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Micro Credit Performance of Banks under Swarnajayanti Gram Swarojgar Yojana in Dibrugarh District of Assam: An Econometric Analysis

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Abstract: The Swarnajayanti Gram Swarojgar Yojana (SGSY) scheme was introduced with the aim to alleviate poverty with a view to assisting the poor to bring them above the poverty line. The study is conducted to analyze seasonal variations in the quantitative time series data in micro credit performance of banks under SGSY scheme in the Dibrugarh district of Assam. The study uses the secondary sources of data. Statistical tools for the present study include compound annual growth rate, trend analysis, Pearson correlation coefficients and ANOVA for regression. It is inferred from the testing of hypothesis that banks operating in Dibrugarh district did not grant credit according to credit target fixed for the period 08-09 to 12-13. It is observed from the study that there is much variation in the growth of number of SHGs formed and amount of revolving fund received, revolving fund released, loan sanctioned, subsidy released and loan /Subsidy disbursement during third quarter 08-09 and second quarter 12-13 due to human forces. The econometric analysis of seasonal variation in micro credit performance of banks under SGSY reveals that that the majority of the F scores for the regression coefficients for each model are found to be statistically significant which in turn implies the overall significance of the model concerned. The cubic model is considered on the ground that the R square value of cubic model is greater than the other forms of models. Thus, cubic model fits the micro credit performance of banks in the time series data.

Keywords: SGSY, revolving fund, SHG, microcredit, CAGR, trend analysis, ANOVA, regression, cubic model.

INTRODUCTION

The Swarnajayanti Gram Swarojgar Yojana (SGSY) scheme was operative from 1st April, 1999 in rural areas of the country. SGSY is a holistic Scheme covering all aspects of self employment such as organization of the poor into Self Help Groups, training, credit, technology, infrastructure and marketing. The scheme was funded by the Centre and the States in the ratio of 75:25 and was implemented by Commercial Banks, Regional Rural Banks and Co-operative Banks. Other financial institutions, Panchayat Raj Institutions, District Rural Development Agencies (DRDAs), Non-Government Organizations (NGOs), Technical Institutions in the district, were involved in the process of planning, implementation and monitoring of the Scheme. NGO’s help may be sought in the formation and nurturing of the Self Help Groups (SHGs) as well as in the monitoring of the progress of the Swarozgaris. Where feasible their services may be utilized in the provision of technology support, quality control of the products and as recovery monitors cum facilitators.

The scheme aims at establishing a large number of micro enterprises in the rural areas. The list of Below Poverty Line (BPL) households identified through BPL census duly approved by Gram Sabha formed the basis for identification of families for assistance under SGSY. The objective of SGSY is to bring the assisted poor families (swarozgaris) above the poverty line by ensuring appreciable sustained income over period of time. This objective is to be achieved by inter alia organizing the rural poor into Self Help Groups (SHGs) through the process of social mobilization, their training and capacity building and provision of income generating assets. The rural poor such as those with land, landless labor, educated unemployed, rural artisans and disabled are covered under the Scheme.

The assisted poor families known as swarozgaris can be either individuals or groups and would be selected from BPL families by a three member team consisting of Block Development Officer (BDO), Banker and Sarpanch.

SGSY focused on vulnerable sections of the rural poor. Accordingly, the SC/ST accounted for at least 50 percent, women 40 percent and the disabled 3 percent of those assisted [1].

Statement of the Problem

The SGSY scheme was introduced with the aim to alleviate poverty with a view to assisting the poor to bring them above the poverty line. Since the inception of the scheme, it benefited a large number of the poor people in the rural area through self employment and income generation activities by enhancing their living standard to considerable extent. Since the scheme focuses on group approach, individuals form themselves into self help group (SHG) to undertake various economic activities. The groups get revolving fund, subsidy and loan subject to fulfillment of certain criteria. The SGSY covers a majority of SHGs compared to other bank-linkage program in the study area from the beginning to the end of the scheme till the year 2012-13. Thus, it is interesting to study the short term variation in time series data in credit performance of banks under SGSY scheme in the area under consideration. The present study highlights the short term variation in time series data in the credit performance of banks under the scheme for the period from 08-09 to 12-13 in Dibrugarh district.

Objective of the Study

The study is conducted to analyze seasonal variations in the quantitative time series data in micro credit performance of banks under SGSY scheme in the Dibrugarh district of Assam.

Testing of Hypothesis

Ho: There is no statistically significant association between amount of credit target fixed by the banks and target achieved under the SGSY scheme in Dibrugarh district during the study period.

Ha: There is statistically significant association between amount of credit target fixed by the banks and target achieved under the SGSY scheme in Dibrugarh district during the study period.

METHODOLOGY OF THE STUDY

The study uses the secondary sources of data. They are collected from the lead bank office of Dibrugarh district personally. These sources of data are available for the period from 2008-09 to 2012-13. In order to fulfill the objective, the present study makes use of these data to analysis it. Moreover, other sources of secondary data are also used to get conceptual framework of the study. For the present study, compound annual growth rate, trend analysis, are used to analyze the data. Pearson correlation coefficients and ANOVA for regression are adopted to draw inference on hypothesis. These statistical tools are explained briefly below:

Compound Annual Growth Rate (CAGR): It is a useful measure of growth over time periods. It can be thought of as the growth rate that gets you from the initial value to the ending investment value if you assume that the investment has been over the time period. The formula is given below:

$$\mathbf{CAGR = (EV / BV)^{1/n} - 1}$$

EV = Ending value, BV= Beginning value and N= Number of periods [2].

