by PRI members and community. For effective involvement of women PRI-members in the planning, implementation and monitoring of the programmes, the scheme guidelines have to be made available to the women PRI-members in the regional language. There should be information counters at the Zilla Parishad, Panchayat Samiti and Gram Panchayat at offices, where detailed information in the form of brochures and leaflets about all the schemes should be available to the PRI-members and to the general public free of cost.The notice board in those offices should clearly display the list of all developmental schemes being implemented in the area.

Adequate number of manuals on ZP/ PS/ GP in regional languages should be made available to all the women PRI-members.

The other major bottlenecks in the participation of women PRI-members in the activities and decision-making process were found as 'lack of mobility', interference from family members and male PRI-members, lack of cooperation from the officials and burden of household responsibilities.

There should be attitudinal change on the part of the officials. They should see the women participation in the PRI bodies not as weakness but as strength for effectively implementing the programmes through greater involvement of the community, especially the women.

The community needs to be sensitised so that they realise that the women involved in the affairs of the PRIs are doing an important job for which they require all support and co-operation. This can be achieved through use of media services, campaigns and inter-personnel communication.

The significant finding of the study was that a sizable section of the women PRI-members have expressed their self-confidence and self- reliance. They have been able to realise their strength to participate in the public activities. This paradigm shift in the attitude of the women will definitely achieve the goal of empowerment. But the State has to support the capacity building process of the women PRI-members through appropriate interventions.

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Journal of Rural Development, Vol. 32, No. (4) pp. 395-408
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SHIFT TO RUBBER CULTIVATION AND CONSEQUENCES ON ENVIRONMENT AND FOOD SECURITY IN KERALA

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ABSTRACT

Over the last fifty years from 1960-61 to 2009-10, agriculture sector in Kerala has shown a degree of change in the cropping pattern. The analysis of cropping pattern shows that the years 1976-77 and 1980-81 marked two important turning points in the Kerala agrarian economy. The area under tapioca was at its maximum in 1976-77 and then declined continuously and the area under rice was at its peak in 1980-81 and then continuous decline set in. The area under total food crops rapidly declined since 1976-77. Rice and tapioca lost the maximum area during the period while rubber and coconut gained the maximum area. The substitution of rubber and coconut at the cost of rice and tapioca has far reaching implications for food and price policies. The change in cropping pattern has given a new dimension in the last decade, that is, rubber seems to be replacing both food crops and non-food crops among the major crops in Kerala. The expansion of rubber and the conversion of food and other non-food crops brought significant change within the farm sector of Kerala. In this context, the negative impact of changing cropping pattern towards rubber is analysed on four grounds, namely, food security (rice security), land degradation, water depletion and chemical pollution. The results show that the supply demand gap of rice in Kerala has widened tremendously; there is a high decrease in the soil fertility status in the rubber cropped areas; the average groundwater level is very lower in rubber cropped areas as compared to other cropped areas; and that rubber farmers are applying overdose of chemical fertilisers and less of organic manures and lime.

Introduction

Analysis of the cropping pattern is necessary for identification of major crops that are grown in a region and changes in their shares over time. Changes in cropping pattern broadly reflect changes in the relative profit expectations of the alternative crops at different points of time. Cropping pattern indicates the level of development and economic prosperity of a region. The farmers' area allocation decisions are conditioned not only by the indigenous factors associated with the farm households but also by a group of exogenous variables.

The cropping pattern of Kerala is quite different from the rest of India owing to the physiographic and climatic conditions of the

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The author is grateful to Dr. K Gangadharan, Professor and Head, Department of Applied Economics, Kannur University, Thalasserry Campus, Palayad, Kerala, India.

State. In addition to rice and tapioca, a number of other garden crops have contributed to the State's food supply. Predominance of cash crops and plantation crops, homestead farming system, high rainfall, etc., make Kerala agriculture unique in many respects.

One of the major changes that have been taking place in Kerala is the gradual shift of area from food crops like rice and tapioca to plantation crops like coconut, rubber, coffee, etc (Lakshmi KR and Pal TK, 1988). The reduction in area under food crops in Kerala from 40.43 per cent in 1970-71 to 18.74 per cent in 1992-93 and 16.52 per cent in 2002-03 is a phenomenon happened very rarely in any State (Mani KP, 2009). Present trend reveals that Kerala is being converted to non-food crop area and the ratio of food crop to non-food crop area is 12: 88. The main feature of the present trend is change in the cultivated area under foodgrain crops to non-foodgrain crops and change in the cultivated area under one non-foodgrain crop to another non-foodgrain crop. Data on the area under major crops in Kerala depict this trend. The area under paddy decreased from 347.46 thousand hectare in 2000-01 to 234.01 thousand hectare in 2009-10, the area under coconut cultivation decreased from 925.78 thousand hectare in 2000-01 to 778.62 thousand hectare in 2009-10, the area under cashewnut cultivation decreased from 92.12 thousand hectare in 2000-01 to 48.97 thousand hectare in 2009-10, the area under pepper cultivation decreased from 202.13 thousand hectare in 2000-01 to 171.49 thousand hectare in 2009-10. On the other hand, the area under rubber cultivation increased from 474.36 thousand hectare in 2000-01 to 525.41 thousand hectare in 2009-10.

The data clearly show that rubber is replacing both food crops and non-food crops. District-wise data on changes of cropping pattern also reveal the same picture as at the State level. The expansion of rubber and the conversion of area under food and other non-food crops to rubber plantations brought significant economic and environmental consequences within the farm sector of Kerala. Hence in this paper an attempt has been made to analyse the negative impact of the change in cropping pattern towards rubber in terms of various parameters like food security, land degradation, water depletion and chemical pollution.

Methodology and Materials

The negative impact of change in cropping pattern towards rubber was on chemical pollution, land degradation, water depletion and food security.

The paper analyses the impact of chemical pollution on the basis of the difference between actual and suggested dose of chemical fertilisers by farmers. The data on the actual use of fertilisers by farmers to various crops were collected from 150 farmers from five panchayats in the Kasaragod district. Five principal crops in the Kasaragod district such as paddy, coconut, arecanut, rubber and banana are selected with 30 farmers from each of the five panchayats selected from the Analytical Register, Vasutha Programme of the District Panchayat, Kasaragod. Among the five panchayats, Vorkady was selected for paddy, Panathady for coconut, Karadka for arecanut, West-Eleri for rubber and Mangalpady for banana; where these crops were largely cultivated. Information on the total quantity of NPK fertilisers applied, lime used and organic manure consumed in their respective plants or farms were collected by interviewing each farmer. Information was also collected on the recommended dose of fertilisers to plants.

Decline in native soil fertility, deficiency of plant nutrients and decline in micro-nutrients are the three main indicators for land degradation. Among these three, the first one was considered in this study due to lack of data on the other two. Soil fertility status in different crop growing areas (paddy, coconut, arecanut and rubber) is taken from the Analytical Register, Assistant Soil Chemist Office of Kasaragod district from 2000 to 2009.

Crop-wise analysis of average groundwater level in different years is made for arecanut, coconut, paddy and rubber to work out the impact of groundwater depletion. Like that of soil fertility status, groundwater analysis was also done by taking Kasaragod district as a case.

The secondary data used for this study were collected from various publications of the Government of Kerala like Economic Review, Statistics for Planning, Agricultural Statistics and Season and Crop Reports. Secondary data were also collected from the Analytical Register, Assistant Soil Chemist Office, Kasaragod, Soil Fertility Card, Vasutha Programme, District Panchayat, Kasaragod, Groundwater Department, Kasaragod District and Package of Practices, Kerala Agricultural University, Trissur.

Herfindahl Index (HI) is used to measure the extent of crop diversification towards rubber in Kerala. It is defined as the sum of squares of acreage proportions in the total cropped area.

$$HI = \sum_{i=1}^{N} p_i^2$$

Where, N is the total number of crops and P_i represents acreage proportion of i^{th} crops to total cropped area.

With the increase in diversification, the Herfindahl Index would decrease. The index takes a value one when there is a complete specialisation and approaches zero as N becomes large, that is, if diversification is perfect. Thus, the HI is a measure of concentration. To convert it as a measure of diversification, the value is subtract from unity:

Diversification Index (DI) = 1 – HI

Supply demand gap of rice in Kerala was worked out to measure the extent of food shortage. Demand for rice for the State as a whole was developed by multiplying per capita consumption of rice in rural and urban areas with corresponding population and aggregated. An attempt has been made to project the demand for rice in Kerala up to the year 2026 under different scenarios of growth in income.

The demand projections for rice were obtained by using the formulae developed by Sekhon MK, Rangi PS and Tejinder Dhaliwal (2008).

$$Dt = do*Nt\ (1+ y*e)\ t$$

Where,

D_t = individual demand of rice in year t (2011, 2021, and 2026),

d_o = per capita demand of rice in the base year (2001),

N_t = projected population in year t (2011, 2021, and 2026),

y = growth in per capita income (five to ten per cent).

e = expenditure elasticity of demand for rice.

Shift in Cropping Pattern in Kerala Towards Rubber

Originally rubber was introduced into areas with degraded forests. From there it spread all over. It replaced natural vegetation, tapioca, cashewnut, fruit trees and coconut. During 1960-61, the area under rubber cultivation was 5.23 percentage of the total cropped area, increased to 13.63 per cent in 1990-91 and 19.65 per cent during 2009-10 (Table1). Among the districts in Kerala, Thiruvananthapuram district recorded highest increase in area under rubber cultivation.

Table1: Shift in Cropping Pattern in Kerala Towards Rubber (Percentage to Total Cropped Area) (1960-61 to 2009-10)

S. No.	Districts	1960-61	1970-71	1980-81	1990-91	2000-01	2009-10	Percentage increase in 2009-10 over 1960-61
1	Thiruvananthapuram	1.89	2.89	3.83	10.94	14.48	17.06	850.26
2	Kollam	8.38	8.71	13.22	13.48	17.32	19.15	128.52
3	Pathanamthitta	-	-	-	34.31	41.53	43.32	26.26
4	Kottayam	13.88	14.57	27.47	44.62	49.33	51.56	271.47
5	Alappuzha	0.88	1.46	1.96	1.67	2.74	3.66	315.91
6	Ernakulam	7.15	9.32	9.02	24.68	25.37	28.80	302.80
7	Idukki	-	-	10.22	17.76	14.24	12.57	22.99
8	Trissur	3.18	3.47	4.06	3.20	6.76	7.77	144.34
9	Palakkad	1.59	2.22	3.29	7.09	9.31	10.06	532.70
10	Malappuram	-	-	7.63	7.44	10.88	12.88	68.81
11	Kozhikkode	4.18	4.99	6.48	5.26	7.71	8.56	104.78
12	Wayanad	-	-	-	2.98	3.08	4.14	38.93
13	Kannur	3.88	4.01	6.25	8.84	12.35	16.37	321.91
14	Kasaragod	-	-	-	12.92	14.43	18.20	40.87
15	State	5.23	6.11	8.24	13.63	15.70	19.65	275.71

Source: - Computed from (i) Statistics for Planning (various issues), Department of Economics and Statistics, Govt. of Kerala, Thiruvananthapuram. (ii) Economic Review (various issues), State Planning Board, Govt. of Kerala, Thiruvananthapuram.

During 1960-61 the order of the first five crops was rice, coconut, tapioca, rubber and pepper in the descending order of shares to the total cropped area. Table 2 reveals that in 2009-10, the first five crops were coconut, rubber, rice, pepper and arecanut. Rubber occupied fourth position in area during 1960-61, went to second position during 2009-10. The main crops losing area between 1960-61 and 2009-10 were rice and tapioca. This change in cropping pattern clearly established a shift from the traditional subsistence cropping to the recent commercial cropping like rubber. From Table 2 it is very clear that among the four plantation crops, rubber emerged as the most significant crop with largest area in the State next only to coconut.

Table 2 : Cropping Pattern According to Land Use Statistics in Kerala (Percentage to Total Cropped Area (TCA))

S. No.	Crops	1960-61	1970-71	1980-81	1990-91	2000-01	2009-10
1	Rice	33.16 (1)	29.83 (1)	27.79 (1)	18.53 (2)	11.50 (3)	8.77 (3)
2	Coconut	21.32 (2)	24.52 (2)	22.56 (2)	26.72 (1)	30.63 (1)	29.18 (1)
3	Arecanut	2.31 (6)	2.93 (7)	2.12 (7)	2.15 (10)	2.89 (8)	3.72 (5)
4	Rubber	5.23 (4)	6.11 (4)	8.24 (4)	13.63 (3)	15.70 (2)	19.65 (2)
5	Pepper	4.25 (5)	4.03 (5)	3.75 (6)	5.58 (4)	6.69 (4)	6.43 (4)
6	Cashewnut	2.31 (6)	3.50 (6)	4.90 (5)	3.83 (6)	3.05 (7)	1.84 (9)
7	Tapioca	10.31 (3)	10.01 (3)	8.49 (3)	4.85 (5)	3.79 (5)	2.80 (7)
8	Coffee	0.72 (10)	1.08 (11)	2.02 (8)	2.49 (7)	2.80 (9)	3.18 (8)
9	Tea	1.60 (8)	1.28 (10)	1.25 (11)	1.15 (11)	1.22 (11)	1.35 (11)
10	Cardamom	1.22 (9)	1.62 (9)	1.87 (9)	2.21 (8)	1.37 (10)	1.56 (10)
11	Ginger	0.51 (11)	0.41 (12)	0.44 (12)	0.47 (12)	0.38 (12)	0.20 (12)
12	Banana and other plantains	1.89 (7)	1.66 (8)	1.72 (10)	2.17 (9)	3.29 (6)	3.71 (6)
13	Other crops	15.17	13.02	14.87	16.22	16.69	17.27
14	T C A	100.00	100.00	100.00	100.00	100.00	100.00

Figures in bracket show rank.
Source: - Computed from (i) Statistics for planning (various issues), Department of Economics and Statistics, Govt. of Kerala, Thiruvananthapuram. (ii) Economic Review (various issues), State Planning Board, Govt. of Kerala, Thiruvananthapuram.

Table 3 clearly supported this shift from food crops, mainly rice and tapioca, in favour of tree crops such as rubber and coconut in Kerala, which was shown in the form of diversification index. It may be observed that the transformed values of Herfindahl Index, that is, Diversification Index were lower in the initial years of study, viz, 1960-61 and 1970-71 and higher in the later

years, viz, 1980-81, 1990-91, 2000-01 and 2009-10 which indicates more diversification. The diversification in cropping pattern mainly towards rubber was noticed during the recent years (Srikumar Chattopadhyay, et.al, 2006).

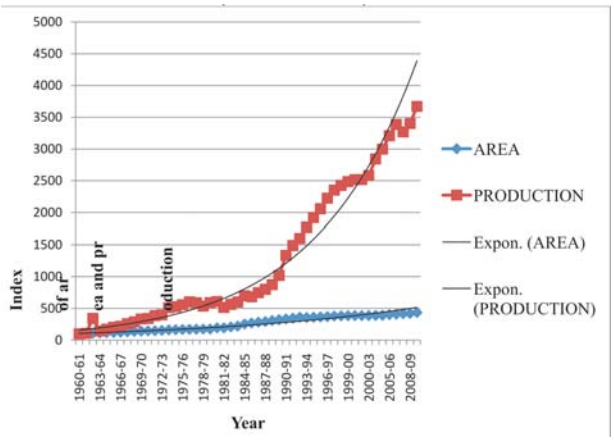
Table 3 : Crop Diversification Indices for Districts in Kerala (1960-61 to 2009-10)

S. No.	Districts	1960-61	1970-71	1980-81	1990-91	2000-01	2009- 10
1.	TVM	0.799	0.793	0.809	0.779	0.749	0.785
2.	KOLM	0.844	0.817	0.833	0.819	0.805	0.848
3.	PATT	-	-	-	0.813	0.778	0.781
4.	KOTM	0.892	0.896	0.842	0.746	0.713	0.701
5.	ALAP	0.739	0.736	0.764	0.727	0.736	0.763
6.	ERN	0.824	0.822	0.776	0.799	0.813	0.848
7.	IDUK	-	-	0.876	0.831	0.898	0.918
8.	TRIR	0.692	0.718	0.676	0.734	0.747	0.784
9.	PALK	0.631	0.693	0.694	0.783	0.821	0.873
10.	MALM	-	-	0.824	0.812	0.803	0.833
11.	KOZH	0.828	0.806	0.857	0.667	0.673	0.699
12.	WAYD	-	-	-	0.808	0.835	0.870
13.	KANR	0.808	0.828	0.879	0.831	0.837	0.853
14.	KSGD	-	-	-	0.834	0.801	0.813
15.	Kerala	0.821	0.833	0.852	0.867	0.858	0.863

TVM - Thiruvananthapuram, KOLM - Kollam, PATT - Pathanamthitta, KOTM -Kottayam, ALAP - Alappuzha, ERN - Ernakulam , IDUK - Idukki, TRIR - Trissur, PALK - Palakkad, MALM - Malappuram , KOZH - Kozhikkode, WAYD - Wayanad, KANR - Kannur, KSGD - Kasaragod.

Figure 1 clearly shows that the area and production of rubber cultivation had tremendously increased in Kerala during 1960-61 to 2009-10 periods.

Figure 1 : Growth in Area and Production of Rubber Cultivation in Kerala (1960-61 to 2009-10)



Negative Impact of Shift in Cropping Pattern Towards Rubber

Environmental degradation is a serious challenge to the life forms on the planet earth. It is adversely affecting not only the individuals and human societies in various ways and in different degrees, but is also influencing the changes that are detrimental to the health and growth of all forms of life (Johl SS, 2006).

The environmental impacts of agriculture can be classified into beneficial and harmful effects. Except for production of food, fodder, fibre, etc., and generation of employment, agriculture is not beneficial to the environment (Reddy KK, 2003). The adverse and harmful effects of agriculture on environment are far and wide. These effects are direct and indirect in nature.

The direct effects are mainly due to the extensive use of chemical fertilisers and pesticides in agricultural sector.The growing use of fertilisers leads to chemical pollution of water resources. The use of nitrogenous fertilisers produces nitrates which end up in streams and groundwater reservoirs. Continuous high intensity fertiliser use leads to a progressive increase in the nitrate content of confined water bodies particularly groundwater. If nitrate content of groundwater goes beyond a permissible limit, water is said to be polluted and not safe for drinking (nitrate content in excess of 50 mg NO3-N/1 is considered unsafe for drinking).

Studies also revealed that Nitrogen loss to the atmosphere through de-nitrification (change of N compounds into nitrous oxide) may contribute to greenhouse gases in the atmosphere (Kayarkanni S, 2006).

Once chemical substances have entered the environment (in the form of fertilisers, pesticides and herbicides), they undergo physical and chemical changes, including combination with other chemicals, that affect their toxicity. Through such chemical transformation, a relatively harmless chemical may become a toxic by-product in the environment. It may further enter the food chain and accumulate in living organisms (Essam El Hinnawi, 1982).

Chemical Pollution : The district and State-wise consumption of chemical fertilisers (NPK) in Kerala shows that the rate of application of fertilisers varied substantially across regions during different years. It has been found that in some areas farmers are using chemical fertilisers and pesticides excessively by 20 – 50 per cent and has created chemical pollution (Chandrasekhar TC, 2008). Studies also show that there is difference between the actual and suggested dose of chemical fertilisers to various crops in the various parts of India (Raja Sekhara Bapu M and Sambasiva Rao B, 2003).

To know whether there is overuse of chemical fertilisers in Kerala, data on the difference between suggested dose and actual used doses of chemical fertilisers to various crops (paddy, coconut, arecanut, rubber and banana) were collected using primary data. On the basis of the data collected , average actual dose of chemical fertilisers (NPK), lime and organic manures used by farmers for paddy, coconut, arecanut, rubber and banana plants were worked out and presented in Table 4. The Table also gives information on the recommended dose of NPK fertilisers, lime and organic manures suggested by the Agricultural Department on the basis of the soil fertility status tested (for each panchayat) and given in the form of the soil fertility card to each panchayat.

Table 4 : Difference Between the Suggested Dose and Actual Used Dose of Fertilisers to Various Crops in the Kasaragod District in Kerala

(1) Soil fertility status (Macro-nutrients) of the sample Panchayat (PH in percentage, Macro-nutrients (NPK) in Kg per hectare)

Item / Crops	Paddy	Coconut	Arecanut	Rubber	Banana
PH	4.90	4.20	4.50	4.20	4.60
N	1.26	2.30	1.85	2.17	1.30
P	12.25	8.00	20.60	15.00	6.98
K	112	135	156	160	130

(2) Suggested Dose

Item / Crops (Kg per hectare)	Paddy (Kg per plant)	Coconut (Kg per plant)	Arecanut (Kg per plant)	Rubber (Kg per plant	Banana
Lime	300	1.500	0.700	0.700	0.600
N	61	0.400	0.136	0.105	0.322
P	74	0.900	0.120	0.477	0.610
K	28	1.065	0.194	0.192	0.470
NPK Total	163	2.365	0.450	0.774	1.402
Organic manure	2500	25	24	10	10

(3) Average Actual Dose Used

Item / Crops (Kg per hectare)	Paddy (Kg per plant)	Coconut (Kg per plant)	Arecanut (Kg per plant)	Rubber (Kg per plant)	Banana
Lime	250	0.500	0.200	0	0.250
NPK Total	175	2	0.400	2	3
Organic manure	1250	20	10	2	2

(4) Difference between Actual and Suggested Dose

Item / Crops (Kg per hectare)	Paddy (Kg per plant)	Coconut (Kg per plant)	Arecanut (Kg per plant)	Rubber (Kg per plant)	Banana
Lime	(-) 50.00	(-) 1.00	(-) 0.500	(-) 0.700	(-) 0.350
Deviation (in %)	(-) 16.67	(-) 66.67	(-) 71.43	(-) 100.00	(-) 58.33
NPK Total	(+) 12.00	(-) 0.365	(-) 0.05	(+) 1.226	(+) 1.598
Deviation (in %)	(+) 7.36	(-) 15.43	(-) 11.11	(+) 158.40	(+) 113.98
Organic manure	(-) 1250	(-) 5.00	(-) 14	(-) 8.00	(-) 8.00
Deviation (in %)	(-) 50.00	(-) 20.00	(-) 58.33	(-) 80.00	(-) 80.00

Source: - (i) Soil fertility card (2009), Vasutha Programme, District Panchayat, Kasaragod (Item (1) and (2)). (ii) Primary data (Item (3)).

From Table 4, it is revealed that paddy, arecanut and coconut farmers were using, to a certain extent, the same quantity of NPK fertilisers as suggested by the scientists; whereas the rubber cultivators using thrice of the suggested dose of NPK (158.40 percentage more of the suggested dose) and banana cultivators using more than double of the suggested dose of NPK fertilisers (113.98 percentage more of the suggested dose).

Another important feature revealed is that farmers in these panchayats were using very low quantity of lime (paddy farmers were using 50 kg per hectare short of suggested dose, coconut cultivators one kg per plant short of the suggested dose, arecanut cultivators 0.500 kg per plant short of the suggested dose and banana cultivators 0.350 kg per plant short of the suggested dose).The rubber cultivators were not using lime in the study area. Paddy cultivators and arecanut cultivators were using almost half of the organic manure as suggested by the agriculture department. Coconut cultivators were using 20 kg per plant as against 25 kg per plant of organic manure as suggested by the department (five kg per plant short as suggested). Rubber cultivators in the study area were using only two kg per plant instead of ten kg per plant of organic manure as recommended (80 percentage short as suggested). Like that, banana cultivators were also using a shortage of eight kg per plant of organic manure as suggested. Out of the five crops selected for the study, rubber and banana cultivators used overdose of chemical fertilisers and under-use of organic manures and lime showing ineffective application of fertilisers compared to other three crops, which leads to chemical pollution of the soil.

Land Degradation : An inter-crop comparison of changes in the soil fertility status for arecanut, coconut, rice and rubber crops in Kerala was also worked out for the period from 2000 to 2009. The soil fertility evaluation on the basis of soil test results in the four crop based systems are done in two ways – firstly by analysing the macro-nutrients (NPK) and secondly by analysing the PH status.

Table 5 shows that there is decrease in the average soil PH status from 2000 to 2009 in all the crop growing systems. An inter-crop comparison reveals that the decline was severe in rubber cropped systems than other crop growing systems. In 2009, average soil PH status in the rubber cropped system was very low (4.20 per cent).

Table 5 : Average Soil Fertility Status in the Different Crop Growing Areas in Kasaragod District in Kerala in Different Years (2000 to 2009)

(PH in percentage, Macro-nutrients (NPK) in Kg per hectare)

Year	Rubber				Arecanut			
	Macro-nutrients (NPK)				Macro-nutrients (NPK)			
	PH	N	P	K	PH	N	P	K
2000	5.65	2.96	19.56	131.48	6.10	3.11	51.94	261.53
2001	5.55	2.91	19.02	130.13	6.00	2.93	50.63	257.18
2002	5.45	2.82	18.51	129.70	5.95	2.88	47.75	252.75
2003	5.45	2.75	18.38	127.44	5.90	2.75	47.02	248.75
2004	5.40	2.69	18.21	123.70	5.60	2.60	32.63	243.73
2005	5.35	2.55	17.55	122.62	5.45	2.57	29.39	231.25
2006	5.35	2.46	13.94	96.13	5.40	2.42	27.83	227.58
2007	5.15	2.41	12.06	76.89	5.15	2.37	24.13	225.45
2008	4.40	2.36	11.62	68.13	4.95	2.34	20.89	216.66
2009	4.20	2.14	11.23	61.50	4.80	2.07	20.31	208.33

(Contd...)

Table 5 *(Contd...)*

Year	Paddy				Coconut			
		Macro-nutrients (NPK)				Macro-nutrients (NPK)		
	PH	N	P	K	PH	N	P	K
2000	6.15	2.91	36.34	211.36	5.96	3.37	55.14	292.56
2001	6.10	2.84	34.24	209.85	5.90	3.18	45.34	284.53
2002	6.05	2.67	33.06	201.15	5.83	3.00	43.59	270.03
2003	6.00	2.53	31.15	195.18	5.76	2.78	42.23	262.16
2004	5.85	2.45	29.57	185.94	5.53	2.62	32.11	220.41
2005	5.45	2.27	26.13	172.23	5.40	2.49	29.44	205.18
2006	5.45	2.20	24.21	164.66	5.33	2.42	28.69	203.90
2007	5.30	2.14	21.83	156.33	5.33	2.31	27.27	203.67
2008	5.00	2.06	19.09	149.50	5.03	2.11	26.08	198.29
2009	4.95	2.01	18.11	145.50	4.46	2.09	24.50	193.50

Source : - Computed from the Analytical Register, Assistant Soil Chemist Office, Kasaragod District.

The NPK status revealed that during 2000 except for the rubber cropping system all other systems had a very high NPK status. In the case of rubber cropping system, the NPK status was 2.96, 19.56 and 131.48 kg per hectare, during 2000, decreased to 2.14, 11.23 and 61.50 kg per hectare, respectively during 2009.

