An Empirical Analysis of Household Income of SHGs in Rural Andhra Pradesh

K. Harika[1], S.M. Reddy[2]

[1]*Post-Doctoral Fellow, Department of Economics, Andhra University, Visakhapatnam, Andhra Pradesh, India.*
[2]*Post-Doctoral Fellow, Department of Economics, Andhra University, Visakhapatnam, Andhra Pradesh, India.*
*Corresponding Author: * Dr. K. Harika*

ABSTRACT: The study analysed income inequality and determinants of SHG households. The primary data of 400 SHG rural households were collected by applying multi stage sampling technique in the district of Visakhapatnam, Andhra Pradesh. Lorenz curve, Co-efficient of Quartile deviation, Co- efficient of variation and Gini Coefficient were calculated. Variation of household income and per capita income was tested by F-test and Z-test. Multiple regression model formulated to analyse determinants of income. It was found that the distribution of income by source shows that income from wage and crop income are the major sources in both the households. The per capita income of the households for the OSHG and NSHG households was observed significant differences between the OSHG and NSHG household. NSHG households are inconsistently distributed than OSHG households. Percentage of worker in household, wage rate of workers and income from other sources were played significant positive role in distribution of income. Size family, age of head and landholdings were significantly working negatively with income distribution.

I.   INTRODUCTION

Household income is the sum of money income and income in kind and consists of receipts which are recurring nature and accrue to the household or to individual members of the household regularly at annual or at more frequent intervals. Household income consists of receipts in cash, in kind or in services, during the reference period when they are received; such receipts are potentially available for current consumption and (ILO, 2014).Theoretical analysis of household income revealed that rural income is mainly derived from farm and non- farm sources. Farm and non-farm variables played a vital role in rural household economy. All variables had their inequality increasing or decreasing effect on household earnings (Akram, W et al., 2011). The wage income and livestock income helpful in reducing overall inequality (Croppenstedt, 2006). On the other hand, non• farm income was found to be inequality decreasing source of income. The results of Janvry et al. (2005) also indicated that participation in non• farm employment had decreased income inequality significantly. Education was the chief determinant of non-farm employment. Findings of Araujo (2003) indicated that secondary education had a positive and significant effect. Earnings in the non-farm sector depended primarily on the education and experience of individual worker (Janvry et al., 2005). Livestock were found to be inequality decreasing sources of income. The complimentary relationship of livestock with agriculture relates source of income. Farm source of income is based primarily on landholding, quality of land and irrigation facilities. (Adams and He, 1995).

II.   LITERATURE REVIEW

The increased employment opportunities or improvement in the already pursuing employment will lead to increase in the earnings. Puhazhendhi & Satyasai, (2000) in their Study found that average net income/household income increased from Rs. 20,177/- or to Rs. 26,889/- or by about 33 per cent in pre and post group formation situation. Another study conducted by Puhazhendhi (2000) in Tamil Nadu covering 70 SHGs and 1041 members found that net incremental income due to the programme implementation was Rs. 2,424/- for all groups and it was relatively more in good performance groups (Rs. 2,967/-) than   average   and   poor performance groups (Rs. 1,650/- and Rs. 1,299/- respectively). Sebastian Titus (2002) conducted a survey of 340 SHG members drawn from SHGs functioning under NGOs in Central Tamil Nadu and found that the overall average incremental income for all households who took loans for productive purposes was Rs. 376.75 per month. More than 60 per cent of the respondents reported a

---

monthly increase in income above Rs. 300/- arising out of income generating activities.

Studies on Grameen Bank have, in general shown a positive change in the income of the beneficiaries. However, all these studies use recall method and therefore suffer from memory bias. Further, these studies have not attempted to isolate the income flows from assets acquired through loans. Therefore comparing the beneficiary income with a control groups income, rather than its own income will be a reliable method. In their analysis Pallavi Chavan and Ramakumar (2002) concluded that both NGO-led micro-credit and state-led credit institutions have led to positive but only marginal increases in the earnings of their beneficiaries. However, given the methodological problems associated with studies on income changes, more empirical evidence is required in order to substantiate such a conclusion.