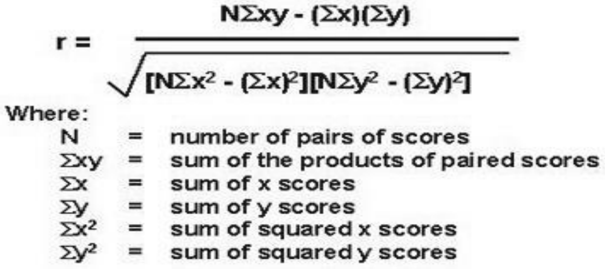
Trend Analysis: Ordinary Linear Square (OLS) is the most popular and widely used method of fitting mathematical functions to a given set of data. The method yields almost correct results if sufficiently good appraisal of the form of the function to be fitted is obtained by either by a scrutiny of the graphical plot of values overtime or by a theoretical understanding of the mechanism of the variable change. An examination of the plotted data over time often provides an adequate basis for deciding upon the type of trend to use. The following are some of the types of curves that may be used to describe the given data in practice.

1) A straight line $Q_t = a + bt + u_t$
2) Second degree parabola $Q_t = a + bt + ct^2 + u_t$
3) K^{th} degree parabola $Q_t = a_o + a_1 + a_2 + \text{...............} + a_K + u_t$

In the present study, linear, second degree parabola, third degree parabola are fitted to study financial aspect in the SGSY scheme. Types of curves have been decided by graphical plots and mathematical formulae[3]. Various models viz simple linear, quadratic, cubic models are fitted to study the trend of performance of the SGSY scheme for the period 2008-09 to 2012-13. The coefficient of determination (R square) has been obtained for each of the model together with F scores. The highest value of R^2 is considered for selection of the model in the present analysis. The curve estimation of econometric analysis in the present study was done with the help of SPSS 17.0.

Pearson Correlation Coefficient

The **Pearson correlation coefficient** is a very helpful statistical formula that measures the strength between variables and relationships. In the field of statistics, this formula is often referred to as the **Pearson R test**. When conducting a statistical test between two variables, it is a good idea to conduct a Pearson correlation coefficient value to determine just how strong that relationship is between those two variables [4].



$$r = \frac{N\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2][N\Sigma y^2 - (\Sigma y)^2]}}$$

Where:

N = number of pairs of scores
Σxy = sum of the products of paired scores
Σx = sum of x scores
Σy = sum of y scores
Σx^2 = sum of squared x scores
Σy^2 = sum of squared y scores

ANOVA for Regression

Analysis of Variance (ANOVA) consists of calculations that provide information about levels of variability within a regression model and form a basis for tests of significance. The basic regression line concept, DATA = FIT+ RESIDUAL, is rewritten as follows:

$$(y_i - \bar{y}) = (\hat{y}_i - \bar{y}) + (y_i - \hat{y}_i).$$

The first term is the total variation in the response *y*, the second term is the variation in mean response, and the third term is the residual value. Squaring each of these terms and adding over all of the *n* observations gives the equation

$$\sum (y_i - \bar{y})^2 = \sum (\hat{y}_i - \bar{y})^2 + \sum (y_i - \hat{y}_i)^2.$$

This equation may also be written as **SST = SSM + SSE**, where SS is notation for ***sum of squares*** and T, M, and E are notation for ***total***, ***model***, and ***error***, respectively.

The square of the sample is equal to the ratio of the model sum of squares to the total sum of squares: **r^2 = SSM/SST**.

This formalizes the interpretation of r^2 as explaining the fraction of variability in the data explained by the regression model.

The sample variance s_y^2 is equal to $\sum (y_i - \bar{y})^2/(n - 1)$ **= SST/DFT**, the total sum of squares divided by the total degrees of freedom (DFT).

For simple linear regression, the MSM (mean square model) = $\sum (\hat{y}_i - \bar{y})^2/(1)$ **= SSM/DFM**, since the simple linear regression model has one explanatory variable *x*.

The corresponding MSE (mean square error) = $\sum (y_i - \hat{y}_i)^2/(n - 2)$ **= SSE/DFE**, the estimate of the variance about the population regression line (σ^2).

ANOVA calculations are displayed in an ***analysis of variance table***, which has the following format for simple linear regression [5]

Source	**Degrees of Freedom**	**Sum of squares**	**Mean Square**	***F***
Model	1	$\sum (\hat{y}_i - \bar{y})^2$	SSM/DFM	MSM/MSE
Error	*n* - 2	$\sum (y_i - \hat{y}_i)^2$	SSE/DFE	
Total	*n* - 1	$\sum (y_i - \bar{y})^2$	SST/DFT	

Reference Period of the study: The present study is for the twenty quarterly financial periods from the year 2008-09 to 2012-13 known as reference period.

Limitation of the Study: a) The study is only confined to the Dibrugarh distict of Assam; b) The study is for the period of 5 years only; c) The analysis of the study is associated with micro credit performance of all banks under SGSY scheme with respect to the SHGs only; d) The study fully relies on data provided by the lead bank office of Dibrugarh.

SGSY Scheme in Assam

Under SGSY scheme, banks operating in Assam are providing financial support to the SHGs to undertake economic activities. Cumulative progress of SHG bank linkage programme under SGSY is shown in the table.

Table-1: Total Credit linkage and credit linkage under SGSY in Assam (Rs. in lakh)

	Total Credit Linkage		Credit Linkage under SGSY	
Year	No. of SHGs	Amount (Rs. lakh)	No. of SHGs	Amount (Rs.lakh)
2004-05	42712	17566.70	20388	11273.74 (64.17)
2005-06	94352	38392.36	48235	25024.66(65.18)
2006-07	109428	52778.91	54735	36549.70(69.35)
2007-08	115716	51372.98	54790	31006.57(60.35)
2008-09	138392	69879.98	69144	45898.88(65.68)
2009-10	163855	83601.33	84678	55161.36(65.98)
2010-11	193922	106855.88	102166	74784.79(69.98)
2011-12	226361	128813.00	123473	94423.5 (73.30)

Source: Reports of State Level Bankers Committee, Assam

Figure in parenthesis indicates the percentage of amount of credit linked under SGSY to total credit linked SHGs in each year.