Table 5 derives the continuous decline of soil fertility and soil health in general and the deterioration of P and K soil status in particular to the rubber cropping system in Kerala. It is found that P and K elements are low in the rubber plantations of the study area. Studies by Balagopalan (1995) and Karthikakutty Amma, et.al (1996) found that NPK components are lower on rubber plantations than with other vegetations (Srikumar Chattopadhyay, et.al, 2006).

This established the findings of earlier studies that the organic matter content on rubber plantations had lower values than other cropping systems and vegetations.The analysis confirmed that the change in cropping pattern towards rubber had started the soil NPK status declining and had been in fact, showing a tendency of further deterioration in the soil fertility status of Kerala indicating land degradation.

Groundwater Depletion : There is wide concern in the world that groundwater resources are deteriorating in the long term both in quantity and quality. Studies on groundwater balance in the State have observed that the water table has been receding in many parts of Kerala (Srikumar Chattopadhyay, et.al, 2005). The depletion of underground water has important implications from the economic angle as well as from the point of view of sustainability of agricultural system.Though many factors are responsible for groundwater decrease, the problem is being largely linked to the changes in cropping pattern.

To study the effect of changes in cropping pattern on groundwater depletion the average groundwater level in different crop growing areas were analysed. For that the average

groundwater level in the four crop growing (paddy, coconut, arecanut and rubber) areas were worked out for the period from 1998 to 2009 in the Kasaragod district. The data were collected from the Groundwater Department, Kasaragod district and are shown in Table 6. The Table reveals that during 1998 to 2009, the average groundwater level of dug well in the paddy, arecanut and coconut growing areas increased and rubber areas decreased. The average groundwater level in the rubber crop growing areas were very low (below four metre) compared to other crop growing areas. It was observed that the recharge of water in the rubber cropped areas was very low compared to other crops and the discharge of water is high. The exercise as shown in Table 6 therefore, reveals that the shift in cropping pattern in favour of rubber will decrease the groundwater level.

Table 6 : Average Groundwater Level in the Different Crop Growing Areas of Kasaragod District in Kerala in Different Years (1998to2009) (Groundwater level in meters)

S.No.	Year	1-Paddy		2- Arecanut		3- Coconut		4- Rubber	
		Dug well	Bore well	Dug	Bore well	Dug	Bore well	Dug	Bore well
1	1998	13.46	5.56	12.13	9.08	14.90	15.82	3.50	2.11
2	1999	13.98	5.14	13.17	9.08	14.16	15.62	2.53	2.72
3	2000	15.12	5.98	16.15	9.02	15.41	15.23	2.67	3.25
4	2001	25.52	6.11	13.25	9.20	16.78	14.27	2.56	3.28
5	2002	19.81	6.05	15.64	8.91	16.41	15.10	2.61	3.57
6	2003	19.84	6.38	15.31	8.63	16.13	15.30	2.31	3.32
7	2004	18.42	5.83	16.12	8.06	17.80	15.01	2.12	3.22
8	2005	20.63	6.60	17.28	8.54	17.07	15.33	2.49	3.59
9	2006	20.92	6.18	16.71	8.53	16.06	15.07	1.92	2.79
10	2007	15.62	5.89	15.12	8.92	16.65	15.33	2.43	3.48
11	2008	19.06	5.18	17.32	8.30	16.68	15.21	2.11	3.18
12	2009	17.71	7.03	17.87	8.37	15.41	15.07	2.52	2.84

Source: - Computed from the Groundwater Department, Govt. of Kerala, Kasaragod District.

Food Security : The substitution of rubber at the cost of rice lands decreased the supply of rice in Kerala and widened the supply demand gap of rice. An analysis of Table 7 demonstrated the demand and supply gap of rice in Kerala from 1960-61 to 2009-10. The data clearly revealed the continuous decrease in the supply of rice in Kerala compared to the demand. In 2009-10, the rice shortage in Kerala was 3022.64 thousand tonnes of the total demand (that is, 83.45 per cent shortage).

Table 7 : Demand and Supply Gap of Rice in Kerala in Different Years (1960-61 to 2009-10)

S. No.	Year	Demand for Rice (in'000 tonnes)	Supply of Rice (in'000 tonnes)	Demand and Supply Gap (in'000 tonnes)
1	1960-61	1782.93	1067.53	-715.40 (40.12)
2	1970-71	2248.86	1298.01	-950.85 (42.28)
3	1980-81	2674.29	1271.96	-1402.34 (52.44)
4	1990-91	3032.43	1086.58	-1945.85 (64.17)
5	2000-01	3319.82	751.33	-2568.49 (77.37)
6	2009-10	3615.98	598.34	-3022.64 (83.45)

Figures in bracket show percentage to total demand.

The results of the projected household demand for rice in Kerala are presented in Table 8. It is estimated that the household demand for rice at five per cent to ten per cent growth rate is very high in the State among rural and urban population during 2011, 2021 and 2026. The figures clearly established the increasing demand for rice particularly among rural people in Kerala in the future years compared to urban population. In 2026 AD, the total demand for rice in Kerala is estimated as 10606.55 thousand tonnes with an average growth rate of ten percentage.

Table 8 : Projected Demand for Rice in Kerala in Different Years (2011 to 2026)

S. No.	Year	Growth rate (%)	Rural (in'000 tonnes)	Urban (in'000 tonnes)	Total (in'000 tonnes)
1	2011	5	3427.11	1017.60	4444.71
		6	3574.13	1054.47	4628.60
		7	3726.81	1092.53	4819.34
		9	4050.34	1172.26	5222.60
		10	4222.10	1213.91	5436.01
2	2021	5	4503.48	1265.32	5768.80
		6	4898.18	1358.67	6256.85
		7	5325.59	1458.53	6784.12
		9	6289.05	1679.48	7968.53
		10	6830.55	1801.34	8631.89
3	2026	5	4673.28	1761.27	6434.55
		6	5190.75	1925.16	7115.91
		7	5762.98	2103.63	7866.61
		9	7095.05	2509.66	9604.71
		10	7866.60	2739.95	10606.55

The analysis of data presented in Table 8 pointed out the increasing demand for rice in Kerala in the coming years compared to the existing supply as shown in Table 7. This will enlarge the supply demand gap of rice in Kerala in the future years indicating a threat to food security.

Conclusion

From the analysis of the change in cropping pattern and the growth trends of area under principal crops in Kerala, it is clearly established that there is a shift in cropping pattern from food crops to non-food crops and recently towards rubber. The measure of diversification reveals that it was less in the initial years and diversification is taking place mainly towards rubber.

Diversification of crops and the overuse of chemical fertilisers lead to chemical pollution. Data analysis on the difference between suggested and applied doses of chemical fertilisers for five crops – paddy, coconut, arecanut, banana and rubber shows that rubber and banana farmers are using overdose of chemical fertilisers and under-use of organic manures and lime as compared to the farmers of other three crops. Paddy, coconut and arecanut farmers are using approximately the same amount of NPK chemical fertilisers as suggested. The diversification of crops towards rubber and the consequent heavy application of chemical fertilisers is resulting in soil pollution which is a great threat to the agrarian economy of the State.

Land degradation is measured on the basis of decline in soil fertility status and is calculated by the average soil fertility status of the four crops, namely, paddy, coconut, arecanut and rubber for the period 2000 to 2009. The soil fertility status is evaluated by analysing the PH status and NPK status. The analysis reveals that (i) though PH status is decreasing over the years in all crop growing areas, the decline is severe in rubber cropped systems, (ii) the continuous decline of soil health and soil fertility in general and the decline of P and K soil status in particular is observed in the rubber cropped areas compared to other cropped areas.

Average groundwater level during 1998 to 2009 shows that the water level in rubber growing areas is very low (below four meters) compared to rice, coconut and arecanut growing areas.

The change in cropping pattern has also led to food security problem. The conversion of rice lands decreased the supply of rice in Kerala and widened the supply demand gap of rice. During 1960-61, the shortage of rice was 40.12 per cent of the total demand and it increased to 83.45 per cent in 2009-10.

These findings clearly reveal the implementation of an appropriately devised nutritional management programmes in the State of Kerala. This comprises soil testing, distribution of soil health cards to all farmers, creating awareness on farm nutrition management, effective monitoring, etc. Adequate soil testing facilities within the easy reach of the farmers would need to be provided to enable them to get their soil tested for efficient fertiliser usage. This would need to be supplemented by appropriate extension facilities to make the farmers understood the necessity of following the recommendations of soil testing. Fertiliser usage should be on the basis of these recommendations. The effective coordination of various research institutions, government departments, local administrative bodies, etc., should be strengthened and encouraged in this regard.

Attention should be given to the balanced use of fertilisers for crops in the State. To improve efficiency of fertiliser use, what is really needed is location-specific research on efficient fertiliser practices such as correct soil testing practices, correct use of balanced nutrients (in the form of organic manures, chemical fertilisers, lime, etc.), correct timing and

placement of fertilisers, monitoring of the overuse or under use of fertilisers, availability of improved fertilisers, development and efficient use of physical and institutional infrastructure, etc.

Agriculture is the biggest user of water, and it is revealed that groundwater level is decreasing in the crop growing areas and it is very acute in rubber cropped areas.To increase the recharge of groundwater in the rubber cropped areas various water recharging methods should be practised. For that the existing programmes in the State should be extended to all areas.

In the paddy sector, strict enforcement of various laws relating to land use should be followed.There is a need to enhance the positive contributions that agriculture makes to the environment. At the same time environmental protection and sustainability are to be adopted in the overall planning for agricultural growth and development. Development and usage of agro-chemicals and organic manures, strengthening of integrated plant nutrient system, monitoring of the usage of chemical fertilisers and pesticides, etc., should be practised in the agricultural sector of Kerala.

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BIODIVERSITY CONSERVATION AND LOCAL LIVELIHOODS: A STUDY ON SIMILIPAL BIOSPHERE RESERVE IN INDIA

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ABSTRACT

Over-exploitation of natural resources and changing climatic conditions due to global warming are responsible for rapid loss of biological diversity. Creation of protected areas (PAs) across the globe which forms a critical component in global biodiversity conservation efforts are primarily designed for preventing further loss of species by restricting human use of natural resources. The Similipal Biosphere Reserve (SBR) in the Indian State of Odisha is the sixth largest biosphere reserve in the country and forms a major part of the World Network of Biosphere Reserves. However, currently the reserve is under increasing pressure from growing human population that directly depends on the reserve for their livelihoods. The objectives of the present study are to develop a comprehensive understanding of the problems facing the SBR; and identify and analyse different factors that determine the extent of dependency of villages located in and around the reserve for extraction of non-timber forest products (NTFPs). The paper reviews the existing studies on the SBR by using the DPSIR framework for an in-depth understanding of interaction between local population and the biosphere reserve. Econometric techniques and descriptive statistics are applied to analyse the secondary data collected from 136 villages located in and around the reserve. The results show that economically poor villages and villages having more male members are likely to extract more NTFPs from the reserve. Villages located in transitional and buffer zones are likely to extract more NTFPs compared to villages that are in core zone. Designing appropriate and effective local institutions that would foster biodiversity conservation as well as livelihoods and structure the community behaviour are widely considered as the panacea for this problem.

Introduction

The basic human life-support systems of the biological environment have always been characterised by change - an inevitable consequence of all anthropogenic factors. In recent years, many scientific reports have pointed out that the loss of biodiversity in terms of extinction of species has increased dramatically, largely due to increasing human intervention in the natural environment (Vitousek et al., 1997; Pimm, 2001; Agarwal and Gibson, 1999) resulting in various social conflicts (Kothari, 1999) and ecological disruption.

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The authors would like to thank Profs. K.B.L Srivastava, Pulak Mishra, Ashok Mishra and M. Padmavati for their useful suggestions on the earlier versions of this paper. The authors are also grateful to the anonymous referee of this Journal for the constructive comments which have helped to improve the paper immensely. However, the usual disclaimers apply.

Forest dwelling communities and indigenous tribes have for centuries depended on forest resources for their livelihoods. There has been increasing interest in the contribution that natural forests make to local employment and income generating activities (Arnold and Towns, 1998; Chileshe, 2005). The people inhabited in and around the protected areas (PAs) live in a subsistence economy with little or no access to market, education, health and other sanitation services and try to improve their living standards by extracting more forest resources (Godoy et al., 1998; Cavendish, 2000; Fisher, 2004) that may result in serious implications on conservation of biodiversity and natural habitats. Nevertheless, the PAs are subjected to pressure from these human extractions/dependencies in terms of grazing, cutting trees for firewood and timber, extraction of non-timber forest products (NTFPs), hunting, etc (World Bank, 1995; Amacher et al., 1999; Heltberg et al., 2000; Linde-Rahr, 2003).

However, empirical studies show that human dependency is high for collection of NTFPs (Heltberg et al., 2000; Heltberg, 2001; Amacher et al., 1999; Linde-Rahr, 2003; Shah, 2007). There is a growing consensus among researchers that NTFPs contribute significantly for rural livelihoods (Cavendish, 2000; Cocks et al., 2008). But, there exists a two-way relationship between extraction of NTFPs, particularly fuelwood collection and deforestation. On one hand, the demand for fuelwood from village commons and forests is the prime cause of forest degradation and on the other hand, increasing fuelwood scarcity is the result of perpetuation of forest degradation as it is the main source of energy for local people (World Bank, 1995; Heltberg et al., 2000). This phenomenon operates in PAs and thereby PAs face tremendous pressure from human population. Studies find that excessive resource extraction for human livelihoods not only affect the tree species and their compositions but also have adverse impact on wildlife, invertebrates and the environment (Shaanker et al., 2004; Shahabuddin and Kumar, 2007)[2].

However, the restrictions imposed both by the Central and local governments on PA forest resources lead to clashes and confrontation between local people and PA managers and many times result in acute human-wildlife conflicts. Hence, it has been argued that the local or indigenous people and their social, physical, and economic well-being should be realised from the perspective of a holistic conservation effort (Sanderson et al., 2002; Sanderson, 2005; Redford and Fearn, 2007). It is widely accepted that local support is a critical factor in successful management of PAs (Wade, 1988; Ostrom, 1990; Bromley, 1992; Baland and Platteau, 1996; Bashir, 2000). Local support or at least acceptance of conservation will be achieved if the attitude of the people can be changed by promoting non-farm activities, such as tourism, alternative employment opportunities, etc., i.e., making them a shareholder in net conservation benefits or at least involving them in low or no costs (Katrina, 2000; Sekhar, 2003; Sekhar, 2003; Nji, 2004; Macura et al., 2011). However, promotion of such policy requires deeper understanding of the interaction between the human population and the biosphere reserve. In other words, it is important to examine the basic social and economic characteristics of the villages that are located in and around the biosphere reserve and how these factors shape the use of resources from the biosphere reserve.

On the basis of above discussions, the present paper makes an attempt to examine these issues in the context of Similipal Biosphere Reserve (henceforth SBR) in the Indian State of Odisha. The aim of the study is to develop a comprehensive understanding of the complex relation between human population and the SBR using the DPSIR framework; and identify and analyse different factors that determine the extent of dependency of villages located in and around the SBR on the reserve for extraction of

NTFPs, using secondary data collected by Indian Institute of Forest Management (IIFM) in 2007-08.

Study Area Description

The selection of SBR as the study region is justified on the following grounds. The SBR covers an area of 5569 km2 and is located in the northern part of the Eastern Ghats of the Indian State of Odisha (200 17'- 220 34' N and 850 40'-870 10 E'). It is the sixth largest biosphere reserve in the country, recognised as one of the first nine prime areas for tiger conservation programme. The forests of Similipal were once leased out during 1890. In 1907, 1152 sq. mile of forests was notified as reserve forests abandoning leasing of timber logging awarded to private companies (Senapati & Sahoo, 1967). The first systematic forest management was initiated through the working plan of JJ Hart in 1909. It was officially designated as a 'Tiger reserve' in 1956 and included under national conservation programme 'Project Tiger' in 1973. The Government of Odisha declared Similipal as a wildlife sanctuary in 1979 with a designated area of 2750 sq. kms. The sanctuary has a core area (845.70 sq. kms.) which has been accorded a national park status by the State Government, without a final notification though, by the Indian Government due to non-eviction of all villages from the core out of the designated park area. The Similipal Tiger Reserve (STR) along with a transitional area of 2250 sq. kms has been declared as a 'Biosphere Reserve' in 1994. UNESCO added the biosphere reserve to its list of biosphere reserves in May 2009. STR is one of such rare PAs to be declared as a biosphere reserve, sanctuary and designated national park having both 'Project Tiger' and Project Elephant', two flagship conservation programmes.

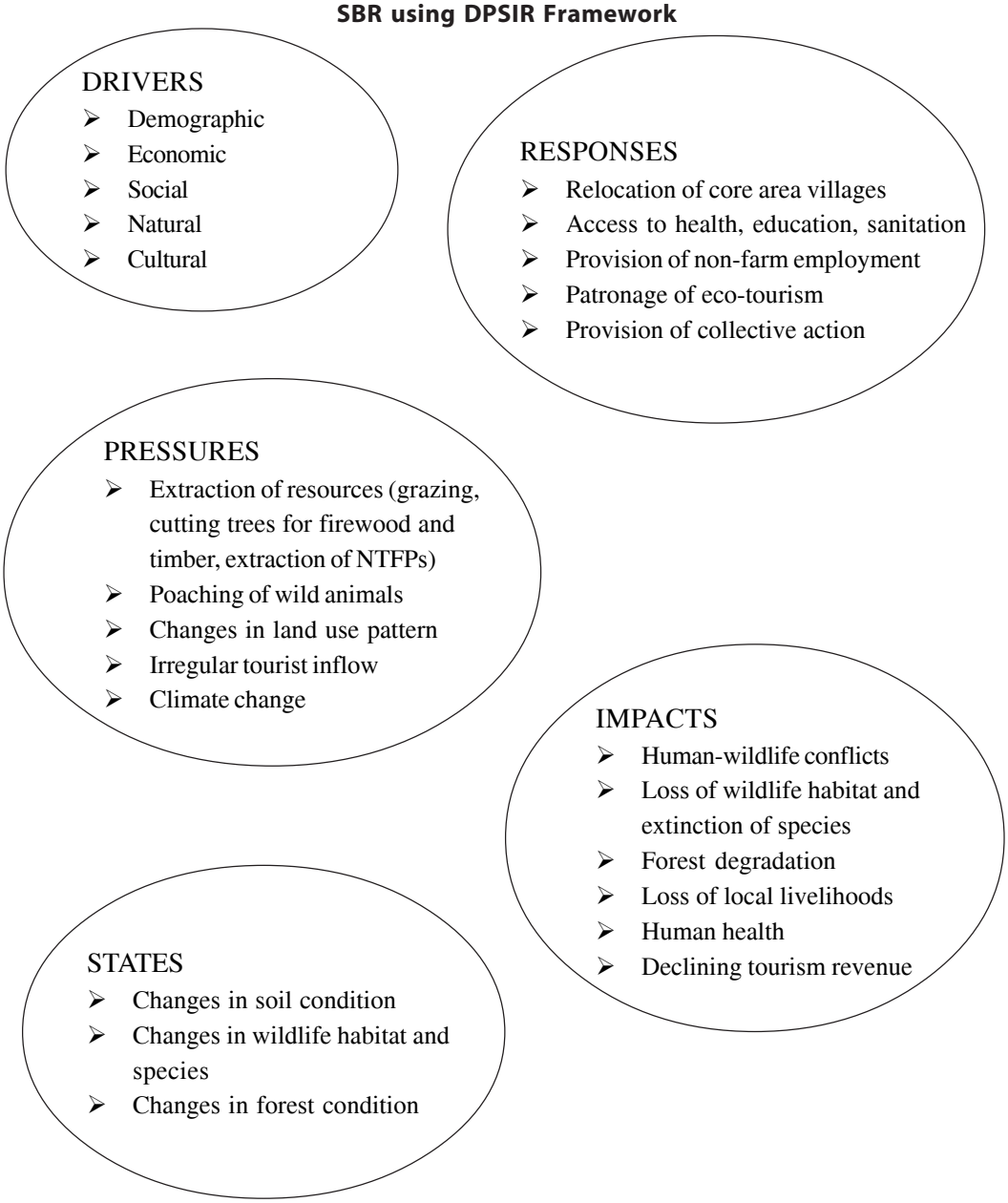
The reserve is dominated by sal (Sho-rea robusta) forests with semi-evergreen, moist and dry deciduous vegetation. The area is the abode of 1076 species of vascular plants representing 170 families of which 64 species are cultivated plants and 96 are orchids (Mishra, 2010). Among 41 species of medicinal plants of Odisha prioritised for conservation action (ibid), 30 are known to occur in Similipal. It is home to 42 species of mammals, 242 species of birds and 30 species of reptiles. As a major tiger habitat, it is estimated to have 99 Royal Bengal Tigers and 432 wild elephants (Census, 2007).

The SBR falls under one of the Schedule V areas (tribal sub-plan area) of the State as majority of inhabitants are tribals. There are 1265 villages inside the SBR with a total population of 4.62 lakhs of whom 73.44 per cent belong to scheduled tribes (Census, 2001). Out of 1265 villages, 65 villages are situated inside the Sanctuary area of which 61 villages are in the buffer area and remaining three villages are in core area. The total population of villages located in buffer and core area is 12000 and 449, respectively (ibid). In buffer area, the percentage of scheduled tribes is 87 while in core area it is 100 (ibid). However, the reserve is facing heavy dependence of local tribal population residing in and around the biosphere reserve for their daily livelihood, which is putting enormous pressure on the reserve.

Human-nature Interaction in the SBR: A Review of Literature Using the Driver-Pressure-State-Impact-Response (DPSIR) Framework

The present study uses the DPSIR[3] framework in order to understand the relation between the conservation of biodiversity and local livelihood implications in the SBR and identify and analyse important factors of Driver-Pressure-State-Impact-Response. For this the study takes the help of existing literature and secondary data on socio-economic and demographic factors from the region. The summary of the analysis of the DPSIR framework are presented in Figure 1.

Figure 1: Understanding the Biodiversity Conservation in SBR using DPSIR Framework



Driving Forces : One of the major driving factors putting pressure on the SBR is the tremendous increase in population in and around the SBR. The total population of the entire biosphere reserve is around 4.62 lakhs (Census 2001), which has increased by around two times compared to the previous census (Census, 1991). Besides, the tribal population constitutes around 74 per cent of the total population who depend largely on the reserve for daily subsistence

(Vasundhara, 2006; Mishra, 2010). A study conducted by Vasundhara (2006) exhibits that the forest produce constitutes more than 50 per cent of the local household income in Similipal. The sheer increased number of people and their growing need for subsistence affect biodiversity, both directly and indirectly. One of the direct consequences of increased population growth has been the expansion of agriculture activities in and around the SBR. Agriculture and animal husbandry alter the biological diversity by destroying or modifying the native biota (Rath and Sutar, 2004). Around 20 per cent of forest land within the biosphere reserve has been reported encroached by local people for agriculture activities since 1995 (ibid). Though grazing is prohibited in the core area of Similipal Sanctuary, around 50,000 livestock graze inside the reserve daily (Singh, 1999). Cattle from up to a distance of 5-7 km from the Reserve boundary also graze inside the reserve (ibid) which exert pressure on the SBR. The livestock population in the core area has also been increased around three times since 1991 (Rath and Sutar, 2004; Rout, 2008).

Poor infrastructure facilities, non-availability of basic amenities and conflicting interests between local people and the forest department officials, which often create space for naxal activities[4], have collectively put enormous pressure on the biosphere reserve. Moreover, the frequent forest fire by the NTFP collectors, smugglers, poachers and grazers, adversely affect the condition of SBR. Between the years 1991 to 2000, around 100 sq km of forest was burnt due to forest fire (Rath and Sutar, 2004). Poaching of wild animals as a cultural practice, locally known as Akhand Shikar, [5] add additional pressure to the SBR. Further, the local village level institutions (both formal and informal) functioning inside SBR fail to address these problems adequately (Vasundhara, 2006). Besides, the natural drivers, such as droughts[6], foster pressure on SBR.

Pressures : The major pressure that the SBR faces is because of the extraction of forest resources by local people. Fuelwood[7] is found to be the single most energy source for people living inside the reserve (Vasundhara, 2006). Livestock population in the SBR has increased substantially, which has led to over-grazing of forest pastures (Singh, 1998). Often the domestic cattle stray into the tiger habitat for grazing because of shortage of fodder in buffer zone resulting in cattle lifting and hence, economic loss to local people. Between the year 1990 and 2000 the total number of cattle killed in such cases was 219 (Rath and Sutar, 2004). Besides, encroachment of forest land area for cultivation by local people has changed the land use pattern. The Maoist attack in different parts of the SBR (specifically on the tourist guesthouses), affected the tourist inflow into the reserve during 2009-10. All these pressures adversely affect the state of environment of the biosphere reserve.

States : The above mentioned pressures have adversely affected the state of the environment of the SBR. The loss of forests and forest cover, and degradation of dense forest have reduced the wildlife habitat, specially the habitats of elephants, mammals and reptiles and many endangered species (CSE, 2002). Again the loss of forest cover and forest areas have its impact on the life of people who largely depended on forest products. As a result of massive degradation of forests and dwindling livelihood options, some people migrated to nearby urban areas for seeking jobs or working as labourers. Forest cover loss also affected the climate of the region in general and of the SBR in particular (World Bank, 2008). Besides, the natural and man-made forest fire especially during summer have reduced flora in mountain and forest areas bringing soil erosion, loss of soil and have threatened wild animals (Rath and Sutar, 2004). Finally, it is to be noted that pressures from human activities have changed and is also changing the biological, physical and chemical conditions of the SBR.

Impacts : The changing biological, physical and chemical conditions of the SBR have resulted in serous impacts on wildlife and human livelihoods. In fact, the altered state of the environment in the SBR has disturbed the human-wildlife ecological equilibrium. The forests of the reserve have been reduced by 30 per cent during the last 30-40 years causing a decline in wildlife population by 50 per cent (Rath and Sutar, 2004). Again, the percentage change in the dense forest area declined from -3.01 per cent in the year 1984-85 to -2.88 per cent in the year 2004-05. Forest degradation and deforestation also affected the social cohesion. Resource scarcity resulted in conflicts between forest department and local people and breaking down of local institutions. The SBR witnessed increasing trend of human-wildlife conflicts in and around the reserve. Though death due to wild animal attack [8] is less in number, the crop raiding by the elephants is a common event inside the reserve (ibid). The declining ecosystem services of the SBR owing to forest degradation and deforestation, dwindling agricultural products, non-availability of basic amenities and poor sanitation are the major cause of malnutrition in the SBR (Vasundhara, 2006). Repeated forest fire[9] severely damaged the flora and fauna in several parts of the SBR (CSE, 2002). Although population of leopards and other wild cats increased in Similipal, the population of tiger has not increased to such extent and the reason is attributed to the human interference in the tiger habitat (Rath and Sutar, 2004). Wild dogs have become rare and even hares are no more frequently met within the denuded area (ibid). Moreover, the declined tourist inflow into the reserve in 2009 due to Maoist violence adversely affected the revenue from eco-tourism which further affected the development projects in the region (Government of Odisha, 2008).

