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MICROCREDIT IN ADDRESSING FOOD SECURITY OF INDIA

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ABSTRACT

India is moderately successful in guarding the vulnerable sections of the population against the insufficiency of food supply. Despite its achievements, malnutrition is a serious problem particularly among rural poor. Pursuant to this conception, a study was undertaken with the general objective to analyse the performance and prospects of microcredit innovation in meeting sustainable household food and nutritional security in Cuddalore District of Tamil Nadu (India). The results of the study indicated that the rural people have been vastly benefited by microcredit. The various analyses undertaken in different dimensions reveal that in rural India the micro credit by way of Self Help Groups has contributed immensely for pushing back poverty and enhancing food security especially nutritional security which is one among the important food system challenges to be addressed with, in developing and under developed economies of the globe. It was concluded that the microcredit innovation would go a long way in attaining sustainable household food and nutritional security in rural areas of any economy.

Key words: Bioinformatics, ClustalW, Clustal Omega, MUSCLE, Multiple Sequence Alignment, Optimization, Hybrid Meta-heuristic, Machine Learning..

INTRODUCTION

India is moderately successful in guarding the vulnerable sections of the population against the insufficiency of food supply. Despite its achievements, malnutrition is a serious problem particularly among rural poor. The problem of human nutrition assumes great significance particularly in developing economics, because it affects the quality of manpower. The purpose of nutrition should be to achieve an acceptable level of physical and mental activity. In human beings, the nutrition assessment would mean, the measurement of nutritional status of children, individuals, a family, a household, a community or a specified group of population. In India, the current nutritional situation does not show an encouraging trend. Malnutrition in the form of under-nutrition or deficiencies of essential vitamins and minerals continues to cause severe illness or morbidity among millions of people. It is estimated that more than 50 per cent of women are affected by iron deficiency anemia and about 49 per cent of the population are at risk of iodine deficiency and millions of children are affected by insufficient vitamin-A. The prevalence of under-nutrition is more often attributed to poor intake, lack of resources, illiteracy and poor environmental conditions, which are born of poverty. Due to their vulnerability to disease and infection, the undernourished usually remain less productive, this get stuck in the vicious cycle of poverty and malnutrition and seldom come out of it. According to Diet Atlas of India published by the National Institute of Nutrition, Hyderabad, the percapita daily food consumption in India indicates a poor picture when compared to Indian Council of Medical Research recommendation.

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The Diet and Nutritional Status of Rural Population, (2001) of the National Nutritional Monitoring Bureau (NNMB) depicts a gloomy nutrition picture of the country. Specifically, in Tamil Nadu State also, the consumption of protein and calorie are much less than the recommended doses.

Women and Food Security: Women play important roles in agriculture and food security in rural areas. Any economic strategy for agriculture and rural employment linked to poverty alleviation and food security must, therefore, consider gender equity and women's contributions as central issues in productivity and access to resources. The urban informal sector is also dominated by the women as nutritional vendors and small commodity traders earning income for household nutritional security. Moreover, women are the nutritional buyers and those who create use value for nutrition at household level. Women produce between 60 and 80 per cent of the food in most developing countries and are responsible for half of the world's nutritional production, yet their key role as nutritional producers and providers and their critical contribution to household nutritional security is becoming recognized only recently. Women are active at every point in the nutritional chain and are often responsible for perfecting the integrity of nutritional and ensuring its wholesomeness and safety. Women are often more vulnerable to nutritional problems because of their lower social and economic status as well as their physiological needs. Gender equality and nutritional security can contribute significantly to improve the nutrition and health status of women, men and children. Improving women's knowledge of nutrition and nutritional safety can prevent illnesses, disabilities and premature deaths. Further women who enjoy good health are better able to contribute to economic development. The

woman, despite her low socio-economic status, is the central figure for participating in development programmes meant to elevate the nutritional status of families. Empowerment of women through a two-way flow, education and direct focus of economic porogrammes can enable the woman to participate in establishing and maintaining the nutrition security at household level. Without economic power and self-confidence, the household nutrition security through the aegis of women remains at a superficial level. Thus the problem of micronutrient deficiency and malnutrition can be solved only through a coordinated effort of nutrition and health workers with active participation of people both at planning and implementation stage. Participatory planning and implementation of relevant projects at the village level linked with innovative microcredit programme could give durable welfare in the rural household food systems especially for women and children.

