TECHNICAL EFFICIENCY OF WOMEN SELF HELP GROUPS GENERATING PROCESSING ACTIVITY

K.D.CHOPDE

"Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola ,Maharashtra."

Abstract : Provision of loans and financial services to the poor is an important aspect of the development agenda of any economy. Study was undertaken in rural areas of Amravati division, 50 SHGs, which were engaged in selected agriculture based activity food processing. In order to analyse the objectives of the study, primary data was collected with the help of Personal interview of self help groups. Those Self help groups were selected for the study which should have an activity in existence of at least 10 years, The variable subsidy and net return executed negative significant contribution in determining the gross loan, it indicates decline in subsidy and there by reduction in net returns adversely affects the loan refund and hence loan outstanding of the borrowers increases. among selected SHGs, the results indicates the variations in technical efficiency 0.94-0.9945 across the individual SHGs. In view of it is necessary to increase the subsidy rate which will make the members to increase their net income and make refund possible.

Key words: Self help groups, Technical efficiency, Gross loan, Subsidy, Returns

1.INTRODUCTION

In India, majority of the people live in rural area and are engaged in agriculture, earning a subsistence wage. Women are vital part of the Indian economy and employment to build their empowerment .All round development of women has been one of the focal points of planning process in India. The provision of loans and financial services to the poor is an important aspect of the development agenda of any economy. Upliftment of the poor by promoting self employment and social security has for a long time been the concern of democratically elected Governments in countries like India. India has been able to develop its own model of microfinance organization in the form of savings and credit groups known as Self-Help-Groups (SHGs) which are bank linked. Rural women of India have been benefited by the Self Help Groups (SHG). The SHG can approach any bank for availing loan facility to undertake a suitable activity. The group loan is distributed among the members to run a small business .(Anjugam, M. et.al.,2007). The loan is repaid out of the profits earned. "Microfinance sector has grown rapidly over the past few decades. Nobel Laureate Muhammad Yunus is credited with laying the foundation of the modern MFIs with establishment of Grameen Bank, Bangladesh in 1976". Microfinance programmes like the Self-Help Bank Linkage Programme in India have been increasingly hailed for their positive economic impact and the empowerment women. Self Help Groups (SHGs) are at the centre of the microfinance revolution that India has been witnessing over the past two decades. The SHG bank linkage programme is the flagship microfinance intervention of NABARD in the year 1992 with the policy support of the Reserve Bank of India. It mainstreamed the institution of SHG as an innovative system based on the principles of trust and mutual help that can effectively deliver affordable financial services to

households with low net worth.(NABARD,2015) Self help groups of poor people in rural area of Amravati division established under District Rural Development Agency (DRDA), Mahila Arthic Vikas Mahamandal (MAVIM), NABFINS-NGOs, Krishi Vigyan Kendra, SHGs are engaged under economic activities or income generating activities. Steps would be taken by government very soon in strengthening the SHGs and achievement in different fields in the rural area of division. .(Ganesamurthy, V., et.al., 2000)

2.MATERIAL AND METHODS

The study on Technical efficiency of Self Help Groups generating agriculture food Processing activity in Amravati division of Maharashtra was undertaken with the following objectives.,

-To ascertain the technical efficient self-help groups and identify the possible determinant of technical efficiency of self-help groups.

Study was undertaken in rural areas self help groups of Amravati division, which were engaged in selected agriculture based activitiy. The five districts were selected for the study Amravati, Akola, Washim, Buldhana and Yavatmal. An study was carried out for year 2016-2017 for Amravati division.

The data needed for the study was collected from SHGs members by personal interview method using pre tested schedule for the purpose. Self help groups which are engaged in agriculture based activities to analyse the technical efficiency,with respect to purpose wise relating to portfolio lending by SHG's providers, utilization pattern of borrowed funds by the Self help groups, loan availed and repayment, rate of interest, service charges and other costs involved in borrowings, cost and returns involved in each activities selected groups efficiency and identified the determinants of variations in efficiencies among SHGs. Total of 50 women SHGS has been selected agriculture based activities and there 10 years existent in five districts of Amravati division for economic analysis.

2.1 Analysis of data

To fulfill the specific objectives of the study, the data generated was subjected to statistical analysis using the following analytical tools and techniques

In order To ascertain the technical efficient self-help groups and identify the possible determinant of technical efficiency of self-help groups. Stochastic Frontier Model has been employed.