Responses : In response to the above problems, the biosphere authorities, in particular, and the government of Odisha, in general, have taken a few corrective measures. One of the important steps that the SBR authority has taken is the relocation[10] of core area villages where the density of wildlife population is high and the negotiations with other three villagers are on for relocations. Several other steps that are taken by the authority are the provision of better access to health, education and sanitation; provision of non-farm employment to local people in order to reduce the dependency on forest resources; patronage of eco-tourism inside the SBR which has huge potential to improve local livelihoods and formation of local institutions[11] for better conservation activities. Efforts are also being made towards providing wildlife education, spreading awareness, research and training for local people by different government organisations and NGOs (Rout, 2008). Though many development activities are being run by the government towards the livelihood improvement and biodiversity conservation, how effective these initiatives are in meeting the requirements needs further examination. However, the responses from both Central and the State governments to the threats of loss of biodiversity especially to the wildlife, have led to the completion of many projects for conservation of wildlife. 'Project Tiger', a major conservation initiative of the Government of India, was launched in 1973 to save the tiger from extinction. Similipal tiger reserve was one of the nine such reserves chosen in the country for launching the Project Tiger. Again, the 'Project Elephant' as a conservation strategy for elephant and its habitat was launched in 1992 and over 7000 sq.km of Similipal area was added to it. Besides, the Mugger Crocodile Project was introduced in Ramtirtha area of Similipal in order to provide protection to the endangered Crocodiles. However, the SBR requires more measures for the in-situ protection of forests, conservation of a number of endangered and medicinal plants and also towards the improvement of local livelihoods of the indigenous people living inside the reserve.

Although the DPSIR framework provides a complete and integrated analysis of factors

affecting biodiversity conservation, the present study primarily focuses on the link between the driving forces and the pressure exerted on the reserve and suggests some suitable responses/ policy measures. In this context, we have made an attempt to identify and analyse the factors that influence the extent of extraction of NTFPs by villages located in and around the SBR using village level secondary data.

Understanding the Factors Affecting the Extraction of NTFPs by Villages in the SBR

As mentioned above, people living in and around the SBR are critically dependent on forests for their livelihood. It is found that 50 per cent of annual household income comes from forest, 20 per cent from agriculture and the remaining 30 per cent comes from wage labour (Vasundhara, 2006). Further, income from forests are largely derived by selling honey, Sal seed, Jhuna (Sal Latex), Paluo, Sal Leaf, Siali leaf, Siali fiber, etc[12].

The present study is the first attempt to understand the village characteristics of resources extraction in the SBR. Various factors may influence household utilisation of forest resources. What follows is a brief review of related literatures from different regions.

It is observed that households with larger size collect more forest products and clear more forest as compared to smaller size households primarily because these households have more workers and more mouths to feed (Almeida, 1992). Studies found that larger families have a greater demand for natural resources and more labour to fulfill this demand, leading to higher forest income (Almeida, 1992; Adhikari et al., 2004). However, it appears that household composition, gender and age structure are more important than the mere numbers (ibid). Having more number of female population in a household implies more dependency on forest produce as in a male dominated society females are engaged in the collection of NTFPs while males are involved in other income generating activities (Heltberg et al., 2000).

Studies found that education makes fuelwood collection increasingly unprofitable due to higher opportunity costs of labour as education creates opportunities for off-farm employment, self-employment and facilitate out-migration for better jobs that reduce dependence on forest resources (Godoy and Contrer, 2001; Adhikari et al., 2004). Better-educated households have more access to a wider range of income opportunities and thus lower forest income (Godoy and Contreras, 2001; Adhikari et al., 2004; Fisher, 2004).

The relationship between the landholding size of a household and dependency on NTFPs is an ambiguous one. Few empirical studies suggest that higher the landholding size, the more forest resources will be required to maintain fertility (Adhikari et al., 2004; Adhikari, 2005) whereas others opine that higher crop income from more land leads to lower relative forest income (Blaikie and Coppard, 1998) or the households with less land use forests more (Fisher, 2004). With regard to livestock holding, it is found that the more livestock may require more forest resources required as feed (Adhikari et al., 2004; Adhikari, 2005) and more collection of forest products during herding (Olsen and Larsen, 2003) whereas more livestock population constitute a major household asset endowment and thereby higher livestock income leads to lower relative forest income (Rayamajhi et al., 2012).

As a whole, higher total household income (and wealth) in the form of improved off-farm employment opportunities (Angelsen and Kaimowitz, 1999), access to credit and better agriculture production may reduce dependency on forest resources. As income rises, the importance of NTFPs in the household economy shrinks, as the economic importance of other income sources, such as agriculture, wage employment and self-employment would rise relative to the income from environmental resources (Godoy et al., 1998). On the other hand, better asset endowments allow households to

exploit more forest resources and thus higher income from NTFPs (Escobal and Aldana, 2003). So, the relationship is ambiguous in nature.

In addition to the internal factors discussed above, external factors, such as market access, influence household decisions towards the use of forest resources in a significant way.It is found that greater access to market may often accelerate forest extraction and induce people to earn more income by selling forest produce in the market (Angelsen and Kaimowitz, 1999). Whereas, others suggest that good market access imply lower forest income as alternative income opportunities are better (Ndoye and Kaimowitz, 2000). Hence, the relationship between market access and NTFPs income is assumed to be ambiguous.

Methods and Data : The data used in this study were extracted from a report [13] prepared by the Similipal Forest Department with the help of Indian Institute of Forest Management (IIFM), Bhopal. The report contains the data related to basic socio-economic characteristics and the market value of NTFP collection of 136 sampled villages located in and around the SBR. The data were collected during the year 2007-08 from three zones: core, buffer and transitional. The sampled villages were distributed across the three zones in the following way. From the core zone all the four (100 per cent sample) villages were selected. From the buffer zone out of 61 villages, 12 villages (20 per cent sample) were sampled using random sampling technique. In the case of transitional zone, out of 1200 villages, 120 villages (10 per cent sample) were sampled for data collection. Although data set has few limitations in terms of restricted number of variables, in this paper we have made an attempt to identify and analyse factors that are likely to affect the extent of extraction of NTFP collection by these villages for a better understanding of the relation between driving forces and pressure.

Variable Description and Hypotheses : In order to understand the level of dependency of local villages on the SBR we have used two dependent variables: (1) average income of the village from the collection of NTFPs and (2) total average income of the village. The idea is to identify and analyse the characteristics of villages that are more likely to depend on the SBR and derive policy implications for reducing pressure on the same. With regard to independent variables several socio-economic and geographical characteristics of sampled villages are considered and hypothesised as under. Average household size of the village is hypothesised to have a positive impact on NTFPs income as larger families demand more natural resources leading to higher income from NTFPs.

Number of females in a family is expected to have a positive effect on household's NTFP income as it is observed in studies that female members are involved more in collecting NTFPs from the forest compared to their male counterparts. This is because male members are usually involved more in agriculture, wage earning and in other non-farm employment activities (Heltberg et al., 2000). Following the dominant view in the literature, the total literacy rate in the sample village (as a proxy for education) is hypothesised to have a negative impact on the NTFPs income. As the members of a family become educated, the dependency on forest shrinks gradually because of higher opportunity costs involved as better employment opportunities can be had outside (Godoy and Contreras, 2001; Adhikari et al., 2004; Fisher, 2004).

Landholding size is another important factor hypothesised to influence household NTFPs income. Some are of the opinion that landholding size has a negative impact on forest dependency, while others find a negative relation between the two. Hence, the relationship between landholding size and NTFPs income is assumed to be ambiguous. Same relation is being observed with regard to livestock holding and NTFPs income (Adhikari et al., 2004; Adhikari, 2005; Rayamajhi et al., 2012). The

distance of the community to the nearest market is used as a proxy for market access, whose relation with the forest dependency is also ambiguous.

With regard to the understanding of share of NTFPs income in the total household income, which includes livestock, agriculture and non-farm activities, we have included, as mentioned above, the average total household income of the village as one of the dependent variables and regressed with a host of independent variables, including the average NTFP income. It is expected that in subsistence economy, such as in Mayurbhanj, the share of NTFP income in the total income would be a significantly positive one.Table 1 presents the description of variables included in the econometric analysis of determinants of average NTFPs income and average total income.

Table 1: Description of Variables Included in the Econometric Analysis of Determinants of Average NTFPs Income and Average Total Income

Variable	Definition	Expected Effect on Average NTFPs Income	Expected Effect on Average Total Income
Ln NTFPs Income	Log of average household income obtained from the selling of NTFPs in the prevailing market price (in rupees) per village	Dependent Variable	?
LN Total Income	Log of average household total income (sum total of average household agriculture income, livestock income, NTFPs income and others) in rupees per village	?	Dependent Variable
Ave. Fuelwood consumption	Average household consumption of fuelwood per week (in kg)		?
People involved in wage earning	Number of people involved in wage earning (either in government or in private jobs) per household		+
Female Population	Number of female members in a household		+
Total Literacy rate	Percentage number of people with the ability to read and write in a village	?	+
Ave. Landholding Size	Average household landholding in acre	?	+
Ave. Livestock population	Average number of livestock population per household	?	+
Distance to nearest Market	Distance to nearest market (in km)	?	+
Ave house hold Size	Average number of household population	+	?
D1	Dummy variable= 1, if the village is coming under transitional zone and 0, otherwise	?	
D2	Dummy variable= 1, if the village is coming under buffer zone and 0, otherwise	?	

The relationship between the dependent and the above mentioned independent variables can be estimated by using the ordinary least squares (OLS) regression. The basic OLS estimation for the determinants of average NTFPs income and the average total household income takes the form:

$$\log \text{NTFP Income} = \alpha + \beta_1 \text{aveHHsize} + \beta_2 \text{female HHpo p} + \beta_3 \text{total literacy} + \beta_4 \text{aveHH land size} + \beta_5 \text{aveHH livestock pop} + \beta_6 \log \text{total income} + \beta_7 \text{market distace} + \beta_8 D1 + \beta_9 D_2 + \varepsilon_1 \quad \ldots\ldots\ldots\ldots (1)$$

$$\log \text{total income} = \alpha + \beta_1 \text{total literacy} + \beta_2 \text{aveHH fuel wood cons} + \beta_3 \text{aveHH size} + \beta_4 \text{aveHH land size} + \beta_5 \text{aveHH livestock pop} + \beta_6 \text{wage earners HH} + \beta_7 \text{market distance} + \beta_8 \log \text{NTFP income} + \varepsilon_2 \quad \ldots\ldots\ldots\ldots (2)$$

Table 2 : Summary Statistics of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Ave. Fuelwood consumption_HH	136	131.871	82.759	0.000	514.000
People involved in wage earning_HH	136	2.053	1.090	0.000	6.329
Ln NTFPs Income_Vilage	136	7.419	1.741	1.000	10.922
LN Total Income_Vilage	136	8.372	0.939	5.513	10.937
Female Population_HH	136	2.789	0.805	1.000	6.651
Total Literacy rate_Vilage	136	36.741	18.780	2.500	100.000
Ave. Landholding Size_HH	136	1.285	1.547	0.333	11.000
Ave. Livestock population_HH	136	10.831	7.982	2.000	57.000
Distance to nearest Market (km)	136	13.199	16.133	1.000	120.000
Ave HH Size	136	5.640	1.524	3.000	13.000

Descriptive statistics of the variables used in the models are provided in Table 2. As can be observed, the average household size of the sampled villages in and around the SBR is 5.64. Literacy rate in these villages are 36 percentage, which is significantly low compared to the district and State level. The average distance to market is found to be 13 kms, which suggest that villages are having no easy access to market.

Results and Discussion : Table 3 presents the results of OLS model of the determinants of the income from NTFPs collection in the SBR. Overall, model is found to be highly significant with an r-square of 78 per cent.

The number of women in household has a negative (contrary to the expected effect) and significant (at 10 per cent level) effect on NTFPs income, indicating that male members in the family are more likely to play role in the NTFPs collection, and thus the income. Average landholding size of the household has a significant negative (at the level of 5 per cent) on the NTFPs income, meaning that more the land, the less will be the dependency on forest produce. Because the household having more landholding may be getting better agriculture produce or involved in productive farm activity. The average livestock population per household is found to have a positive significant (at 10 per cent level) effect on forest produce, indicating that the local households are extracting more forest resource to feed and herd the livestock and thereby getting more income by selling animal products.

The total income per village has a positive effect on the income from NTFPs and the effect is highly significant at 5 per cent.This indicates that the increase in total income (including agriculture, livestock, wage earnings, etc.) does not reduce the village dependency on the forest produce and more forest extraction leads to higher NTFPs income. This may be because of the fact that collection of NTFP may not involve cost to the households, except opportunity cost of time, which may attract households' labour allocation to this activity.The two locational variables are found to be significant and have positive effect on forest dependency. The villages coming under the buffer and transitional zone are highly dependent on the forest produce and getting more income from NTFPs collection compared to the core zone villages.This may be due to the fact that the buffer and transitional area villages might have better market access as compared to the core areas villages.

Table 3: OLS Regression Results of Determinants of Average NTFPs Income

Variables	Coef.	Std.Err.	t	P>t
D1	3.942	0.898	4.39*	0.000
D2	3.363	0.754	4.46*	0.000
Female Population_HH	-0.360	0.211	-1.70**	0.091
Total Literacy rate_Vilage	0.001	0.004	0.24	0.809
Ave. Landholding Size_HH	-0.394	0.113	-3.50*	0.001
Ave. Livestock population_HH	0.018	0.011	1.63***	0.105
LN Total Income_Vilage	1.338	0.081	16.52*	0.000
Distance to nearest Market (km)	0.003	0.005	0.61	0.542
Ave HH Size	0.163	0.113	1.45	0.149
Constant	-7.245	1.234	-5.87*	0.000
Number of obs	136			
F(9, 126)	51.8*			
Prob > F	0.000			
R-squared	0.787			
Adj R-squared	0.772			
Root MSE	0.831			

Note: * 1% significance level; ** 5% significance level; *** 10% significance level.

Table 4 presents the OLS results of determinants of average total income of the villages in and around the SBR.The overall model is highly significant with an r-square of 69 per cent.

The coefficient of income from NTFPs has turned out to be positive and highly significant (at 1per cent level or less) indicating that the collection of NTFPs forms a significant part of household income. This means higher the income from NTFP higher is the total income of the village/household. The average household size has a significantly (at 10 per cent level) positive impact on the total income, meaning that the larger the household size, the more the average total income of the household. This is

because more people will be engaged in income generating activities (particularly in the collection of NTFPs) leading to higher total income. Average landholding size has a highly significant (at 1per cent level or less) positive impact on total income indicating that households having more lands are likely to have more average total income. This may also mean that the share of income from agriculture is likely to be more as the landholding size is more.The distance to nearest market place has a significant (10 percent level) negative effect on total income, indicating that the village households nearer to market places are likely to have more income in comparison to the far away village households. This is obvious because households closer to market can sell their products easily and hence have more income.

Table 4: OLS Results of Determinants of Average Total Income

Variable	Coef.	Robust Std.Err.	t	P>t
Total Literacy rate_Vilage	-0.001	0.003	-0.310	0.756
Ave. Fuelwood consumption_HH	0.001	0.001	1.210	0.230
Ave HH Size	0.058	0.030	1.960***	0.052
Ave. Landholding Size_HH	0.380	0.061	6.270*	0.000
Ave. Livestock population_HH	-0.001	0.007	-0.130	0.896
People involved in wage earning_HH	-0.021	0.047	-0.440	0.659
Distance to nearest Market (km)_Village	-0.006	0.003	-1.780***	0.077
Ln NTFPs Income_Vilage	0.478	0.054	8.790*	0.000
constant	4.087	0.413	9.890*	0.000
N	136			
F (8,127)	22.85*			
Prob>F	0.000			
R-square	0.689			
Root MSE	.54			

Note: * 1% significance level; ** 5% significance level; *** 10% significance level.

Conclusions

In this study we have made an attempt to understand the complex relationship between biodiversity conservation and promotion of local livelihoods in SBR using secondary literature and information. First, we have reviewed the existing empirical studies on the SBR systematically by using the DPSIR framework in order to have a comprehensive and clear understanding of the various interactions between biodiversity conservation and local livelihoods. Second, by using the secondary data of 136 villages located in and around the SBR, the study analyses various factors that influence the extraction of resources from the SBR with the help of econometric tools (OLS regression).The analysis of DPSIR framework provided a broader understanding of how the driving forces, such as changing population dynamics, increasing economic activities, rising social tensions, etc., have put enormous pressure on the SBR leading to change in the state of the environment which has resulted in various impacts, such as loss of habitats and wild species and loss of livelihoods and so on.

The empirical results suggest that villages located in and around the SBR are

dependent more on the reserve for their sustenance. More importantly, the results suggest that the villages having low landholding size are likely to extract more NTFPs from the reserve which indicates that poor villages are dependent more on the SBR. Because of low opportunity costs involved in collection of NTFP the share of NTFP income to the total income of the household increases as the total income rises. Interestingly, villages located in buffer and transitional zones extract more NTFPs compared to the villages located in core zone of the SBR. This can be attributed to the fact that villages located in transitional and buffer zones are having relatively easy access to market as compared to the core zone villages. Therefore, it is essential to take necessary measures in order to reduce anthropogenic pressure on the SBR.

In this context, the first set of measures should be adopted for reducing the direct household dependency on the SBR for livelihoods. The measures could be in the form of the provision of non-farm activities in tourism sector (Hvenegaard & Dearden, 1998; Bookbinder et al., 1998; Gossling, 1999; Sekhar, 2003), promotion of local handicrafts industries, engaging local people in various forest activities including patrolling and infrastructure development works, etc. In addition, access to education can also go long way in providing alternative livelihood opportunities to the local people. The second set of measures should be framed for promoting sustainable use and management of the SBR. In this context, attention must be focused in strengthening local level community and/or village institutions that can restrain excess use of resources from the reserve by framing rules and regulations (Ostrom, 1990; Heltberg, 2001; Adhikari, 2005; Behera, 2009). As indicated, a variety of local level community institutions (e.g., JFM, EDC, green gaurd) exists in and around the SBR but majority of them are often found to be not effective. Devolving sufficient property rights over forest resources to local communities may help secure their broad-based and active participation in decision making process, which may result in positive change in the attitude of local population towards conservation of biodiversity, as experienced in African countries where forest department and local communities are managing the wildlife jointly. In this regard, the role of NGOs and forest department is critical in evolving co-management system for wildlife and its habitats.

Notes

1 According to the World Bank (2002), more than 1.6 billion people throughout the world rely heavily on forests for their livelihoods and some 350 million people depend only on forests, both for their subsistence and income (Mahapatra et al., 2005; Howell et al., 2010). It is found that more than 65 per cent PAs are characterised by human settlements and resource use (World Bank, 1995) who use forest extensively (Godoy et al., 1998; Cavendish, 2000; Fisher, 2004).

2 For instance, over-grazing by cattle and removal of dead branches and dry leaves from the ground can alter the nutrient dynamics and constant movement of livestock and humans inside the PAs may disturb the normal life of the wild habitats (Sekhar, 1998).

3 The European Environmental Agency (EEA) introduced the DPSIR (Driving Forces- Pressures-State-Impacts- Responses), a conceptual framework describing the environmental problems and their relationships with the socio-economic indicators (See Figure 1). According to the DPSIR framework, social and economic developments (D) put Pressures (P) on the environment, leading to the physical, chemical or biological change in the State of the environment. This

leads to Impacts on ecosystems, human health, and society, which require a societal Response (R) based on Driving Forces, State or Impacts indicators through various mitigation, adaptation or curative actions (Gabrielsen and Bosch, 2003; Maxim, 2009).

4 The savage Maoist attack in the year 2009 has severely destroyed the reserve's infrastructure.

5 Akhand Shikar' is considered to be one singular custom that results in large-scale killing of wild animals.

6 According to Kanungo (2010), 2,460 villages in Mayurbhanj district in which the SBR falls are found to be highly affected by frequent occurrences of drought.

7 Almost 100 per cent households living in and around the SBR use fuelwood as major energy source (Vasundhara, 2006).

8 Most of the cases of tiger attack happened between 1973 and 1990 when more than six deaths were reported and, a few persons have been injured or killed by elephants attack (Singh, 1999).

9 Between the years 1991–2000, around 100 sq. km. of forest was burnt due to forest fire (Rout, 2008) and is a major cause of soil erosion and death of ground flora and fauna.

10 Out of four villages inside the core area, one has already been displaced to the transitional area in 2010.

11 The Government of Odisha, through its Joint Forest Management (JFM) Resolution (2008), adopted eco-development programme as a strategy for securing support from local communities in PA management. Eco-development Comm-ittees (EDCs) along the lines of *Vana Surakhya Samiti* (VSS) provide a strong linkage between conservation and development in order to meet the ecological demands, as well as to protect the SBR.

12 It is also observed that in Khadia and Mankidia villages 60 to 100 per cent of the annual income of the families comes from forest produces (Vasundhara, 2006).

13 A socio-economic study on Similipal Biosphere Reserve (IIFM, 2007).

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Journal of Rural Development, Vol. 32, No. (4) pp. 427- 438
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HANDLOOMS FOR LIVELIHOOD IN NORTH-EASTERN REGION : PROBLEMS AND PROSPECTS

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ABSTRACT

The paper explores the problems and scope of handloom sector in north- eastern region of India for economic upliftment of the people. In NE region, women dominate the weaving occupation but in other States like Uttar Pradesh, Andhra Pradesh, Tamil Nadu, Odisha, West Bengal, Haryana and Karnataka, men play a major role in weaving while women are involved in pre-weaving. The women weavers of NE region perform multiple roles of being handloom producers and trading of handloom products. As there are no cloth mills, or large number of powerlooms in the region, weavers put their hard labour by working manually. In the process of earning income, they preserve our culture and heritage by laboriously producing traditional clothes. The integral role of women in handlooms in industrially backward States of NE region is worth studying. Handlooms being a traditional occupation, women find it convenient and safe to work. The region has contributed an important share in handloom sector in terms of number of employed or owning of looms. When the number of handloom weaver households decline in India, the region recorded increase of number of weaver households from first (14.6 lakh) to the third (15.1 lakh) census. But the sector is not progressing as expected. Income from handlooms and its contribution in the household economy is less as compared to other States. It is largely dominated by domestic production and part time weaving. Various issues like social and cultural aspects, demographic profile, production, employment, market structure, technology and skill are analysed for understanding the present condition of handlooms. The factors contributing in promoting handloom sector are identified so that mobilisation can be done for promoting it as a livelihood activity.

Introduction

The handloom sector has a long tradition of excellent craftsmanship in India. It is also the country's second largest employment generation sector next to agriculture. The weaving community consisted of a wide range of ethnic groups reflecting their caste and community identity in the weaving pattern, style and motif. It has been a traditional occupation for women who produce clothes for the family members. It is also a source of livelihood, especially in industrially backward States of morth -eastern region (NE region) of India for a large section of rural women. Welfare schemes, financial assistance and health insurance of weavers are some of the interventions for

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development of handlooms taken up by the government.The result of such interventions help the NE region occupy a remarkable place in the country in terms of number of handloom workers, number of handloom households and looms, yet the average working days are less as compared to other States. Owing to large domination of part-time weavers, the economic contribution from the weaving activity cannot be derived fully. Having said this, the region has tremendous potential in promoting handloom sector as a trademark of the ethnicity.There is no social stigma of a woman working as a weaver because culture demands that women know this occupation. In this mechanised and globalised market, the handloom sector is providing a refreshing change in unique manual skill and diversity. It can play a positive role for providing livelihood to a large section of women in NE region.

Objective : The objective of this paper is to examine the profile of handloom sector and its social relevance in the NE region from the following perspectives :

1. Social significance and potential of handlooms as a livelihood activity
2. Demographic and social profile of handloom weavers
3. Impediments in the growth of the handloom sector in NE region
4. To evolve a sustainable mechanism for promotion of handloom as a source of livelihood.

Methodology

As per the Handloom census 2010, out of 27.8 lakh handloom worker households in India, nearly 61 per cent belonged to NE region which comprises States like Arunachal Pradesh, Assam, Manipur, Mizoram, Meghalaya, Nagaland, Tripura and Sikkim. In terms of total workforce in handlooms, there are around 43.3 lakh weavers in India out of whom 21.6 lakh belong to NE region. It contributed half of the total workforce in handloom sector.The region is selected for a detailed analysis of the problems and potential of handloom production as livelihood of the weavers.The Handloom Census data of 2010 are presented to analyse the demographic, employment, income and organisation set-up of handloom sectors in NE region and compare these components with other States or national average. Literature related to the issue are reviewed to provide a comprehensive view of the problems of handloom production and suggestions are made for making it a valuable option for livelihood promotion.

Social Significance of Handlooms

In primitive society, when men were hunters and warriors, women were concerned with food gathering and sustaining agriculture. Women then started producing several crafts like pot making, leather making, house building and the technique of cordage weaving. Cordage weaving was the beginning of whole chain of great textile industry. Thus, women should be credited for developing the physics of spinning and the mechanism of loom (Reed 1970). Now it has become a part of the decentralised sector consisting of cloth production by family units. In the early seventies, the report on handloom sector of the high-powered committee under the chairperson of Mira Seth (Government of India 1974) described handlooms as 'a work of art craft as well as industry' representing 'one of the most aesthetic aspects of existence'. This perhaps still holds true even now. Despite fulfilling the basic clothing needs at home, or for ceremonial occasion or as a decorative piece, the hand-woven textile played a significant role in making our social and cultural identity, rituals and habitat. Among the tribal society of Tripura no right or ritual is sanctioned unless it is preceded by a worship of *Riha*, the hand –woven breast cover of the family elders. In Assam, the hand-woven cotton *Ghomsa* which symbolises respect and honour is used to welcome the guest on any occasion. It is also presented by the bride and bridegroom to the elders during the time of

marriage for showing respect and seeking blessings from them. The design used in the cloth also had a close relation with the rituals and habitat of the particular group. Thus, the circular look - like motif *(Khoi Mayek)* design in *Meitei Phanek*[1] was derived from *Lairen Mathek* (movement of a python), a ritual performance during the time of *Umanglai Haraoba*[2]. The Meiteis also popularly used the fish design, which was either in a horizontal or head downward position to make the impression of living in water. This symbolises happiness and prosperous life of the Meities (Bahadur 1997).

Handloom sector is an integral part of the marriage institution in NE region. Weaving was one of the criteria for selection of mate. Among some tribes of Manipur, marriages were solemnised only with persons living in those villages who had weaving skills. Girls who master the weaving were taken for a preference as brides (Gailangam 1997). Besides this, among the tribes, girls expressed their love and care for their beloved by presenting weaving products, the more intricate the design, the more love it symbolises (Paoki 1988). It was a custom among Meities girls to gather in the house of a senior woman and learn the work of spinning and other works related to pre-weaving activity. This custom is known as *Sinnaibham kaba*[3] (Bahadur 1997). While marriageable girls learn the art of weaving, prospective grooms interact and mingle with them during Sinnaibham kaba which was also socially allowed (Jhalajit 1999). During marriage, important parental gifts for women consisted of weaving tools and looms. These are given so that she can start an economic activity by weaving handloom products. Among tribes, gifts to be exchanged during marriage are woven by women members of the family.