Role of Microcredit

The recent developments indicate an unique phenomenon of Non Governmental Organisations helping the women in organizing them and providing both financial and non-financial services, particularly to the poor women, both in rural and urban areas. The poverty alleviation programmes of the central and state governments also provide for a specific percentage to be covered by women beneficiaries. Some of the NGOs were promoted by banks to serve exclusively poor women. The NGOs are engaged in organizing women's groups, encouraging thrift habits among them, promotion of Self Help Groups (SHGs) for mutual help and benefit, linking them with banks, etc. The NGOs are also helping women in training, skill upgradation, provision of backward and forward linkages, etc. Besides, they provide various services to improve health, education, child care and creation of social awareness and awakening.

The microcredit assistance provided by the SHGs has benefited the women members by enhancing their income and employment and consequentially has resulted in remarkable empowerment of poor women. Now, these women members are able to participate in the financial decision making process of their families while earlier they were not allowed to do so.The effective management and development of women resources are of paramount importance for the mobilization and development of human resources. The goals of poverty eradication and empowerment of women can be effectively achieved if poor women could organize into groups-for community participation as well as for ascertaining their rights in various services related to their economic and social welfare. The Self Help Groups movement had a greater vision of empowerment of rural women for overall human development. They involved in poverty alleviation programme through institutionalization. This movement developed thrifts as a habit among the rural poor women and paved the way for decision- making power for women in the family. Thus the house hold nutritional security problem where in women are the key managers could be better addressed through microcredit innovation effected by the self help groups. Hence, this study is focused on the performance and prospects of microcredit innovation in household food security in Cuddalore District of Tamil Nadu (India) with the following objectives and hypotheses.

Hypotheses

- The microcredit innovation has significant influence on the economic status of rural women
- There is a significant variation in the nutritional security of rural households due to microcredit innovation.

Objectives

The general objective of this study is to analyse the performance and prospects of microcredit innovation in meeting sustainable household food and nutritional security in Cuddalore District of Tamil Nadu. The specific objectives are:

- To study the performance of microcredit innovation in improving the economic status of rural women.
- To find the impact of microcredit on the consumption pattern of the rural households.
- To study the factors determining the nutritional security in rural households.
- To find the problems faced by the respondents in meeting household nutritional security.

Design of the study

Sampling Design: A multistage stratified random sampling technique with Cuddalore district (Tamilnadu state, India) as the universe, the Community Development Blocks as the first stage unit, the SHGs that have linkage with banks as the second stage unit, and the members of the SHGs as the third and ultimate unit of sampling, was adopted for this study. After arranging the blocks in Cuddalore district in the descending order of magnitude based on the cumulative number of SHGs linked with banks, as at the end of March 2009, two blocks viz., Parangipettai and Bhuvanagiri were selected randomly. The SHGs in these selected blocks which have linkage with the banks were listed separately based on the date of registration and thirty SHGs were selected from each of the two blocks. The respondents at the rate of two members from each of these SHGs were selected at random. Consequently, the ultimate sample for this study consisted of 60 SHGs and 120 SHG members.

Nature of Data Collected: The required data for this study were collected from both primary and secondary sources. The primary data were collected from the selected SHGs and from the members. The data collected from the respondents included details on their socio-economic status including the level of employment, income, expenditure, savings and consumption pattern. All the required primary data were collected from the members for both pre-SHG and post-SHG situations. The data for pre-SHG period referred to the previous year of joining SHG.

Period of Study: All the required primary data were collected during the months – April 2009 to March 2010, using structured schedules, which were finalised after pre testing for their adequacy with a reconnaissance survey of the area of study. The reference period for the primary data collected for this study pertained to the year 2009-10. The data collected from the published sources pertained to the latest year of the availability of data.

Analysis of Data

The 'Z' test analysis undertaken to find the homogeneity of sample mean, indicated that the sample is homogeneous of the population. However, there existed high variations within the sample selected for this study.