Need for the study

Self-help groups play today a major role in poverty alleviation in rural areas. A growing number of poor people (mostly women) in various parts of India are members of SHGs and actively engage in savings and credit, as well as in other activities like income generation, natural resources management, literacy, child care and nutrition, etc. The in savings and credit focus in the SHG is the most prominent element and offers a chance to create some control over resources. The impact of SHGs on individual members, family, and community life, changes in skills, knowledge, and attitudes, successful outcomes, and the development of human and social capital. There are few studies in the literature which put attention on the impact of SHG on household income and its distribution in rural areas. The present study attempts to fill this gap and the objective of the study is to explore the relationship of SHG with household income and put attention on the income inequality and its determining factors.

III. METHODOLOGY

Primary data source was used to fulfill the objectives of the study. A detailed household questionnaire was developed after the pre-testing. Data were collected from the Chodavaram mandal of Visakhapatnam district. In this study, multi stage sampling technique is used in the selection of units. Accordingly, at the first stage, Visakhapatnam district is selected purposively. The second stage of sampling is the selection of Mandal, is selected keeping in view that it should satisfy the two criteria viz., (i) cover the maximum number of rural poor households and (ii) cover the maximum number of Self-Help Group (SHG) households. The Third stage of sampling is the selection of villages. The Fourth stage of sampling involved the selection of households. In all, 400 SHG households were selected for the study. While 200 are members of old Self Help Groups (OSHG) and 200 are members of New Self Help Groups (NSHG). For OSHG, the SHGs who have completed more than 5 years membership are taken and for NSHG, the SHGs having a membership of less than 5 years was considered. These two groups of households have been chosen keeping in view the probability proportion to their actual number in the total SHG households in the study area i.e., 10 per cent of the households.

Measures of study

In order to analyse income inequalities, the study used Co-efficient of Quartile deviation, Co-efficient of variation and Gini Coefficient measures. Besides these numerical measures, graphical presentation of income distribution made by Lorenz curve. Variation of household income and per capita income was tested by F-test and Z-test. Multiple regression model formulated to analyse determinants of income, and per capita income of the household was considered dependent variable.

IV. RESULTS AND DISCUSSION

Income distribution

The income of the household generally indicates the economic status of household. In arriving at the total annual income, income from wage and income from agriculture are considered. To overcome the problem of recall, the wage-income from casual labour for seven days preceding the date of survey has been taken. The annual income from agriculture as declared by the sample households has been taken up, as there are no problems of recall in this regard. The details of the distribution of the households by income groups and average annual income and average per capita income of the sample households by source are presented in Tables- 1 and Table -2

Table- 1 Distribution of Households by Annual Household Income Groups

Income Group	OSHG	NSHG	All
Below- 50000	7 (3.5)	7 (3.5)	14 (3.5)
50000-100000	118 (59.0)	140 (70.0)	258 (64.5)
100000-150000	60 (30.0)	40 (20.0)	100 (25.0)
150000-200000	13 (6.5)	7 (3.5)	20 (5.0)
Above- 200000	2 (1.0)	6 (3.0)	8 (2.0)
Total	200 (100.0)	200 (100.0)	400 (100.0)
Source: Filed Survey.			

Table- 2 Average Annual Household Income of the Sample Households by Source

Source	OSHG	NSHG	All
Crop income	40.0	25.0	32.5
Wage income	57.5	71.5	64.5
Livestock/rearing of cattle	0.0	0.0	0.0
Household industry	0.0	0.0	0.0
Trade	0.0	0.0	0.0
Salaried income	2.5	3.5	3.0
Profession	0.0	0.0	0.0
Others	0.0	0.0	0.0
Total Average income	100.0 (39948.25)	100.0 (22550.60)	100.0 (31249.43)
Per Capita Income (annual)	23965	26687	25265
Per Capita Income (per month)	1843.46	2052.85	1943.46
Source: Filed Survey. Note: Figures in brackets are Household Income.			