Though all the tribes in NE region produce handloom products, some of them are known for their expertise. Among 20 tribes and 100 sub-tribes in Arunachal Pradesh, the Apatanis are famous for weaving. According to one of the legends, the art of weaving was learnt in a dream from the goddess, Podi Barbi. Weaving is a full time job for the women particularly, Garo women in Meghalaya. Assamese of Sualkuchi village in Assam are known for its tradition of weaving silk products. Any change in the handloom sector which has a social relevance brings conflict in the society. In 2013, the Sualkuchi witnessed major incidents of violence when local weavers burnt down stocks of textile products imported from other parts of India which were sold in the name of Assam silk. After the incident, steps were taken up by the Government to ban illegal sale of imported silk in the name of Assam silk and set up enforcement squads across the State to keep an eye on any violation of Handloom (Reservation of Articles for Production) Act, 1985. In the 19th and 20th centuries, the modernisation of textile industry, which led to the production of both foreign and domestic mill-made cloth, posed a great threat to the handlooms. They had to face the danger of extinction on account of discrimination and exploitative policies adopted by the British rulers. Therefore, the Father of the Nation symbolised hand spun to self-respect. It played a significant role in Indian war of Independence. After Independence, handloom sector became the symbol of all decentralised industries and caught a great deal of attention from the government. Later on, under the Right of Articles for Production Act, 1985, 22 articles were exclusively reserved for production in handlooms and set up unions or cooperative structures (Baud 1991).

Demographic and Social Profile of Handloom

To provide database, inputs for planning purposes and policy measures related to the handlooms, the Ministry of Textiles, Government of India published Handloom census in 1988, 1995 and 2010. In the third census, identity cards were issued to the genuine weavers so that the welfare schemes will be directly targeted to the beneficiaries without hassle. The Handloom census shows increase of number of

handloom worker households which means households of both weaver and allied activities from 25 lakh in 1995 to 27.8 lakh in 2010. Nearly 61 per cent of these handloom worker households are from the NE region (see Table 1). There is also an increase of full time weavers from 44.3 per cent in 1995 to 63.5 per cent in 2010. But considering only the weaver households in India, it recorded a declining trend from the first (29.9 lakh), to second (25.3 lakh) and the third (22.6 lakh) handloom census. In contrast to the national trend, the sector is gaining momentum in NE region with an increase of weaver households from first (14.6 lakh) to the third (15.1 lakh) census. Out of a total of 23.7 lakh looms in the country, the NE region has 15.5 lakh. The looms which are generally used in the region like loin, pit and frame looms are operated manually. Half of the total workforce in handloom belongs to NE region. Majority of them belonged to adult workers (see Table 2). They are more educated when compared with other States of India. In regard to possession of looms, there are variations in the proportion of households having loom in NE region when compared to other States of India. Out of the total handloom households, 80.2 per cent in NE have looms while in other States of India it was only 45.7 per cent. This indicates that majority in NE region work as independent weavers and less hired by others. They purchase raw materials, make clothes and sell the finished products in the market. Their earnings depend upon market condition, productivity and skill.

There is difference in the composition of social groups of handloom workers in NE region and other States. In NE region, scheduled tribes (36 per cent) and other backward castes (33 per cent) have similar proportions of almost a third of the total weaver households followed by other category (24 per cent), while scheduled caste households (7 per cent) are very less in number. Whereas in India, almost half belonged to other backward castes (45.2 per cent), scheduled tribes constitute only 18.1 per cent and other category 26 per cent. Thus, scheduled tribes in NE region unlike the other tribes in India involve in weaving and produce wide range of ethnic clothes. Weaving is a traditional occupation for a broad range of social groups in NE region (see Table 3).

In States like West Bengal, Uttar Pradesh, Haryana, Karnataka, Andhra Pradesh, Tamil Nadu, Odisha, weaving had never been identified with women except for certain specific operations. Generally women did the preparatory work while men did the main weaving job; hence all the credit for weaving went to men (Parikh et al.1991;Baud 1991). The study of women workers in Handloom and Khadi industry (Shram Bureau 1995) revealed that almost all women were engaged in spinning and winding. The reason being that such pre-weaving activities were available to them at their doorsteps, so they could engage both in household activities and income earning works. In the case of NE region, 99 per cent of the handloom weavers are women (Handloom Census 2010). A study of weavers in Manipur revealed that women choose weaving as their occupation because it is easy to earn money, staying at home, being a traditional occupation no formal training required. They could combine the dual roles of weaving and household chores. Thus, the traditional attitude that women are responsible for domestic chores and child caring affected their choice of occupation. Moreover, being confined to home and economic independence gave the woman concerned, a higher socio-economic status rather than working outside the house like construction worker, vendor or agricultural worker (Devi 2012). They learnt weaving from their mothers or female relatives and need not to enrol in formal institute. Children between the age of 9 and 10 years are engaged in weaving after their school hours. Sometimes they dropped out from school because their mother or grandmother was expecting agents very soon with orders and the orders had to be

Table1: State-wise Distribution of Handloom Worker Households

State	Total handloom worker households ('000)	Per cent distribution	Total handloom weaver households ('000)	Per cent distribution
Arunachal Pradesh	30	1.09	23	1.53
Assam	1,241	44.58	1096	72.7
Manipur	179	6.43	175	11.67
Meghalaya	11	0.41	10	0.71
Mizoram	39	1.42	38	2.58
Nagaland	61	2.19	42	2.82
Sikkim	1	0.02	0.53	0.03
Tripura	121	4.33	118	7.87
NE total	1683	60.47	1506	66.44
All India	2,783	100	2,268	100

Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

Table 2: Distribution of Handloom Workers by Age

NER/India	Total workforce (lakh)	Less than 18 years (%)	Adult workers (18 years and above)(%)	Total
North - eastern region	21.6	8.7	91.3	100
India	43.3	11.2	88.8	100

Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

Table 3: Distribution of Adult Handloom Workers by Social Groups

NER/India	Scheduled Castes (%)	Scheduled Tribes (%)	Other Backward Castes (%)	Others
North-eastern region	7.2	34.3	33.9	24.6
India	10.1	18.1	45.2	26.6

Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

executed quickly (Sircar 1984). There was also a pride in working craft at an early age. Their social status increased after becoming a weaver because they could contribute financially to the family and for knowing a traditional women occupation (Devi 2012).

The analysis of demographic profile and social relevance of handloom sector in NE region reveals scope for the promotion of handlooms in NE region. This depends on adequate income flow from weaving via encouragement of weaving profession, capacity building through literacy, full time engagement in weaving, good leadership, modernisation of looms, marketing facilities and financial support. Women in NE region have been working in handlooms traditionally and it is an accepted activity for women. Hence taking a little additional effort can be a good source of income generation through value addition for their products so that weavers could accept weaving as an occupation for livelihood.

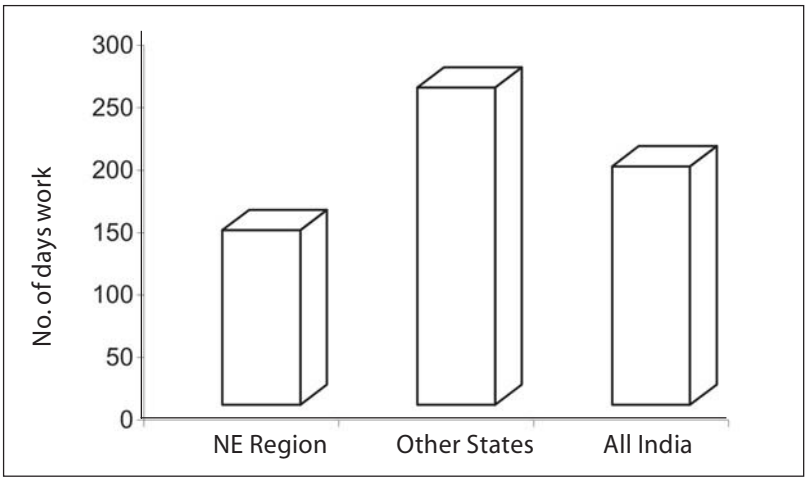
Production, Employment and Income

The nature of handloom production, employment and economic contribution from handloom are examined to identify impediments to the growth of the sector. Majority of the handlooms in NE region could contribute less economically to the family income (19 per cent only) while it is 58 per cent in other States of India (Handloom Census 2010). The region has to increase the average working days for getting higher income. While handloom workers in the region work on an average 140 days, other States in India work for 245 days in a year (see Figure 1). The reason is that the NE region handloom sector is dominated by domestic production (62 per cent) and a large portion of domestic workers work mostly on a part time basis. Other States of India are primarily engaged in commercial production of handlooms. The region also has highest proportion of idle looms in the country. As almost half (45.9 per cent) of weavers worked in domestic production and therefore, there is low productivity. Hence contribution from handlooms to household income remains marginal. However, the weavers support the family by supplying clothes which are used by family members for daily wear, festivals and ceremonies. When compared to States which are primarily engaged in commercial production, the region recorded a low productivity. While half of the weavers in other States produce above two metres per day, only a few weavers in the region produce above two metres per day. Half of NE weavers generally produce one meter per day. The condition did not improve after two decades because the handloom census 1988 estimated productivity among the States where there were working looms and recorded that Assam had the highest number of working looms (12.9 lakh) but lowest productivity, Manipur fourth largest looms (2.7 lakh); but both had productivity way below the average Indian production of 5.12 meter per loom per day (Handloom Census 1988). The low productivity of handlooms was on account of four factors- (1) nature of work pattern (2) technology (3) management and (4) market structure (Debi 1994). For the growth of handlooms sector the impediments have to be addressed with government support and mobilisation of weavers to change their attitude towards more productivity.

The Handloom Census 2010 reported that the average share of handloom income to the total household income in India is 30.2 per cent, but in NE region except Meghalaya, all the States show below the national average (see Figure 2). Where there is dominance of commercial production the share of handloom income to the total household income is 58.1 per cent. Since the economic contribution is less in NE region, the proportion of indebtedness (1.6 per cent) is also low compared to States like Andhra Pradesh, West Bengal, Odisha and Karnataka. There is low penetration of mills and powerlooms, so there is less threat in NE region. With proper intervention in terms of market access and organisation of weavers, the sector can be a source of livelihood for women who are either educated or uneducated. Besides this, handlooms being viewed as a cultural accomplishment, 30 per cent of handlooms households in the region reported to prefer their children to follow this traditional occupation. But

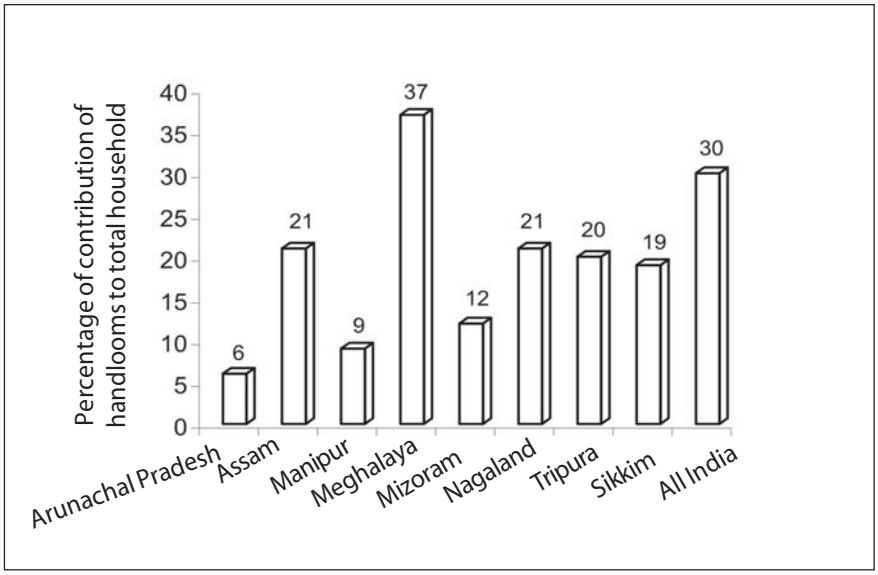
in States like Tamil Nadu, Andhra Pradesh and West Bengal, very few weavers reported to like their children to continue the activity of weaving as it is a hard, time consuming and low remuneration work.

Fig.1: Average Working Days of Handloom Workers



Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

Fig. 2: Contribution of Handloom to Total Household Income (%)



Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

A study of 300 weavers in Manipur revealed that the average monthly wages earned from weaving differ depending upon the nature of works. Comparing weavers who are self-employed, to weavers working under merchant and weavers working in cooperative societies it was found that the weavers working under the merchants get lower wages while the self-employed get more wages. Weavers working under merchants got an average monthly income of ₹ 200-600 while self-employed got ₹ 600-1000. The earnings of weavers under the cooperative society were also almost like the merchant weavers (Devi 2012). A study of handloom contractual workers in Assam, by Bortamuly and Goswami (2012) found that among the factors such as age, productivity, gender, experience, and education, only the productivity and gender influenced wage structure. If given a choice, the owners are reluctant to hire females having domestic chores apart from the weaving works, on the same monthly wage rate as that of males. Organisation of weavers would serve as a mechanism to address such problems related to gender and household work related problem, for justification of lower wages paid to the female workers.

Dynamics of Change

Under the Technology Upgradation Fund Scheme (TUFS) the corpus fund was raised to ₹ 200 crore from ₹ 50 crore to set up 50,000 shuttleless looms and to convert 2.5 lakh traditional looms to automatic ones. This clearly shows that the enterprising handloom weavers have been pushed up to adopt modern technology. Yet, the scheme does not mention any measures to strengthen institutions such as weavers' cooperative societies that protect the interest of weavers. Thus, the new government policies that focused on the liberalisation, modernisation and globalisation of the industry ignored the livelihood issues pertaining to lakhs of traditional handloom weavers. The problem of the weaving industry which had often been an issue of handlooms versus powerlooms, is no longer valid. With the liberalisation of market, the issue now is how to safeguard small and vulnerable sections from the big and strong segments.

Weavers need to upgrade their skill and technology levels to face the changing market structure. Regarding the marketing of handlooms, Srinivasula (1997) stated 'the role of handloom is recruited to 'passively' responding to the demand when the strategy should be one of actively intervening and influencing the market'. Both the government and weavers should become partners to derive benefits from government schemes, infrastructure development, diversification of products and markets. For handloom products, designs add value and price of the cloth. With no training and inadequate infrastructure, weavers find it difficult to use the available designs in catalogues. As the market is globalised, the region also imports clothes and other textiles at cheap rate from neighbouring States and countries like Myanmar and Bangladesh. Thus, traditional weavers were lagging behind in relation to cost, durability and design in their products. On the other hand, male traders, especially the Marwaries handled the market. They also sometimes worked as cloth merchants. While they exported the finished products to places like Delhi and Rajasthan, exhibiting a broad marketing strategy, the restriction on women's mobility forced local weavers to struggle in the local market.

Due to marketing problems, weavers sometimes prefer to work under merchant weaver despite getting low wages. The earnings from handloom are also used in household expenditure, hence can not invest in weaving business. Though financial institutions are ready to give loans, weavers hesitate to take loans, as they are not certain about their income. Other problems are lack of adequate stalls in the market and lack of quality control. To solve the problems some weavers produce only after getting order or organise phi-marups[4], a process where weavers played the role of a producer, organiser

and distributor. It made the weavers economically secure and also helped the customers by allowing them to buy in bulk on instalment basis. This entrepreneurial spirit is a new development among the weavers.

Promotion of Cooperatives and Organisations

The handloom sector is organised under the umbrella of cooperative society. This is the policy of the government of India and it has two objectives (1) social and (2) development (Parikh et al.1991). Firstly, the social objective was to ensure minimum wages to the weavers and freedom from the bondage of master weavers. Secondly, the development objective aimed to updating the old technology, increasing productivity, introducing new colour, new designs and exporting the handloom fabric. Handloom cooperative societies act as an agent to render support services to the weavers. Such facilities of the cooperative society are not received by many weavers in NE region because very few of them enrol for membership. In all States of NE region except Meghalaya, membership in cooperative society is below the national average (see Table 4). Tamil Nadu (27.6 per cent) and Andhra Pradesh (18.1 per ent) have cooperative memberships higher as compared to other States of India.

The analysis of handloom census found mixed response of relation between membership in cooperative society and income contribution of handloom to household economy. In States which have low membership in cooperatives like Punjab, Haryana and Uttar Pradesh, handlooms contributed about 80 per cent of income to the household while those States with high membership have also contributed much to the household income. Large commercial production, full time weaving and membership in cooperatives are some factors for high income contribution from handlooms to the household income. In NE region, membership as well as contribution of income to household is low. The weavers have to transform from domestic to commercial production for covering a wider range of market. At such juncture organisation of weavers and support from cooperatives may be helpful in strengthening the isolated weavers. Under the Integrated Handloom Cluster Development Scheme implemented at Imphal, Manipur 199 Self-Help Groups (SHGs) covering 2780 weavers were formed till 2012. Out of this, 35 SHGs received credit of ₹ 31.80 lakh and provided market linkage. We need such pattern of organisations to replicate the process to a large section of weavers in NE region. Lack of organisational mechanism may influence the poor weavers to work under the master weavers or merchants. They play the role of supplier and also took care of marketing the products, thus relieving the weavers from marketing problems. Besides this, the master weavers are the source of loan for 44.6 per cent of handloom worker households in India but in NE region their role is marginal. Commercial banks have become a reliable source of finance for NE region handloom workers (see Table 5). But the case study of the women weavers in Vengamedu, Tamil Nadu, indicated that they were exploited by master weavers by paying low wages who thereby made substantial profit (Sundari and Manimekalai 1989). Thus, based on the above information, it is difficult to state whether the presence of master weaver is detrimental to the handloom sector or not.

Table 4: Membership in Cooperative Society 2009-2010

NE States	Number of households reporting membership	Percentage
Arunachal Pradesh	184	0.6
Assam	39375	3.2
Manipur	571	0.3
Meghalaya	1216	10.7
Mizoram	441	1.1
Nagaland	206	0.3
Sikkim	8	1.4
Tripura	3992	3.3
All India	273914	9.8

Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

Table 5 : Percentage Distribution of Handloom Worker Households by Major Sources of Finance

NER/India	Money-lenders	Master weavers	Friends/ relatives	Cooper-ative society	Comme-rcial banks	SHGs	Tra-ders	Others
NE	12.2	6.8	9.0	13.1	30.5	17.7	0.8	10
India	13.4	44.6	4.9	5.9	14.8	5.0	4.3	7.2

Source: Handloom Census of India, 2010, Ministry of Textiles, Govt. of India.

Conclusions

The NE region is taking a place in the nation map for handlooms sector and it could find a niche market if proper planning and policies are framed. Women weavers though largely dominated the handlooms sector in this region, with changing market structure and competition, they face conflict and compromise. They are still using manual looms with low technology base which affects production. If appropriate action is not taken, then there is a fear of replacing the handloom products by imported materials. The responsibility is also with designers to focus on the handloom products instead of western garments to bring back a proud tradition. There is an expression of feminism in the NE region patrilineal society which encourages women to be self-reliant, economically active and collectively powerful. Thus, they felt that engaging in weaving which is a traditional feminine occupation increased their socio-economic status instead of sitting idle at home. However, a strong working organisation among the weavers was lacking to safeguard their security and fight their rights in the society. Mobilisation for forming weaver organisations may enable them to get government schemes, health insurance, credit and market linkages. Efforts need to be made to make the cooperative society sustainable and effective. We also need to acknowledge the significance and openness to new concepts to bring a more

positive understanding of the women's participation in the economic activities because for many of these women, working in the handlooms sector is a matter of contributing economically to the family and supplying clothes for the family members. Increasing productivity by working as full time rather than part time will make handlooms production more sustainable for livelihood. Weaving being a traditional feminine occupation, many women, be they educated or illiterate, got jobs in this sector. Therefore, with suitable public policies for this sector, large employment opportunities can be created for the women of the region. With the introduction of photo identification in the Handloom Census 2010, the schemes are hopeful to reach to the right beneficiaries. This will give immense opportunity for raising the socio-economic status of the NE women.

Notes

1. *Meitei Phanek* is a kind of lungies used by the Meitei women to warp around the waist and extend up to ankle (length 1.5 metre, width 1metre).
2. *Lai Haraoba* is the ritual celebration held only once in a year by the Meiteis to worship their ancestors. Though they are converted into Hinduism, they still worship their ancestors and keep deities at home.
3. *Sinnaibham kaba* is a sort of school at the house of a senior woman to learn pre- weaving and weaving works, embroidery and the art of running home.
4. *Phi-marup : phi* - cloth, *marup*- chit fund. Around 10-30 people contribute a fixed amount of money every month and with this amount buy clothes from weavers. One member in a month will be getting clothes. These clothes are supplied by weavers so they are engaged until the *phi-marup* is completed.

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Journal of Rural Development, Vol. 32, No. (4) pp. 439-449
NIRD, Hyderabad.

REVIVAL PACKAGE FOR PACS IN TAMIL NADU : EMERGING CHALLENGES

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ABSTRACT

Tamil Nadu is endowed with a network of 4530 Primary Agricultural Cooperative Societies (PACSs). The implementation of Task Force Recommendations 2004 contributed significantly for revival of the functioning of the PACSs in the State. Majority of the PACSs could reduce and / or wipe out entire loss and increase their loan operations. However, the post-Revival Package era witnessed that the PACS loan operations have been skewed in favour of jewel mortgage business forgetting their responsibility in crop loan. This study attempts to trace out the emerging challenges before PACS during post-Revival Package (2004) era.

Introduction

The seed for today's cooperative movement in India was sown in the erstwhile Madras Presidency. The Madras Government under Section 98 (a) of the Civil Service Regulations placed Sir Frederick Augustus Nicholson on special duty, for the purpose of enquiring into the possibility of introducing Land and Agricultural Banks in order to relieve the rural people from the problem of indebtedness through its order dated 15 March 1982. He submitted his reports in two volumes in 1895 and 1897. After the enactment of the Cooperative Credit Societies Act in 1904, Thiru Sir D.Rajagopalachariar, the first Registrar of Cooperative Societies, registered the first PACS in this region with the objective of encouraging thrift, self-help and cooperation among agriculturists, artisans and persons of limited means through cooperative credit societies thereby relieving the poor farmers from the clutches of moneylenders at Thiroor village in the present Tiruvalluvar district (Ravichandran, K & Revathibala, M: 2008, p.45). Over the years, the growth and development of PACS in Tamil Nadu is influenced by the recommendations of various Committees and Commissions of the Government of India and the State Government. The policy of the State Government has always been that the strengthening of the Cooperative Societies is necessary for the economic prosperity of the people, especially the weaker sections. At present in Tamil Nadu, the Short-term Co-operative Credit Structure (STCCS) is three tier and consists of 4534 PACSs, 23 Central Cooperative Banks (CCBs) and Tamil Nadu State Apex Cooperative Bank. On an average, a PACS covers four revenue villages. Cooperative credit structure in the State is the largest institutional credit delivery system in terms of reach and network (Government of Tamil Nadu: 2012-17, p.21). At all India level there are 93413 PACSs functioning across the country covering more than 99 per cent of Indian villages. They are

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affiliated with 371 CCBs. To guide all these institutions 31 State Cooperative Banks (SCBs) are functioning at State level (www.nafscob.org).

Implementation of Task Force Recommendations 2004

Despite their outreach and volume of operations, over the years, the financial health of PACS deteriorated significantly. For example, at all India level PACS experienced with low resource base, huge accumulated losses, borrower-centered policies, high dependence on external sources of funding, government control, poor business diversification and low fund recovery (Government of India: 2008, p-71). The share of PACS in agricultural credit at all India level fell down from 62 per cent in 1992-93 to 22 per cent in 2007-08 (Sharad N.Bansal et.al: 2012, p.42), and to 15.7 per cent in 2010-11 (Government of India:2011-12, p.72). PACS in Tamil Nadu is also no exception to this trend. They too faced one or more of the stated problems and reduced their share in the rural credit market.

Government of India recognised the importance of reviving these institutions and constituted a Task Force under the Chairmanship of Prof. A. Vaidyanathan, in August 2004, to formulate a practical and implementable plan of action to rejuvenate the STCCS. The Task Force submitted its report to the Government of India on 4.2.2005. The Government of India accepted the recommendations in principle and placed the same before National Development Council meeting held on 27.6.2005. The Task Force report and its recommendations were also discussed in detail at a special meeting of the State Chief Ministers held on 9.2.2005. It was agreed that a Draft Statement of Consensus emerging from the deliberations be prepared and discussed with the Finance and Cooperation Ministers of select State Governments. This meeting was held on 29.9.2005 where the consensus was further crystallised into a Statement of Consensus. Based on this Statement of Consensus, the Revival Package prescribing the financial, legal, and institutional measures for restructuring of the STCCS was prepared and circulated among States. The Revival Package is aimed at reviving and rejuvenating STCCS and makes the structure vibrant member-centered institutions by :

1) providing financial assistance to bring the institutions in the STCCS to an acceptable level of financial health
2) introducing legal and institutional reforms necessary for the democratic, self-reliant and efficient functioning of STCCS, and
3) taking other appropriate measures to improve the quality of management.

The Task Force considered that all the three components of the Revival Package are equally important. Hence Government of India treated and implemented this Revival Package as an Integrated Package. The financial assistance under this Revival Package is a one-time measure. Release of financial assistance under the Revival Package will be back-ended and linked to achievement of pre-defined benchmarks in respect of legal, institutional and regulatory reforms and will, therefore, be phased over a period. The summary of benchmark monitorable activities by various agencies and release of financial assistance under the package is given in Table1.

Statement of the Problem

The Government of Tamil Nadu has signed MoU with Government of India and NABARD for availing of assistance under Revival Package for the revival of STCCS on 3.1.2008. Accordingly, the accumulated losses suffered by the eligible PACSs, CCBs and Tamil Nadu State Apex Cooperative Bank as on 31.3.2004 has to be fully recapitalised. In this direction the following efforts were made in Tamil Nadu.

- ☞ State Level Implementing and Monitoring Committee (SLIC) and District Level Implementing and Monitoring Committee (DLIC) were constituted on 28.2.2008.

☞ The Ordinance was promulgated to amend the Tamil Nadu Cooperative Societies Act 1983, on 20.10.2008. The same was published in the Gazette on 21.10.2008 (Tamil Nadu Ordinance 8 of 2008). Further the Act was passed on 14.11.2008 in the Legislative Assembly and received the assent of the Governor on 30.11.2008 as Act No.62 of 2008.

Table 1 : Summary of Benchmark Activities

Benchmark activities	Release of financial assistance
State Government accepts the package, issues consent letter, signs the Memorandum of Understanding (MoU) or exchange letters with Government of India.	Assistance is released for conduct of special audits, computerisation of STCCS and HRD initiatives.
PACS/CCBs/SCB sign MoUs with implementation committees, Executive Order amending necessary provisions in Cooperative Societies Acts (CSA) issued by State Government, special audits are completed, and State Government releases committed liabilities.	75 per cent of financial assistance for funding accumulated losses would be released.
Elections are conducted wherever due, professionals are either elected or co-opted, professional CEO appointed, CSA amended or special chapter incorporated, a sound system of internal checks and controls put in place by SCBs/CCBs and Development Action Plans/ MoUs are signed.	Balance 25 per cent of financial assistance for funding accumulated losses would be released.