It can be observed from the above table that out of total credit linkage to SHGs in Assam for the period 2004-05 to 2011-12, majority of the SHGs have been linked with bank under the SGSY scheme as compared to total credit linkage program. The rate of amount of credit linkage with bank under the SGSY scheme ranges from 60 percent to 75 percent out of total amount of credit linkage in each year during the period of 8 years.

Micro Credit Performance of Banks in Dibrugarh District

The SGSY is a credit cum subsidy program. It covers all aspects of self employment [6]. The table 1 gives a summarized picture of spread of SHGs block wise in Dibrugarh district under the scheme.

Table 2: Block wise Number of SHGs Receiving Revolving Fund in Dibrugarh District

	Number of SHGs					
Year Blocks	08-09	09-10	10-11	11-12	12-13	Total
Khowang	287	157	085	192	101	822
Barbaruah	187	101	085	122	000	495
Lahoal	070	099	071	174	000	414
Panitola	041	076	045	166	024	352
Tengakhat	018	098	108	173	000	397
Joypur	122	105	101	167	010	505
Tingkhong	164	101	52	253	000	570
Total	890	737	547	1257	135	3566

Source: DRDA office of Dibrugarh

Table 3: Size of Amount Released as Revolving Fund to SHGs of Dibrugarh District

	Amount of Revolving Fund (Rs. in Lakh)					
Year Blocks	08-09	09-10	10-11	11-12	12-13	Total
Khowang	28.70	15.70	8.50	19.20	10.10	82.2
Barbaruah	18.70	10.10	8.50	12.20	00.00	49.5
Lahoal	07.10	9.90	7.10	17.40	00.00	41.5
Panitola	04.10	7.60	4.50	16.60	02.40	35.2
Tengakhat	01.80	9.80	10.80	17.30	00.00	39.7
Joypur	12.20	10.50	10.10	16.70	01.00	50.5
Tingkhong	16.40	10.10	5.20	25.30	00.00	57.0
Total	89.00	73.70	54.70	124.70	13.50	355.6

Source: DRDA office, Dibrugarh

Table 4: Block wise Number of SHGs receiving subsidy in Dibrugarh District

	Number of SHGs					
Year Blocks	08-09	09-10	10-11	11-12	12-13	Total
Khowang	48	109	50	125	00	332
Barbaruah	47	66	55	74	12	254
Lahoal	21	27	34	85	09	176
Panitola	21	97	30	140	09	297
Tengakhat	36	62	50	147	00	295
Joypur	20	60	43	107	11	241
Tingkhong	41	63	20	93	00	217
Total	234	484	282	771	41	1812

Source: DRDA office, Dibrugarh

Table 5: Amount of Subsidy received by SHGs of Dibrugarh District

	Amount of Subsidy (Rs. in lakh)					
Year / Blocks	08-09	09-10	10-11	11-12	12-13	Total
Khowang	37.00	106.50	48.50	121.00	00.00	313.00
Barbaruah	30.50	69.50	62.00	76.40	14.75	253.15
Lahoal	15.12	19.75	35.00	81.75	09.00	160.62
Panitola	12.50	93.25	32.75	131.95	09.00	279.45
Tengakhat	31.50	63.40	56.00	155.50	00.00	306.40
Joypur	20.00	55.75	47.50	100.20	11.00	234.45
Tingkhong	26.00	61.20	20.00	86.45	00.00	193.65
Total	177.62	469.35	301.75	753.25	43.75	1745.72

Source: DRDA office, Dibrugarh

Table 6: Block wise amount of Bank loan disbursed to SHGs In Dibrugarh District

	Amount of Loan (Rs. in lakh)				
Year / Blocks	08-09	09-10	10-11	11-12	Total
Khowang	37.00	106.50	48.50	121.00	313.0
Barbaruah	30.50	69.50	66.00	76.40	242.4
Lahoal	15.12	19.75	66.92	96.51	198.3
Panitola	12.50	93.25	32.75	131.95	270.45
Tengakhat	31.50	63.40	56.00	155.50	306.4
Joypur	20.00	55.75	47.50	100.20	223.45
Tingkhong	26.00	61.20	20.00	86.45	193.65
Total	177.62	469.35	337.67	768.01	1752.65

Source: DRDA office, Dibrugarh

It is observed from the above (table Nos 2,3,4, 5and 6) that Khowang block recorded highest number of 822 SHGs in terms of receipt of revolving fund among all the blocks in Dibrugarh district during the period from 08-09 to 12-13. A total amount of Rs. 82.2 lakh was released to these SHGs for the period of 5 years. In case of subsidy also, the highest number of 332 SHGs of Khowang block received the subsidy amount during the period. The bank disbursed an equal amount of Rs. 313 lakh subsidy and loan to these SHGs over the period.

DISCUSSION AND ANALYSIS

The SGSY scheme was providing credit and subsidy to the SHGs in Dibrugarh district. Here the funding pattern of the scheme is divided into revolving fund received, revolving fund released, loan sanctioned, subsidy released and loan disbursed to analyze the variation in the performance of the SGSY for the period of 5 years from 2008-09 to 2012-13.

Revolving Fund Received

The Table 7 reveals that the number of SHGs for which bank received the revolving fund in Dibrugarh shows annual growth rate of 157.15 percent for the period from 08- 09 to 09-10. The negative growth rate continues to reach - 43.75 percent for the period 09-10 to 10-11. It jumps steeply to 151.23 percent which comes down sharply to touch – 90.23 percent in the subsequent year from 11- 12 to 12-13. The CAGR in number of SHGs for the period of 5 years is -18.72 percent.

The annual growth rate in the amount of revolving is similar to the preceding analysis for the study period of 08-09 to 12-13. The CAGR in the amount of revolving fund received by the bank for the period of 5 years is -18.72 percent.