2.2 Stochastic frontier approach

Output oriented technical efficiency shows the firms ability to obtain maximum output from a given amount of inputs. Technical inefficiency affects allocative efficiency and a negative cumulative effect on economic efficiency operates. Hence the concept of technical efficiency is important for the better performance of the economic units. Technical efficiency is measured by the distance a particular firm is from the production frontier. A firm that sits on the production frontier is said to be technically efficient. The concept of technical efficiency is important to firms because their profit depends highly upon their value of technical efficiency.

Is a method of economic modeling It has its starting point in the stochastic production frontier models simultaneously introduced by Aigner, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977). Is a method of economic modeling. It has its starting point in the stochastic production frontier

models simultaneously introduced by Aigner, Lovell and Schmidt (1977) and Meeusen and Van den Broeck (1977).

The production frontier model without random component can be written as:

$$y_i = f(x_i;\beta)\cdot TE_i$$

Where,

y_i is the observed scalar output of the producer i, $i=1,..I$, x_i is a vector of N inputs used by the producer i, $f(x_i, \beta)$ is the production frontier, and β is a vector of technology parameters to be estimated.

TE_i denotes the technical efficiency defined as the ratio of observed output to maximum feasible output. A stochastic component that describes random variables affecting the production process is added. The stochastic production frontier will become:

$$y_i = f(x_i;\beta)\cdot TE_i \cdot \exp\{v_i\}$$

We assume that TE_i is also a stochastic variable, with a specific distribution function, common to all producers.

We can also write it as an exponential

$$TE_i = \exp\{-u_i\},$$

Where,

$u_i \geq 0$, since we required $TE_i \leq 1$.

Thus, we obtain the following equation:

$$y_i = f(x_i;\beta)\cdot \exp\{-u_i\}\cdot \exp\{v_i\}$$

The technical efficiency of i^{th} firm at t^{th} time period is given by

$TE_{it} = exp\ (-U_{it}) = exp\ (-\ zit\ \delta - W_{it})$

Now, if we also assume that $f(x_i, \beta)$ takes the log-linear Cobb-Douglas form, the model can be written as:

$$\ln y_i = \beta_0 + \sum_n \beta_n \ln x_{ni} + v_i - u_i$$

We have followed Battese and Corra (1977) specification for variance parameters

$\Sigma s^2 = \sigma v^2 + \sigma^2$

$\gamma = \sigma^2 / \sigma s^2$

The value of γ lies between 0 and 1. Zero value of γ shows that variance of the efficiency effects is zero and deviations from the frontier are entirely due to noise.

Value $\gamma = 1$ indicates that all deviations are due to technical efficiency

For output variable we have taken gross loan portfolio (measured in Rupees). cost per borrower (CPB), assets, borrow per member, net returns and subsidy are taken as input variables. all variable were measured in rupees.

2.3 Specification of model

Stochastic frontier model of technical efficiency are given below:

$$\mathbf{lnGLP_{it} = \beta_o + \beta_1\, LCPB_{it} + \beta_2\, LASSET_{it} + \beta_3\, LBPM_{it} + \beta_4\, LNR_{it} + \beta_5\, LSUB_{it} + V_{it} - U_{it}}$$

Where,

ln natural logarithm (i.e. logarithm to the base e).

GLP_{it} represents all outstanding principals due for all outstanding members loans of i th SHGs at time period t.

$LCPB_{it}$ represents logarithm of cost per borrower (operating expense/ Number of active borrowers) measured in Rupees of i^{th} SHGs at time period t.

$LASSETS_{it}$ represents logarithm of total of all net asset account of the i^{th} SHGs at t^{th} time period measured in Rupees

$LBPM_{it}$ represents logarithm of loan borrow per member of i^{th} SHGs at time period t. measured in Rupees

LNR_{it} represents logarithm of net returns of i^{th} SHGs at time period t measured in Rupees

$LSUB_{it}$ represents logarithm of Subsidy taken by i^{th} SHGs at time period t, measured in Rupees

β_i Parameters to be estimated

V_{it} are independent and identically random errors

U_{it} are non- negative random variables.

2.4 Allocative efficiency

Allocative efficiency refers to the ability and willingness of a firm to use this inputs optimally given the input prices. Allocattive efficiency defined in terms of profit maximization, given the technology allocative efficiency referes to the achievement of optimum output so has to maximize gross loan.

Allocative efficiency = GLP_0 /GLP_E

GLP_0 =Observed maximum gross loan portfolio among all selected SHGs.

GLP_E =Estimated loan or potential gross loan portfolio at the level of input used by SHGs who obtained maximum gross loan .

2.5 Economic efficiency

the measure of economic efficiency can be divided in to two component *viz.*, technical efficiency, price or allocative efficiency. It is combination of technical and allocative efficiency(EE=Technical efficiency × Allocative efficiency).

