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Determining optimal solution of short term loan use to maximize net farm return in Jorhat District of Assam

Abstract: The present study of **Determining optimal solution of short term loan use to maximize net farm return in Jorhat District of Assam** was undertaken to examine the possibilities and prospects of increasing net return through optimal allocation of resources under existing financial environment. The study was carried out through collection of data by interview method and linear programming technique was used to develop optimum plans for different farms of the study area. The results of the study brought out that there was a tremendous scope to shift the resource allocation to more revenue generating high value crops. The analysis of the results shows that the farmer's optimal cropping pattern was sugarcane, pea, potato, cauliflower and cabbage in all the farm groups. The operation wise labour use was also increasing significantly in optimal plan. The results showed that in order to obtain an optimum farm credit farm plan, the short term farm credit were used. The optimum farm credit was reached when the net revenue were maximum in all the farm groups. Credit played an important role in increasing net farm return. The effect of credit on income was inversely related with the size of the farm whereas the credit needs were directly related to the farm size.

Keywords: Linear Programming, Optimum allocation, Farm credit

1. INTRODUCTION

Despite the focus on industrialization, agriculture remains a dominant sector of the Indian economy both in terms contribution to Gross Domestic Product (GDP) as well as a source of employment to millions across the country. Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture as their principal means of livelihood. Finance in agriculture is as important as other inputs being used in agricultural production. Technical inputs can be purchased and used by farmer only if he has money but in India, one of the major problems facing by small and marginal farmers is poor access to adequate capital. The agrarian Structure of an economy assumes a key part in upgrading agricultural profitability and raising financial proficiency of farm. Agricultural growth and development cannot be achieved against the background of farmer's poor financial position. Good lending principles include that farmers should be given sufficient credit for their needs so as to make

19 effective use and avoid diversion. It is therefore necessary to answer the question of what is the
20 level of credit need of the farmers. Thus, the need for this study arises because of the conflicting
21 information about the real credit need of small scale farmers in India. The study focuses on
22 describing in detail the existing agrarian structure and determining the economic efficiency of
23 different farms, applying the Linear Programming. Lack of knowledge about the recommended
24 farm practices also has a direct bearing on the efficient utilization of resources. It could be
25 argued that it is not enough to know about the constraints only. It would be useful to know which
26 of the constraints have had binding and limiting effects on the farm efficiency. As regards credit,
27 in most of the cases, it was not in adequate quantity as also not received in time when it was
28 needed. Various techniques for optimization have been developed for making the most efficient
29 use of the available resources. Among these different models, Linear Programming (LP) has
30 been found to be one of the best and simple techniques for optimizing net farm return with
31 limited quantity of land, labour and capital. In the study area it was observed that farmers, who
32 are growing Boro paddy, vegetables, cash crops and commercial crops like Tea, Orange, etc., are
33 more interested for bank loan. But farmers, who are growing mostly Sali paddy, do not feel
34 credit is very important. This is because of the fact that the farmers are using seed of their own
35 stock and rate of seed replacement is very slow. Further, the use of fertilizer and pesticides are
36 also at relatively low dose. Most of the farmers in the study, who have Kisan Credit Card
37 expressed that the limit was insufficient and need to be increased. Under these circumstances, the
38 present study was conducted to derive an optimal solution of short term loan use to maximize net
39 farm return in Jorhat District of Assam.

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41 **2. METHODOLOGY**

42 The field investigation was started in the second week of March and completed by the middle of
43 May 2016. The data collected pertains to the year 2016. The sampling design followed for the
44 study is three stage random sampling design. Blocks formed the first stage unit, villages were the
45 second and the sample farmers were the third and ultimate stage of units of sampling. A list of
46 the eight development blocks (undivided) in Jorhat district was prepared. From eight
47 development blocks three blocks were purposively selected for the study. Thus, Jorhat North
48 west Development Block, Titabor Development Block and Kaliapani Development Block were
49 selected as first units of sampling. In the next stage, all the villages in the above mentioned three

50 selected blocks three villages were selected from each block by consulting the respective Block
 51 Development Offices. The village thus selected for drawing the sample were:

52

53 **Table 1. List of blocks and villages selected for sample collection**

Blocks	Villages
Jorhat North West Development Block (Dhekorgorah)	Eporia Maloukhat Baligaon
Kaliapani Development Block	Bamunpukhuri Boloma Balijan
Titabor Development Block	Bekajan Ekorani Rajabahar