Table 7: Revolving fund received by Banks for SHGs over period 08-09 to 12-13 in Dibrugarh district

Financial Year	Quarter of a year	Number of SHGs	*Annual Growth %	Amount (Rs. lakh)	*Annual Growth %
2008-09	April – June	79	***	7.90	***
	July - Sep	106		10.60	
	Oct - Dec	000		00.00	
	Jan - March	765		76.50	
	Total	950		95.00	
2009-10	April – June	765	157.15	76.50	157.15
	July - Sep	351		35.10	
	Oct - Dec	590		59.00	
	Jan - March	737		73.70	
	Total	2443		244.3	
2010-11	April – June	30	-43.75	3.00	-43.75
	July - Sep	247		24.70	
	Oct - Dec	550		55.00	
	Jan - March	547		54.70	
	Total	1374		137.4	
2011-12	April – June	250	151.23	25.00	151.23
	July - Sep	885		88.50	
	Oct - Dec	1070		107.0	
	Jan - March	1247		124.7	
	Total	3452		345.2	
2012-13	April – June	000	-90.23	000	-90.23
	July - Sep	159		15.9	
	Oct - Dec	000		00.00	
	Jan - March	178		17.8	
	Total	337		33.7	
*CAGR		-18.72		-18.72	

Source: Lead Bank Office of Dibrugarh *own calculation
*CAGR: Compound Annual Growth Rate

Table 8: Model Summary and Parameter Estimates

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.004	.081	1	18	.780	38.220	.434		
Quadratic	.195	2.063	2	17	.158	-4.322	12.037	-.552	
Cubic	*.212	1.433	3	16	.270	12.891	3.254	.468	-.032

*Note: The value of R square of cubic model is greater than value of other two models. Thus, cubic model is considered for this study

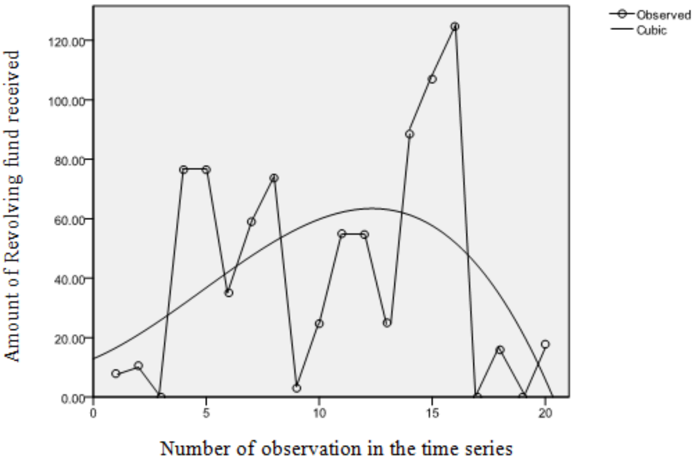


Fig-1: Amount of Revolving fund received by Banks over period 08-09 to 12-13

The horizontal line at the bottom of Figure1 in the graph implies quarterly observations in a time series for five years. The vertical line on the left hand side of the graph depicts amount of revolving fund received by the banks. The dotted points in the observed line are the actual amount of revolving fund received by the banks during the study period. From the graphic plot of model of the cubic form of the model for the SGSY scheme, it can be observed that amount of revolving fund received by the banks. There is an increase in amount of revolving fund in the first, second and fourth quarter except third quarter during the year 08-09. In next year, the amount decreases in second quarter, then it increases in third and fourth quarter. The amount goes up in second and third quarter and it declines in fourth quarter very marginally for the period 10-11. The amount continues to go up in second, third and fourth quarter in the next year. During the year 2012-13, the amount increases in second quarter, then becomes nil and it goes up in fourth quarter. From the plot of the cubic function, it is observed that the model suffers from outlier most at time point 12-13. Apart from this point, observation in amount of loan/subsidy disbursed by all the banks is seen to maintain cubic behavior with respect to time.

Revolving Fund Released

The growth rate in the number of SHGs in study area is 432 percent for the period from 08- 09 to 09-10 (Table 9). The negative growth rate of -20.53 percent was seen for the period 09-10 to 10-11. The figure jumps steeply to 142.87 percent in the subsequent year which comes down sharply to – 89.90 percent during the year from 11- 12 to 12-13. The CAGR shows 0.73 percent in number of revolving fund released to SHGs for the entire period.

The figure of growth rates in the amount of revolving fund released to SHGs is 226.40 percent for the period from 08-09 to 09-10. There is negative growth rate of -28.26 percent for the period 09-10 to 10-11. This goes up steeply to 135.17 percent in the next year which goes down sharply to – 89.90 percent in the year from 11- 12 to 12-13. The CAGR shows negative figure -11.07 percent in the amount of revolving fund released to SHGs for the period of 5 years.

Table 9: Revolving fund released to SHGs over period 08-09 to 12-13 in Dibrugarh district

Financial Year	Quarter of a year	Number of SHGs	*Annual Growth %	Revolving fund (Rs. lakh)	*Annual Growth %
2008-09	April – June	64	***	9.60	***
	July - Sep	86		8.60	
	Oct - Dec	00		00.00	
	Jan - March	175		42.40	
	Total	325		60.6	
2009-10	April – June	175	432	42.40	226.40
	July - Sep	227		22.7	
	Oct - Dec	590		59.0	
	Jan - March	737		73.7	
	Total	1729		197.8	
2010-11	April – June	30	-20.53	7.50	-28.26
	July - Sep	247		24.7	
	Oct - Dec	550		55.0	
	Jan - March	547		54.7	
	Total	1374		141.9	
2011-12	April – June	250	142.87	25.0	135.17
	July - Sep	783		78.3	
	Oct - Dec	1070		107.0	
	Jan - March	1234		123.4	
	Total	3337		333.7	
2012-13	April – June	000	-89.90	000	-89.90
	July - Sep	159		15.9	
	Oct - Dec	00		00.00	
	Jan - March	178		17.8	
	Total	337		33.7	
*CAGR		0.73		-11.07	

