

1 | TECHNICAL EFFICIENCY OF WOMEN SELF HELP GROUPS (SHG) GENERATING POULTRY  
2 | ACTIVITY IN AMRAVATI DISTRICT OF MAHARASHTRA

3 |  
4 | **ABSTRACT**

5 | Women are vital part of the Indian economy and employment to build their  
6 | empowerment, The provision of loans and financial services to the poor is an  
7 | important aspect of the development agenda of any economy. Rural women of India  
8 | have been benefited by the Self Help Groups (SHG). The SHG can approach any bank  
9 | for availing loan facility to undertake a suitable activity. The loan is  
10 | repaid out of the profits earned. An study was carried out for year 2016-2017 for  
11 | Amravati division. Study was undertaken in rural areas of Amravati division, 50  
12 | SHGs, which were engaged in selected agriculture based activity poultry. In order to  
13 | analyse the objectives of the study, primary data was collected with the help  
14 | of Personal interview of self help groups. Those Self help groups were selected for the  
15 | study which should have an activity in existence of at least 10 years, In poultry SHGs  
16 | the elasticity of ana cost per borrower and an subsidy, this both variables positively  
17 | significant contribution in the gross loan. Negative Marginal value productivity of  
18 | assets, borrow per member and net returns are determine to decrease the use of  
19 | these variables and scope to increase this variable, & its executed negative significant  
20 | contribution in determining the gross loan ,its adversely affects the loan refund. Among  
21 | selected SHGs, the results indicates the variations in technical efficiency  
22 | 0.7632-0.9966 across the individual SHGs.

Comment [u1]: What is the objective of the study? Or where is the objective?

Comment [u2]: Borrow or loan by member

23 |  
24 | **Key words:** Self help groups, Technical efficiency, Gross loan, Subsidy, Returns, Women

Comment [u3]: Return on investment (ROI)

25 |  
26 | **INTRODUCTION**

27 | In India, majority of the people live in rural area and are engaged in agriculture,  
28 | earning a subsistence wage. The provision of loans and financial services to the poor is an important  
29 | aspect of the development agenda of any economy. Upliftment of the poor by promoting self  
30 | employment and social security has for a long time been the concern of democratically elected  
31 | Governments in countries like India. India has been able to develop its own model of microfinance  
32 | organization in the form of savings and credit groups known as Self-Help-Groups (SHGs) which are  
33 | bank linked. Rural women of India have been benefited by the Self Help Groups (SHG). The SHG can  
34 | approach any bank for availing loan facility to undertake a suitable activity. The  
35 | group loan is distributed among the members to run a small business. The loan is repaid out of the

Comment [u4]: Author should talk about the poultry industry and SHG. Why SHG? Why poultry?

36 | profits earned. "Microfinance sector **has grown** rapidly over the past few decades. Nobel  
37 | Laureate Muhammad Yunus is credited with laying the foundation of the modern **MFIs** with  
38 | establishment of Grameen Bank, Bangladesh in 1976". over the past two decades. Women SHGs  
39 | which can have income generating activities from their savings and beneficiaries income to repay the  
40 | loan, accelerating the socio economic growth of the members and raising socio economic status in  
41 | society is the prime reason for members joining the SHG, SHGs borrowing systems are more  
42 | responsive and efficient, SHGs performance using the economic analysis for the existent. Ability and  
43 | willingness of SHGs to maximize their gross loan portfolio to use the inputs like SHGs members and  
44 | cost per borrower to produce, they facilitate the comparison across similar economic SHGs,  
45 | measurement reveals variations in efficiencies among SHGs further analysis can be undertaken to  
46 | identify the factors responsible for the variations and identification of such factors is valuable for policy  
47 | formulation for improvement of SHGs efficiencies.

Comment [u5]: Spell out the abbreviation then used it in your text

48

## 49 MATERIAL AND METHODS

50 | The mode of any investigation is to draw the useful conclusion the light of objectives  
51 | of the study in order to arrive the meaningful conclusion, it is essential to the investigator to adopt  
52 | appropriate method or procedure, keeping in this view, the study on Technical efficiency of Self Help  
53 | Groups generating agriculture Poultry activity in Amravati division of Maharashtra was undertaken  
54 | with the following objectives.

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

Comment [u6]: I assume that these are your objectives. Kindly placed it in your abstract and introduction.

57 | Study was undertaken in rural areas self help groups of Amravati division, which were  
58 | engaged in selected agriculture based activity poultry. The five districts were selected for the **study**  
59 | **Amravati** Akola, Washim, Buldhana and Yavatmal.