The collected data were post-stratified into two categories, i.e., category I and category II. Category I consisted of SHGs that have up to 2 years of their existence, and category II consisted of SHGs that have more than 2 years of their existence. They were also referred to as younger groups and older groups, respectively. The distribution of post-stratified sample is shown in Table 1.

Analytical Tools

Descriptive Analysis: The descriptive analysis was undertaken using percentages, means, etc., to study the impact of microcredit on SHG members in both pre- and post-SHG situations. The percentage analysis was also undertaken to study the socio-economic characteristics of the sample respondents.

Estimation of Income Elasticities using Engel's Curve Estimates: Engel's curves were estimated for basic food items like cereals, pulses, fats and oils, sugars and gur, milk, vegetables, fruits and meat and meat products for sample households separately. The Engel's curve would show the relationship between expenditure on the consumption of a particular commodity and the level of family income. In this study, the linear functional form with net income and family size as independent variables was used. The choice of the functional form was based on the observed relationship between the dependent and independent variables in the scatter diagram. The general functional form estimated in this study was

$$E_i = \beta_{oi} + \beta_{1i} Y + \beta_{2i} N + u_i \quad (1)$$

where,

E_i - Annual expenditure on i^{th} commodity
Y - Net annual income
N - Family size (consumption units)
β_{1i} & β_{2i} - Parameters to be estimated
β_{oi} - Constant term
u_i - Error term

The expenditure on a particular commodity was measured by the amount of money spent on that commodity. The family size is expressed as consumption units using Lusk coefficient (Rao 1983) to take into account the influence of demographic characteristics, such as age and sex on consumption of food items. The Lusk coefficient for standardization of households is presented in detail, vide Appendix I.

Income Elasticity of Expenditure: From the Engel's curve estimates the income elasticity for different food items have been worked out for both categories of households in pre- and post- SHG situations separately, in order to assess and compare the sensitivity with which expenditure on different commodities changes for changes in income. This income elasticity could be treated as an indicator of the households' financial stability.

From equ(1)

$$\eta_i = \frac{\beta_{1i}}{\bar{E}_i / \bar{Y}} \quad (2)$$

where, η_i - Income elasticity of i^{th} commodity group

Factors Influencing Nutritional Security

A linear regression analysis was undertaken to study the factors influencing the nutritional status of the households. The linear regression model was specified in accordance with the observed relationship between the dependent and independent variables in the scatter diagram.

$$Yi = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + u_i$$

Where,

Y_i – Nutritional status (calories per day/consumption limit)
X_1 – Age of the respondents (years)
X_2 – Literacy level of the respondents (years)
X_3 – Family size (consumption units)
X_4 – Income of the households (Rs.)
X_5 – Food consumption expenditure (Rs.)
Ui - Error term

The nutritional status was expressed in terms of calories on per day per consumption unit basis and family size was expressed in terms of number of consumption units in accordance with Lusk coefficient calibrations (Appendix – I).

The Garrett Ranking Technique: Ranking is an expression of the respondents' priority about their thoughts and feelings. Garrett and Woodworth (1971) and Ray and Mondal (2004) have enunciated a scoring procedure suggested by Garrett in 1969 for converting the ranks into scores when the number of items ranked differed from respondent to respondent. The conversion method used was as follows. As a first step, the per cent position of each rank was found out by using the following formula:

$$\text{cent position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

where,

R_{ij} = Rank given for i^{th} items by the j^{th} individual
N_j = Number of items ranked by j^{th} individual

The per cent position of each rank, thus, obtained was then converted into scores by referring to the Table given by Garrett in 1969. The respondents were requested to rank the opinions / reasons relevant to them according to the degree of importance. The ranks given by each of the respondents was converted into scores. Then for each reason, the scores of individual respondents were added together and divided by the total number of respondents. These mean scores for all the reasons were arranged in the descending order and ranks were given. By this method, the accuracy in determining the preference was obtained. In this study, the Garrett ranking technique was used to study the problems faced by the

respondents in attaining sustainable household nutritional security.