Source: Lead Bank Office of Dibrugarh *own calculation

*CAGR: Compound Annual Growth Rate

Table 10: Model Summary and Parameter Estimates

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.032	.593	1	18	.451	26.913	1.085		
Quadratic	.253	2.871	2	17	.084	-15.817	12.738	-.555	
Cubic	*.303	2.318	3	16	.114	12.310	-1.614	1.113	-.053

*Note: The value of R square of cubic model is greater than value of other two models. Thus, cubic model is considered for this study

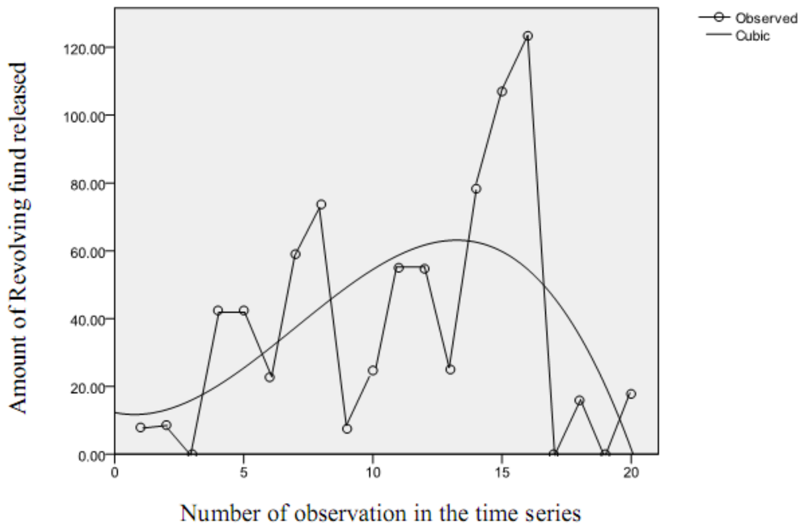


Fig-2: Amount of Revolving fund released to SHGs over period 08-09 to 12-13

The horizontal line at the bottom in the graph implies quarterly observations in a time series for five years (Figure 2). The vertical line on the left hand side of the graph depicts amount of revolving fund released to the SHGs. The dotted points in the observed line are the actual amount of revolving fund released to SHGs during the study period. From the graphic plot of model of the cubic form of the model for the SGSY scheme, it can be observed that amount of subsidy released to SHGs. There is an increase in amount of loan/subsidy in the first, second and fourth quarter except third quarter during the year 08-09. In next year, the amount decreases in second quarter, then it increases in third and fourth quarter. The amount goes up in second and third quarter and it declines in fourth quarter very marginally for the period 10-11. The amount continues to go up in second, third and fourth quarter in the next year. During the year 2012-13, the amount increases in second quarter, then becomes nil and it goes up in fourth quarter. From the plot of the cubic function, it is observed that the model suffers from outlier most at time point 12-13. Apart from this point, observation in amount of loan/subsidy disbursed by all the banks is seen to maintain cubic behavior with respect to time.

Bank Credit Target under SGSY scheme

Table 11 shows that there is a bank target of 900 numbers of SHGs for two years 08-09 and 09-10 respectively in Dibrugarh district under district credit plan of SGSY scheme. During the succeeding three years 10-11, 11-12, and 12-13, the bank target goes up and it becomes 1000 SHGs. The amount of bank target is 1286.72 lakh for the period of two years 08-09 and 09-10. The bank target mounted to Rs. 1429.80 lakh for the next three years 10-11, 11-12 and 12-13 in the area.

Table 11: Target under district Credit Plan during the study period

Year	Number of SHGs	Credit targeted (Rs. lakh)
08- 09	900	1286.72
09-10	900	1286.72
10-11	1000	1429.80
11-12	1000	1429.80
12-13	1000	1429.80

Source: Lead Bank Office of Dibrugarh

Loan sanctioned

The rate of growth in number of SHGs for loan sanctioned by the banks in Dibrugarh district is 61.98 percent for the period from 08- 09 to 09-10 (Table 12). The growth rate falls to – 44.63 percent in the subsequent year. It jumps sharply to 158.64 percent for the year 10-11 and 11-12, then goes down steeply to – 94.95 percent at the end. The CAGR in the number of loan sanctioned to SHGs for the period of 5 years is -34.85 percent.

For the period from 08-09 to 09-10, the growth rate in the amount of loan sanctioned by the bank is 65.53 percent. It goes down to 2.35 percent for the year from 09-10 to 10-11. In the succeeding year, there is a steep rise of growth rate to 50.85 percent. It falls steeply to -94.55 percent during the period 11-12 and 12-13. The CAGR in the amount of loan sanctioned to SHGs for the period of 5 years is -32.74 percent.

Table 12: Loan sanctioned to SHGs over period 08-09 to 12-13 in Dibrugarh district

Financial Year	Quarter of a year	Number of SHGs	*Annual Growth %	Loan sanctioned (Rs. lakh)	*Annual Growth %
2008-09	April – June	105	***	97.60	***
	July - Sep	258		237.11	
	Oct - Dec	000		00.00	
	Jan - March	455		413.40	
	Total	818		748.11	
2009-10	April – June	455	61.98	413.40	63.53
	July - Sep	131		113.55	
	Oct - Dec	255		227.05	
	Jan - March	484		469.35	
	Total	1325		1223.35	
2010-11	April – June	25	-44.53	27.25	2.35
	July - Sep	131		268.00	
	Oct - Dec	297		629.23	
	Jan - March	282		327.67	
	Total	735		1252.15	
2011-12	April – June	170	158.64	173.00	50.85
	July - Sep	370		356.15	
	Oct - Dec	590		591.66	
	Jan - March	771		768.01	
	Total	1901		1888.82	
2012-13	April – June	000	-94.95	00.00	-94.55
	July - Sep	48		51.50	
	Oct - Dec	00		00.00	
	Jan - March	48		51.50	
	Total	96		103.0	
*CAGR		-34.85		-32.74	