54 After selection of villages, the entire household from each villages were listed and thirty
 55 household from each selected villages were selected at random. Thus, total 270 households were
 56 finally selected for the study. The sample households were stratified in to three size groups, on
 57 the basis of their area under cultivation. As only few farmers were found to have more than 3 ha
 58 of land hence, the stratification was done as follows:

- 59 Group I : Less than 1 ha.
 60 Group II : Between 1 - 2 ha
 61 Group III : Above 2 ha

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64 **Table 2. The distribution of sample households according to the stratification**

Stratification of sample household	No. of household per groups	Percentage of total sample household
Group I (Less than 1 ha)	119	44
Group II (Between 1 - 2 ha)	110	41

Group III (Above 2 ha)	41	15
Total	270	100

65 The study was based on primary data. Primary source were the farmer borrowers. The primary
66 data were collected with the help of pre-tested schedule and questionnaire through personal
67 interview.

68 The different analytical tools used in the study were as follows:

69 **Linear Programming:** The general deterministic Linear Programming model of the
70 study was a gross margin maximization model designed to find out the optimum solutions of
71 short term loan use. Thierauf and Klekamp (1975) described linear programming as term that
72 covers a whole range of mathematical techniques that aim to optimize performance in term of
73 combinations of resources. The algebraic expression of the linear programming model developed
74 for this study with the objective to determine the optimum credit need was expressed as follows:

$$\begin{aligned}
& \text{Maximize } Z = \sum_{j=1}^n C_j X_j \\
& \text{Subject to} \\
& \sum_{j=1}^m a_{ij} X_j \leq b_i \quad (j = 1 \dots m) \\
& X_j \geq 0
\end{aligned}$$

85 Where,

86 Z: Total net revenue from all the activities

87 C_j: Net revenue/farm from each activity

88 a_{ij}: Level of inputs

89 b_i: Amount of farm credit available

90 n: Number of possible activities

91 m: Number of constraints

92 **Activities of the model:**

93 Activities included in the model were crop activities and borrowing activities.

94 **Crop activities:** the crops grown by the farmers of the study area were categorized as *kharif*
95 Crops and *Rabi* crops.

96 The *kharif* crops are:

97 X1: Sali Rice

98 X2: Blackgram

99 X3: Sugarcane

100 X4: Ahu Rice

101 The *rabi* crops included are

102 X5: Toria

103 X6: Pea

104 X7: Potato

105 X8: Cauliflower

106 X9: Cabbage

107 **Borrowing activity:** This activity was included in the model to meet the capital required for
108 crop production when the farmers do not have adequate owned capital. Though short term
109 borrowing, the farmers can obtain needed capital for crop production.

110 **Resource constraints/ restrictions of the model:**

111 **1. Land:** The land area was classified according to two crop seasons namely; Kharif and
112 Rabi. In Kharif season the crops like sali rice, blackgram, and sugarcane were grown in the study
113 and in the Rabi season crops like toria, ahu rice, potato, pea, cauliflower and cabbage were
114 considered. Sali Rice is the most important crop in the cropping system. It is largely grown
115 during rainy (*kharif*) season. Other crops cover negligible area in the production system. toria,
116 sugarcane, blackgram, vegetables are commonly grown. After harvest of paddy, most of the land
117 kept fallow during post rainy (*Rabi*) season.

118 **2. Labour:** Two sources of labour open to the farmer are considered in this study,
119 namely: human labour and animal labour. Human labour is of two types; one is the family farm
120 labour which includes the sum of man-days a farm family can directly engage in farm operations,
121 and the other is hired labour which the farm operator employs whenever the family farm labour
122 is not enough to meet the man labour needed in farm operations.

123 **3. Capital:** The farm operator is generally confronted with two types of capital
124 investments, viz.; owned capital and borrowed capital. The owned capital included cash on hand

125 or revenue gained from farm return and the borrowed capitals were short term loan or crop loan
126 from credit agencies.

127 As a constraint, capital/credit constraints was linearly constructed keeping owned capital
128 constant in each category of farms allowing short term borrowing through borrowing activity.

129 **Minimum area constraints:**

130 To ensure inclusion of some non remunerative crops in the optimal plan, minimum area
131 restrictions was put for some of the crops which is shown in table 3.