It could be observed from the Table-1 that 59 percent of the OSHG households and 70 percent of the NSHG households are in the income range of Rs 50,000/- to Rs 100,000/- per year indicating that the microfinance has marginal impact on their income levels. The distribution of income by source shows that income from wage and crop income are the major sources in both the households (Table -2). The per capita income of the households is estimated separately for the OSHG and NSHG households. There are significant differences observed between these households.

Income variation

An attempt is made to examine the income variations and the pattern of income distribution among the two groups of households in order to assess the significance of the variations. The pattern of income distribution among the sample households is studied by using the quartile deviation method. Co-efficient of variation is calculated to examine the degree of variation around the mean in the incomes and is also used to compare variations between two groups of households. Co-efficient of Quartile Deviation is calculated by using the formula and the results of the analysis are presented in Table -3.
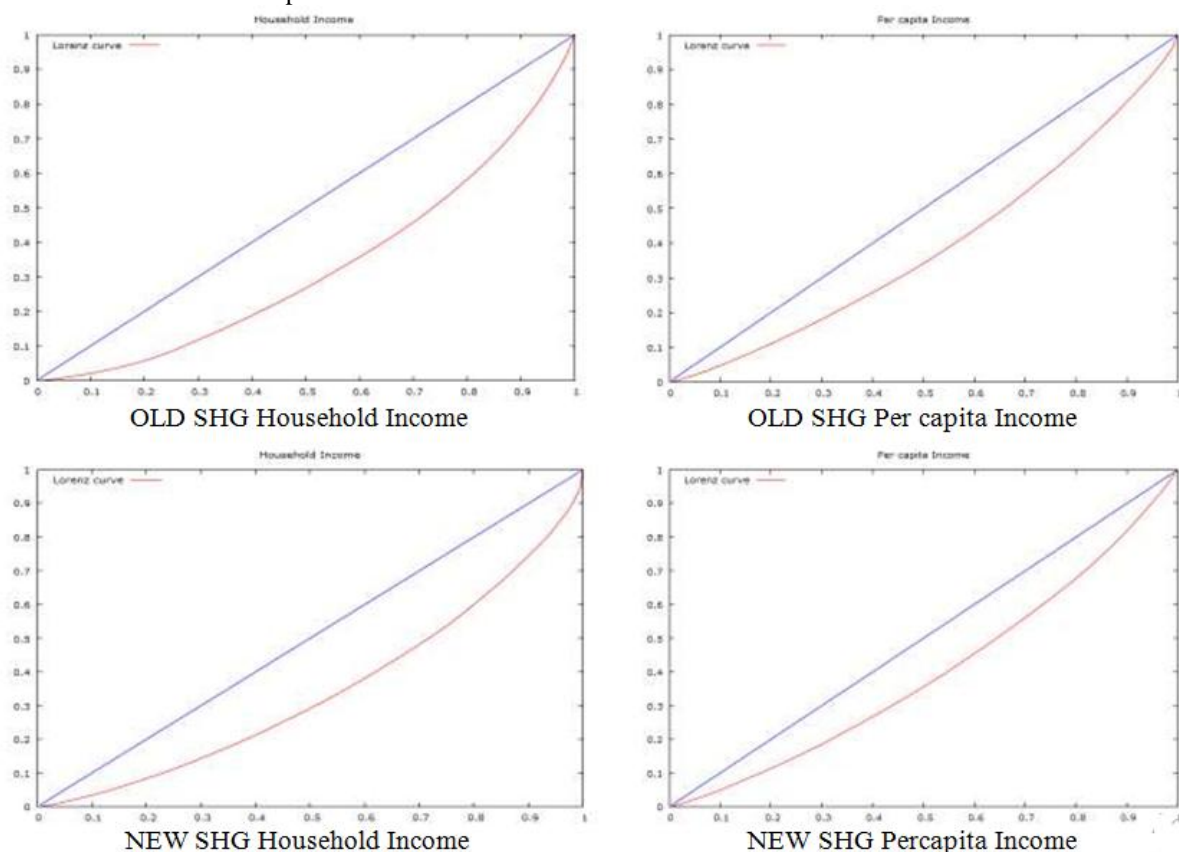
Table –3 Income variation by Category of Households