RESULTS AND DISCUSSION

Economic Impact of SHGs: It would be appropriate to assess the impact of microcredit innovation on employment, income, asset position, savings, availability of finance and the expenditure level of the respondents. Hence, the results are presented for the beneficiaries under pre- and post- situations. A look at Table 2 would show that the microcredit innovation have significant impact on the economic status of the sample respondents. It could be seen that the respondents have experienced a much more positive and significant increase in the economic status after they became the members of SHG. The study has shown that the employment per household in pre-SHG situation was 429 mandays in category I and 420 mandays in category II. However, it had increased to 510 mandays in category I and 527 man days in category II in post-SHG situation – an increase of 18.88 per cent in category I and 25.48 per cent in category II. It was found that the annual income of the family was Rs.35980 and Rs.35573 per annum in pre-SHG situation for category I and category II, respectively, while it was Rs.44356 and Rs.47467 per annum in post-SHG situation in the respective categories. Thus it was found that the per capita income had increased by 23.28 per cent and 33.44 per cent in category I and category II, respectively, after they became members of SHG. The results of the study had shown that an average SHG member household possessed assets worth of Rs.9881 (category I) and Rs.9582 (category II) in pre-SHG situation while it was Rs.16325 (category I) and Rs.17244 (category II) in the post-SHG situation - an average increase of 65.22 per cent and 79.96 per cent in category I and category II, respectively. The results indicated that, on an average, a household had saved only Rs.697 and Rs.893 in category I and category II, respectively, before they became members of the SHGs. However, the savings had increased to Rs.2300 and Rs.2773 in category I and category II respectively in the post-SHG situation. These substantial increase in the savings over the pre- SHG situation indicated that the marginal propensity to save had improved after becoming members of SHG, even though they were still low due to poverty of the respondent households.

The study had shown that the SHGs, cooperatives and banks shared most of the credit needs of the SHG members in both the categories of the respondents. On an average, a household had borrowed only Rs.4179 and Rs.4814 before they became members of the SHGs. However, the borrowings had increased to Rs.13663 and Rs.15024 in the post-SHG situation. It was also found that the level of repayment of loans to all agencies was very high in the post- SHG situation, in both the groups, as compared to the pre- SHG situation. This was mainly due to the financial inclusion, which resulted through microcredit innovation. The study on the pattern and the level of consumption of the respondent families has shown that consumption expenditure per annum per household was Rs.19642 and Rs.21450 in pre-SHG situation for category I and category II, respectively. It had increased to Rs.26731 and Rs.29948 in post-SHG situation for category I and category II, respectively. Thus the per annum consumption expenditure has increased by 36.09 per cent and 39.62 per cent, respectively in these two groups after they became the members of SHG. The results of this study had shown that microcredit innovation have registered positive and significant impact on the economic aspects of the sample respondents. It could also be seen that the older SHG member households (category II) have exhibited a much more positive and significant increase in the economic variables when compared with the younger SHG member households (category I). Thus the broad conclusions that would emerge from this analysis is that the SHGs are performing the role as vehicles in increasing the economic status by microcredit intervention.

Food Consumption Pattern

The food consumption pattern of households were probed based on the understanding that it could convey meaningful inferences on the sustainable household food security of respective groups. The consumption pattern in the pre- and post- SHG situation in both the groups were compared by taking into account two prime features, *viz.,* average expenditure share and income elasticity of expenditure of different food items like cereals, pulses, fats and oils, sugars and gur, milk, vegetables, fruits and meat and meat products. The annual expenditure on various food items were analysed and are presented in Table 3. It is evident from the Table 3 that the average food consumption expenditure per annum, per household was Rs. 11825 and Rs. 12498 in pre-SHG situation for category I and category II, respectively. It has increased to Rs.16750 and Rs.18785 in post-SHG situation for these categories respectively. Thus the per annum food consumption expenditure has increased by 41.65 per cent and 50.30 per cent, respectively, in these two groups, after they became the members of SHG. However, of the total expenditure the per cent share was highest in case of cereals which accounted for 36.74 per cent and 26.92 per cent in category I and 38.67 per cent and 27.66 per cent in category II during pre- and post-SHG situation respectively. It could be observed that percentage of expenditure spent on basic food items was less in post- SHG situation of sample households than the pre SHG situation. But the expenditure incurred in absolute terms in the post- SHG situation by the sample households on basic food items has increased considerably, which implies that the scenario is in conformity with Engel's law. This increase in actual expenditure was due to two factors, *viz*., increased quantity of consumption and improved quality of consumption, which truly reflects the enhanced household food security due to microcredit. With regard to other food items *viz*., pulses, sugar and gur, milk, vegetables, fruits and meat & meat products, both average expenditure shares and actual expenditures were higher after they became the members of SHGs than prior to joining. It clearly indicates that household food security of sample respondents has improved due to the innovative microcredit programme to a reasonable extent, in both the categories especially with the improvement more pronounced in category II. Thus it has been concluded that being poor these SHG members spent a higher percent of their expenditure on cereals alone and only the rest of the amount had been spent on pulses, fats & oils, sugars, and gur, milk, vegetables, fruits meat & meat products. After joining SHG, the expenditure percentage on cereals decreased and others got increased from which it could be concluded that the SHGs have succeeded in their role of change agents that could help in household food security.