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133 **Table 3. Minimum area under nine crops across different farm size groups (Area in ha)**

Crops	Minimum area		
	Group I	Group II	Group III
Sali Rice	0.30	0.39	1.13
Blackgram	0.08	0.27	0.32
Sugarcane	0.11	0.32	0.55
Ahu Rice	0.06	0.09	0.29
Toria	0.04	0.26	0.25
Pea	0.09	0.13	0.14
Potato	0.05	0.13	0.22
Cauliflower	0.05	0.05	0.23
Cabbage	0.07	0.05	0.15

134 **Existing cropping pattern in the study area**

135 The existing cropping pattern across different farm size groups in the study area was
136 presented in table 4. It was observed from the table that sali rice dominated the cropping pattern
137 occupying 39.22 per cent area in the study area. The share of Sali rice in the gross cropped area
138 varied from 36.59 per cent in Group II to 46.91 per cent in Group I. Sali rice is largely grown
139 during rainy (Kharif) season. Besides rice, black gram occupied 19.36 per cent of gross cropped
140 area followed by Ahu rice (11.21 per cent) and sugarcane (6.58 per cent) as kharif season crops.
141 Similar trend was also observed across the farm size groups. Among the rabi season crops,
142 highest share in gross cropped area was occupied by toria (11.21 per cent) followed by potato
143 (4.97 per cent), cauliflower (3.73 per cent), cabbage (3.62 per cent) and pea (2.76 per cent). After
144 harvest of paddy, most of the land kept fallow during post rainy (*Rabi*) season. Although some
145 crops like Pea and *Rabi* vegetables are grown in the post rainy season but their area was not

146 catching up. The most pre dominant cropping pattern followed by the farmers in the study area is
 147 Rice + fallow, Rice + Toria, Rice + Pea and Sugarcane as sole crop. The cropping intensities of
 148 Group I, Group II and Group III were 147.14 per cent, 147.29 per cent and 149.11 per cent
 149 respectively.

150 **Existing labour utilization pattern in the study area**

151 Labour utilization pattern in the existing production plan across different farm groups
 152 presented in table 5. Existing labour utilization was found to vary between 165.84 mandays in
 153 Group I to 201.39 mandays in Group III with an average of 183.74 mandays. Operation wise
 154 breakup of labour utilization revealed that labour intensive operations were transplanting (24.70
 155 per cent), post harvest operations (22.36 per cent), intercultural operations (12.31 per cent) and
 156 land preparation (10.64 per cent) respectively. Operation wise labour utilization was more or less
 157 similar in all the farm size groups.

158 **Existing capital and credit utilization pattern across different farm groups**

159 Table 6 showed the existing capital and credit utilization pattern across various farm
 160 sizes. The capital used in the production programme were owned capital and crop loan or short
 161 term loan borrowed from different credit agencies. The share of borrowed capital to the total
 162 capital used was significant in case of Group I (80.88 per cent), it indicates Group I farmers were
 163 mainly dependent on borrowed capital for production of crops. On the other hand, nearly 55.42
 164 per cent and 41.89 per cent of capital was borrowed by Group II and Group III farmers
 165 respectively for production of crops.

166 **Table 4. Existing cropping pattern across different farm size groups**

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Crops	Area (ha)			
	Group I	Group II	Group III	All groups
Sali Rice	0.38 (46.91)	0.78 (36.45)	1.37 (38.59)	0.69 (39.22)
Blackgram	0.11 (13.58)	0.49 (22.90)	0.62 (17.46)	0.34 (19.36)
Sugarcane	0.06	0.17	0.14	0.12

		(7.41)	(7.94)	(3.94)	(6.62)
Ahu Rice		0.06	0.28	0.38	0.20
		(7.41)	(13.08)	(10.70)	(11.21)
Toria		0.08	0.19	0.25	0.15
		(9.87)	(8.88)	(7.04)	(8.52)
Pea		0.03	0.05	0.10	0.05
		(3.70)	(2.34)	(2.82)	(2.76)
Potato		0.03	0.09	0.25	0.09
		(3.70)	(4.21)	(7.04)	(4.97)
Cauliflower		0.03	0.04	0.24	0.07
		(3.70)	(1.87)	(6.76)	(3.73)
Cabbage		0.03	0.05	0.20	0.06
		(3.70)	(2.34)	(5.63)	(3.62)
Gross Cropped Area		0.81	2.14	3.55	1.77
		(100.00)	(100.00)	(100.00)	(100.00)
Net Cropped Area		0.55	1.45	2.37	1.19
Cropping Intensity		147.27	147.59	149.11	148.57