Source: www.nabard.org

☞ Special Audit has been carried out and total loss for 4540 PACS as on 31.03.2004 has been arrived at ₹ 2129.50 crore (Government of Tamil Nadu : 2011-12,p.15).

☞ The Government of India's share of ₹ 1078.84 crore and State Government's share of ₹ 385.45 crore have been received under this scheme (Government of Tamil Nadu:13-14,p.18).

☞ Special audit of TNSC Bank was completed with 'NIL' claim.

☞ Common Accounting System and Management Information System have been installed in all PACSs from 1.4.2009.

☞ Common Software for CCBs and PACSs is under implementation.

It is expected that this Revival Package would revive the functioning of PACS by increasing their business and thereby they would play a significant role in the rural credit market. In this context it becomes necessary to study what is the impact of Revival Package on the business operations of the PACS? Whether the post-Revival Package era enabled the PACS to strengthen their owned resources? What is the trend and extent of loan operations of PACS during pre and post- Revival Package era? What are the challenges faced by the PACS at present? These and other similar questions need to be addressed through micro level studies so as to understand the impact created by Revival Package.

Objectives of the Study : The present study has the following objectives :

1) To study the business performance of sample PACS in Theni District during pre and post-Revival Package implementation
2) To study the impact of Revival Package on the functioning of sample PACS
3) To find out the challenges faced by the sample PACS and
4) To suggest suitable measures to combat against these challenges

Methodology

Case study method has been followed for this study. Both primary and secondary sources of data were collected and collated to bring meaningful inferences. For the purpose of this study two PACSs viz., MD. SPL.82. Endapulli Primary Agricultural Cooperative Credit Society (EPACS) and A.737.Upparpatti Primary Agricultural Cooperative Credit Society (UPACS) were selected purposively. Relevant data on the business performance of these sample societies were collected from Audit and Annual Reports of the societies. Personal discussions were also held with the staff of the sample societies to have indepth understanding on the impact of the Revival Package.

The present study is not far from limitations. The analysis made in this study is based on the data / information collected through structured interview schedule from the two sample PACSs in Theni district. Every effort has been made wherever necessary to ascertain the accuracy of the data / information provided. Due to paucity of time the perception of member users of these societies could not be collected. Hence, the findings of the study may be relevant in the given context.

Rationale for the Study : Tamil Nadu is one among the 25 States which accepted this Revival Package. Government of Tamil Nadu is taking several institutional and legal measures as per the MoU. As on 31.8.2012, ₹ 134011.12 lakh has been released to 4471 PACSs through the CCBs in the State. The TNSC Bank has formed a separate section namely SCORE CELL (Short-term Cooperatives Revival Cell) for the purpose of guiding and monitoring the progress of the implementation in PACS, CCBs and also for coordinating with the implementing agencies viz., NABARD and office of the Registrar of Cooperative Societies in the State. All PACS Secretaries were trained on 'Capacity Building', 'Business Development and Profitability and MIS /CAS'.

Due to all these support and patronage from State Government there is growth in the business performance and operational viability of PACSs in Tamil Nadu. At present the PACS have been facilitated to provide about 20 loan products, 5 marketing services, and host of other services which include running of common service centres, agri-clinics, agro-service centres and Fair Price Shops under Public Distribution System. The total deposit mobilised by PACS has increased from ₹ 343983.64 to ₹ 468235.77 during the period between 2008-09 and 2010-11. The total loan outstanding also has increased from ₹ 630685.07 to ₹ 1101384.54 (Table -2). Consequent to these developments, out of 4,530 PACSs functioning in the State, 1112 are on profit, and 1754 are on current profit (Government of Tamil Nadu: 2013-14, p.8). In spite of all these developments no study has been conducted on the impact of Revival Package at micro level. Hence the present study is undertaken.

Table 2 : Business Performance of PACS in Tamil Nadu

(₹ in lakh)

Year	No. of functioning PACSs	Total Deposits Outstanding	Total Loan Outstanding
2008-09	4531	343983.64	630685.07
2009-10	4531	401476.67	865327.79
2010-11	4532	468235.77	1101384.54

Source : Compiled from the records of Office of the Registrar of Cooperative Societies, Chennai for various years.

Impact of Revival Package on the Functioning of Sample PACS

Theni District is predominantly an agrarian economy and out of the total geographical area of 3242.30 sq.km 35 per cent is net cultivated area. This district was carved out of the composite Madurai district in the year 1997. It has 5 taluks, 5 Municipalities, 23 Town Panchayats, 113 Revenue Villages and has the credit of being the leading vegetables and fruits producing district in the State. The Office of Joint Registrar of Cooperative Societies was established in Theni district on 28.5.97 with two Circle Deputy Registrar Offices (Periyakulam and Uthamapalayam) and One Deputy Registrar (Public Distribution System). The composite Madurai District Central Cooperative Bank is still acting as the Financing Bank with 10 Branches and hence there is no separate CCB for Theni district.

There are eighty functional PACSs and they have wide reach in the district. The block-wise distribution of the PACSs is given in Table 3. The first PACS registered in the district was A 737 Upparpatti PACS and the latest being MP 101 Chinnamanur BGCS. More number of PACSs were organised during the period between 1961 and 1970. Both in Theni and Aundipatti blocks, all the existing PACSs were established before 1970. Further, it is to be noted that 17 PACSs were established even before Independence. While the average number of villages served by PACS at all India level is 6, in Tamil Nadu it is 4. In the case of Theni for about three revenue villages, there are two PACSs functioning. Such wide coverage facilitates the farming community to have easy access to the services of PACS.

Table 3 : Block-wise Presence of PACS in Theni District

Name of the Block	No. of PACSs
Aundipatty Block	11
Bodinayakanur Block	12
Chinnamanur Block	11
Cumbum Block	7
Myladumparai	4
Periyakulam Block	15
Theni Block	12
Uthamapalayam	8
Total	80

Source: Compiled from Interview Schedule.

The impact of Revival Package on the business performance of sample PACS is analysed with the basic indicators viz., membership, share capital, borrowings, deposits, loan operations and financial viability. At the district level there has been progress in respect of all loan outstanding and jewel loan outstanding. For example, the total loan outstanding during the year 2004-05 was ₹ 8734.03 lakh, which increased to ₹19082.40 lakh during the year 2010-11. The average loan issued by a PACS also increased from ₹ 109.18 lakh to ₹ 238.53 lakh during the same period (Table 4). Due to these developments many of the PACSs have become operationally viable units during post-Revival Package era.

Table 4 : Progress of PACS in Theni District

(₹ in lakh)

Year	Membership	Loan Outstanding	JML Outstanding
2004-05	221195 (2765)	8734.03 (109.18)	3653.91 (45.67)
2005-06	221797 (2772)	9034.51 (112.93)	3654.92 (45.69)
2006-07	218197 (2727)	7674.05 (95.93)	4620.25 (57.75)
2007-08	220485 (2756)	9231.71 (115.40)	5791.20 (72.39)
2008-09	219703 (2746)	10742.80 (134.29)	6804.33 (85.05)
2009-10	214617 (2683)	14763.70 (184.55)	9923.92 (124.05)
2010-11	215021 (2688)	19082.40 (238.53)	13300.29 (166.25)

Source: Compiled from Institution Schedule.

Note: Figures in parentheses are average per society.

Membership and Share Capital : As there was a ban on admitting new members, the average membership of PACS remained at 2688 per society at district level during the year 2010-2011 (Table 4). In the case of sample societies the number of members remained same during the study period. However, new members were admitted as Associate Members to avail service from the societies (Table 5).

Regarding share capital position of sample PACS, it is found that in the case of UPACS the position of share capital increased from ₹ 3.70 lakh to ₹ 11.13 lakh during the period between 2004-05 and 2011-12. The respective figure for EPACS was ₹ 6.98 lakh to ₹ 9.81 lakh. As share capital mobilisation linked with loan operations, there is no significant trend found in the growth of share capital even after availing of assistance under Revival Package.

Table 5 : Membership and Resource Mobilisation in Sample PACS

(₹ in lakh)

	UPACS				EPACS			
Year	No. of Members	Share Capital	Borrow-ings	Deposits	No. of Members	Share Capital	Borrow-ings	Deposits
2004-05	720	3.70	131.02	5.94	2519	6.98	121.70	14.43 (3.6)
2005-06	730	3.59 (-2.9)	140.85 (7.5)	5.65 (-4.8)	2519	7.00 (0.2)	126.10 (3.6)	11.76 (-18.5)
2006-07	735	4.55 (26.7)	117.52 (-16.5)	4.09 (-27.6)	2519	8.55 (22.1)	86.58 (-31.3)	9.35 (-20.4)
2007-08	742	5.34 (17.3)	120.51 (2.5)	5.06 (23.7)	2519	8.65 (1.1)	96.00 (10.8)	15.27 (63.3)
2008-09	742	5.65 (5.8)	129.66 (7.5)	5.22 (3.1)	2519	8.74 (1.0)	113.60 (18.3)	16.20 (6.0)
2009-10	742	6.69 (18.4)	140.17 (8.1)	5.99 (14.7)	2519	8.93 (2.1)	95.71 (-15.7)	17.10 (5.5)
2010-11	742	7.03 (5.0)	149.78 (6.8)	6.20 (3.5)	2519	9.50 (6.3)	127.20 (32.9)	16.55 (-3.2)
2011-12	709	11.13 (56.8)	81.88 (-45.3)	8.36 (34.8)	2519	9.81 (-45.3)	149.64 (17.6)	16.29 (-1.5)

Source: Compiled from Institution Schedule.

Note: Figures in parentheses are percentage of change over the previous year.

Borrowings and Deposits : Borrowings from Madurai CCB constitute the major source of working capital of majority of PACS. It was found that in the case of UPACS the position of borrowings increased from ₹ 131.02 lakh to ₹ 149.78 lakh. In the case of EPACS, the total borrowings increased from ₹ 121.70 lakh to ₹ 149.64 lakh during the study period.

In the case of deposits, sample societies have not shown any significant increase in their deposit mobilisation. They remain as borrower-centric institutions and as such these institutions remain as State delivery mechanism.

Loan Portfolio of PACS : The sample PACS provides ST and MT loan facilities to members, which includes crop loan, agricultural jewel loan, general jewel loan, micro credit, loan to SHGs, women, women entrepreneurs and others.

The total loan outstanding of the PACS in the district has grown from ₹ 8734.03 lakh to ₹ 19082.40 lakh during the period from 2004-05 to 2010-11. On an average, ₹ 109.18 lakh is the loan outstanding per PACS during the year 2004-05, which has increased to ₹ 238.53 lakh during 2010-11. In the case of sample societies, the position of loan outstanding in UPACS increased from ₹ 25.30 lakh to ₹ 159.10 lakh. EPACS also increased its total loan outstanding from ₹ 63.70 lakh to ₹ 171.13 lakh (Table 6). Though crop loans are given under KCC, it is not operated like a cash credit. One time drawal and one time repayment or renewal was observed (NABARD: 2009, p-68).

Table 6 : Loan Operations of Sample PACS

(₹ in lakh)

Year	UPACS					EPACS				
	ST loan outstanding	MT loan outstanding	JML loan outstanding	Other loan outstanding	Total loan outstanding	ST loan outstanding	MT loan outstanding	JML loan outstanding	other loan outstanding	TotaL loan outstanding
2004-05	21.85	3.45	Nil	-	25.30	13.58	24.89	8.79	16.44	63.70
	(86.4)	(13.6)			(100)	(21.3)	(39.7)	(13.8)	(25.8)	(100)
2005-06	41.70	3.45	Nil	38.63	83.78	14.23	47.08	8.26	1.93	71.50
	(49.8)	(4.1)		(46.1)	(100)	(19.9)	(65.8)	(11.6)	(2.7)	(100)
2006-07	2.27	12.31	Nil	Nil	14.58	7.66	1.80	7.25	6.12	22.83
	(15.6)	(84.4)			(100)	(33.6)	(7.9)	(31.8)	(26.8)	(100)
2007-08	13.99	Nil	Nil	Nil	13.99	9.11	11.44	8.12	2.52	31.19
	(100)				(100)	(29.2)	(36.7)	(26.1)	(8.1)	(100)
2008-09	27.26	10.68	Nil	Nil	37.94	10.30	15.85	7.72	2.44	36.31
	(71.9)	(28.1)			(100)	(28.4)	(43.6)	(21.3)	(6.7)	(100)
2009-10	69.31	8.14	66.61	Nil	144.06	25.25	21.36	70.80	2.44	119.85
	(48.1)	(5.7)	(46.2)		(100)	(21.1)	(17.8)	(59.1)	(2.1)	(100)
2010-11	65.80	9.82	102.07	7.96	185.65	37.18	15.98	84.50	2.40	140.06
	(35.5)	(5.3)	(54.9)	(4.3)	(100)	(26.5)	(11.4)	(60.3)	(1.7)	(100)
2011-12	64.12	11.30	80.92	2.76	159.10	47.52	15.50	105.71	2.40	171.13
	(40.3)	(7.1)	(50.9)	(1.7)	(100)	(27.7)	(9.1)	(61.8)	(1.4)	(100)

Source: Compiled from Institution Schedule.

Note : (1) Nil – No loan outstanding exists during this period.

(2) Figures in parentheses are percentage to total loan outstanding.

Financial Viability : Increasing the financial health of the PACS to the acceptable level is the main objective of the Revival Package. In this context, out of 82 PACSs in Theni District during 2004-05 only 20 PACSs were functioning with current year profit. The number has been increased to 61 at the end of the year 2010-11. Also the number of viable PACSs increased from 16 to 66 during this period. In the case of UPACS, it is coming under Potentially Viable PACS category while EPACS is coming under Viable PACS category.

EMERGING CHALLENGES AND STRATEGIES FOR REVIVAL

Challenge-1: Low Capital Formation

The receipt of financial assistance under the Revival Package has enabled sample societies to clear their dues to CCB and operate Cash Credit Accounts. In turn, sample societies are able to issue loan to the members. For example, an amount of ₹ 69.94 lakh was released to EPACS by the CCB under the Revival Package, which enabled the society to increase the JML business from the year 2009-10. As dues in the CC Accounts are cleared, the position of crop loan given under KCC also increased from the year 2009-10. Sample PACS's inability to raise their own resources forced them to depend on CCB for raising capital. Lack of deposit base has been an important reason for the failure of PACS at all India level during the past (Government of India: 2007, p-38).

Strategy : To mobilise deposits from members and non-members, the sample PACS may establish continuous awareness campaigns and regular contact with the members. The support of opinion leaders at village level may also be enlisted. Further, sample PACS may devise suitable strategies to mobilise deposits from village level institutions like panchayats, schools, and hospitals. Those PACSs which are supported with low cost deposits never depend on higher tiers for working capital.

Challenge 2 : Support of Financing Institution

One of the important recommendations of the Task Force is that PACS should be allowed to affiliate or disaffiliate with the existing CCBs without having any restriction over the area of operation. If this suggestion is implemented in full vigour, CCBs will also have the option whether they can lend loan to a particular PACS or not. Hence, this is the time that every individual society is trying to identify itself as an autonomous and independent unit.

Strategy : Every business institution needs the support of a financial institution for raising adequate capital. Hence, sample PACS must ensure its business viability both in short run and long run. The importance of sustainability in business must be understood by every employee of the PACS.

Challenge-3 : JML has Become Lifeline

It is found that during post-Revival Package era, the PACS loan operations have been skewed in favour of JML business forgetting their prime responsibility in crop loan portfolio. There are two types of JML advanced by PACS. They are

- ☞ JML issued for agricultural purposes.
- ☞ JML issued for general consumption purposes.

For example, in the case of EPACS in the total loan outstanding, the contribution of JML outstanding was 13.8 per cent in 2004-05, which increased to 61.8 per cent in 2011-12. In the case of UPACS in the total loan outstanding, the contribution of JML outstanding was 46.2 per cent in 2009-10, which increased to 50.86 per cent in 2011-12. This is due to the fact the JML is considered to be the secured and safest mode of doing rural banking business. The other reason for this growth was that for every crop loan issue applications are sent to CCB for verification and

sanctioning of loan, which is based on the funds availability at CCB level. Whereas in the case of JML, there is no such restriction and hence the available funds at PACS level are rotated easily. This trend brings the following concern.

- ☞ The growth in JML will hamper GLC flow to farm sector as only people who have the source to pledge alone will be benefited. The other small, marginal and tiny farmers and sharecroppers who have been hitherto the clientele base of PACSs (Government of India: 2008, p.72) will again be left out to the hands of non-institutional sources of credit.
- ☞ Though the sample PACSs have strong room with defender door and locker facilities to store the jewel pledged, the question of having full proof security is a major issue in the long run.
- ☞ Further, the fear among the PACS is that no loan could be recovered from borrowers as the post-waiver and Revival Package era has created an impression among the borrowers that the loan from PACS need not be repaid. As there is total interest subvention scheme for such crop loan which has been repaid by due date the recovery is made possible. In the case of JML, the recovery is cent per cent either through closing the account completely or pledging the jewel again.

Strategy : While ensuring profitability in business, PACS must ensure that its role in agricultural credit is also strengthened. Any form of credit flow to farm or non-farm sector if it is supported with adequate extension support, the problem of poor recovery could be addressed. Continuous and adequate pre and post-credit flow extension support is the main reason for the better recovery flow in micro-credit programmes.

Challenge - 4: The Continuance of the Problem of Cumulative Loss

The sample PACSs are still facing the problem of cumulative losses. In the case of UPACS, the total cumulative loss during the year 2004-05 was ₹ 131.11 lakh, which increased over the years and stood at ₹ 199.99 lakh during the year 2011-12. The respective figure for EPACS is ₹ 95.98 lakh and ₹ 112.53 lakh (Table 7).

In the case of EPACS the major reason for the cumulative loss was MT loan overdue. This loan was given to 75 dairy farmers during the year 2006 and all become Non-Performing Assets. Apart from this the continuance of State's waiver schemes has been a major hurdle for PACS to recover the dues. Paradoxically, the loan waiving schemes instead of helping the farming community, have eroded the willingness of the borrowers to repay the loan; boosted wilful default culture; crippled the financial viability of banking institutions and emerged as popular ethos of election manifestos (Ravichandran, K & Revathibala, M: 2008, p.294).

Strategy : Legal actions must be taken against the defaulters. For this purpose, support of the State is required.

Table 7 : Position of Profit / Loss in PACS

(₹ in lakh)

Year	UPACS		EPACS	
	Profit / Loss	Cumulative Loss	Profit / Loss	Cumulative Loss
2004-05	30.10 Loss	131.11	5.68 Loss	95.98
2005-06	41.79 Loss	143.42 (9.3)	16.43 Loss	112.42 (17.1)
2006-07	37.21 Loss	159.48 (11.1)	1.94 Loss	114.36 (1.7)
2007-08	62.40 Loss	166.55 (4.4)	10.03 Profit	104.33 (-8.7)
2008-09	62.40 Loss	169.44 (1.7)	22.10 Loss	126.43 (21.1)
2009-10	66.70 Loss	170.15 (0.4)	40.50 Profit	85.93 (-32.1)
2010-11	70.21 Loss	172.85 (1.5)	35.50 Profit	50.43 (-41.3)
2011-12	59.27 Loss	199.99 (15.7)	9.12 Loss	112.53(123.1)

Source: Compiled from Institution Schedule.

Note : Figures in parentheses are percentage change over the previous year.

Challenge - 5: Lack of Business Diversification

The staff are trained and enlightened on the need for business diversification for the growth of PACS. Under Integrated Cooperative Development Project (ICDP) exposure visits were arranged for the staff to understand the functioning of well run PACSs in nearby States. All these efforts end with training. During the post-Revival Package period, the priority for regular work has been different and hence the concept of business diversification becomes old/ outdated/postponed.

Strategy : All the employees must be reoriented on the importance of business diversification. It is reported that the business operations and management of the institutions have been made efficient by enhancing the skills of the personnel with the assistance of the NABARD (Government of Tamil Nadu: 2013-14, p.18 & 19). The training offered under this banner followed universal approach and helped only for creating awareness among the employees on management of the institutions in the context of changed economic scenario. What is required is tailor-made solutions to address the society-specific problems. It is found from the past experience that a business opportunity for one PACS was not suitable for other PACS. Hence, a separate training programme need to be organised for the employees of sample PACS. The gap between the existing skill among employees and required skill for business diversification must be imparted and addressed through training and development. The potential user members of the society are also should be made to realise the need and importance of business diversification of their PACS through continuous interaction and communication.

Conclusion

The Task Force 2004 emphasised that its recommendations for legal and institutional reforms are means to bring about a big improvement in credit discipline and financial management of STCSS (Government of India: 2004, p-98). The Government of India after several stages of detailed deliberations implemented this Package with the awesome

amount of about ₹ 13596 crore and it is expected that the amount would increase up to ₹ 19330 crore (NABARD: 2011, p.2). Tamil Nadu is one among the 25 States which accepted this Revival Package and so far released an amount ₹ 134011.12 lakh released to 4471 PACSs through the CCBs. Suitable amendments in the existing Tamil Nadu Cooperative Societies Act 1983 were made and all the Secretaries of PACSs were given training under various HRD programmes.

From the above analysis it is found that during post-Revival Package era, the functioning of all PACSs has improved due to 'financial assistance' provided under Revival Package no doubt served as trigger. Now all these PACSs in Theni district have become functional and viable units. In the case of sample PACSs, their dependency on CCB for resource mobilisation continues as the member users' participation in capital formation is very poor. Post-Revival Package era increased loan operation but it is skewed in favour of JML business forgetting their basic responsibility to farm sector. Also the problem of cumulative loss continues to be a major concern. Solid organisations could be built only with significant member stakes (Sriram M S: 2005, p-8). Hence any revival strategy for PACS should start with enlisting the participation of member users and provision of integrated farm gate services.

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FOOD PROCESSING INDUSTRY IN INDIA : S&T CAPABILITY, SKILLS AND EMPLOYMENT OPPORTUNITIES

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ABSTRACT

This paper provides a detailed analysis of food processing industry in India, its S&T capability, skills and employment opportunities. Food processing industry is slowly and steadily becoming one of the major industries of our economy. Its share in GDP is on continuous rise, with a CAGR of 8.40 per cent, from 2005-06 to 2009-10. Ther0e has been a continuous increase in the total plan outlay amount from INR 650 crore in 10th Plan; to INR 15077 crore in proposed outlay for 12th Plan. The sector is growing, but it is yet to compete in the world market. India's share in world export is meagre with 1.17 per cent. There is a wide gap between productivity and processing of items. The factors which have been used to study food processing industry are S&T capability of sector, its employment generation capacity and skills needed in the sector. The S&T capability segment venture into the changing trend of technology, difference between conventional and modern technology, the areas in which India is lagging behind. The employment generation capacity highlights growth and size of the industry and skills about the kind of human resources involved in the industry, the level of technology used in the sector. The employment generation capacity of the sector is huge, but the industry is not working at its potential. The labour force is highly unskilled, with 80 per cent of them having educational level below 10th standard. The impact of a variety of policies and programmes undertaken by government to develop food processing sector has not been very encouraging. The state needs to strengthen its efforts in S&T capability, infrastructure support and skill set in order to develop food processing industry.

Introduction

Food processing is the transformation of raw ingredients into food, or of food into other forms. Food processing typically takes clean, harvested crops or butchered animal products and uses these to produce attractive, marketable and often long shelf-life food products.

The processed food industry is divided into the following broad segments:

- Primary processed food – which includes products such as fruits and vegetables, packed milk, unbranded edible oil, milled rice, flour, tea, coffee, pulses, spices, and salt, sold in packed or non-packed forms.

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- ☞ Value-added processed food – which includes products such as processed fruits and vegetables, juices, jams, pickles, squashes, processed dairy products (ghee, paneer, cheese, and butter), processed poultry, and processed marine products, confectionary, chocolates, and alcoholic beverages.

Across the world, food-processing is considered to be a sunrise sector because of its large potential for growth and socio-economic impact. It not only leads to income generation but also helps in reduction of wastage, value addition, and foreign exchange earnings and enhancing manufacturing competitiveness. In today's global market, quality and food safety have become competitive edge for the enterprises producing foods and providing services. "With proper investment in food processing, technical innovation and infrastructure for agriculture sector, India could well become the food basket of the world" (Punjabi Meeta, 2007). The existing level of processing and the extent of value addition are very low as compared to other developing countries. In India, the food processing industry is ranked fifth in terms of production, consumption, export and expected growth (MOFPI, 2007). A strong and dynamic food processing sector plays a significant role in diversification of agricultural activities, improving value addition opportunities and creating surplus for export of agro-food products (Merchant, 2008). Food processing accounts for about 14 per cent of manufacturing GDP, i.e. ₹ 2,80,000 crore, and employs about 13 million people directly and 35 million people indirectly. Its employment intensity can be seen by the fact that for every ₹ 1 million invested, 18 direct jobs and 64 indirect jobs are created in organised food processing industry only (MOFPI, 2010).

It is widely accepted that the food processing sector is the most appropriate sector for creating jobs for rural poor, and thus reduce the burden on agricultural sector for creation of their livelihood. This is due to their familiarity with the agricultural sector which would make it easier to train and place them in food processing enterprises. The multiplier effect of investment in food processing industry on employment generation is also higher than any other sector. Therefore, for the overall progress of economy it is important that the farmers and backward communities working in rural food-processing units are treated at the top of the growth process. Rapid and sustained poverty reduction requires economic growth which is inclusive and the one that allows people to contribute to and benefit from it.

In India, the food processing industry is highly fragmented and is dominated by the unorganised sector. A number of players in this industry are small. About 42 per cent of the output comes from the unorganised sector, 25 per cent from the organised sector and the rest from small players. Though the unorganised segment varies across categories, approximately 75 per cent of the market is still in this segment. The organised sector is relatively bigger in the secondary processing segment than the primary processing segment. Increasing urbanisation, consciousness on health and nutrition and changing lifestyle are changing the consumption habits of India. The number of working women, single students/professionals and nuclear families are creating demand for processed ready-to-eat foods. Growth of organised retail, which makes the processed food readily available, is also driving growth of food processing.

The paper endeavours to analyse the food processing industry in its current form in India. It will primarily focus on S&T issues related to food processing industry. The paper looks into the various challenges faced by the industry, and the future prospects of sector, the employment generation capability of industry, and the skills possessed by the workforce; it also deals with

various public sector initiatives implemented through various policies, programmes and schemes of government.

Methodology

We reviewed the relevant literature and analysed secondary data available on food processing sector. The data sources are from National Sample Survey Organisation (NSSO), National Skill Development Corporation (NSDC) report on Human Resource and Skill Requirements in the Food Processing Sector, Study on mapping of human resource skill gaps in India till 2022, National Bank for Agricultural and Rural Development (NABARD) occasional paper on Status and Potentials of Village Agro-Processing Units/Industries, 2005, Annual Survey of Industries (ASI) reports of the year 2010-11, Ministry of Food Processing Industry (MoFPI) strategic plan and others. The NSSO data belong to 56th and 62nd rounds. The other reports which were consulted are Planning Commission Working Group report on 12th Five Year Plan. Food Processing and Agribusiness (ASSOCHAM, 2009), Processed Food and Agribusiness: Opportunities for investment in India (FICCI, 2007), FICCI survey on challenges in Food Processing Sector, 2010.