Sl. No	Item	Household Income			Per capita Income		
		OSHG	NSHG	All	OSHG	NSHG	All
1	Standard Deviation	27555.58	19838.64	25511.86	14067.65	10605.62	12516.25
2	Co-efficient of Quartile deviation (in %)	34.17	31.57	41.16	25.96	23.90	26.32
3	Co-efficient of variation (in %)	68.98	87.97	81.64	45.76	37.85	42.60
4	Gini Coefficient (in %)	34.8	31.4	37.3	22.5	20.6	21.7

Source: Filed Survey

It can be observed from the Table that the household income of the first and third quartiles ranged from Rs. 78000/- to Rs. 124225.00/- for OSHG households. Whereas in case of NSHG households the range is from Rs. 70190/- to Rs. 49375.00/-. To know the extent of income variation between the OSHG and NSHG households, the Co-efficient of Quartile Deviation and the Co-efficient of Variation are calculated. The Co-efficient of Quartile Deviation of OSHG households (34.17) is lower than that of NSHG households (31.57). The value of Co-efficient of Variation for OSHG households is 68.98as against 87.97 for NSHG households**.** It implies that the NSHG households are inconsistently distributed than OSHG households. The same analysis is carried out for per capita income of these two categories of households. The differences in the values of Co-efficient of Quartile Deviation (25.96and 23.90 for OSHG and NSHG respectively) and Co-efficient of Variation (45.76 and 37.85 for OSHG and NSHG households respectively) contrast more in terms of per capita income and OSHG households are inconsistently distributed than NSHG.

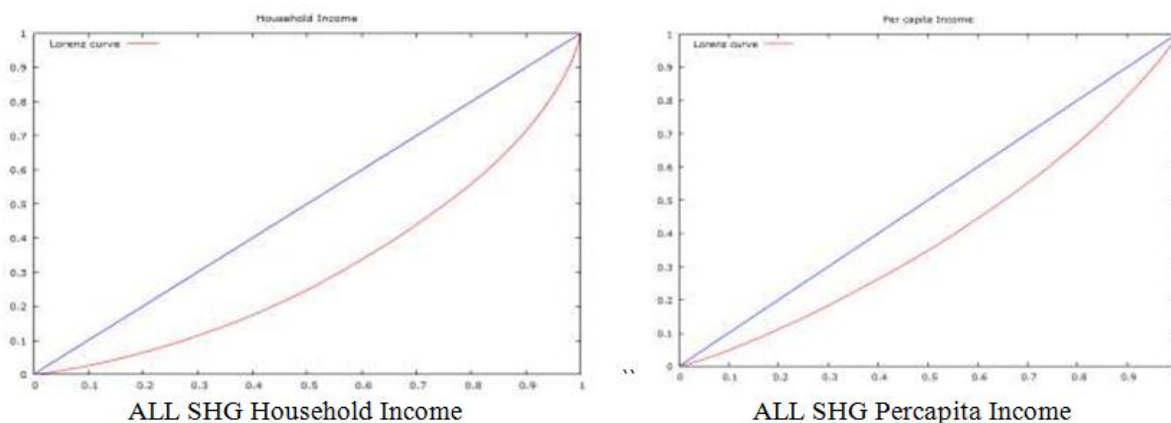Graphical Presentation of Income Variations with Lorenz Curve

OLD SHG Household Income

OLD SHG Per capita Income

NEW SHG Household Income

NEW SHG Percapita Income

ALL SHG Household Income

ALL SHG Percapita Income

Table – 4 Significance of Difference between Income of OSHG and NSHG

Income	Z-test		F-test	
	Z-value	p-value	F-value	p-value
Household Income	7.7153*	0.001	52.508*	0.000
Per capita Income	2.1851**	0.028	4.773**	0.029

Source: Filed Survey
* Significant at 1% level & ** Significant at 5% level.