Table 1. The Distribution of Post-stratified Sample

(numbers)

Sl. No.	Category	Sample Size	
		SHGs	SHG members
1	Category I (Up to 2 years)	36	72
2	Category II (Above 2 year)	24	48
	Total	60	120

Table 2. Economic Indicators of Sample Respondents

Sl.No.	Particulars	Category I			Category II		
		Pre-SHG	Post- SHG	Increment	*Pre-SHG*	Post- SHG	Increment
1	Employment (Mandays)	429	510	81 (18.88)	420	527	107 (25.48)
2	Income (Rupees)	35980	44356	8376 (23.28)	35573	47467	11893 (33.44)
3	Assets (Rupees)	9881	16325	6444 (65.22)	9582	17244	7662 (79.96)
4	Savings (Rupees)	697	2300	1603 (229.99)	893	2773	1880 (210.53)
5	Borrowings (Rupees)	4179	13663	9484 (226.94)	4814	15024	10210 (212.08)
6	Consumption Expenditure (Rupees)	19642	26731	7089 (36.09)	21450	29948	8498 (39.62)

Table 3. Annual Food Consumption Expenditure of Sample Households

(Rupees)

Sl.No.	Particulars	Category I			Category II		
		Pre-SHG	Post- SHG	Increment	*Pre-SHG*	Post- SHG	Increment
1	Cereals	4344 (36.74)	4509 (26.92)	165 (3.80)	4833 (38.67)	5196 (27.66)	363 (7.51)
2	Pulses	1561 (13.20	2536 (15.14)	975 (62.46)	1091 (8.73)	1901 (10.12)	810 (74.24)
3	Fats & oils	1409 (11.92)	1454 (8.68)	45 (3.19)	1552 (12.42)	1806 (9.61)	254 (16.36)
4	Sugar & Gur	968 (8.19)	1517 (9.06)	549 (56.71)	944 (7.55)	1422 (7.57)	498 (52.75)
5	Milk	1233 (10.43)	1975 (11.79)	742 (60.18)	1376 (11.01)	2730 (14.53)	1354 (98.40)
6	Vegetables	945 (7.99)	1632 (9.74)	687 (72.70)	978 (7.83)	2067 (11.00)	1089 (111.35)
7	Fruits	305 (2.58)	1038 (6.20)	733 (240.33)	470 (3.76)	1163 (6.19)	693 (147.45)
8	Meat& meat product	1060 (8.96)	2089 (12.47)	1029 (97.08)	1254 (10.03)	2500 (13.31)	1246 (99.36)
	Total	11825 (100.00)	16750 (100.00)	4925 (41.65)	12498 (100.00)	18785 (100.00)	6287 (50.30)

Note: Figures in the parentheses represents per cent values.