Note: Figures in parentheses indicates percentage to gross cropped area

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Table 5. Labour Utilization pattern in existing plan across different farm groups

Activities	Labour (mandays)			
	Group I	Group II	Group III	All groups
Land preparation	19.81 (11.94)	17.22 (8.76)	25.01 (12.42)	19.54 (10.64)
Manuring and Fertilization	8.55 (5.16)	18.40 (9.36)	14.32 (7.11)	13.44 (7.31)
Transplanting	41.23 (24.86)	48.97 (24.92)	47.87 (23.77)	45.39 (24.70)

Sowing	7.20 (4.34)	17.25 (8.78)	14.27 (7.09)	12.37 (6.73)
Intercultural operation	17.23 (10.39)	27.82 (14.16)	24.25 (12.04)	22.61 (12.31)
Harvesting	30.21 (18.22)	28.71 (14.61)	28.24 (14.02)	29.30 (15.95)
Post harvest operation	41.61 (25.09)	38.15 (19.41)	47.43 (23.55)	41.08 (22.36)
Total	165.84 (100.00)	196.52 (100.00)	201.39 (100.00)	183.74 (100.00)

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Note: Figures in parentheses indicates percentage to total labour

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Table 6. Existing plan showing own capital and short term credit use pattern

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(Amount in Rs.)

Particulars	Group I	Group II	Group III	All groups
Owned capital	4981.93 (19.12)	15948.86 (44.58)	30298.78 (58.11)	13294.35 (39.13)
Borrowed capital	21070.44 (80.88)	19824.79 (55.42)	21837.37 (41.89)	20679.41 (60.87)
Total capital	26052.37 (100.00)	35773.65 (100.00)	52136.15 (100.00)	33973.76 (100.00)

Note: Figures in parentheses indicates percentage change to total capital

177 **Optimum Cropping Patterns across different farm size**

178 The optimum cropping patterns for the sampled farmers are presented in Table 7. From
179 the table it was found that the in Group I, the area under Sali rice and blackgram and were
180 decreasing by 21.05 per cent and 9.71 per cent respectively in kharif season but the area under
181 Sugarcane was increased by 150 per cent in optimal solution. However the area under ahu rice

182 was remained same in optimal plan. In Rabi season the area under pea, potato, cauliflower and
183 cabbage were increased by 266.67 per cent, 200.00 per cent, 133.33 per cent and 233.33 per cent
184 respectively but area under toria was decreased by 37.50 per cent in the optimal plan by 33.33
185 per cent and 25.55 per cent respectively. In case of Group II, the area under sali rice was
186 declined by 10.26 per cent and blackgram and toria by 28.57 per cent respectively but the area
187 under sugarcane increased by 135.00 per cent. In rabi season area under toria was decreased by
188 21.05 per cent and area under pea, potato, cauliflower and Cabbage increased by 60.00 per cent,
189 44.44 per cent, 125 per cent and 180.00 per cent respectively in optimal plan. In case of Group
190 III, it showed that the area under sali rice, blackgram, ahu rice were decreasing by 8.76 per cent,
191 27.42 per cent and 21.05 per cent respectively whereas in rabi season all the rabi crops like toria,
192 pea, potato, cauliflower and cabbage were increased by 12.00 per cent, 70.00 per cent, 40.00 per
193 cent, 29.17 per cent and 25.00 per cent respectively.

194 From the table, the comparison between existing and optimal pattern at Group I, Group II
195 and Group III farm showed that the area under Sugarcane in kharif season and pea, potato,
196 cabbage and cauliflower were increased substantially in optimal solution but the area under Sali
197 rice and blackgram decreased in all the farm groups. The area under Ahu Rice in Group I was
198 remained same in the optimal cropping pattern. There was a tremendous scope to shift the
199 resource allocation to more revenue generating high value crops. The analysis of the results
200 shows that the farmer's optimal cropping pattern was sugarcane, pea, potato, cauliflower and
201 cabbage in all the farm groups

202 **Optimum labour utilization pattern across different farm groups**

203 Table 8 showed the optimal labour utilization pattern across various farm sizes. From the
204 table it was found the labour utilization was simultaneously increased in all the farm operations
205 in the optimal plan. Average labour use in Group I, Group II and Group III were increased from
206 165.84 mandays to 195.66 mandays, 196.52 mandays to 212.87 mandays and 201.39 mandays to
207 246.52 mandays. The operation wise labour use was also increasing significantly in optimal plan.
208 The increase in labour utilization may be due to more area was incorporated in the optimal
209 production plan.