2.6 Marginal valve productivity (MVP)

The MVP was computed by multiplying the coefficients of the given resources with ratio of the geometric mean of the output to the geometric mean of given resource for example the MVP of Xi would be

$$MVP(xi) = bi \frac{\overline{Y}(GM)}{\overline{Xi}(GM)}$$

Given,

GM = represents the geometric mean

MVP =Marginal value productivity

bi =is the corresponding elasticity of xi

$\overline{Xi}$(Gm) is the geometric mean of the i^{th} resources

$\overline{Y}$ (GM)= is the computed value at geometric mean

3. RESULT AND DISCUSSION

TECHNICAL EFFICIENCY OF FOOD PROCESSING SHGS

Marginal likelihood estimates of the parameters of the production frontier in Table 1 indicates that stochastic frontier production function of food processing SHGs, the elasticites of frontier gross loan portfolio with respect to cost per borrower, assets and borrow per member were estimated at the means of input variables to be 0.0983,0.0379 and 0.7264,

Table 1. Maximum likelihood estimates of stochastic frontier production function of food processing SHGs

Sr. No.	Explanatory variables	βi	Coefficient	St. Error
1	Constant	β0	2.6137	0.2300
2	Log cost per borrower	β1	0.0983***	0.0269
3	Log assets	β2	0.0379**	0.0145
4	Log borrow per member	β3	0.7265***	0.0424
5	Log net return	β4	-0.0668***	0.0201
6	Log subsidy	β5	-0.1140***	0.0310
Log likelihood		109.35		
		R^2	0.87*	
		γ	0.8433	0.3464
		σ^2	0.0030	0.0057
Average Technical efficiency		0.9817		

*** significance at 1%, ** significance at 5%, * significance at 10%

respectively. Given the specification of stochastic or Cobb Dougloulas frontier model results shows that the elasticity of mean value an increasing function of this all variables are positively significant contribution in the gross loan. (Singh S.,2013)

In Table 2 indicates the negative marginal value of productivity of food processing SHGs in subsidy and net returns variable determine to decrease the use and scope to increase this variable.

Table 2. Marginal value productivity of food processing SHGs

Sr. No.	Variables	MVP
1	Cost per borrower	4.142094
2	Assets	0.142791
3	Borrow per member	6.79172
4	Net return	-0.082225
5	Subsidy	-0.312209

The variable subsidy and net return executed negative significant contribution in determining the gross loan, it indicates decline in subsidy and there by reduction in net returns adversely affects the loan refund and hence loan outstanding of the borrowers increases in view of it is necessary to increase the subsidy rate which will make the members to increase their net income and make refund possible therefore the subsidy and net returns are possible of gross loan refund. The returns to scale was found to be 0.6819 implying increase in the input variables would results to less than proportionate increase in the gross loan of the food processing SHG, is the decreasing returns to scale.(Islam, K.M et.al, 2011 ; Izah Mohd Tahir et.al., 2013.)

In Table 3 shows efficiency distribution of food processing SHGs, indicates minimum and maximum technical efficiency among selected SHGs, the results indicates the variations

Table 3. Efficiency distribution of food processing SHGs

Efficiencies	Efficiency level
Technical efficiency	0.9817
Allocative efficiency	0.6783
Economic efficiency	0.6664
Maximum Technical efficiency among selected SHGs	0.9945
Minimum Technical efficiency among selected SHGs	0.94

in technical efficiency 0.94-0.9945 across the individual SHGs. The minimum technical efficiency in selected SHGs sample was 0.94 (94%), while maximum was 0.9945 (99.45%). The average technical efficiency for entire sample of food processing SHGs was 0.9817(98.17) indicating 0.0183 (1.83%) inefficiency implies to there is scope to increase the gross loan portfolio. The allocative efficiency 0.6783 (67.083%), which indicates the allocative inefficiency is 0.3217 (32.17%) it can be from that there is scope to increasing food processing SHGs loan and the 0.6664 (62%) economic efficiency and it found to 0.3336 (33.36%) economically inefficient food processing SHGs, indicating which have scope to improve the economic efficiency. (Oteng-Abayie et.al., 2011)

Frequency distribution of efficiency of food processing SHGs was presented in Table 4 technical efficiency from all 50 SHGs

Table 4. Frequency distribution of sample efficiency of SHGs food processing activities