***Limitations**:* Access and availability of same set of data on food processing industry across different years was a big constraint. There was no separate code for food processing industries till 2008 in Annual Survey of Industries and National Sample Survey Organisation reports. The Food and Processing industries are included in Food and Beverages industry according to National Industrial Classification (NIC), 2004 and in Food Industry according to NIC, 2008. The last survey done on industries by NSSO was in 62nd round (July 2005-June 2006). Before that manufacturing industries were surveyed in rounds 3rd, 10th, 14th, 23rd, 29th and after the launching of Economic Census (EC) in 1977, the industries were again surveyed in rounds 33rd, 40th, 45th, 51st, 56th and 62nd of NSSO. In ASI data are available up to 2010-11, but there is no distinction between food products industry and food processing industry. There are no data available after 2010 on food processing industry from NSSO and ASI.

Overview of Indian Food Processing Industry

In the post-Independence period, India witnessed rapid growth in food- processing sector specifically during 1980s. It followed the first phase of the Green Revolution that had resulted in increased agricultural production and the need for its post-harvest management. The importance of the sector was realised by the business community leading to diversification from grain trading to processing (Kachru, 2006). Initially it was rice processing which was followed closely by wheat milling, paper and pulp industry, milk processing sector, jute industry, sugarcane processing and oils extraction through solvent plants. In some areas like the solvent extraction industry, the growth in installed processing capacity has been far higher than the supply of the raw materials. However, in other areas like fruits and vegetable processing, the growth has not been encouraging due to poor demand for processed products by the consumers. In such cases, the industry has also not been able to develop the demand adequately. The low levels of processing are driven primarily by the food habits of the population. Fresh fruits and vegetables are preferred compared to processed fruits and vegetables (Deloitte, 2009).

Even after a strong agricultural production base, India's food processing industry is still under-developed. The highest share of the processed food is in the dairy sector, where 35 per cent of total produce is processed, of which only 15 per cent is processed by the organised sector. The processing level is around 2.2 per cent in fruits and vegetables, 21 per cent in meat and poultry products. Of the 2.2 per cent processing in fruits and vegetables only 48 per

cent is in organised sector remaining in unorganised sector (Merchant, 2008). Food and food products are the biggest consumption category in India, with spending on food accounting for nearly 21 per cent of India's GDP and with a market size of ₹ 9,050 billion. The share of food processing industry in GDP has gone up to ₹ Rs.44,93,743 crore in 2009-10 from ₹ 32,54,216 crore in 2005-06, with Compound Annual Growth Rate (CAGR) of 8.40 per cent. CAGR for total manufacturing sector during the same period has been 9.35 per cent (Table 1).

Table 1: Contribution in GDP from 2004-2010

	Contribution to GDP (₹ in crore) at 2004-2005 prices						CAGR
	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2005-06 To 2009-2010
Manufacturing	453225	499011	570436	629052	655775	713428	9.35
Food processing industry	44355	47690	52164	57320	67122	66078	8.49
Registered food processing industry	22148	26780	30710	34752	43893	43910	13.16
Non-registered food processing industry	22207	20910	21454	22568	23229	22168	1.47
Total GDP	2971464	3254216	3566011	3898958	4162509	4493473	8.40

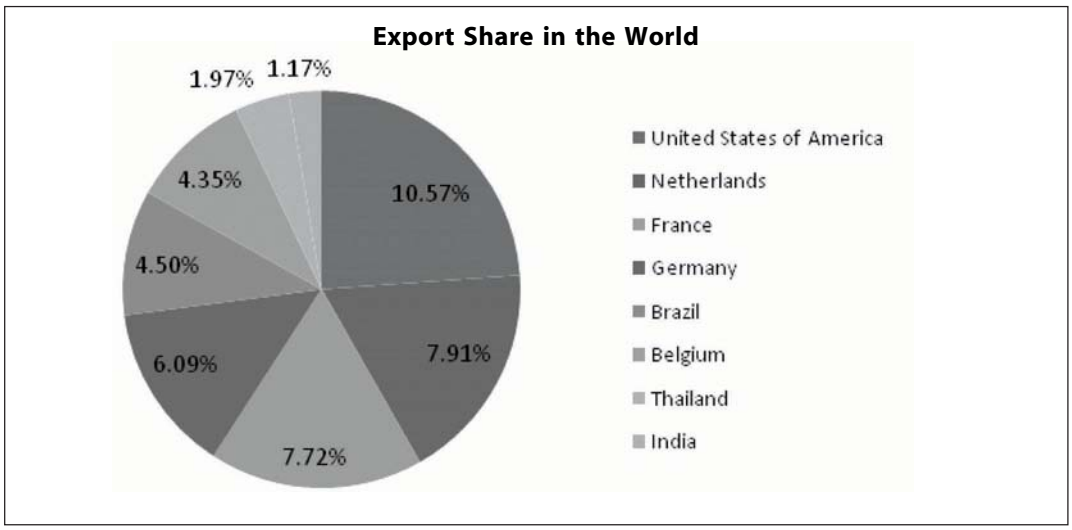
Data Source: NAS, 2011.

A study by McKinsey reiterates the importance of the food sector in India. It indicates that food in India has an economic multiplier of 2-2.5.That is to say that for every rupee of revenue from food, the economy at large gets ₹ 2-2.50. This phenomena was highlighted in a study done in Uttar Pradesh for knowing the contribution of agro-industries in generation of income and employment generation for farmers, it was found out that the farmers involved in food processing industry as suppliers are able to increase their income to the extent of 69 per cent for large farmers, followed by 13 per cent for farmers who own 10 to 20 acres of land while it increased lowest at 0.69 per cent for farmers owning land below 5 acres of land sizes. Presence of food processing industry also increases the hired workforce in farms. It is over 75 per cent for farms associated with industry in comparison to average of 72 per cent of total hired workforce in agriculture (Mehta, 2012). Even after all these benefits, farmers and the private sector are yet to exploit the full potential of food industries in India.There is a big market for products like sugar, coffee, tea and processed foods such as sauce, jelly and honey.The market for processed meat, spices and fruits is equally large.Tripling of the size of industry by 2015 is expected to generate direct employment of 28 lakh persondays and an indirect employment of 74 lakh persondays (MOFPI, 2007).

India is the largest producer of milk, fruits, pulses, cashewnuts, coconuts and tea in world and accounts for 10 per cent of the world fruit production. Confederation of Indian Industry estimated that the food processing sector has potential of attracting US$ 33 billion (₹ 1, 50,000 crore) of investment in next ten years.The Indian domestic food market is expected to grow by nearly 40 per cent of the current market size to ₹ 12,900 billion by 2015 and ₹ 17,200 billion by 2025 (World of Food India, 2011; Merchant, 2008). The state wants to fully utilise the untapped potential of the sector, and generate more revenue from the sector. If the policies of government towards food processing industry are analysed, there also it comes out that according to the vision 2015, the food processing industry is moving towards higher avenues, for example, increase in the level of processing of perishables from 6 to 20 per cent, value addition from 20 to 35 per cent, increase in share of global food trade from 1.5 to 3 per cent. These targets can be achieved if policies are implemented properly and international standards match, then food processing industry can become the leading industry of India's economy, generating huge employment opportunities and increase in income.

Still, there are significant constraints which, if not addressed sooner, can impede the growth prospects of food processing industry in India. At present, our share in exports of processed food in world trade remained at about 1.5 per cent or ₹ 16 billion (Bhuyan, 2010). Competitiveness of Indian export items are coming down, eg. India slipped from first to third rank in tea export. It is no longer competitive even with Vietnam in marine products and spices. Indian exporters are largely small scale, often undercut each other, export low value-added products to small traders/agents overseas or bulk packaged commodities for re-processing and re-packaging overseas where real value addition takes place. According to Annual Report of MOFPI, 2008-09, India produces 105 million tonnes of milk, 150 million tonnes of fruits and vegetables, 485 million livestock, 230 million tonnes of foodgrain, 7 million tonnes of fish, 489 million poultry and 45, 200 million eggs, and still our presence at world stage is even less than 1.5 per cent.

Figure 1: Export Share of Various Countries in World Processed Food Market



Source: NMCC, 2009.

Having analysed the general scenario of food processing industry, its contribution in national income, and in international trade, we will be analysing the major segments within food processing industry, the growth of food processing across various states, and its role in generating employment and skill development in the sector.

The major segments in the Food Processing sector comprise fruits and vegetables, dairy, edible oils, meat and poultry, non-alcoholic beverages, grain-based products, marine products, sugar and sugar-based products, alcoholic beverages, pulses, aerated beverages, malted beverages, spices, and salt. Out of these segments, dairy (16 per cent), grain-based products (34 per cent), bakery-based products (20 per cent), and fish and meat products (14 per cent) contribute to a major portion of industry revenues, apart from the manufacture of beverages.

Fruits and Vegetables : F&V processing is dominated by unorganised players, who occupy a share of 70 per cent in the total market size. Over the last few years, the industry has witnessed rapid growth of Ready to Eat foods, frozen vegetables, processed mushroom etc. The major challenge with this sector is non-availability of infrastructure facility to store produce. The cultural preference for fresh fruits and vegetables dominates over processed items.

Dairy: According to Dairy India 2007 estimates, the current size of the Indian dairy sector is ₹ 3133.50 billion and has been growing at a rate of 5 per cent a year. The dairy sector is mainly unorganised due to which the products do not match international standards. In 2011, the value of milk output from livestock is around ₹ 240000 crore and the value of dairy products market is around ₹ 400000 crore (Source : NDRI, 2011).

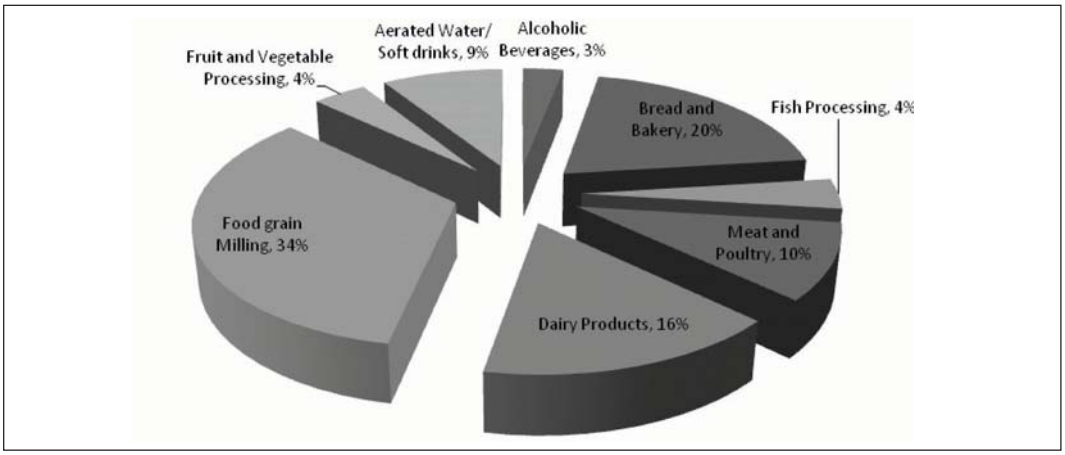
Meat & Poultry: Entry of many organised players like Godrej, Venkateshwara Hatcheries, Suguna poultry etc., in meat processing and packaging has accelerated growth of this industry segment. Meat production is estimated at 6.5 MT during 2007-08, which is around 2 per cent of world meat production. The contribution by bovine, ovine, pig and poultry is 43, 12, 8 and 37 per cent, respectively (Source: NPC, 2009).

Fish & Marine Products : The dietary habits of the people all over the globe are changing fast and India is gearing up to produce and supply value added products in tinned packs by adopting the latest technologies and by tapping the unexploited and under-exploited fishery resources. Value addition has been considered as the thrust area. Indian seafood processing units are being encouraged to go in for value addition and export through setting up new units, expanding their capacity and diversifying their current activities etc., for value addition. The export of marine products has steadily grown over the years-from a mere ₹ 3.92 crore in 1961-62 to ₹ 8607.94 crore in 2008-09. Marine products account for approximately 1.1 per cent of the total exports from India (Source: NPC, 2009).

Snacks : The Indian snacks market is estimated to be worth ₹ 150 billion with the organised segment accounting for half of the market share and is growing at a rate of 15-20 per cent. The unorganised share is roughly ₹ 75 billion and is currently growing at a rate of 7-8 per cent. Potato chips and potato based products occupy almost 85 per cent share of the Indian snack market (Source: PC, 2009).

Beverages : The market for carbonated drinks in India is worth US$ 1.5 billion while the juice and juice-based drinks market accounts for US$ 0.25 billion. Growing at a rate of 25 per cent, the fruit-drinks category is one of the fastest growing segments in the beverages market (Source: NPC, 2009).

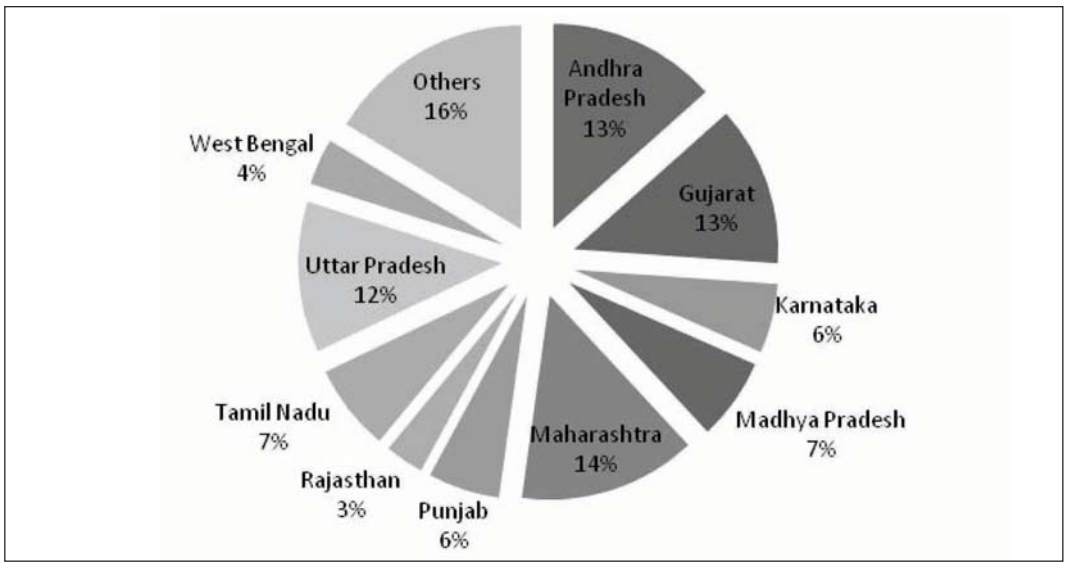
Figure 2: Share of Major Segments of Food Processing Industry in Revenue Generation in 2010



Source: ASI, MOFPI, 2010.

Major food processing States in India are Andhra Pradesh (13.4 per cent of India's food processing industry, and a centre for fruits, vegetables, grains and livestock products viz. poultry, dairy, fisheries, meat, etc.), Gujarat (12.7 per cent, and a centre for edible oils and dairy), Maharashtra (14 per cent, and a centre for fruits, vegetables, grains and beverages), and Uttar Pradesh (12 per cent, across almost all product categories).

Figure 3: Major Food Processing States in India



Source: ASI, 2010.

Figure 3 demonstrates that there is uneven development of food processing industries in India, most of the States have not fully capitalised their resources, and most of the produce is getting waste. This figure also demonstrates the fact that there is huge gap between numbers of food processing industries present in different States.

The food processing industry has strong backward linkages with rural economy, as all the raw material is produced by rural people. Hence, any growth in food processing industry, positive or negative, will have a direct impact on economy of rural India. According to NABARD (2005-06), the share of agro-industry in village level rural industry in terms of number of enterprises, total employment and gross value added were 83, 78 and 72 per cent, respectively. Out of the agro-processing sector in rural areas, the food processing industry is the second most important industry, in terms of revenue generation. But there is a huge productivity gap because of the use of traditional technology in production.

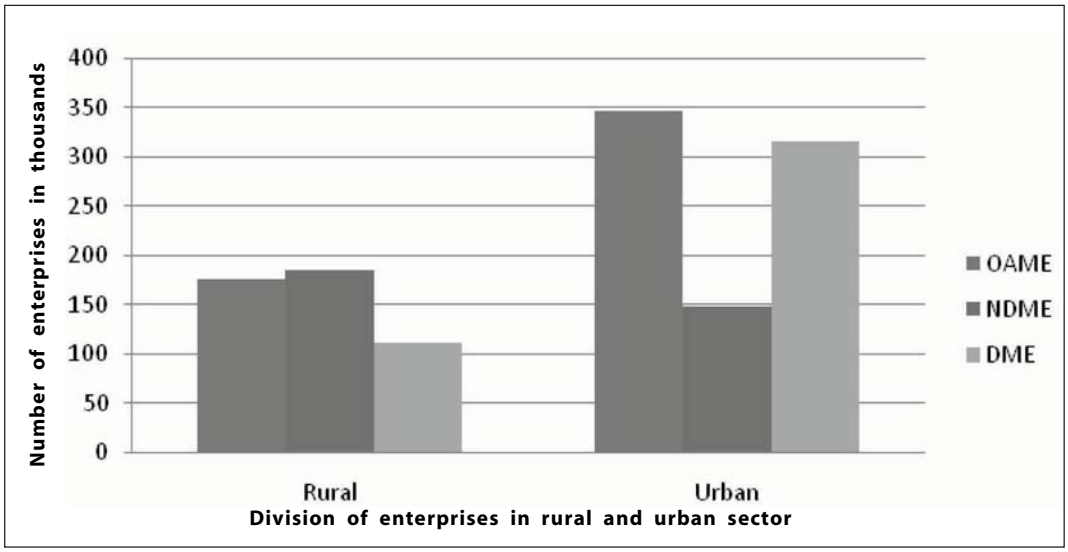
In rural areas, the food processing industry is mainly unorganised. According to NSSO classification, there are two types of setup in unorganised sector, one is own-account enterprise and another is establishment. An own-account enterprise is an enterprise which is run without any hired worker employed on a fairly regular basis, and an establishment is the one which employs at least one hired worker on a fairly regular basis.

In the unorganised sector, the OAME have the highest number of enterprises in both rural and urban areas. The OAME consist of fragmented primary processing units which are mostly home-based (Graph 1). The higher share of OAME leads to non-adherence to quality standards, low income generation, and less skill development. In OAME, it's the same work which continues for generation, thus leading to stagnation of creativity and development of technology.

The study by Sarkar (1995) indicated that the Own Account Enterprises (OAE), the smallest size group in the unorganised sector, is disadvantageously positioned in terms of backward linkage, raw material concentration index and size of market factors. Their ever diminishing advantages lie in dispersed raw material availability and sectors where processes are difficult to standardise. Further, raw material concentration index and direct backward linkage are positively and significantly correlated. It signifies that food-industries using larger proportion of material inputs also have added advantage in geographically concentrated availability of raw materials used in production. Whereas the advantages of factory sector lie in terms of larger market, higher linkages and concentrated availability in raw material. Specialisation of agricultural production in different regions, higher income level by expanding size of market and better transportation facilities are likely to eat into the location advantages that the OAME still possess.

With the increase in preference for processed food in India, there is a significant

Graph 1: Total Number of Unorganised Food Processing Industries in India in 2006-07



Source: NSSO 62nd round, February 2008.

increase in the number of industries in organised sector. The sector has grown at 31 per cent in the last three years (Table 2). This development gives a very encouraging view of food processing industry.

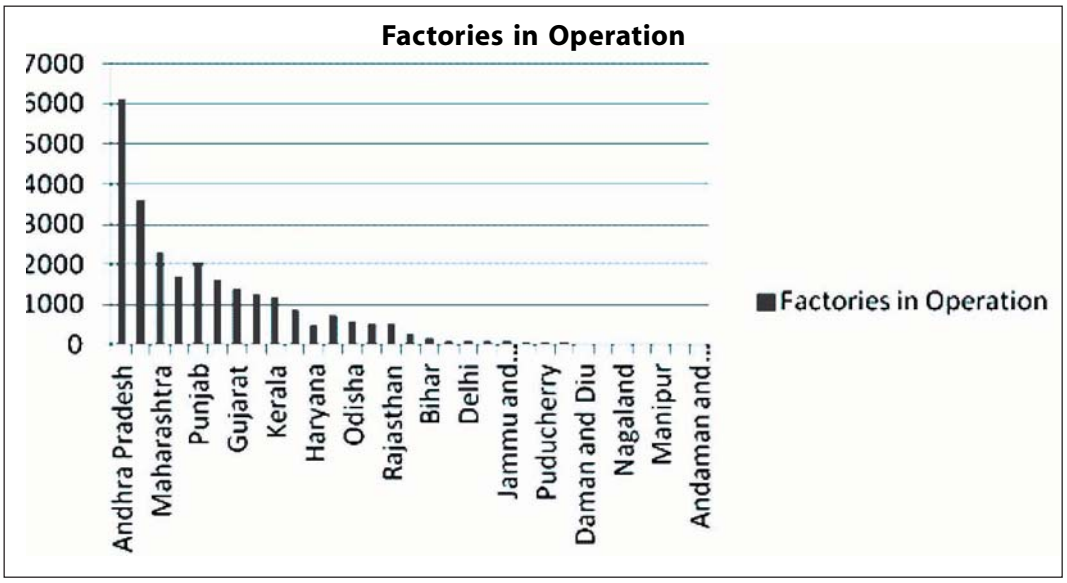
Table 2: Total No. of Factories in Organised Food Processing Sector from 2008 to 2011

Year	No. of factories
2008-09	25854
2009-10	26164
2010-11	34023

Source: ASI, December 2011.

India's strong agricultural base, variety of climatic zones and accelerating economic growth hold significant potential for food processing industry, and provide a strong attraction to foreign investment. The foreign players are able to sense enormous unexploited potential, and are continuously increasing their investment in food processing sector. The sector has been able to attract around INR 45.19 billion Foreign Direct Investment (FDI) during 1991-2005 which is 3.3 per cent of total FDI inflow in India, and has been ranked as 7th sector attracting largest FDI in India. There is quite a significant presence of food processing Multi National Corporations (MNC's) in different States in India. The highest number of MNC's are present in Andhra Pradesh (6127), followed by Tamil Nadu (3589) and Maharashtra (2316). These numbers show that those States which have provided some incentives through policy initiatives in the food processing industry are able to attract foreign investment. They provide significant investment subsidy, sales tax exemption on a fixed capital and rebate on power bill, thus making themselves a perfect choice for investment.

Graph 2: State-wise Number of MNC Food Processing Factories in Operation



Source: ASI, MOFPI, 2010.

The presence of FDI is beneficial to the retail segment also. The presence of FDI cutout the middlemen, thus giving a platform to the farmers to sell their produce to industry at a profitable price. There has been some hesitation regarding government decision to allow FDI in food retail sector, but some of the farmers' associations like All India Vegetable Growers Association (AIVGA), Bharat Krishak Samaj, Consortium of Indian Farmers Associations (CIFA), People for Environment Horticulture & Livelihood of Himachal Pradesh have come out in the support of FDI, as they expect that FDI will roll out produce storage centres, increase market access, reduce the number of middlemen and enhance returns to farmers. Then there are various examples where presence of Multi-national Corporation has changed the fortune of farmers of that area. Here, study of two cases is given which strengthen the fact that FDI will bring a good change for the farmers.

Case study1: PepsiCo India

PepsiCo India's potato farming programme reaches out to more than 12,000 farmer families across six States. They provide farmers with superior seeds, timely agricultural inputs and supply of agricultural implements free of charge. The company has an assured buy-back mechanism at a prefixed rate with farmers. This insulates them from market price fluctuations. Through their tie-up with State Bank of India, they help farmers get credit at a lower rate of interest. The company arranges weather insurance for farmers through tie-up with ICICI Lombard. They have a retention ratio of over 90 per cent, which reveals the depth and success of their partnership with farmers. In 2010, contract farmers in West Bengal registered a phenomenal 100 per cent growth in crop output, creating a huge increase in farm income. The remarkable growth has resulted in farmers receiving a profit between ₹ 20, 000– 40,000 per acre, as compared to ₹ 10000–20,000 per acre in 2009.

Case study 2: Bharti Walmart Initiative

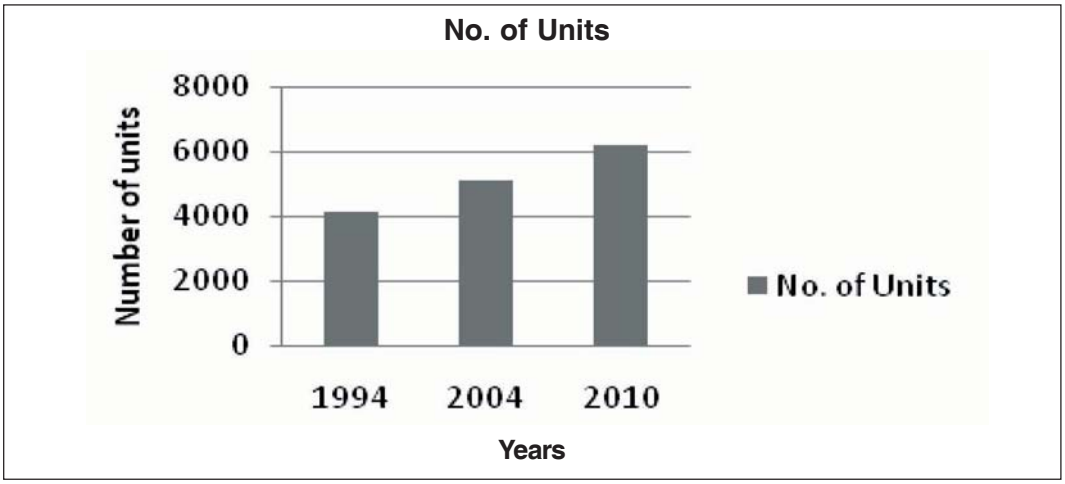
Corporate Social Responsibility (CSR) initiatives in Bharti Walmart are aimed at empowerment of the community thereby

fostering inclusive growth. Through their philanthropic programmes and partnerships, they support initiatives focused on enhancing opportunities in the areas of education, skills training and generating local employment, women empowerment and community development. In conjunction with the farmers' development programme in Punjab, community-building activities have been implemented in village, Haider Nagar. Due to lack of sanitation facilities, households tend to use the farm fields, thereby affecting yields and impacting the produce that is being supplied to stores. In order to improve the yields and the community's way of life, the company is working on the issues of Sanitation and Biogas, Education, Awareness Building and Health and Hygiene.

The presence of FDI will definitely act as a boon for the investors, farmers and everyone associated with food processing sector, but there is a strong need to regulate the modern retail, the laws should be properly implemented such that small retailers are safeguarded, the traditional retailers should be upgraded and wholesale markets should be upgraded to serve retailers and farmers better. The policy should work on the line of "Competitiveness with inclusiveness".