The significance of the differences between the mean household income and mean per capita income of two groups was tested with the help of Z – test and the significant variation of distribution in household income and per capita income of two groups with F-test. The values of F-statistic are presented in Table 4. Since, the value of F-statistic is less than the Table value, we accept from the null hypothesis that there are no differences between the standard deviations of the two household groups with respect to household income as well as per capita income and the Z values are significant at 1% level and 5% level. It implies that the differences in household income and per capita income between OSHG and NSHG households are statistically significant. Therefore, we reject the null hypothesis. It shows that the mean household income as well as per capita income of OSHG are higher than those of NSHG households. It can be inferred from the above analysis that households who participated in the groups for longer time are able to make significant improvements in their incomes compared to the households who do not have group help.

Determinants of Income
With the help of regression analysis, an attempt is made to identify the determinants of income of the households. The crucial variables that influence the income generally are: (i) size of the household, (ii) percentage of workers in the household, (iii) wage rate of agricultural labour (annual wage income/number of man-days employed), (iv) wage rate of non-agricultural labour (v) per capita income from live stock (vi) size of the landholding of the household, (vii) per capita other income (self-employed), (viii) literacy level of the head of the household, (ix) age of the head of the household and (x) age squared of the head of the household. Specification of the model is the first step in a systematic study of the relationship. This involves the determination of (i) the dependent and the explanatory variables, (ii) the number of equations of the Model and their precise mathematical form and (iii) a prior theoretical expectation about the size and magnitude of the parameters.

Accordingly, per capita income is taken as the dependent variable for the present study. We can easily identify the variables that influence per capita income based on discussion presented in this Study and may write the following function.
Where
$PCIH = f(SH, PWH, WR_{ag}, WR_{nag}, SLHH, PCIOS, PCILS, LH, AH, SAH)$

PCIH SH	=	Annual per capita income of the household (**Dependent variable**) Size of the
PWH	=	household
WR_{ag}	=	per centage of workers in the household wage rate of agricultural labour
	=	

WR_{nag}	=	wage rate of non-agricultural labour
SLHH	=	size of the landholding of the household
PCIOS	=	per capita income from other source (self-employment)
PCILS	=	per capita income from livestock
LH	=	literacy level of the head of the household
AH	=	Age of the head of the household
SAH	=	Age squared of the head of the household.

As mentioned above, the dependent variable (PCIH) is the per capita income of the household. Income includes all the earnings of the household from wage employment, cultivation, livestock and other self-employment activities. The size of the household (SH) is expected to have a negative correlation with the annual per capita income. The percentage of workers in the household (PWH) is expected to have a positive correlation with the per capita income. As the percentage of workers increases, the levels of per capita income also will increase. An increase in wage rate of agricultural labour and non-agricultural labour (either WR_{ag}, or WR_{nag}) is expected to have a positive correlation with the per capita income.

As the size of the landholding of the household (SLHH) increases, the size of return/produce from the land will increase. Due to this reason, the level of the per capita income will increase and a positive correlation is always expected. An increase in the level of the income from livestock and other self-employment activities will raise the income level of the household. Hence, the level of per capita income from livestock and other self-employment activities PCILS, PCIOH, are expected to have positive correlation with the annual per capita income. Literacy level of the head of the household (LH) is expected to have a positive correlation with the per capita income of the household, as the literacy level helps improve the income level. Number of years of schooling is taken to assess the literacy level of the head of the household.