Sr. No.	Efficiency Index	No of SHGs		
		Technical Efficiency	Allocative Efficiency	Economic Efficiency
1	0.15-0.20	-	-	-
2	0.20-0.25	-	-	-
3	0.25-0.30	-	-	-
4	0.30-0.35	-	-	-
5	0.35-0.40	-	-	-
6	0.40-0.45	-	-	1
7	0.45-0.50	-	1	3
8	0.50-0.55	-	5	3
9	0.55-0.60	-	11	10
10	0.60-0.65	-	3	4
11	0.65-0.70	-	1	1
12	0.70-0.75	-	21	20
13	0.75-0.80	-	3	3
14	0.80-0.85	-	-	2
15	0.85-0.90	-	2	-
16	0.90-0.95	3	1	1
17	0.95-1.00	47	2	2

majority of 47 SHGs ranges between 0.95-1 efficiency level and 3 SHGs were ranges 0.90-0.95.Technical efficiencies of all SHGs higher because low cost of borrowing of loan and less variations in technical efficiency estimate is indicating to the majority of SHGs use their resources efficiently in SHGs loan process. In allocative efficiencies majority of 21 SHG ranges between 0.70-0.75, followed by11 SHGs ranges between 0.55-0.60, 5 SHGs ranges between 0.50-0.55, 3 SHGs allocative efficiency from each ranges 0.60-0.65 and

0.75-0.80, 2 SHGs from each ranges 0.85-0.90 and 0.95-1.00 efficiency level and one SHGs from each ranges 0.45-0.50,0.65-0.70 and 0.90-0.95, respectively, variations in allocative efficiencies indicating to improve allocation of resources of SHGs. In economic efficiencies majority of 20 SHGs ranges between 0.70-0.75,followed by10 SHGs ranges between 0.50-0.65, 4 SHGs ranges between 0.60-0.65, 3SHGs economic efficiency in each range 0.45-0.80, 0.50-0.55 and 0.75-0.80,2 SHGs ranges between 0.80-0.85 and 0.95-1.00 efficiency level each and 1 SHGs comes under each ranges 0.40-0.45,0.65-0.70 and 0.90-0.95 economic efficiency, variations in efficiency indicating scope to SHGs to improve their variable which is help full in loan process and improvement in income to repay the gross loan.(Niels Hermes, et.al.,2008)

4. CONCLUSIONS

1.The variable subsidy and net return executed negative significant contribution in determining the gross loan, it indicates decline in subsidy and there by reduction in net returns adversely affects the loan refund and hence loan outstanding of the borrowers increases.

2. The average technical efficiency for entire sample of food processing SHGs was 0.9817(98.17) indicating 0.0183 (1.83%) inefficiency implies to there is scope to increase the gross loan portfolio.

3.The allocative efficiency 0.6783 (67.083%), which indicates the allocative inefficiency is 0.3217 (32.17%) it can be from that there is scope to increasing food processing SHGs loan and the 0.6664 (62%) economic efficiency and it found to 0.3336 (33.36%) economically inefficient food processing SHGs, indicating which have scope to improve the economic efficiency.

4. In view of it is necessary to increase the subsidy rate which will make the members to increase their net income and make refund possible therefore the subsidy and net returns are possible of gross loan refund.

5. References

1. Aigner, D., K. Lovell, and P. Schmidt, 1977. Formulation and Estimation of Stochastic Frontier Production Function Models. Journal of Econometrics 6(1) : 21-37.
2. Alagumani, T. and M. Anjugam, 2000. Impact of dairy enterprises on income and employment in Madurai district, Tamil Nadu. Proceedings of the 7th Annual Conference of Agricultural Economics Research Association on Livestock in Different Farming Systems, held at Tamil Nadu Veterinary and Animal Sci. Uni., Chennai, pp 30.
3. Ali Al-Sharafat, 2013. Technical Efficiency of Dairy Farms: A Stochastic Frontier Application on Dairy Farms in Jordan, Journal of Agricultural Science, 5(3) : 45-53
4. Anjugam, M. and C. Ramasamy, 2007. Determinants of Women's Participation in Self-Help Group (SHG)-Led Microfinance Programme in Tamil Nadu, Agricultural Economics Research Review, 20 : 283-298..
5. Anonymous, 2015-2017. www.nabard.org.in
6. Asogwa, B.C., J.E. Ihemeje and J.A.C. Ezihe, 2011. Technical and allocative efficiency analysis of Nigerian Rural Farmers : Implication for poverty reduction, Agriculture Journal. 6(5) : 243-251.
7. Banerjee, G.D., 2002. Evaluation study on self-help groups. Financing agriculture-in house. J. Agril. Finance. Co-operation ltd., 34(2) : 38-42.
8. Battese, G.E. and T.J. Coelli, 1995. Frontier Production Functions, Technical Efficiency and Panel Data: With Applications to Paddy Farmers in India. Journal of Productivity Analysis 3 : 153-169.
9. Bele´n Ira´izoz, Manuel Rapun, Idoia Zabaleta, 2003. Assessing the technical efficiency of horticultural production in Navarra, Spain, Agricultural Systems 78 : 387–403. www.elsevier.com/locate/agsy