60 | The data needed for the **study** was collected from SHGs members by  
61 | personal interview method using pre tested schedule for the purpose. Self help groups which are  
62 | 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  
63 | borrowed funds by the Self help groups, loan availed and repayment, rate of interest, service charges  
64 | and other costs involved in borrowings, cost and returns involved in each activities selected groups  
65 | efficiency and identified the determinants of variations in efficiencies among SHGs. Total of 50  
66 | women SHGS has been selected agriculture based activities and there 10 years existent in five  
67 | districts of Amravati division for economic analysis.

## 69 Analysis of data

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

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

#### 75 **Stochastic frontier approach**

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

83 Is a method of economic modeling modelling It has its starting point in  
84 the stochastic production frontier models simultaneously introduced by Aigner, Lovell and Schmidt  
85 (1977) and Meeusen and Van den Broeck (1977). Is a method of economic modeling. It has its  
86 starting point in the stochastic production frontier models simultaneously introduced by Aigner, Lovell  
87 and Schmidt (1977) and Meeusen and Van den Broeck (1977).

Comment [u7]: ??? Confusing

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

$$89 \quad y_i = f(x_i; \beta) \cdot TE_i$$

90  
91 Where,

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

95  
96  $TE_i$  denotes the technical efficiency defined as the ratio of observed output to  
97 maximum feasible output. A stochastic component that describes random variables affecting the  
98 production process is added. The stochastic production frontier will become:

$$99 \quad y_i = f(x_i; \beta) \cdot TE_i \cdot \exp \{v_i\}$$

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

102 We can also write it as an exponential

$$103 \quad TE_i = \exp \{-u_i\},$$

104 Where,

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

106

107 Thus, we obtain the following equation:

$$108 \quad y_i = f(x_i; \beta) \cdot \exp\{-u_i\} \cdot \exp\{v_i\}$$

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

$$110 \quad TE_{it} = \exp(-U_{it}) = \exp(-z_{it} \delta - W_{it})$$

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

$$113 \quad \ln y_i = \beta_0 + \sum_n \beta_n \ln x_{ni} + v_i - u_i$$

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

$$115 \quad \Sigma s^2 = \sigma v^2 + \sigma^2$$

$$116 \quad \gamma = \sigma^2 / \sigma s^2$$

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

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

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

### 123 **Specification of model**

124 Stochastic frontier model of technical efficiency are given below:

$$125 \quad \ln GLP_{it} = \beta_0 + \beta_1 LCPB_{it} + \beta_2 LASSET_{it} + \beta_3 LBPM_{it} + \beta_4 LNR_{it} + \beta_5 LSUB_{it} + V_{it} - U_{it}$$

126 Where,

127  $\ln$  natural logarithm ( i.e. logarithm to the base e).

128  $GLP_{it}$  represents all outstanding principals due for all outstanding members loans of  $i^{\text{th}}$  SHGs  
129 at time period t.

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

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

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

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

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

139  $\beta_i$  Parameters to be estimated

140  $V_{it}$  are independent and identically random errors

141  $U_{it}$  are non- negative random variables.

142

### 143 **Allocative efficiency**

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

148 Allocative efficiency =  $GLP_0 / GLP_E$

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

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

152

### 153 **Economic efficiency**

154 the measure of economic efficiency can be divided in to two **component**  
155 *viz.*, technical efficiency, price or allocative efficiency. It **is** **combination** of technical  
156 and allocative efficiency( $EE = \text{Technical efficiency} \times \text{Allocative efficiency}$ ).

### 157 **Marginal value productivity (MVP)**

158 The MVP was computed by multiplying the coefficients of the given resources with  
159 ratio of the geometric mean of the output to the geometric mean of given resource for example the  
160 MVP of  $X_i$  would be

$$161 \text{ MVP}(x_i) = b_i \frac{\bar{Y}(\text{GM})}{\bar{X}_i(\text{GM})}$$

164 Given,

165 GM = represents the geometric mean

166 MVP =Marginal value productivity

167  $b_i$  =is the corresponding elasticity of  $x_i$

168  $\bar{X}_i(\text{GM})$  is the geometric mean of the  $i^{\text{th}}$  resources

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

170

### 171 **Technical efficiency of poultry SHGs**

172 Marginal likelihood estimates of the parameters of the production frontier in Table 1  
173 shows the elasticities of frontier gross loan portfolio with respect to cost per and subsidy were  
174 estimated at the means of input variables to be 0.5117 and 0.1665 respectively. Given the  
175 specification of stochastic or **Cobb-Douglas** frontier model results shows that the  
176 elasticity of mean value of gross loan was estimated to be an increasing function of cost per borrower  
177 and an subsidy, this both variables positively significant contribution in the gross loan its indicates that

178 this variables to help the loan refund. Negative Marginal value of productivity of assets, borrow per  
 179 member and net returns are determined to decrease the use of this variables and scope to increase  
 180 this variable, the variable asset, borrow per member and net returns executed negative significant