The age of the head of the household (AH) is expected to have a positive correlation with the annual per capita income. The variable age squared of the head of the household (SAH) is expected to have a negative relationship with income. As the age of the head (up to the age of 60 years) of the household increases, the level of income will also increase with an increasing rate, but later as the age increases, the level of income will increase with a decreasing rate i.e., there exists an inverse relationship between age squared and per capita income of the household. Based on the above assumptions, multiple regression analysis is used to specify the function and relationship between the dependent and independent variables. Accordingly, in this Study, the following multiple regression model is used.

$$PCIH = \alpha + \beta_1 SH + \beta_2 PWH + \beta_3 WR_{agl} + \beta_4 WR_{nagl} + \beta_5 SLHH + \beta_6 PCIOH +$$
$$\beta_7 PCILS + \beta_8 LH + \beta_9 AH + \beta_{10} SAH + \ldots\ldots\ldots\ldots + \mu$$

Since there exists an inverse relationship between the size of the household and per capita income, the parameter b_1 is expected to have a negative sign. The parameters β_2, β_3, β_4, β_5, β_6, β_7, β_8, and β_9 are expected to have positive signs and finally, parameter β_{10} is expected to have a negative sign since there exists an inverse relationship between the age squared of the head of the household and per capita income.

The regression coefficients of independent variable estimated through regression analysis together with their coefficient of multiple determinations (R^2) are presented in Table 5.

It can be seen from the Table that the estimated regression coefficient of variable SH has the expected negative sign and it is significant at 1 per cent level in both the OSHG and the NSHG households. The estimated coefficient of variable PWH has the expected positive sign in both the OSHG and NSHG cases and it is significant at 1 per cent level in the NSHG households. The variable WR_{ag} has a positive sign as expected in both OSHG and NSHG cases and it is significant at 1 per cent level in the case of the NSHG. The variable WR_{nag} has a positive sign as expected in both OSHG and NSHG cases and it is significant at 1 per cent level in both the cases. The variable SLHH has a positive sign as expected in both OSHG and NSHG cases and it is significant at 1 per cent level in the case of the OSHG and 5 per cent level in NSHG. The variable PCIOS has a positive sign as expected in both OSHG and NSHG cases and it is significant at 1 per cent level in the case of both the OSHG and NSHG. The variable PCILS has negative sign in OSHG and positive sign in NSHG and it is insignificant in both the cases. The variable LH has a positive sign in case of the OSHG and the NSHG households but not significant. This may be due to the reason that the increased employment opportunities may not be sensitive at significant level to the literacy level of the head of the household. However, the variable is not significant in both the cases.

The variable AH, as expected, has a positive sign only in both groups of households, but has significant in case of the OSHG households. Finally, variable SAH has the expected negative sign in case of the OSHG and the NSHG households. The reason in case of households is that the increased employment of the other members of the family reduces the need of the head of the household's participation in economic activities at an older age. The explanatory variables have explained 93 per cent of variation in the OSHG group of households and around 73 per cent in case of the NSHG households indicating the overall goodness of fit. Thus, in analyzing the factors influencing the per capita income of the rural poor households, it is found that the size of the household, per centage of workers in the household, wage rates of agricultural laboures, wage rates of non -agricultural labourers, size of landholding of household, per capita income from other sources like self-employment, age of the head of the households and age squared of the head of the households are the significant factors. Having presented the income levels and the determinants the focus of the analysis is shifted to the examination of income-expenditure relationship of the poor households.