Table 4. Income Elasticities of Different Food Items

Sl.No.	Particulars	Category I		Category II	
		Pre-SHG	Post- SHG	*Pre-SHG*	Post- SHG
1	Cereals	0.25	0.12	0.26	0.11
2	Pulses	0.65	0.32	0.87	0.29
3	Fats & oils	0.83	0.44	0.52	0.49
4	Sugar & Gur	0.85	0.63	0.81	0.70
5	Milk	1.72	0.76	1.60	0.60
6	Vegetables	1.61	0.64	1.58	0.58
7	Fruits	1.12	0.78	1.13	0.65
8	Meat& meat product	1.90	0.95	2.50	0.86

Income Elasticities of Different Food Items: The income elasticities were worked out using the Engel's curve estimates which were arrived at individually for each food items of the sample households. As like average expenditure shares, by analyzing the income elasticities also, the household food security could be compared. The income elasticities are capable of explaining the degree of stability in the expenditure pattern of different groups of people. Lower the elasticity, higher will be the stability and hence higher the household food security. The income elasticities of different food items were presented in Table 4.

It could be observed from the table that the income elasticities of basic food items such as cereals, pulses, oils and sugar were inelastic in the pre- and post- SHG situation of both the categories of households.

Table 5. Nutritional Status of Members in the Sample Households

(in calories / day/consumption unit)

Sl. No	Particulars	Category I			Category II		
		Pre-SHG	Post- SHG	Increment	*Pre-SHG*	Post- SHG	Increment
1	Cereals	1598.02 (71.46)	1963.87 (71.41)	365.85 (22.89)	1828.73 (71.05)	2050.34 (70.18)	221.61 (12.12)
2	Pulses	135.92 (6.08)	164.67 (5.99)	28.75 (21.15)	156.25 (6.07)	181.60 (6.22)	25.35 (16.22)
3	Fats & oils	127.55 (5.70)	149.61 (5.44)	22.06 (17.29)	149.24 (5.81)	167.64 (5.74)	18.40 (12.33)
4	Sugar & Gur	21.02 (0.94)	26.00 (0.094)	4.98 (23.69)	23.06 (0.89)	28.07 (0.96)	11.05 (64.92)
5	Milk	198.63 (8.88)	249.46 (9.07)	50.83 (25.59)	222.50 (8.64)	253.91 (8.69)	31.41 (14.12)
6	Vegetables	101.76 (4.55)	127.04 (4.62)	25.28 (24.84)	132.96 (5.16)	155.60 (5.33)	22.64 (17.03)
7	Fruits	10.01 (0.46)	10.22 (0.37)	0.21 (2.09)	13.59 (0.53)	16.84 (0.58)	3.25 (23.91)
8	Meat& meat product	43.22 (1.93)	59.36 (2.16)	16.14 (37.34)	47.45 (1.85)	67.13 (2.30)	19.68 (41.47)
	Total	2236.13 (100.00)	2750.23 (100.00)	514.10 (22.98)	2573.78 (100.00)	2921.13 (100.00)	347.35 (13.49)

Table 6. Regression Estimates on Factors Influencing Nutritional Security

Sl. No.	Variables	Coefficient	Standard Error
1.	Intercept	2.8233	1.4189
2.	Age	0.1734	0.6619
3.	Literacy level	0.1643**	0.1244
4.	Family size	-0.1785***	0.0740
5.	Income	0.1667**	0.0906
6.	Food consumption expenditure	0.3449***	0.0355
	R^2	0.39	
	Number of observations	120	

Note: *** Significant at one per cent level of probability
** Significant at five per cent level of probability

Table 7. Problems faced by Respondents in Attaining Nutritional Security

Sl.No.	Particulars	Category I		Category II	
		Rank	Score	Rank	Score
1	Low income	I	65.01	I	72.01
2	Lack of decision making power	II	62.37	II	65.38
3	High prices for commodities	III	59.82	III	55.30
4	Lack of awareness on consumption pattern	IV	57.45	V	42.18
5	Large family size	V	54.48	IV	39.12

Although both were found to be inelastic, it could be observed that income elasticity in post- SHG period of the sample households was more inelastic than, the pre- SHG confirming the comparative strength of higher income derived due to the joining in SHGs. The income elasticities of other food items, *viz*., milk, vegetables, fruits, meat and meat products were elastic in the pre-SHG situations of sample households, where as they were inelastic in the post-SHG situation, which could reveal that the expenditure pattern had become more stable after availing the microcredit, thereby assuring a sustainable household food security. The comparison of income elasticities between the older and younger category of SHGs also reveals an encouraging trend, confirming a higher degree of stability in expenditure with older SHGs.