181  
 182 **Table 1. Maximum likelihood estimates of stochastic frontier production function of**  
 183 **Poultry SHGs**

Sr. No.	Explanatory variables	$\beta_i$	Coefficient	St. Error
1	Constant	$\beta_0$	3.8841	0.1826
2	Log cost per borrower	$\beta_1$	0.5117***	0.0779
3	Log assets	$\beta_2$	-0.0607**	0.0228
4	Log borrow per member	$\beta_3$	-0.0789*	0.0424
5	Log net return	$\beta_4$	-0.1144***	0.0438
6	Log subsidy	$\beta_5$	0.1665***	0.0349
Log likelihood			71.03	
		$R^2$	0.8444*	
		$\gamma$	0.9997	0.0018
		$\sigma^2$	0.0060	0.0020
Average Technical efficiency			0.9053	

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

185  
 186 contribution in determining the gross loan its indicates decline assets, borrow per member and there  
 187 by reduction in net returns, its adversely

188 **Table 2. Marginal value productivity of poultry SHGs**

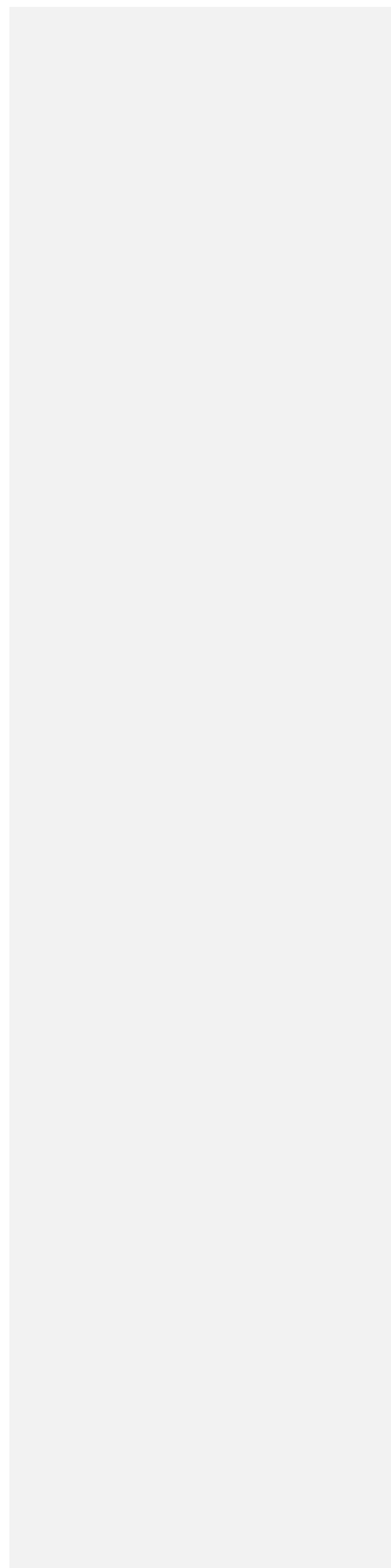
Sr. No.	variables	MVP
1	Cost per borrower	21.4472
2	Assets	-0.2285
3	Borrow per member	-0.7372
4	Net return	-0.1185
5	Subsidy	0.4219

189  
 190 affects the loan refund and hence the size of SHGs is limited and loan outstanding of **SHGs**  
 191 **borrowerSHGs borrower** increases, in views of this it is necessary to increase the assets and borrow  
 192 per member for SHGs income generating activities which will be the make the SHGs members to  
 193 increase the net income to refund, therefore assets, borrow per member and net returns are the  
 194 possible determinant of gross loan portfolio. The returns to scale parameters was found to be 0.4242  
 195 implying increase in the input variables

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198 | would results to less than ~~proportionate~~than proportionate increase in the gross loan of the poultry  
199 | SHGs.

200 | The minimum and maximum efficiencies for all selected SHGs are presented in Table  
201 | 3 based on estimated function technical efficiency of individual SHGs has been estimated, the results  
202 | indicates the

203 | **Table 3. Efficiency distribution of Poultry SHGs**

Efficiencies	Efficiency level
Technical efficiency	0.9053
Allocative efficiency	0.6072
Economic efficiency	0.5542
Maximum Technical efficiency among selected SHGs	0.9966
Minimum Technical efficiency among selected SHGs	0.7632