210 **Optimum capital and credit utilization pattern across different farm groups**

211 Table 9 showed the optimal capital and credit utilization pattern across various farm sizes. The
212 results showed that in order to obtain an optimum farm credit farm plan, the short term farm

213 credit were used. The optimum farm credit was reached when the net revenue were maximum in
214 all the farm groups. That is, an increase in the level of farm credit can no longer bring further
215 improvement on the net revenue. With the existing capital i.e; owned and short term loan net
216 revenue of Rs. 23q641.10, Rs.27396.56 and Rs. 26959.80 in Group I, Group II and Group III
217 respectively were obtained. The major limiting constraints in the model were credit. When the
218 average farm credit was increased by 16.31 per cent in all the farm groups there was increased in
219 net revenue by 23.13 per cent. This goes to confirm that the optimum farm credit for the farm
220 plan is Rs. 23557.37, Rs. 23544.12 and Rs. 26850.33 for Group I, Group II and Group III
221 respectively. It indicated that the farmer's requirement of the farm credit in the study area was
222 not met. One of the major problems confronting Indian farmers is lack of farm planning. This
223 model was designed to assist farmers in getting optimum farm credit as well as planning for
224 adequate use of farm credit. This implies that with the level of resources available in this model
225 which represent the true farm conditions of the farmers, a farm credit of about Rs. 23557.37, Rs.
226 23544.12 and Rs. 26850.33 in Group I, Group II and Group III respectively would be adequate to
227 meet the extra financial needs on the farm. From the above discussion, it may be noted that credit
228 played an important role in increasing income. Further it was clear that the potentiality of
229 increasing net farm returns through borrowing adequate capital was more on Group I compared
230 to Group II and Group III. This could be due to higher productivity of capital under
231 recommended technology on Group I than on Group II and Group III. These similar findings
232 were reported by Jayashree Handigol and R. A. Yeledhalli (2011), Sharma and Prasad (1971),
233 Singh and Ramanna (1981), Gajanana and Sharma (1990), Sastry and Venkataram (1993) and
234 Deoghare (1997). The optimum farm credit determined for this model was subject to influence
235 by some socio-economic variables such as farm size and credit. Labour and capital for a farmer
236 who meets the resource conditions of the farm model were the major binding constraints in the
237 plan, which implies that farmers cannot increase their production unless they are addressed.
238 Therefore, for farmers to demand for more than the optimum farm credit recommended, they
239 must be ready to increase their hectare of land in order to accommodate the additional labour
240 needed for the production of the farm enterprises. The results of the optimal solution was in line
241 with the study conducted by Abu *et.al* (2001) that credit level was raised to N30, 000.00. The net
242 revenue further increased to N422, 271.27. This shows that the addition of N10, 000.00 farm
243 credit to the former level yielded additional revenue of N27.032.00. S. Osamama *et.al.* (2017)

244 also found that the gross net benefit is increased by an average of 6:44% _ 0:84 during the five
 245 years after optimization compared to the existing cropping pattern in Egypt.

246 **Table 7. Optimum cropping pattern of across different farm size**

247 (Area in ha)