Nutritional Status of Households: The nutritional status of the sample households was studied and per day calorie intake by the respondents is given in Table 5. The average per day calorie intake of members of the sample households expressed in consumption unit was 2236.13 and 2573.78 cal per day in pre- SHG situation for category I and category II, respectively. It has increased to 2750.23 and 2921.13 cal per day in post-SHG situation for category I and category II, respectively. Thus the nutritional status has increased by 514.10 and 347.35 calories, respectively, in these two groups after they become the members of SHG. The average food intake in terms of calories by family members was expressed on "per consumption unit" basis after accounting the influences of demographic characteristics in accordance with the Lusk coefficient calibrations (Appendix – I). The results clearly indicated that the calorie intake per day by the sample respondents was lower than the recommendation for dietary requirement by Indian Council of Medical Research (ICMR) – Nutrition Expert Groups of 1968 as furnished in Appendix II. With regard to item-wise calorie intake, members had nearly 71 per cent calorie intake in the form of cereals as against the ICMR recommendation of 66.98 per cent. The calorie intake was less in all the items with the exception of milk for which the recommended calorie was 175 cal per day. Though the calorie intake of the food items was very much less than the ICMR recommendation, the respondents have switched over to nutritious items in the post-SHG situation.

It is evident that the calories obtained from vegetables, fruits, milk and meat has been increased in post-SHG situation. Of all the households studied in both the groups there was noted difference in total calorie intake between the respondents in pre- and post- situation of category I and category II. Though malnutrition was prevalent in both the category, the family members of category II were found to be in better position than their counter parts in the category I. Also the nutritional status has been increased in the post-SHG situation, in both the category of respondents which is resulted through the microcredit intervention.

Factors Influencing Nutritional Security: The linear regression analysis was employed to find the factors influencing the household nutritional security (in terms of calories/day) and the results are presented in Table 6. It could be seen that the coefficient of multiple determination '$R^{2'}$ was 0.39, which indicated that 39 percent of variation in nutritional status of the households was explained by the explanatory variables included in the regression function. The variable literacy level, income and food consumption expenditure were positively significant at different levels of significance, whereas the variables family size was negatively significant. The variable age of the respondent was not significant. The regression coefficient for the variable income (X_4) indicated that an increase in the income of the households by one rupee, keeping all other variables constant, would result in an increase in the nutritional status of the household by 0.1667 calories per day. Similarly, an increase in the food consumption expenditure (X_5) by one rupee, would result in 0.3449 calories increase in the nutritional status. Thus the above estimated functional analysis indicated that literacy level, family size, income and food consumption expenditure would have significant influence on the households nutritional security. Problems Faced by Respondents in Meeting Nutritional Security. The problems encountered by SHG respondents in meeting nutritional security were analysed using Garrett ranking technique and are presented in Table 7. It could be seen from the table 7 that among the problems encountered by the sample respondents in attaining nutritional security, the first and foremost problem faced by them was 'low income'. They assigned the second rank to 'lack of decision making power', third to the problem of 'high prices for commodities', 'lack of awareness on consumption pattern' was ranked fourth, fifth to 'high family size'.

The same rank was given by the respondents in category II households, except for the last two ranks. In sum, it could be inferred that the rural people have been vastly benefited by microcredit. It has helped them in their socio-economic upliftment. The various analyses undertaken in different dimensions reveal that in rural India the micro credit by way of Self Help Groups has contributed immensely for pushing back poverty and enhancing food security especially nutritional security which is one among the important food system challenges to be addressed with, in developing and under developed economies of the globe. The rural poor now feel that they can also be partners in the process of rural development by joining the SHG movement. This study has also indicated that even though the members have joined the SHGs for various reasons, all of them have one common goal, which is seeking a better standard of living *via* a better organization that works for their benefits. Hence, it could be concluded that the microcredit innovation would go a long way in attaining sustainable household food and nutritional security in rural areas.

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