10. Bharathamma, G.U., 2005. Empowerment of rural women through income generating activities in Gadag district of north Karnataka. M.Sc. (Agri.) Thesis, Univ. Agric. Sci. Dharwad.
11. Charnes, A., W.W. Cooper and W.E. Rhodes, 1978. Measuring the efficiency of decision making units, European J. Operational Research, 2 : 429-444.
12. Dasgupta, R., N.B. Shete, K.D. Rao and D.P. Khamkoje, 2001. Maharashtra Rural Credit Project; Ongoing Evaluation IX. (Unpublished Report) National Institute of Bank Management, Pune.
13. Erasmus Fabian Kipesha, 2013. Production and Intermediation Efficiency of Microfinance Institutions in Tanzania Journal of Finance and Accounting, 4(1) : 149-159. www.iiste.org
14. Ganesamurthy, V., M.K. Radhakrishnan, S. Bhuvaneswari and A. Ganesan, 2000. A study of thrift and credit utilization pattern of SHG in Lakshmivilas Bank Suriyam Palyam branch Erode. Indian J. Marketing, pp 12-16.
15. Islam, K.M., S.B. Zahidul and J. Sumelius, 2011. Technical, economic and allocative efficiency of microfinance borrowers and non-borrowers: Evidence from peasant farming in Bangladesh, European Journal of Social Sciences,18(3) : 361-376.
16. Izah Mohd Tahir and Sudin Haron, 2013. Technical efficiency of the Malaysian commercial banks : A stochastic frontier approach Research Banks and Bank Systems, 3(4) : 65-72.
17. Jyoti Kachrooa, Arti Sharmaa and Dileep Kachroob, 2010. Technical Efficiency of Dryland and Irrigated Wheat Basedon Stochastic Model.Agricultural Economics Research Review, 23 : 383-390.
18. Kumaran, K.P., 1997. Self-help groups- An alternative to institutional credit to the poor-A case study in Andhra Pradesh. J. Rural Development, 16(3) : 515-530.
19. Kumbhakar, S., B. Biswas and D. Bailey, 1989, A Study of Economic Efficiency of Utah Dairy Farmers : A System Approach. The Review of Economics and Statistics, 71 : 595-604.
20. Kumbhakar, S., S. Ghosh and J. McGuckin, 1991. A Generalized Production Frontier Approach for Estimating Determinants of Inefficiency in US Dairy Farms. Journal of Business and Economic Statistics, 9 : 279-286.
21. Lipishree Das, 2012. Microfinance in India - Self Help Groups - Bank Linkage Model, MPRA (Munich Personal RePEc Archive) Paper No. 38755, posted 12. May 2012, 23:44, Online at http://mpra.ub.uni-muenchen.de/38755/
22. Liu, Y., 2006. Papers on Agricultural Insurance and Farm Productivity. Michigan State University, Ph.D. Dissertation Chapter 2.
23. Niels Hermes, Robert Lensink and Aljar Meesters, 2008. Outreach and Efficiency of Microfinance Institutions ,Centre for International Banking, Insurance and Finance (CIBIF). pp 1-29.
24. Oteng-Abayie, E.F., K. Amanor and J.M. Frimpong, 2011.The Measurement and Determinants of Economic Efficiency of Microfinance Institutions in Ghana: A Stochastic Frontier Approach, African Review of Economics and Finance, 2(2) : 30-35.
25. Sanjay Kumar and G.S. Gill, 2006. Economic viability of important agriculture based enterprises for women in Punjab. Agric. Econ. Res. Rev., 19 (Conference No.), pp. 59-70.
26. Shiu, A., 2002. Efficiency of Chinese Enterprises, The J. Productivity Analysis, 8(3) : 255-267.
27. Shobhana Gupta and Sanjeev Kumar Singh, 2012. Economic Security among Rural Women through Self Help Groups: An Analytical Study, Indian Res. J. Ext. Edu. 12(2) : 117-118.
28. Singh, S., 2013. Technical efficiency and it determinants in Microfinance institutions in India ,a firm level analysis. J. Innovation Economics, 1(11) : 15-31.
29. Tariq, M., and A.I. Mohd, 2008. Technical Efficiency of Microfinance Institutions in India – A Stochastic Frontier Approach. Unpublished. Online at http://mpra.ub.uni- muenchen.de/ 25454/MPRA Paper No. 25454.