One of the sectors which is attracting a huge attention from global market players as well as from domestic players is fruit and vegetable processing sector. There is a sudden surge in demand for these products and market is trying to cope up with the demand. India is the second major producer of fruits and vegetables after China, but our fruit and vegetable processing industry is making a very slow progress. In last 16 years, only 2068 new licenses have been issued for the fruit and vegetable processing industries, marking only 50 per cent rise in the number of industries. These facts again prove that there is higher preference for fresh fruits and vegetables.

Graph 3: Fruit and Vegetable Processing Licensed Industries (1994, 2004 and 2010)



Source: Indiastat.com, 2010.

Till now we have studied that the food processing industry is growing at a significant rate. There is a continuous increase in the number of industries. There is a decent presence of foreign capital in the sector. The industry is growing in some States at a very fast pace (Andhra Pradesh, Maharashtra, Tamil Nadu), but some places are yet to mark their place especially north-east. But, overall the industry is growing, which is a positive sign.

With the kind of growth the industry is registering, it is important to know about its technology, its income and employment generation capability and skills needed in the sector.

Technological Capability of Food Processing Industry

The incoming of FDI and increase in the number of food processing industries, highlights the importance of science and technology capability of our food processing industries. A well developed technology infrastructure will add on to other incentives which India enjoys in food processing industry. In India, food processing dates back to the pre-historic age when crude processing including various types of cooking, such as over fire, smoking, steaming, fermenting, sun drying and preserving with salt were in practice. Foods preserved this way were a common part of warriors' and sailors' diets. These crude processing techniques remained essentially the same until the advent of the Industrial Revolution. Modern food processing technologies, in the 19th century were also largely developed to serve military needs. In the early 20th century, the space race, change in food habits and the quality consciousness of the consumers in the developed world furthered the development of food processing with advancements such as spray drying, juice concentrates, freeze drying and the introduction of artificial sweeteners, colourants, and preservatives. In the late 20th century, products including dried instant soups, reconstituted fruit juices, and self-cooking meals such as ready-to-eat food rations etc., were developed. But, in technological advancement and use, India is far behind other countries. Most of the work is done manually, and international standards are compromised.

India produces about 450 million tonnes of raw food materials of plant and animal origin which are refined, stored and transformed into various usable products using conventional and modern post-harvest and food processing technology. It involves operations like cleaning, grading, drying, storage, milling, packaging, transport, marketing and utilisation. At the end of each operation, value is added to the product. The lowest and the highest monetary values of a food commodity are, respectively, when it is in raw and fresh form and when it is in processed and ready to consume/eat form. Post-harvest and food processing technology are commodity and location-specific. It enhances and augments per capita food availability from a unit arable land and other resources by preventing avoidable post-harvest losses and adding value to the fresh agro-produces. It also creates opportunities for employment and income generation. Integration of production agriculture with on-farm primary processing is needed to have higher and sustainable production, productivity and better quality end products for domestic and export markets. It, therefore, demands establishment of Agro-Processing Centres in the production catchments itself to facilitate backward linkage with farmers, have fresh and best quality raw food materials for processing and value addition, minimise material movements, check migration of rural people to urban areas for jobs and thereby reducing pressure on public utilities in urban areas. Such centre would be a very strong tool for rural reconstruction and its upliftment. It would help in reducing rural- urban disparity and ensuring household food and nutritional security for all at an affordable cost. The technology is available but political will and commitment is required to implement the programme to shape a new India in the new millennium where everyone would be healthy and happy. It is in the interest of the nation and its people.

In India, the post-harvest losses are to the tune of ₹ 76,000 crore per annum, giving out a gruesome picture of industry. A substantial amount of these losses could be prevented if appropriate agro-processing centres having backward linkage with farmers to ensure

constant supply of quality raw food materials are established and operated. The two major goals of post-harvest technology are loss prevention and value addition to the raw food commodities through preservation and processing. Raw food materials are cleaned, graded and then they are either stored or processed. Processing is done to make raw commodities edible through primary and secondary processing and ready to eat through tertiary processing. Estimated value additions to the raw food materials through primary and secondary/tertiary processing in India are 75 and 25 per cent, respectively.

Now, we will explore some of the conventional and improved agro-processing technologies which are used in food processing industry. Indian food processing industry is growing at a healthy rate, and two sectors which are driving the growth are dairy sector and horticulture sector.

Table 3: Conventional and Improved Agro-processing Operations Used in Food Processing Industry

Operation/activity	Conventional technology	Post-harvest technology
Threshing	Manual beating and animal/tractor treading	Mechanical threshing with improved design of threshers
Winnowing	Manually with ordinary baskets	Mechanical winnowing with manual mechanical power.
Cleaning	Manually operated SUPA, a simple device but of low capacity	Manual/power operated cleaner cum-graders.
Drying	Open yard sun drying	Solar dryers or heated air dryers using mechanical power.
Storage	Earthen pitchers, mud bins or bag storage	Metal bins, brick structures and concrete silos of improved designs.
Milling	Hand and foot pounding, rice hullers, stone grinders, oil ghanis, etc.	Modern rice, dal and flourmills of different capacities, oil expellers, solvent extraction plants.
By-product utilisation	Direct feed and fuel uses	Solvent extraction of rice bran and oil cakes, pelleted animal feed, etc.
Marketing	Selling raw materials to middlemen of trade at low prices	Selling of cleaned and graded produces, value added products directly to super/cooperative markets for better profitability.
Preparation and utilisation	Open vessel cooking and traditional food preparations	Pressure and microwave cooking. Nutritionally balanced diet/recipes. Use of refrigerators, grinders/ mixtures.

Source: Ali, 1999.

Dairy Sector

India is currently the largest producer of milk in the world, a status it has maintained since the late nineties. Further, India is also self-sufficient in milk. This has been largely achieved through a combination of favourable policies and an institutional network that has helped support millions of rural households in pursuing their livelihoods through small-scale dairy farming. About one-fifth of the milk produced is collected and processed by the organised dairy sector. Cooperatives now link more than twelve million small-scale dairy producers to urban markets and provide them a stable source of income. India is witnessing winds of change because of improved milk availability, a change-over to market economy, globalisation, and the entry of the private sector in the dairy industry. The value addition and variety in the availability of milk products are on everybody's agenda. There is an increasing demand for new products and processes. The main reasons are - an increase in disposable incomes; changes in consumer concerns and perceptions on nutritional quality and safety; arrival of foreign brands; increasing popularity of satellite/cable media; and availability of new technologies and functional ingredients.

In India, milk and milk products are inseparable part of socio-cultural life. The traditional milk product marks an auspicious and happy occasion in India. Traditional products account for more than half of the total revenue generated from dairy industry. But, then also these products have not been able to create an international demand for them, due to their limited shelf-life period. With advent of new processing technology in dairy sector, the sector is gearing up to take on the world with its traditional products.

Traditional Sweets : With the successful innovation of Scraped Surface Heat Exchangers, traditional sweet products can be easily manufactured by the Indian dairy industry. About 15 plants in India have initiated industrial production of khoa with daily output of 1 to 4 tonnes using continuous khoa making machine. The entire traditional technology can be improved and modernised by employing mechanical systems such as casein parocess for chhana and paneer making. Shelf-life of pasteurised milk could be extended by adoption of higher pasteurisation conditions, Lactoperoxidase (LP) - system, bactofugation technique, micro-filtration technique, electrical process, thermisation process or use of bio-preservatives. These sweets are also gaining wide acceptance in South Asian and African countries, UK, Canada and the USA.

New Whey Products : In India, whey is obtained during the manufacture of paneer, chhana, casein and shrikhand. It has been estimated that about one million tonnes of whey is annually derived as a by-product which possesses about 70,000 tonnes of nutritious solids. Whey obtained in our country as by-product is mostly thrown away as waste. No proper attempts have so far been made particularly on a small scale to exploit this by-product. Considerable economic benefit can also be secured from prompt utilisation of the whey. Whey can be converted into a range of products viz. whey powder, lactose, high protein whey powders, whey protein concentrate, granulated high protein whey powders, These products can be used in infant foods, weaning foods, bakery products, confectionery products, dairy products etc. Beverages and soups are generally consumed by a large number of people for the reasons of their being refreshing, tasty and nutritious.

Ultra High Temperature (UHT) Processing and Aseptic Packaging: Considered as the single most important innovation for dairy products in the last half-century, it involves producing shelf-stable products by sterilising the product and the packaging material or container separately and filling in a sterile environment. It was popularised in India with the success of fruit juices, drinks and milk such as Amul Taaza.

Super Heated Water Spray Steriliser : Early methods for sterilising milk involved filling milk into heat resistant glass bottles, then sealing them with air tight, pressure resistant caps and heating in a commercial pressure cooker (or retort) to temperatures between 1150 C and 122.70 C for between 12 and 20 minutes. The retort process can include an agitation step which helps reduce heat transfer time and combats settling and separation. A new method of sterilisation has been developed called "Super Heated Water Spray Steriliser" for heat sensate products. This is suitable for delicate containers like plastic bottles. This system is suitable for rapid heating and rapid cooling for heat liable products.

Membrane Processing *:* Recently, membrane processing has gained importance over conventional processes in dairy industry for its advantages that are well known and established. Membrane processing has presented new possibilities for the production of newer intermediate dairy products that can be used in different foods based on their functional properties.

Horticulture

Another very important component of food processing industry is Horticulture. Horticulture sector includes fruits, vegetables, root and tuber crops, spices, mushrooms, honey, floriculture, medicinal and aromatic plants and nuts. These crops though account for only 6-7 per cent of the total area under cultivation, provide more than 25 per cent of total agricultural GDP and the total agricultural expertise. It is estimated that post-harvest losses of horticultural produce range between 8-37 per cent. Even if 10 per cent of these losses could be saved by converting the surplus into processed products, there will be considerable saving to the horticultural wealth in the country.

The horticulture sector of India has got its share of limelight in last decade only, with the advent of globalisation. Before that, most of the fruits and vegetables were stored in the form of pickles, murabba and other homemade chutneys. Mostly the produce was heated, boiled or sun dried. There was no big business in the form of fruit and vegetable processing.

But in the last two decades things have changed, with the coming of multi-national corporations and new technologies, fruit and vegetable processing is also seen as a business opportunity. Some of the new technologies which are used in horticulture sector are:

Thermal Processing Methods: In this method the severity of the heat treatment and the resulting extension of the shelf life are determined mostly by the pH of the food. In low acid foods its mainly high temperature processing, and in acidic and highly acidic food its boiling water processing. Some of the thermal processing methods are, Blanching, Pasteurisation, Sterilisation and Commercial Sterilisation.

Drying/ Dehydration: Preservation of foods by drying is perhaps the oldest method known. Drying of foods and biological products is a widely applied process for different purposes such as increasing shelf life, reducing packaging costs, lower shipping wastes, encapsulating flavours, making food available during off-season, adding value by changing the phase structure of the native material and maintaining nutritional value. In earlier times drying was only done by solar, i.e. sun drying. With the invention of new technologies many more have come, they are Mechanical (Cabinet) dehydration, Osmotic dehydration, Freeze drying, Ionising radiations.

Chemical Preservation: In this technique, chemical additives such as sugars, salt, acids, spices etc., are used to preserve food. Some of the common ways are high sugar preservation, use of salt/acid/spices, and use of chemical additives.

The use of chemical additives is highly sensitive issue; there are basic rules which

govern chemical preservation. Chemical food preservatives have to be used only at dosage level that is needed for a normal preservation and not more than that prescribed by Fruit Product Order, 1955. Reconditioning of chemical preserved food is not recommended. The use of chemical preservatives must be strictly limited to those substances which are recognised as being without harmful effects on human beings' health and are accepted by national and international standards.

Another very common method of preservation is **Hurdle technology**; it's a combined method of preservation. The trend of using a wide range of mild preservation techniques has emerged to be known as combined preservation or barrier (Hurdle) technology. It advocates the deliberate combination of existing and novel preservation techniques in order to establish a series of preservative factors (hurdles) that any microorganisms present should not be able to overcome.

These were some of the technologies used in horticulture for the preservation of products. The Indian entrepreneurs are making use of new technologies to increase their production, match the quality standards of international trade, and to generate maximum profit for themselves. But Indian food processing industry is highly unorganised, and most of the employers in this sector ignore the new technologies and prefer manual labour, compromising on Good Manufacturing Practices. For example, our meat and poultry industry, which has a huge market outside India, has only 9 modern abattoirs out of the 3,600 slaughter houses. Therefore, it's the time when Indian government should come out with various policies to promote technological development of food processing industry.

Now, we will analyse the employment generation capacity and skill requirements of the sector. The food processing industry is employment intensive. The sector employs people of different backgrounds and of different education level. The sector actually needs highly skilled people, who can contribute to the growth of sector. The need of skills is different in different segments of the sector. For example: a person, who is working in dairy segment, might be highly skilled for that segment, but he will not be suitable in fish processing segment. In this part we will first analyse the employment generation capacity of food processing sector.

Employment Generation Capacity

As stated earlier, food processing industry employs 13 million people directly and 35 million people indirectly (MOFPI, 2011), and the kind of growth industry has it is expected that it will create job opportunities for large part of workforce. The food processing sector is highly unorganised, 82 per cent of the workforce employed in food processing industry is in unorganised sector, and i.e. out of every 10 persons around 8 are employed by unorganised sector (Table 4).

Table 4: Employment Scenario in Food Processing Industry in India in 2010-11

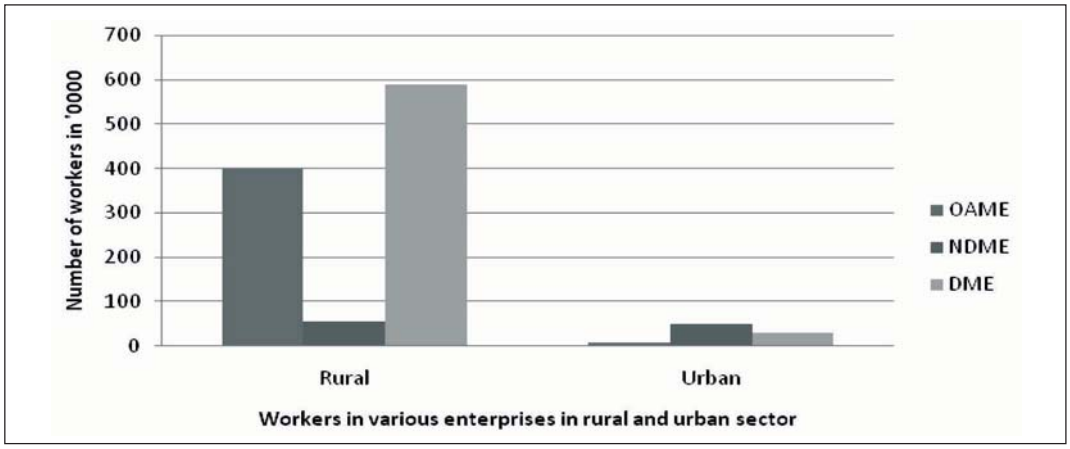
Sector	No. of Persons (million)	Share (%)
Organised	1.53	18%
Unorganised	7.00	82%
Total	8.53	100

Source: ASI, NSSO, 2010-11.

As for unorganised sector, the maximum working population is in DME (Directory Establishment). The higher proportion in DME can be attributed to the fact that they are large

industries and hire more people. Another striking feature which comes out of Graph 6 is that in rural areas OAME (Own account manufacturing enterprises) sector is much bigger than the NDME (Non-directory manufacturing establishment) sector in employment generation, i.e. more people go for their own enterprises in rural areas, and in urban areas the OAME sector is almost negligible.

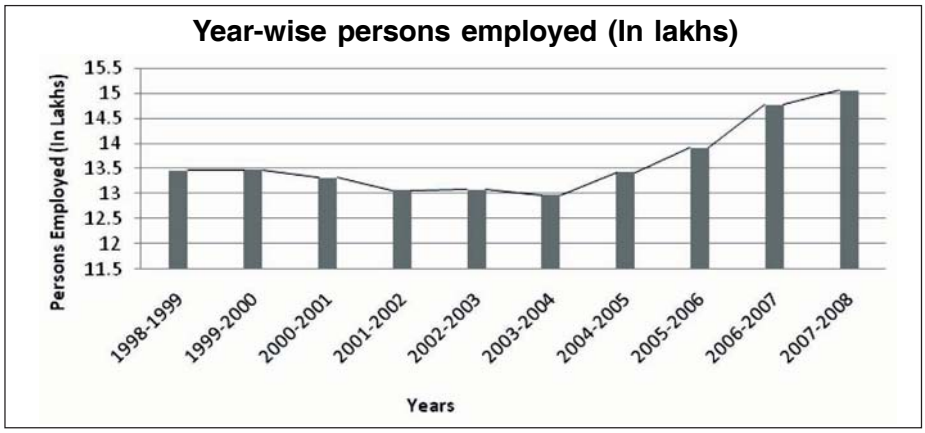
Graph 4: Number of Workers Engaged in Unorganised Food Processing Industry by Enterprise Type, 2005-06



Source : NSSO, December 2007.

Persons employed under the registered food processing industries have been increasing from 2004-05 to 2007-08. There has been a fall in the growth rate of employment in registered food processing industry units in 2007-08, probably because the growth had been very high in the preceding years and also because 2007-08 was a year when there was a global slowdown in economic activity.

Graph 5: Persons Employed Under Registered Food Processing Industries



Source : ASI, 2007-08.

In division of employment state-wise it came out that Andhra Pradesh has the biggest share of persons employed in food processing industry, as Andhra Pradesh is the biggest centre of food processing sector in India (Table 5).

Table 5: Share of Various States in Employment in Food Processing Industry in 2010

S. No.	Name of the State	Share of employment in %
1	Andhra Pradesh	14.1%
2	Assam	4.7%
3	Gujarat	5.9%
4	Haryana	3.3%
5	Karnataka	6.0%
6	Kerala	11.9%
7	Madhya Pradesh	2.3%
8	Maharashtra	7.8%
9	Punjab	7.7%
10	Tamil Nadu	11.2%
11	Uttar Pradesh	12.0%
12	West Bengal	4.8%
13	Others	8.3%

Source: NSDC, 2010.

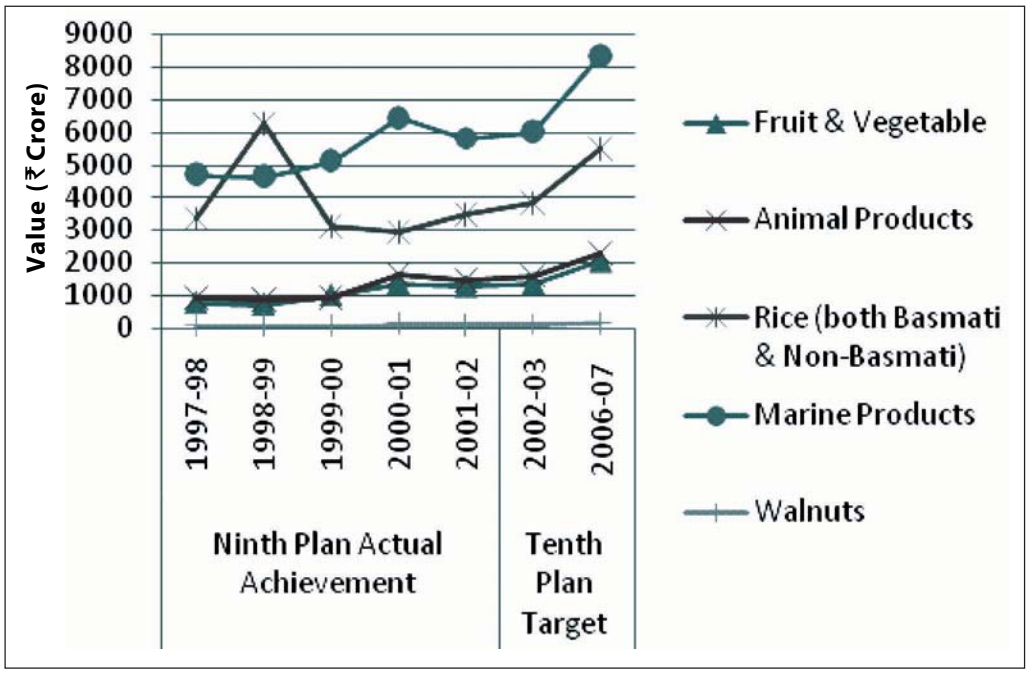
While analysing the employment generation of food processing industry, it is important to understand the skill set which is required in food processing Industry. To understand the skill set required it is important to know value chain in food processing industry.

Value Chain in Food Processing Industry

The value chain in food processing industry starts from farm inputs and ends at food retail and food service. The first stage of value chain includes delivery of agro-inputs, i.e. seeds, agro-chemicals, fertilisers etc. This also includes production of crop, and insurance of crop against any sort of natural or man-made calamity. The stage also involves procurement of agro-produce for value addition. The second stage of trade and distribution, which involves storage and trading of produce and here, comes the importance of cold chain facilities. The absence of proper cold storage facilities leads to wastage of produce, which amounts as high as 35 per cent. This problem has been marked as number 1 challenge in food processing industry, by the entrepreneurs in a survey conducted by FICCI (FICCI, 2010). The trade and distribution facilities also include transportation for export, and shifting of produce from one place to another and trading of sourced agro-produce. Then comes the processing part which involves grading, sorting and waxing in case of fruit and vegetable segment, milling, grading in case of grains (for example, paddy-rice, wheat-flour). Then value addition of wheat into noodles, wheat into bakery items, processed fruit and vegetables, extruded snacks etc. In the next stage there is wholesale trading of value-added produce, export of produce and branding of products. The entry of big brands in food industry has created a tiff competition for small players. The presence of MNC's in the market, do not allow local players to grow, as they lack that extensive branding and publicity. The final stage of food retail and food services, implies retailing of value-added foods by means of hotels, restaurants, eat-outs and retail stores (for packed items, grains, Ready to Eat foods etc.). There is increase in value addition in every segment of food processing industry

with increase in demand for processed food. Graph 6 clearly shows that there is increase in target for Tenth Plan in every segment with respect to Ninth Plan.

Graph 6: Value Addition in Different Segments in Ninth Plan and Target for Tenth Plan



Source: Indiastat.com.2005.

The value addition in different stages in food processing industry requires different skill sets; the basic functional distribution of human resource across segments in food processing industry is given in Table 5. Around 55 per cent of the human resource in food processing industry is involved in production work, or in processing stage. Table 6 gives out a basic distribution of human resources across different segments in food processing industry.

Table 6 : Basic Functional Distribution of Human Resources Across Segments in Food Processing Industry in 2010

Function	% of employees
Procurement	10%
Testing and Quality	20%
Production	55%
R&D	1-2%
Storage	2-3%
Other(Sales and other support functions)	10%

Source: NSDC, 2010.

Having provided the functional distribution of human resources across segments in food processing industry, now we will reflect upon the educational profile of the employees involved in food processing industry.

Analysis of Table 7 shows that maximum percentage of workers in food processing industry have low level of education, and therefore, their skill level is also low. Low level of skills highlights a very dark picture of Indian food processing industry; here workers can not contribute from their side in the development of the industry, thus leading to stagnation of the industry.

Table 7: Distribution of Human Resources by Education Level in Food Processing Industry

Education level	% of employees
Employees with management education	1-2%
Proportion of food technologists	20%
Post-Graduates	0.5-1%
Graduates	10%
Diploma holders	2-5%
Certificate holders	2-5%
10th Standard or below	80%

Source: NSDC, 2010.

While the overall requirement for skilled human resource in the food processing sector is much larger, we have considered the organised sector to illustrate the demand-supply gap. Table 8 presents the demand for skilled human resource across different educational qualification for the organised sector alone.

Table 8 : Annual Demand for Skilled Human Resource in Organised Sector in Food Processing Industry

Category	Required annual demand
Food technologists (Post Graduate)	2,384
Food technologists	5,363
Diploma	4,768
ITI/ITC	4,768
Short term-course trained personnel with education below 10th /12th std.	95,351
Total	112,633

Source: NSDC, 2010.

While there are gaps in terms of excess of demand over supply in the organised sector at all levels, the gap is maximum when considering the demand for 'those trained by short-term courses' with low educational qualification (below 10th/12th standard) where there is a required demand for about 1 lakh trained persons annually against a supply of over 10,000 persons. This requirement will increase to over 5.3 lakh if the unorganised sector is also taken into account.

Skill Gaps in Food Processing Industry

Analysis of Table 9 shows that there is a wide gap between skills needed and skill available. If India is to make its presence in the

world market, then there is a need to bridge this gap as soon as possible. There is a huge gap in demand and supply market. According to a survey done by NSDC, there is a huge demand for skilled workers at all the stages in food processing industry, especially for persons with short-term course training, having education level below 10^{th}/ 12^{th} standard.

Table 9 : Skill Gaps Present in Various Segments of Food Processing Industry

S. No.	Type of Gaps	Dairy	Foodgrain milling	Fruit & Vegetable	Meat & Poultry	Fish and marine products
1	Production	Inadequate knowledge of ways of maintaining the quality of produce. Inadequate knowledge of breeds, feeding, disease control, and poor knowledge of hygiene maintenance and management practices.	Inadequate knowledge of latest / best farming practices because of lack of training /access to other information sources. Inadequate knowledge of percentage increase in value with minimal value addition to Produce. Lack of knowledge of grading and standardisation of foodgrains. Inadequate understanding of ways to minimise breakage of grains.	Inadequate / restrictive motivational skills Inadequate documentation skills / not conversant with e-reporting / working on computers. Inadequate knowledge of operations resulting in wastage	Inadequate consistency in Operations due to inadequate understanding of immediate or long term impacts. Tendency to change jobs frequently, leading to a high attrition rate and consequently lower quality of work and lower productivity.	Inadequate knowledge of fish breeding and rearing processes. Inadequate sensitivity to environmental issues, thus leading to poor hygienic conditions
2	Testing	Inadequate ability to practically conduct tests and record results, no knowledge of correct sampling methods.	Inadequate practical expertise in conducting tests. The field needs Visual examination skills for faster segregation and checking of input/ output and ability to record the results as they are observed and reporting non-adherence to standards.	Inadequate ability to apply technical expertise and procedural knowledge in actual work situations, especially at the entry level.	Inadequate ability to conduct tests and record results. Inadequate technical knowledge for primary medication in case of disease/ medication.	Inadequate technical knowledge about the new machines and the associated aspects of maintenance.
3	Procurement	Inadequate ability to forecast demand. Inadequate communication skills, especially in local language because of diverse dialects. Poor knowledge of making milk by-products, and inability to increase their shelf life.	Inadequate ability to forecast the demand accurately. Inadequate training skills for encouraging the producers for better productivity and quality. Inadequate ability to follow rules of marking gunny bags.	Inadequate knowledge and ability to educate farmers on demand, advice on farming and wastage reduction. Inadequate communication skills to be able to motivate farmers for better quality and higher productivity.	Inadequate awareness of prevention care techniques.	

Data Source: NSDC, 2010.

The demand for skilled human resource is continuously increasing, but there is greater demand in unorganised sector rather than organised sector (Table 10). This is because of the fact that organised sector is very small in respect to unorganised sector.