Table -5 Regression Coefficients of the independent variables of OSHG and NSHG Households

Independent variables	OSHG		NSHG		All	
	β	Sig.	β	Sig.	β	Sig.
(Constant)	2606.287 (.545)	.587	8518.696 (1.498)	0.136	8303.011** (2.056)	0.040
SH	-2823.582* (-7.736)	0.000	-2740.535* (-5.771)	0.000	-2973.029* (-9.304)	0.000
PWH	20.517 (0.945)	0.346	79.012* (3.035)	0.003	39.835** (2.188)	0.029
WR $_{agl}$	13.186 (1.564)	0.120	22.078* (3.572)	0.000	25.735* (5.200)	0.000
WR $_{nagl}$	72.067* (26.564)	0.000	47.856* (13.583)	0.000	58.355* (24.930)	0.000
SLHH	6828.482* (3.767)	0.000	-2414.107** (-2.341)	0.020	-1849.468** (-2.113)	0.035
PCIOS	0.881* (38.220)	0.000	0.695* (16.185)	0.000	0.794* (34.085)	0.000
PCILS	-0.010 (-0.047)	0.963	0.457 (1.833)	0.068	0.178 (1.056)	0.291
LH	23.967 (0.316)	0.752	165.107 (1.695)	0.092	72.863 (1.107)	0.269
AH	450.960** (2.120)	0.035	276.518 (1.018)	0.310	298.830 (1.597)	0.111
SAH	-5.099** (-2.239)	0.026	-3.844 (-1.315)	0.190	-3.561 (-1.776)	0.077
R^2	0.932		0.738		0.828	
Adjusted R^2	0.919		0.724		0.824	
F-value	227.548*		53.216*		187.243*	

Source: Filed Survey
Note: Figures in brackets indicate' values.
* Significant at 1% level. & ** Significant at 5% level.

V. CONCLUSION

The distribution of income by source shows that income from wage and crop income are the major sources in both the households. The per capita income of the households is estimated separately for the OSHG and NSHG household sand significant differences observed between the OSHG and NSHG household. NSHG households are inconsistently distributed than OSHG households. The same analysis is carried out for per capita income of these two categories of households. The differences in the values of Co-efficient of Quartile Deviation and Co-efficient of Variation contrast more in terms of per capita income and OSHG households are inconsistently distributed than NSHG. Differences in household income and per capita income between OSHG and NSHG households are statistically significant. Households who participated in the groups for longer time are able to make significant improvements in their incomes compared to the NSHG households. Size of family has played negative role to income distribution and percentage of workers in the family positively contributed. Wage rates were positively related to income whereas size of land holding negatively working. Per capita income from other source was having positive impact and age square had negative impact.

REFERENCES

[1]. A.P. Sebastian Titus (2002), "Promotion of Women Entrepreneurs through Self-Help Groups, Khadigramodyog", *The Journal of Rural Economy*, 49 (2):68-72.
[2]. Adams, R. H. Jr. and J. J. He (1995), *Sources of income inequality and poverty in rural Pakistan,*
[3]. Research Report -102, International Food Policy Research Institute.
[4]. Akram, W., Naz, I., & Ali, S. (2011), "An Empirical Analysis of Household Income in Rural
[5]. Pakistan: Evidences from Tehsil Samundri", *Pakistan Economic and Social Review*, 49(2): 231-249.
[6]. Araujo, C. (2003), *Non-agriculture employment growth and rural poverty reduction in Mexico during the 90s,* Department of Agriculture and Resource Economics, University of California, Berkeley.
[7]. Chavan, P., & Ramakumar, R. (2002), "Micro-credit and rural poverty: An analysis of empirical evidence*", Economic and Political weekly*, 37(10): 955-965.
[8]. Croppenstedt, A. (2006), *Household income structure and determinants in rural Egypt*, ESA Working Paper - 06-02, The Food and Agriculture Organization, United States.
[9]. ILO (2014), Household income and expenditure statistics, Seventeenth International Conference of Labour Statisticians, 24 November-3 December 2003, Geneva.
[10]. Janvry, A. and E. Sadoulet (2002), "World poverty and the role of agriculture technology: Direct and indirect effects". *Journal of Development Studies*, 38(4): 1-26.
[11]. Puhazhendhi V. & Satyasai K. J. S. (2000), "Micro Credit for the Rural People: An Impact Evaluation", National Bank for Agriculture and Rural Development, Mumbai, Also see http://www .nabard.org/mcid/impactstudy.htm.