Source: Lead Bank Office of Dibrugarh *own calculation
*CAGR: Compound Annual Growth Rate

Table 13: Model Summary and Parameter Estimates

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.000	.003	1	18	.960	265.669	-.466		
Quadratic	.205	2.191	2	17	.142	1.359	71.618	-3.433	
Cubic	*.258	1.855	3	16	.178	186.668	-22.937	7.554	-.349

*Note: The value of R square of cubic model is greater than value of other two models. Thus, cubic model is considered for this study

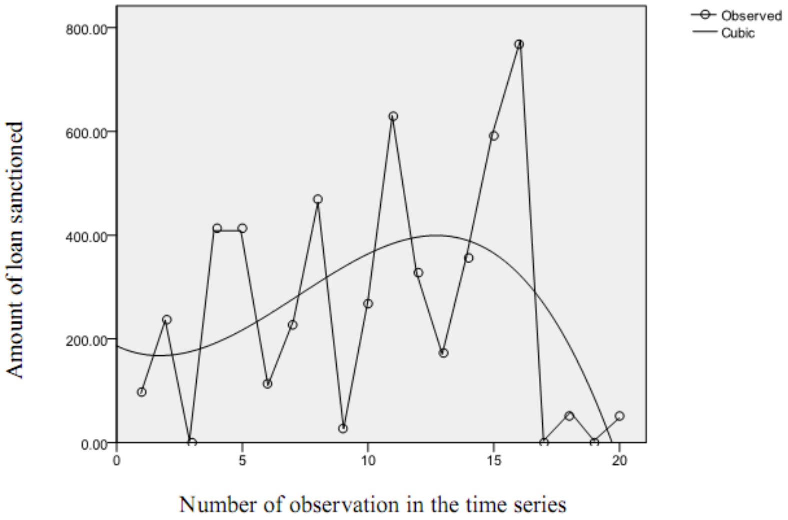


Fig-3: Amount of loan sanctioned by bank over period 08-09 to 12-13

The horizontal line at the bottom of figure 3 in the graph implies quarterly observations in a time series for five years. The vertical line on the left hand side of the graph depicts amount of loan sanctioned by the banks. The dotted points in the observed line are the actual amount of loan sanctioned to SHGs during the study period. From the graphic plot of model of the cubic form of the model for the SGSY scheme, it can be observed that amount of loan sanctioned to SHGs. There is an increase in amount of loan/subsidy in the first, second and fourth quarter except third quarter during the year 08-09. In next year, the amount decreases in second quarter, then it increases in third and fourth quarter. The amount goes up in second and third quarter and it declines in fourth quarter for the period 10-11. The amount goes up in second, third and fourth quarter in the next year. During the year 2012-13, the amount increases in second quarter, then becomes nil and it goes up in fourth quarter. From the plot of the cubic function, it is observed that the model suffers from outlier most at time point 12-13. Apart from this point, observation in amount of loan/subsidy disbursed by all the banks is seen to maintain cubic behavior with respect to time.

Testing of Hypothesis

Ho: There is no statistically significant association between amount of credit target fixed by the banks and target achieved under the SGSY scheme in Dibrugarh district during the study period.

Ha: There is statistically significant association between amount of credit target fixed by the banks and target achieved under the SGSY scheme in Dibrugarh district during the study period.

Table 14: Correlation between Credit Target and Target Achieved

		Credit Target	Target Achieved
Credit Target	Pearson Correlation	1	.079
	Sig.(2- tailed)	0	.900
	N	5	5

Table15: Model Summary of Relationship between Credit Target and Target Achieved

Model	R Square	R Square	Adjusted R Square	Std. Error of the Estimate
1	.079^a	.006	-.325	764.04094

a. Predictors: (Constant), Credit Target

Table 16: ANOVA Test

Model	Sum of Squares	Degree of freedom	Mean Square	F	Sig.
1 Regression	10965.702	1	10965.702	.019	.900^a
Residual	1751275.690	3	583758.563		
Total	1762241.393	4			

a. Predictors: (Constant), Credit Target b. Dependent Variable: Target Achieved

The statistical test of Pearson Correlation shows that there is very low statistically significant correlation between amount of credit target fixed by the banks and target achieved under the SGSY scheme in Dibrugarh district during the study period (Table 14) with R= .079, R^2 = .006, adjusted R^2 = -.325 (Table 15). On the basis of adjusted R square, it can be stated -3.25 percent variation is in target achieved is explained by variation in credit target. Further, the value of one way ANOVA reveal that F= .019, and p-value is .900 (Table16). Since the p- value .900 is higher than 0.05, hence, null hypothesis of no significant association between amount of credit target fixed by the banks and target achieved under the SGSY scheme is accepted. It is inferred that banks operating in Dibrugarh district did not grant credit to the SHGs according to credit target fixed for the period 08-09 to 12-13.

Subsidy released

Table 17 presents that for the period from 08-09, the growth rate in the number of SHGs for subsidy released in study area is 60.24 percent. There was negative growth rate of – 44.73 percent for the period 09-10 to 10-11. The figure jumps steeply to 158.64 percent in the subsequent year which comes down sharply to – 94.95 percent in the year from 11- 12 to 12-13. The CAGR shows negative figure -35.04 percent in number of subsidy released to SHGs for the period of 5 years.