Crops	Existin	Optim	% chang e	Existin	Optim	% chang e	Existin	Optim	% chang e
	g	al		g	al		g	al	
	Group	Group		Group	Group		Group	Group	
	I	I		II	II		II	II	
Sali Rice	0.38 (46.91)	0.30 (29.13)	-21.05	0.78 (36.45)	0.70 (28.57)	-10.26	1.37 (38.59)	1.25 (31.02)	-8.76
Blackgra m	0.11 (13.58)	0.10 (9.71)	-9.09	0.49 (22.90)	0.35 (14.29)	-28.57	0.62 (17.46)	0.45 (11.17)	-27.42
Sugarcane	0.06 (7.41)	0.15 (14.56)	150.0 0	0.17 (7.94)	0.40 (16.33)	135.0 0	0.14 (3.94)	0.67 (16.63)	378.5 7
Ahu Rice	0.06 (7.41)	0.06 (5.83)	0.00	0.28 (13.08)	0.20 (8.16)	-28.57	0.38 (10.70)	0.30 (7.44)	-21.05
Toria	0.08 (9.87)	0.05 (4.85)	-37.50	0.19 (8.88)	0.28 (11.43)	-21.05	0.25 (7.04)	0.28 (6.95)	12.00
Pea	0.03 (3.70)	0.11 (10.68)	266.6 7	0.05 (2.34)	0.15 (6.12)	60.00	0.10 (2.82)	0.17 (4.22)	70.00
Potato	0.03 (3.70)	0.09 (8.74)	200.0 0	0.09 (4.21)	0.20 (8.16)	44.44	0.25 (7.04)	0.35 (8.68)	40.00
Cauliflow er	0.03 (3.70)	0.07 (6.80)	133.3 3	0.04 (1.87)	0.07 (2.86)	125.0 0	0.24 (6.76)	0.31 (7.69)	29.17
Cabbage	0.03 (3.70)	0.10 (9.71)	233.3 3	0.05 (2.34)	0.10 (4.08)	180.0 0	0.20 (5.63)	0.25 (6.20)	25.00
GCA¹	0.81 (100.00)	1.03 (100.00)	27.16	2.14 (100.00)	2.45 (100.00)	4.67	3.55 (100.00)	4.03 (100.00)	13.52
NCA²	0.55	0.55		1.45	1.45		2.37	2.37	
CI³	147.27	187.27	27.16	147.59	168.97	4.67	149.11	170.04	13.52

248 **Note:**

249 ¹ Gross Cropped Area; ² Net Cropped Area; ³ Cropping Intensity

250 Figures in parentheses indicates percentage to gross cropped are

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252 **Table 8. Optimal plan showing labour utilization pattern across different farm size**

253 (Figures in Mandays)

Activities	Existing Plan			Optimal Plan		
	Group I	Group II	Group III	Group I	Group II	Group III
Land preparation	19.81 (11.94)	17.22 (8.76)	25.01 (12.42)	25.12 (12.84)	21.26 (9.99)	27.29 (11.07)
Manuring and Fertilization	8.55 (5.16)	18.40 (9.36)	14.32 (7.11)	12.41 (6.34)	21.52 (10.11)	19.21 (7.79)
Transplanting	41.23 (24.86)	48.97 (24.92)	47.87 (23.77)	52.33 (26.75)	71.41 (33.55)	61.26 (24.85)
Sowing	7.20 (4.34)	17.25 (8.78)	14.27 (7.09)	11.42 (5.84)	16.25 (7.63)	17.11 (6.94)
Intercultural operation	17.23 (10.39)	27.82 (14.16)	24.25 (12.04)	27.65 (14.13)	29.44 (13.83)	31.74 (12.88)
Harvesting	30.21 (18.22)	28.71 (14.61)	28.24 (14.02)	29.17 (14.91)	33.58 (15.77)	32.25 (13.08)
Post harvest operation	41.61 (25.09)	38.15 (19.41)	47.43 (23.55)	37.56 (19.20)	19.41 (9.12)	57.66 (23.39)
Total	165.84 (100.00)	196.52 (100.00)	201.39 (100.00)	195.66 (100.00)	212.87 (100.00)	246.52 (100.00)

254 **Note:** Figure in parentheses indicates the percentage to total labour

255 **Table 9. Effect of farm credit on net revenue and farm output**

Plans	Level of Farm credit use (Rs.)				Net Revenue (Rs.)			
	Group I	Group	Group	All	Group I	Group	Group	All Groups

		II	III	Groups		II	III	
Existing Plan	21070.44	19824.79	21837.37	20679.41	23641.10	27396.56	26959.80	25675.05
Optimal Plan	23557.37	23544.12	26850.33	24052.01	29415.17	33232.76	33652.25	31613.89
% change over existing plan	11.80	18.76	22.96	16.31	24.42	21.30	24.82	23.13

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260 **Recommendations**

261 Based on the findings the following policy measures are suggested as means to increase
262 agricultural credit system and efficient use of agricultural credit.

263 1. Extension unit of Agricultural Development Project should advise farmers on how to use
264 the surplus farm labour resources identified in this study to grow crop with low land
265 requirements in order not to waste them.

266 2. Banks should provide more credit to farmers with the view to enable them increase
267 production. The credit volume should be large enough to take charge of both production
268 and consumption needs of farmers.

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