Table 10: Incremental Human Resource Requirement for Persons Trained Through Short-term/Modular Training Initiatives in Food Processing Industry-Annual Requirements (in'000s)

Sector	Total demand of trained human resources	Demand of trained human resources in organised sector
Fruit and Vegetable Processing	12	2
Foodgrain Milling	42	8
Dairy Products	68	12
Meat and Poultry Processing	104	19
Fish Processing	1	0
Bread and bakery	258	46
Alcoholic beverages	42	8
Aerated water/soft drinks	2	0
Total	530	95

Source: NSDC, 2010.

We have studied the various skill gaps present in food processing industry. Now, we will look at various science and technology policy initiatives of Government of India in development of food processing industry.

Table 11: Various Institutions Providing Vocational Education and Training Programmes in Food Processing Sector

S.No.	Ministry/ Department	Schemes/Programmes/ Institutions having provision for vocational education and training programme	Target Group	Duration of training (short-term/long-term)
1	Ministry of Food	Grants were provided to NGO for setting up 326 food processing and training centres (FPTCs) during 1992-93 to 2000-01.	Persons living in rural areas with preference being given to women, SC, ST and other weaker sections of society.	
		Institutions like Central Food Technology Research Institute, Paddy Processing Research Centre, PHTC, Council of Entrepreneurial Development Programme (EDP) are also training courses.	Mainly persons in food Processing Industries	Short-term
		Person power development in rural areas (FPTC Scheme)	Open	Short-term
		Entrepreneurship Development Programme	Open	Short- term
		Programmes for development of human resources in food processing, testing, training, quality management etc.	Candidates aspiring to managers, technicians/ technologists, and entrepreneurs.	AICTE approved diploma/degree courses durations as usual (Long-term)
2	Ministry of Micro, Small and Medium Enterprises	Entrepreneurship Development programme, Skill Development	▪ Workers	Both short-term and long-term
	[Small Industries Development Organisation (SIDO)]	Programme (SDP), Management Development Programme.	▪ Educated unemployed youth ▪ Entrepreneurs	

Source: MOFPI, MMSME, 2012.

Table 12: Programmes and Policies of GoI for Food Processing and Gaps Present

Policy/ Programme	Year	Feature	Gap/ Constraints
Scheme for Implementation of HACCP/ISO 22000, ISO 14000/GHP/GMP, Quality/ Safety Management (Source: Food Safety and Standards Bill, 2005)	2005	Match the quality standards of the world.	The numbers of food processing centres are highly uneven in respect to number of industries.
Scheme of Technology up-gradation, Establishment and Modernisation of Food Processing Industries (Source : MOFPI , 2006-07)	2007	Financial intervention for enhancing processing levels of industries, and assistance in setting up new industry	No knowledge on how unorganised sector will come in its purview. There has been a persistent demand for increasing the limit of capital grant, but this does not seem to be feasible in view of the limited resources for and galloping demand on the scheme.
Entrepreneurship Development Programme (Source: Eleventh planning commission report, 2007)	2007	Financial assistance to various organisations to promote establishment of food processing industries.	No incubation policy in case of failure of the business.
Scheme for creating Primary Processing Centres/Collection Centres in rural areas. (Source: Draft report for WG 12TH FYP,2011)	2011	Development of rural entrepreneurship and transfer of technology for food processing by utilising locally grown raw materials.	The entrepreneurs do not pay adequate attention to all these facilities, therefore all the responsibility falls on farmer groups.
Training at recognised national/state level institutes sponsored by MOFPI/other training programmes (Source: HRD Ministry, annual report 2011-12)	2011	Financial assistance to farmers or upcoming entrepreneurs for training	The training centre location, and till time even after grant of budget no training institute has come up.
Creation of Infrastructure Facilities for running Degree/Diploma Course in Food Processing Technology (Source: HRD Ministry, annual report 2011-12)	2011	Financial assistance to educational institutions for starting course in food technology.	The problem lies whether the courses introduced are in line with the market demand. Various short duration certificate courses have been introduced, but there are no statistics on whether they suffice the market demand.

Most of the policies developed by Central government are generic in nature. In order to benefit from these policies, respective States have to evolve their own policies, which are in tune with their socio-economic and agri-livestock resource base. The policy from the Centre and State should incentivise and encourage Public Private Partnership (PPP) in overcoming various constraints namely, non-availability of adequate infrastructure facilities, cold chain, packaging and grading centres, lack of adequate quality control and testing infrastructure, inefficient supply chain, shortage of processable varieties of farm produce, seasonability of raw material, high inventory carrying cost, high taxation, high packaging cost, affordability and cultural preference for fresh food. Table 13 lists various challenges faced by food processing industry, and their weightage.

Table 13: Top Five Challenges of Food Processing Industry and Their Weighted Response

Top Five Challenges Identified	Weightage of Challenges
Inadequate Infrastructural Facilities	44.25
Comprehensive national policy on food processing sector	34.46
Food safety laws	28.51
Inconsistency in Central and State policies	28.08
Availability of trained manpower	25.53

Source: FICCI survey, 2010.

The food processing sector is governed by multiple acts rather than a single comprehensive policy on food processing. The food laws governing food processing industry span nine ministries, comprising 13 central orders alone; in addition, States have their own control orders. The policy to be effective will have to be comprehensive and adopt a number of legislative, administrative and promotional measures. According to NABARD, village level agro-industry does not come within the purview of any single Ministry. Because of this problem, only a fraction of the village level agro-industries are registered. It says further that an overwhelming proportion of the registered enterprises are registered with the village panchayats. To infuse technology and credit in agro-industry, it is required to bring them under single registration authority and start a massive campaign to register village level agro-industries. It goes on to state that in spite of the government programmes, lack of infrastructural facilities hinders the growth of agro-industries. These include electricity connection, power cut, transportation facilities, etc. Infrastructural facilities need to be upgraded substantially for economic viability of these enterprises through widespread development of rural infrastructure (NABARD, 2005).

If infrastructural facilities present at village level or all over India are considered, then the most important part of infrastructure facility in food processing industry is cold storage facilities, which are crucial for the value addition. In India, there are 5,381 cold stores with a storage capacity of 24.45 MT. Uttar Pradesh and West Bengal account for more than 60 per cent of the cold storage capacity followed by Punjab, Bihar, Gujarat, Andhra Pradesh and Madhya Pradesh. Over ninety five per cent of the cold storages are in the private sector. According to the Report of the Task Force on Development of Cold Chain in India constituted by Ministry of Agriculture in May, 2007, more than 80 per cent of the capacities are utilised only for potatoes and about 17 per cent fall under multi-commodity category. Most of the multi-purpose cold stores are also used for potato storage besides providing storages for chillies, dry fruits, spices, vegetables etc. Cold storages for meat, fish, milk and milk

products and for other commodities such as chillies and other spices account for about one per cent of the total cold storage capacity. These cold storages are usually smaller in capacity. This difference in storage of potatoes and other products is mainly attributed to the high and annual intake of potatoes, and its longer shelf life. The various existing challenges present in cold storages in India are discussed in Box 1.

Box 1 : Technological challenges in cold storage facility in India

- Designed to store single commodity, not suitable for multipurpose.
- Not suitable for providing storage conditions of uniform temperature, humidity, air circulation and fresh air requirements.
- Pre-cooling technologies such as forced air evaporative cooling, package icing, and vacuum cooling are non-existent in India.
- Controlled atmosphere cold storages still in nascent stage.
- Over 90 per cent of cold stores use old ammonia refrigeration compressor without any capacity control, which is inefficient and expensive.
- Managed by unskilled and untrained manpower, not aware of latest technology and techniques in handling and storing fresh perishable produce to international standards.

In context with food regulation laws, the Indian food regulations comprise various food policies that have been enacted at different points of time, and are under the ambit of various ministries of Government of India (GoI). Historically, they were introduced to complement and supplement each other in achieving total food sufficiency, safety and quality. This incremental approach has led to incoherence and inconsistency in the food sector regulatory scenario. In addition, the multiplicity of ministries and administering authorities at both the Central and State levels has resulted in a complex regulatory system that is not well integrated adding an additional burden on the food industry.

Lack of skilled and trained manpower in food processing industry is also a big issue. Many positive developments in the food processing sector have also resulted in the apprehension about the emerging skill shortages due to mismatch between the demand for specific skills and available supply. In fact, of late, shortage of skilled, semi-skilled and unskilled workers has emerged as a critical factor impacting the competitiveness of Indian food industry. Around 58 per cent of the employers are dissatisfied with technical skills and knowledge needed for the job. Also 72 per cent showed discontent with employees' ability to use appropriate and modern tools, equipment, and technologies specific to their jobs (FICCI, 2010).

The food processing industry has many challenges in front of it, ranging from infrastructure to human resources and to technological backwardness. Now, with the growing demand of processed food there is a need to address these problems and concerned issues on priority basis. Else, India will miss a golden opportunity of using its vast agri-livestock resources to strengthen its economy, revive its rural industries and create employment for thousands of people.

Opportunities

Indian food processing industry has seen significant growth and changes over the past few years, driven by changing trends in markets, consumer segments and regulations. These trends, such as changing demographics, growing population and rapid urbanisation are expected to continue in the future and, therefore, will shape the demand for value added products and thus for food processing industry in India. The Government of India's focus towards food processing industry as a priority sector is expected to ensure policies to support investment in this sector and attract more FDI. India, having access to vast pool of natural resources and growing technical knowledge base, has strong comparative advantages over other nations in this industry. The food processing sector in India is clearly an attractive sector for investment and offers significant growth potential to investors. There is a huge opportunity to develop S&T capability and R&D in the sector. There is a need to train the unskilled labour force, need for development across various human resource profiles. India can harness all the opportunities present in food processing sector only when its labour force is educated and skilled. The government needs to strengthen its skill development programme; new training institutes should open up, which are in tune with market demand. The development of infrastructure facilities like cold chain, road facilities, and power will strengthen the food processing industry. It will have a very positive sign on perishable food products industry, such as fruit and vegetable, dairy industry, meat and poultry segment. The food processing industry is all set to drive Indian economy to higher growth, only need is to pay due attention on technological development of field, and generation of skilled manpower.

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Journal of Rural Development, Vol. 32, No. (4) pp. 479-480
NIRD, Hyderabad.

ANNEXURE

Definition BY NSSO :

Enterprise:

An enterprise is an undertaking engaged in the production and / or distribution of some goods and / or services meant mainly for the purpose of sale, whether fully or partly. An enterprise may be owned and operated by a single household or by several households jointly on a partnership basis, or by an institutional body.

Manufacturing Enterprise:

A manufacturing enterprise is a unit engaged in the physical or chemical transformation of materials, substances or components into new products. It covers units working for other concerns on materials supplied by them. Also included are units primarily engaged in maintenance and repair of industrial, commercial and similar machinery & equipment, which are, in general, classified in the same class of manufacturing as those specialising in manufacturing the goods.

Unorganised Manufacturing Enterprise:

The unorganised manufacturing sector for the present survey consists of following types of enterprises: (i) All manufacturing enterprises except those registered under section 2m(i) and 2m(ii) of Factories Act, 1948 and Bidi and Cigar Workers (conditions of employment) Act, 1966.

(ii) All manufacturing enterprises except those run by Government (Central Government, State Governments, Local Bodies) / Public Sector Enterprises.

Household Enterprise:

A household enterprise is one which is run by one or more members of a household or run jointly by two or more households on partnership basis irrespective of whether the enterprise is located in the premises of the household(s) or not. In other words, all proprietary and partnership enterprises are household enterprises.

Non-household Enterprise:

Non-household enterprises are those which are institutional i.e. owned and run by the public sector (Central or State Government, local self-governments, local bodies, government undertakings, etc.), corporate sector, cooperative societies, other type of societies, institutions, associations, trusts, etc. Nonhousehold enterprises covered under public sector were not included in the current survey.

Own-account Enterprise:

An enterprise, which is run without any hired worker employed on a fairly regular basis 5, is termed as an own account enterprise. If such an enterprise is engaged in manufacturing and/or repairing activities, it is termed as Own Account Manufacturing Enterprise (OAME).

Establishment:

An enterprise which is **employing at least one hired worker** on a fairly regular basis is termed as establishment. Paid or unpaid apprentices, paid household member/servant/resident worker in an enterprise are considered hired workers.

Establishments have further been categorised into two types: non-directory and directory.

Non-directory Establishment:

An establishment employing less than six workers (household and hired workers taken together) is termed non-directory establishment. If such an establishment is engaged in manufacturing activities, it is termed Non-Directory Manufacturing Establishment (NDME).

Directory Establishment:

A directory establishment is one which has employed six or more workers (household and hired workers taken together). If such an establishment is engaged in manufacturing activities, it is termed Directory Manufacturing Establishment (DME).

Definition by ASI

Factories:

Factory is one that is registered under sections 2m (i) and 2m (ii) of the Factories Act, 1948. The sections 2m (i) and 2m (ii) refer to any premises including the precincts thereof (a) whereon ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on; or (b) whereon twenty or more workers are working or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on without the aid of power, or is ordinarily so carried on.

Journal of Rural Development, Vol. 32, No. (4) pp. 481-485
NIRD, Hyderabad.

BOOK REVIEWS

Agrarian Distress and Farmers Suicides in India by M. Yadagira Charyulu, Published by Serials Publications, New Delhi, 2013, Price : ₹ 1295.

The book under review is a combination of secondary data collected from All India level and primary data collected from four districts of Andhra Pradesh. The empirical study was carried out in three regions of Andhra Pradesh i.e. Warangal and Mahaboobnagar districts in Telangana region, Anantapur district in Rayalaseema region and Guntur district in Andhra region. The study concentrated among the households where the farmers committed suicide.

The study conceived the following objectives and hypotheses :

Objectives

1. To understand and analyse agrarian scenario in Indian economy in general with a special focus on Andhra Pradesh.
2. To observe and assess trends in farmers' suicide phenomena at all India level with particular reference to Andhra Pradesh.
3. To look into the factors that led to farmers' suicides in the study area and their impact on socio-economic, psychological and moral aspects of affected households.
4. To examine the government sponsored measures and their impact to tackle this problem.
5. To come up with appropriate alternative policy measures to find a long lasting solution to the agrarian crisis and its resultant suicides of farmers.

Hypotheses

1. Institutional and market driven policies of globalised world economic phenomena have changed socio-economic scenario of the rural India.
2. Globalisation led liberalisation policies and reforms in agriculture have caused distress among small and marginal farmers in particular and the agrarian economy in general.
3. Institutional policy formulations obviously proved as temporary packages and failed to find out sustainable relief to the problems of agriculture sector in a comprehensive manner.

The author tried to put the Indian agricultural scenario in an overarching framework under the following broad themes : Landholding Pattern, Subsidies, Irrigation, Climate Change, Seed Sector, Fertilisers & Pesticides, Research and Extension, Agricultural Insurance, Investment and Capital Formation, GDP and Agriculture, Production Trends, Output Prices-MSP, Marketing and, Farm Business Income.

To support the macro picture, field study was carried out and the following variables/ issues, were analysed :

- Using the caste as an indicator, the author came to the conclusion that large majority of the farmers belonging to backward castes committed suicides. Substantial number of farmers belonging to the forward caste community also committed suicides but less than the backward caste communities. Suicides among SC/ST farmers are very negligible.
- Based on age profiles of victims, it was brought out that more than three-fourths victims are in the age group of 20-50 years.
- Almost 90 per cent of the victims committed suicide by consuming pesticides.
- Number of years of experience in agriculture has not helped the farmers to come out from the distress situation.
- Tenant farmers are more prone to commit suicide due to over-burden of cost of cultivation.

- Changing pattern of crops from cereal based to commercial crops identified as one of the important reasons.
- Price fluctuations and international trade and tariffs of agricultural commodities apart from the lack of effective implementation of minimum support price for agricultural produce.
- Increased cost of cultivation includes seeds, fertilisers, pesticides and labour.
- Dependency on non-institutional source for credit support rather then failure of institutional credit mechanism has been brought out.
- Problems faced by dependents in getting assistance from the schemes of government relief and rehabilitative measures.

Similar studies have been carried out by several national and state level institutions. The study has not brought out any new knowledge and tried to explore new areas. The author tried to emphasise the endogenous factors rather than exogenous factors which have played a crucial role in making cultivation more vulnerable and unremunerative.

Dr. K. Suman Chandra

Credit Risk Management for Indian Banks by K. Vaidyanathan, SAGE Publications, New Delhi, Pages 359, Price : ₹ 595.

'Credit Risk Management for Indian Banks' is a comprehensive book on the subject of Credit Risk Management which enables managers of Indian banks to hone their skills to optimally balance the opposing forces of competition and credit risk exposures frequently faced by them. Similarly, the book discusses the causes and symptoms of credit risk in the context of financial sector liberalisation and the subsequent national policy re-engineered for both fund based and non-fund based credit products to meet the requirements of credit managers, credit regulators, risk managers, treasury managers and investment bankers of the banking sector.

It appears that this book is one of the reference books on critical assessment of credit risk management of the banking sector in India and contains details of credit products and their risk management based on the guidelines issued by the Reserve Bank of India from time to time. Needless to add, this book is a must for those who want to delve into the risk management area in general and credit risk management in particular as it provides the analysis in a most comprehensive manner. The richness of the book lies in its diversity of perspectives, sectorial contents and breadth of issues covered with in-depth analyses. It is a rare blending of qualitative analysis with policy and action relevance inputs for the banking sector in its totality.

The book contains twelve chapters; each chapter redefines an important aspect of the credit risk management through detailed inputs. As it is not possible to present all the relevant points from all the chapters, some notable points from few chapters are illustrated below reflecting the richness of the contents and substances as illustrated in the book.

For example, in the first 'Introduction' chapter, the author clearly illustrated an example of a ship being built to sail on the high seas and earn from its voyages and not to be docked in the safety of a harbour. Likewise, a bank's dharma is to lend and earn, and in turn promote economic activities to create wealth and employment. It is, therefore, important that bankers are encouraged to assume prudent credit risk in the interest of banks themselves and overall economic development. Indeed in this introduction chapter itself, the author has paved the way on undertaking a systematic study of credit risk in the banking industry.

In Chapter II on 'Short-term Credit by Commercial Banks' the author suggested that in case of large corporate advances where working

capital credit requirements are substantial, lending banks should share the risk by providing credit through a consortium. The author strongly feels that with appropriate and faster regulatory changes, the credit risk management will be reinvented for the benefit of the bankers those who are left behind in the liberalisation process and unable to assimilate with the highly competitive field of credit dispension.

In Chapter III on 'Long-term Credit by Commercial Banks', the author highlighted that the way to test the viability of a project is to put the relevant factors in the financial analysis under stress and then study the impact on the bottom-line of the project. Thus, instead of following a routine financial analysis, it is always better to follow the path of cushion which can guarantee a return on lending proposition.

In Chapter IV on "Non-fund-based Credit Exposure: Bank Guarantee" the author highlighted that banks perform the role of a very important catalyst in cementing the trade relationship between two contracting parties. Hence, banks should ensure not only professional delivery mechanism but also ensure accountability of its non-fund based products.

As there are twelve chapters, and each chapter contains some valuable analysis of the credit risk management, practically they have been omitted for individual attention in this review as justice cannot be done by giving scant attention to each chapter.

Finally, it can be rightly stated that this book is a reference for those who are engaged in credit risk management as well as for those who are interested to know the gamut of various provisions available for facilitating the effective management of credit risk by the banks. The author is required to be highly appreciated as the book contains list of relevant annexures which simplifies the most difficult and contentious issues in the areas of credit risk management in a most comprehensive manner.

Dr. B. K. Swain

International Trade Reforms & Iranian Economy by Dr. Karim MH & Dr. Salarpour Mashallah, Serials Publications, New Delhi, Pages 205, Price : ₹ 795.

The volume has portrayed the impact of international trade reform and free trade in Iran during last one decade. The country, rich in crude oil is located in between the Persian Gulf and Caspian Sea. In spite of some odd events which happened earlier in Iran like war, inflation, nuclear energy issue etc., Iran's foreign trade has scaled up in recent years with favourable trade. Its' GDP has been growing at the rate of 5 per cent and because of trade reform non-oil export also has been enhanced. Iran is the 17th largest economy in the world in terms of purchasing power party and 26th by market value.

The book contains seven chapters with list of abbreviations, appendices, bibliography and index. The first chapter, an introductory one described issues related to access in the world market. The chapter has touched upon origin of GATT, followed by WTO, and other institutions like SAFTA, NAFTA, APEC and EFTA have been referred here. In addition, referring Uruguay Round discussion, trade related issues have been covered in this chapter.

Chapter-2 has dealt with geography and economy of Iran at length focusing on issues like population, agriculture and allied activities, service sector, foreign trade vis-à-vis war with Iraq. In addition, Iran economic situation before revolution (1973-78) and post-revolution as well as consequence of war between Iraq and Iran which continued for almost eight years have been covered in this chapter referring international trade. Moreover, development measures in different five-year plans have been analysed here.

Literature based on Computable General Equilibrium (popularly known as CGE) have been reviewed in chapter-3. In addition, academicians of Iran who did a study based on CGE model has been described here. The review has focused on trade liberalisation, consumption,

productivity, import technology, manufacturing sector, income distribution etc.

The structure of Computable General Equilibrium (CGE) with reference to Iran focusing on its functions has been discussed in chapter-4. While analysing the CGE, Iran's production, investment, export, trade balance, consumer expenditure etc., have been taken into account. The authors have used many charts, graphs, mathematical equations to substantiate the facts.

Chapter-5 consisting of six sections has focused on application of data based on input-output table. It is pertinent to mention that input-output table was initially developed by W.W Leontief, however in this section authors did not mention him while describing input-out table. The sixth section is spread over to issues like explication of input-output table, parameters of the table, multi-step solutions etc. In this chapter like previous one the analysis has been substantiated by graphs, table and mathematical formula.

Implementation of input-output model with focus on short-run and long-run tariff reduction under Uruguay Round has been narrated in chapter-6. Sensitivity analysis for elasticity has also been covered here.The authors have observed that 'variation in Armington elasticity caused only slight changes in the results from trade reforms under Uruguay Round simulation and therefore it is acceptable'. In the concluding chapter, the authors feel that Iran would gain from trade liberalisation in the short-run as employment, consumption and export will scale up. Thus, GDP will grow and in future with doubling the export, income of the common masses will substantially increase. According to the authors, "Iran will be one of the developed countries in the region by 2025". Suggestions of the authors (as observed in the book) inter alia, are Government should invest more in education and skill development so that with generation of employment, industrial development etc., with "Multiplier Effect" Iran's economic development will take place.

This volume is useful for researchers, academicians, policymakers especially to those who are interested in international trade as well as about Iran. As limitation of the study little old data have been used as authors have also agreed that latest input-output table or data were not available. In addition, in the tables (tables- 6.5, 6.6, 6.7, & 6.8) reference year have not been mentioned and abbreviations have been used without expansion at the bottom of the table. So in the next volume these issues should be addressed as this is a good piece of work and asset to academicians.

Dr. Shankar Chatterjee

INDIA POLICY FORUM 2012/13 (Volume 9) by Shekhar Shah, Barry Bosworth and Aravind Panagariya, Published by SAGE Publications, New Delhi, 2013, Pages 238.

Developing new knowledge-base is one among the primary goals of any policy research. At the same time, all policy development may not be the same but it has different stages that are typically generated by its ethnic nature. Most of the scholars and institutes have discussed policy and development in different stages relating to the types of (research) objectives and end outcome that grantees are expected to pursue. Generally, policy research begins with significant discoveries and moves through theory, measures and develops methodology, ultimately to enable the development of effective new and improvised interventions, products and services and environmental adaptations. In this context, this book is a new device or technique for improving the knowledge on policy frameworks.

The stages of knowledge development are multi-dimensional and are interrelated. Some of its major dimensions include: the level of economic growth, level of education, level of

health services, degree of modernisation, status of women, level of nutrition, accessibility for drinking water, quality of housing, distribution of goods and services, and access to communication etc. In India, the progress of socio-economic development among major states is not uniform. This book examines the existing variability on inter-subject development policies thereby identifying the indicators responsible for the diversity in development. Instead of revealing a particular subject, composite policy issues based on several indicators have been analysed and accordingly five invited papers were placed in the book. They are: (1) Priorities for Primary Education Policy in India's 12th Five Year Plan by Karthik Muralidharan, (2) Policy Lessons from the Implementation of India's Total Sanitation Campaign by Dean Spears, (3) The Demographic Dividend: Evidence from the Indian States by Shekar Aiyar and Ashoka Mody, (4) Sustaining Groundwater: Role of Policy Reforms in Promoting Conservation in India by Sheetal Sekhar (5) Information Technology and Productivity in Indian Manufacturing by Shruti Sharma and Nirvikar Singh.

The importance for quality education is realised as one of the most important pillars of sustainable development. It is an acceptable fact that rural India suffers from improper policy formulations and shortage of infrastructure. While serious deficiencies persist towards the subjects like education, drinking water, health facilities, electricity, housing, roads and communications etc., these are known and recognised by the public. However, the role of technology in solving these and/or other problems is but barely acknowledged, and the actual availability of technology in rural areas, at best, is marginal. The overall findings of the Editors' analysis support the general perception and application of resourceful policies and technologies for inclusive development across the nation.

The present discourse of this book, a compilation of articles written by technocrats, academicians, researchers and practitioners in their respective field of expertise, elaborates the need for establishing the sustainable policy framework and technological development process at the various considerations – social, economic, political and environmental etc. Particularly, the authors viewed that access for information technology and resources, must be ensured and protected for overall growth of the Indian union. Such effort will not only lead to optimum utilisation of resources but also generate more employment opportunities for the people.

The contributors of articles explained about the challenges for primary / basic education and technology integrations, security measures, administrative reforms and role of governance in development administration, impact of appropriate and new policies for management and so on. They also provided suggestive policy measures to develop alternative, appropriate techniques for the inclusive rural development. The portion of the book explains the human resource availability and process of utilisation in the developmental path etc. The authors do advocate the need for ICT applications in the rural masses. The contributors never forget to analyse the impacts of urbanisation and industrialisation that cause damage to the quality of water and its sustainability in the country. They also caution the distribution of industry which not only pollutes the environment but also carnage the rural livelihoods and suggest for transparent policy initiatives for future endeavour.

Obviously, this book presents brilliant ideas for all sections of stakeholders, users, policymakers and institutions involved in transfer of technologies from lab to land. This also helps in focusing much better in tackling pertinent issues relating to conservation of techniques and management of resources and presenting analysis of the various elements involved in integrated development of technology and resource systems that the subject specialist, researcher, planner and policymaker will find this book interesting and useful.

Dr.R.Murugesan

Journal of Rural Development, Vol. 32, No. (4)
NIRD, Hyderabad.

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS
(Organ of the Indian Society of Agricultural Economics)

Vol. 68	JULY-SEPTEMBER 2013	No.3

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Journal of Rural Development, Vol. 32, No. (4)
NIRD, Hyderabad.

JOURNAL OF
EDUCATIONAL PLANNING AND ADMINISTRATION
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Journal of Rural Development

Vol.32 **October-December 2013** **No. 4**

CONTENTS

BOOK REVIEWS