The figure of growth rates in the amount of subsidy released to SHGs is 87.48 percent for the period from 08-09 to 09-10. There is negative growth rate of – 11.10 percent in succeeding year. It goes up steeply to 71.20 percent for the period 11-12 and 12-13 and it is down sharply to – 94.46 percent at the end of the period. The CAGR shows negative figure -30.86 percent in the amount subsidy released to SHGs for the period of 5 years.

Table 17: Subsidy released to SHGs over period 08-09 to 12-13 in Dibrugarh district

Financial Year	Quarter of a year	Number of SHGs	*Annual Growth %	Subsidy released (Rs. lakh)	*Annual Growth %
2008-09	April – June	131	***	101.95	***
	July - Sep	239		137.88	
	Oct - Dec	00		00.00	
	Jan - March	460		411.90	
	Total	830		651.73	
2009-10	April – June	460	60.24	411.90	87.48
	July - Sep	131		113.55	
	Oct - Dec	255		227.05	
	Jan - March	484		469.35	
	Total	1330		1221.85	
2010-11	April – June	25	-44.73	27.25	-11.10
	July - Sep	131		128.00	
	Oct - Dec	297		629.23	
	Jan - March	282		301.75	
	Total	735		1086.23	
2011-12	April – June	170	158.64	173.00	71.20
	July - Sep	370		356.15	
	Oct - Dec	590		577.25	
	Jan - March	771		753.25	
	Total	1901		1859.65	
2012-13	April – June	000	-94.95	00.00	-94.46
	July - Sep	48		51.50	
	Oct - Dec	00		00.00	
	Jan - March	48		51.50	
	Total	96		103.0	
*CAGR		-35.04		-30.86	

Source: Lead Bank Office of Dibrugarh *own calculation

*CAGR: Compound Annual Growth Rate

Table 18: Model Summary and Parameter Estimates

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.000	.004	1	18	.949	239.885	.594		
Quadratic	.192	2.017	2	17	.164	-15.547	70.257	-3.317	
Cubic	*.237	1.657	3	16	.216	155.355	-16.947	6.815	-.322

*Note: The value of R square of cubic model is greater than value of other two models. Thus, cubic model is considered for this study.

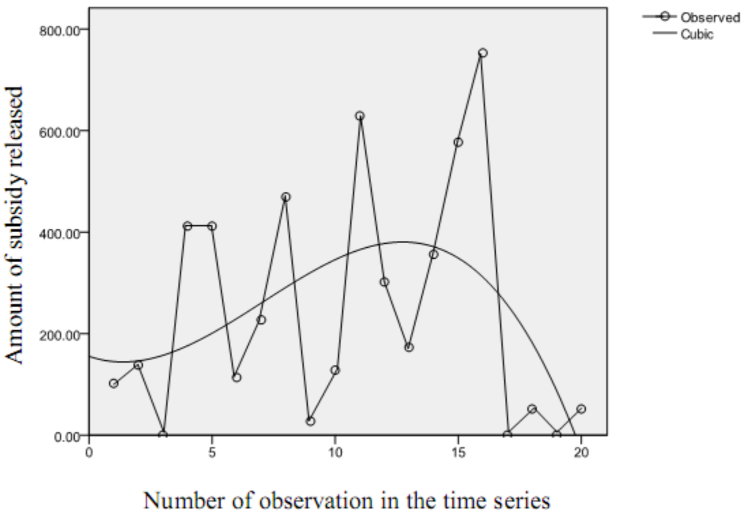


Fig-4: Amount of subsidy released to SHGs over period 08-09 to 12-13

The horizontal line at the bottom in the graph implies quarterly observations in a time series for five years (figure 4). The vertical line on the left hand side of the graph depicts amount of subsidy released by the banks. The dotted points in the observed line are the actual amount of subsidy released to SHGs during the study period. From the graphic plot of model of the cubic form of the model for the SGSY scheme, it can be observed that amount of subsidy released to SHGs. There is an increase in amount of loan/subsidy in the first, second and fourth quarter except third quarter during the year 08-09. In next year, the amount decreases in second quarter, then it increases in third and fourth quarter. For the period 10-11, the amount goes up in second and third quarter and it declines in fourth quarter. The amount goes up in second, third and fourth quarter in the next year. During the year 2012-13, the amount increases in second quarter, then becomes nil and it goes up in fourth quarter. From the plot of the cubic function, it is observed that the model suffers from outlier most at time point 12-13. Apart from this point, observation in amount of loan/subsidy disbursed by all the banks is seen to maintain cubic behavior with respect to time.

Loan/ Subsidy disbursement

The rate of growth in number of SHGs for loan/subsidy disbursed by the banks in Dibrugarh district is 74.28 percent for the year from 08- 09 to 09-10 (Table 19). The growth rate falls to – 39.05 percent in the subsequent year. It jumps sharply to 139.59 percent for the year 10-11 and 11-12, then goes down steeply to – 94.55 percent at the end of the period. The CAGR of loan/subsidy disbursed in the number of SHGs for the period of 5 years is -32.64 percent.

For the period from 08-09 to 09-10, the growth rate in the amount of loan sanctioned by the bank is 93.80 percent. It goes down to – 7.18 percent for the year from 09-10 to 10-11. In the succeeding year, there is a very steep rise of growth rate to 215.26 percent. It falls very steeply to - 96.51 percent for the year 11-12 and 12-13. The CAGR in the amount of loan/subsidy disbursed to SHGs for the period of 5 years is -27.66 percent.

The horizontal line at the bottom of figure 5 in the graph implies quarterly observations in a time series for five years. The vertical line on the left hand side of the graph depicts amount of loan/subsidy disbursement of the banks. The dotted points in the observed line are the actual amount of loan disbursement to SHGs during the study period. From the graphic plot of model of the cubic form of the model for the SGSY scheme, it can be observed that amount of loan/subsidy disbursed by the banks. During the year 08-09, there is an increase in amount of loan/subsidy in the first, second and fourth quarter except third quarter. In next year, the amount decreases in second quarter and it increases in third and fourth quarter. For the period 10-11, the amount goes up in second and third quarter and it declines in fourth quarter. The amount goes up in second, third and fourth quarter in the next year. During the year 2012-13, the amount increases in second quarter, then becomes nil and it goes up in fourth quarter. From the plot of the cubic function, it is observed that the model suffers from outlier most at time point 12-13. Apart from this point, observation in amount of loan/subsidy disbursed by all the banks is seen to maintain cubic behavior with respect to time.