204 |  
205 | variations in technical efficiency 0.7632-0.9966 across the individual poultryindividual poultry  
206 | SHGs. The minimum technical efficiency in selected SHGs sample was 0.7632 (76.32%), while  
207 | maximum was 0.9966 (99.66%). The average technical efficiency for entire sample of poultry SHGs is  
208 | 0.9053 indicating 0.0947 (9.47%) inefficiency implies to there is scopeis scope to increase the gross  
209 | loan portfolio. prevails an allocative inefficiency to the extent of 39%among average SHGs in  
210 | comparison with the SHGs who obtain maximum gross loan. The allocative efficiency 0.6072  
211 | (60.72%), which indicates the allocative inefficiency is 0.3928 (39.28%) it can be from that there was  
212 | scope to increasing poultry SHGs loan and the 0.5542 (55.42%) is economic efficiency and it found to  
213 | 0.4458 (44.58%) economically inefficient poultry SHGs indicating which have scope to improve the  
214 | economic efficiency.

215 | Frequency distribution of selected sample efficiency of SHGs poultry activities was  
216 | presented in Table 4, in technical efficiency from

217 |  
218 | **Table 4. Frequency distribution of sample efficiency of Poultry SHGs**

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	-	1	9



4	0.30-0.35	-	11	3
5	0.35-0.40	-	1	2
6	0.40-0.45	-	1	2
7	0.45-0.50	-	3	3
8	0.50-0.55	-	1	
9	0.55-0.60	-		8
10	0.60-0.65	-	8	5
11	0.65-0.70	-	10	5
12	0.70-0.75	-	4	7
13	0.75-0.80	2	1	2
14	0.80-0.85	8	9	3
15	0.85-0.90	11	3	
16	0.90-0.95	14		
17	0.95-1.00	15	1	1

Comment [u8]: No value???

219  
220 all 50 SHGs majority of 15 SHGs were ranges between 0.95-1 efficiency level followed by 14 SHGs  
221 were ranges between 0.90-0.95 technical efficiency, 8 SHGs comes under the range 0.80.85 and only  
222 2 SHGs ranges 0.75-80 respectively, technical efficiencies of majority of poultry SHGs were higher  
223 because low cost of borrowing of loan, increasing variations in technical efficiency estimates is  
224 indicating the some of the SHGs use their resources inefficiently in SHGs loan process but majority of  
225 SHGs use their resources efficiently. In allocative efficiencies majority of 11 SHGs ranges between  
226 0.30-0.35, followed by 10 SHGs were ranges between 0.65-0.70, 9 SHGs ranges between 0.0.80-  
227 0.85, 8 SHGs ranges in 0.60-0.55, 4 SHGs ranges in 0.70-0.75, 3 SHGs from both ranges 0.45-0.50  
228 and 0.85-0.90, 1 SHGs allocative efficiency from each range 0.25-30, 0.35-0.40,0.40-0.45, 0.50-  
229 0.55,0.75-0.80, 0.95-1.00, respectively, wide variations in allocative efficiency not proper allocation of  
230 resources and more scope to improve allocation of resources of poultry SHGs. In economic  
231 efficiencies majority of 9 SHGs ranges between 0.25-0.30, followed by 8 SHGs ranges between 0.55-  
232 0.60, 7 SHGs ranges between 0.70-0.75,5 SHGs from both ranges 0.60-0.65 and 0.70-0.75, 3 SHGs  
233 economic efficiency from each range 0.30-35, 0.45-0.50 and 0.80-0.85 and 2 SHGs economic  
234 efficiency from each ranges 0.35-0.40, 0.40-0.45, 0.75-0.80 and one SHGs ranges between 0.95-  
235 1.00, respectively. The wide variations in economic efficiency is indicating to which have more scope  
236 to improve economic efficiency of poultry SHGs.

237 **CONCLUSIONS**

- 238 1. In poultry SHGs the elasticity of mean value of gross loan was estimated to be an increasing  
239 function of cost per borrower and an subsidy, this both variables positively significant  
240 contribution in the gross loan.

- 241 | 2. Negative Marginal value productivity of assets, borrow per member and net returns are  
242 determine to decrease the use of these variables and scope to increase this variable, the  
243 variable asset ,borrow per member and net returns executed negative significant  
244 contribution in determining the gross loan its indicates decline assets, borrow per member  
245 and there by reduction in net returns, its adversely affects the loan refund.  
246 3. The average technical efficiency was 0.9053, the average allocative efficiency was 0.6072  
247 and average economic efficiency was 0.5542.

248

## 249 POLICY IMPLICATIONS

250 In views of this it is necessary to increase the assets and borrow per member for SHGs income  
251 generating activities which will be the make the SHGs members to increase the net income to  
252 refund, therefore assets, borrow per member and net returns are the possible determinant of  
253 gross loan portfolio. The amount needs to be fixed according to the income generating activities  
254 and borrow per member increases contribute more to their family income.

Comment [u9]: Preferable as conclusion of the study not for policy implications

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