Table-19: Loan/ Subsidy disbursement to SHGs over period 08-09 to 12-13 in Dibrugarh district

Financial Year	Quarter of a year	Number of SHGs	*Annual Growth %	Subsidy/Loan disbursement (Rs. lakh)	*Annual Growth %
2008-09	April – June	105	***	97.60	***
	July - Sep	229		207.85	
	Oct - Dec	00		00.00	
	Jan - March	358		562.95	
	Total	692		868.4	
2009-10	April – June	358	74.28	562.95	93.80
	July - Sep	125		203.95	
	Oct - Dec	239		280.15	
	Jan - March	484		635.88	
	Total	1206		1682.93	
2010-11	April – June	25	-39.05	35.23	-7.18
	July - Sep	131		268.0	
	Oct - Dec	297		629.43	
	Jan - March	282		629.42	
	Total	735		1562.08	
2011-12	April – June	121	139.59	219.30	215.26
	July - Sep	314		538.50	
	Oct - Dec	590		1168.91	
	Jan - March	736		2997.84	
	Total	1761		4924.55	
2012-13	April – June	000	-94.55	000	-96.51
	July - Sep	48		86.0	
	Oct - Dec	00		00.0	
	Jan - March	48		86.0	
	Total	96		172.0	
*CAGR		-32.64		-27.66	

Source: Lead Bank Office of Dibrugarh *own calculation
*CAGR: Compound Annual Growth Rate

Table 20: Model Summary and Parameter Estimates

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.033	.622	1	18	.440	242.952	20.719		
Quadratic	.092	.857	2	17	.442	-166.760	132.458	-5.321	
Cubic	*.180	1.173	3	16	.351	529.274	-222.699	35.946	-1.310

*Note: The value of R square of cubic model is greater than value of other two models. Thus, cubic model is considered for this study

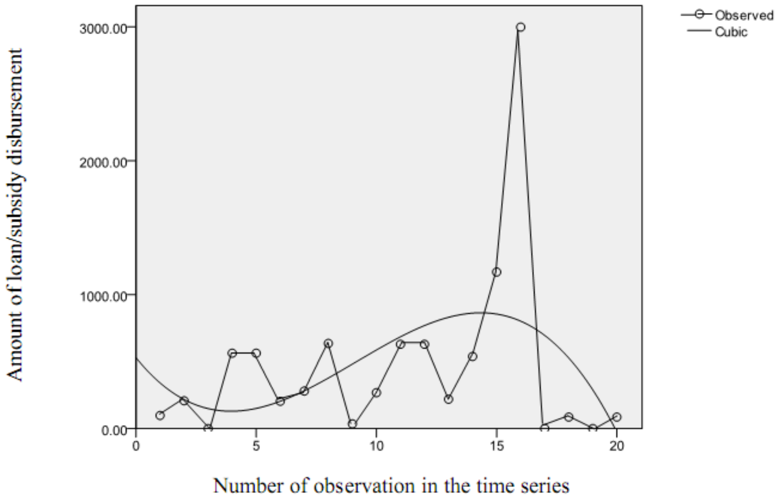


Fig-5: Amount of loan/subsidy disbursement over period 08-09 to 12-13

Loan Recovery of Banks under SGSY Scheme

The sources of data for loan recovery of bank from the SHGs under the SGSY scheme are available for the period of three years 08-09, 09-10 and 10-11 because the banks have not supplied the data to the lead bank office in some years in the study area. There was a demand from the bank against the loan disbursed to the SHGs under the scheme. For the period of 08-09, the recovery of loan from SHGs under SGSY scheme was Rs. 77.86 lakh as against the demand of the bank of Rs. 150.42 lakh. In 09-10, it amounted to Rs. 78.70 lakh as against an amount of Rs. 149. 96 lakh demanded by the bank. The bank recovered an amount of Rs. 953.16 lakh as against the demand of Rs. 2815.85 lakh for the year 10-11.

CONCLUSION

It is observed from the study that there is no difference found in annual growth rate is found in number of SHGs and amount of revolving fund received during the period of five years with negative CAGR -18.72. There is positive value of 0.73 CAGR in number of SHGs and negative value of -11.07 CAGR in amount of revolving fund released to SHGs over the period. It is found to be negative CAGR in both number of SHGs (-34.85) and amount of loan sanctioned (-32.74) during the study period. The CAGR is also negative in subsidy released with number of SHGs (-35.04) and amount of SHGs (-30.86) for the period. It is also observed to be -32.64 CAGR in number of SHGs and -27.66 CAGR in amount of loan disbursement over the period. There is much variation in the growth of number of SHGs formed and amount of revolving fund received, revolving fund released, loan sanctioned, subsidy released and loan /Subsidy disbursement during third quarter 08-09 and second quarter 12-13 due to human forces. The econometric analysis of seasonal variation in Credit performance of bank under SGSY scheme reveals that that the majority of the F scores for the regression coefficients for each model are found to be statistically significant which in turn implies the overall significance of the model concerned. The cubic model is considered on the ground that the R square value of cubic model is greater than the other forms of models. Thus, performance evaluation of SGSY in Dibrugarh district is seen to maintain cubic behavior with respect to time during the entire period. The result of hypothesis testing is that there is no significant association between amount of credit target fixed by the banks and target achieved (loan sanctioned) under the SGSY scheme is accepted.

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