

Profit Enhancement of Rice-based Production System through Lac enterprise

Abstract

Jharkhand agriculture a rainfed one characterized with ninety per cent cultivable area mono-cropped with rice only. On one hand, there is a need to enhance the productivity of agricultural crop, another hand priority is to be given for profit enhancement of ikela-Kharsawan district of Jharkhand Lac is a major source of rural livelihood. Major lac host species are available in plenty *Butea monosperma*(palash), *Zizyphus mauritiana* (ber) and *Schlerichera oleosa*(kusum) in the forest as well as on own gravel upland which is otherwise not under crops and is a wasteland. Agriculture production system through the inclusion of another enterprise. In SaraDiversifying the existing agriculture system through the inclusion of lac not only enhances the profit margin of the production system but also developed entrepreneurial behaviour of the main actor of the system. Because of this lac cultivation interventions was introduced in the rice-based monocropping system. Inclusion of Lac on the abandoned tree of *Butea monosperma* and *Zizyphus mauritiana* fetch good economic return to the farm families with a net return of Rs. 25090 and Rs. 7480 respectively from kusumi lac on and rangeeni lac on respectively, whereas in upland rice it was only Rs. 3804. The benefit per rupee of investment is lowest in the case of growing only rice with Rs. 2.08 and the maximum benefit was Rs. 5.14 in case of lac on ber. Benefit in per rupee investment was found 3.59, 4.83, and 2.41. and 2.08 respectively in rice with lac cultivation on *Palash* and ber tree, rice with lac on *ber*, rice with lac on *Palash* and cultivation of only rice crop. Organizing Lac cooperative and input bank at kisan club proved a pivot in better management of products and ensuring local availability of broo lac.

Keyword: profit maximization, lac enterprise, Lac cultivation

27 **Introduction**

28 Over-dependence on monsoon and limited scope for area expansion made agriculture development is
29 critical to generate employment and additional income for the rural poor at the micro-level of the rural
30 economy. Enhanced productivity, profitability and competitiveness surface as the main sources of
31 agricultural growth for the future. The major part of the agricultural population is small and marginal
32 farmers who are economically vulnerable and poor. The consequence of inclement weather on crop
33 production affects even the livelihoods of farmers. In the changing scenario improvements in farmers'
34 productivity and competitiveness, diversification of agriculture has been acknowledged to enhance profit,
35 generate additional employment for rural masses and to conserve the natural resources.

36 Integration of different component at farm level is the need of the hour to enhance the profitability
37 of the agriculture production system. Jharkhand state the resource-rich state playing monocropping in
38 rainfed agriculture with small undulated upland. The rural economy is the mixed type where forest
39 produces particularly lac play an important role. To enhance the rural economy, integration of agriculture
40 with forest-based intervention appears to be a viable option to enhance the profits and productivity of
41 upland which is almost sixty per cent of total cultivable land. Free grazing made imperative the second
42 crop, even though moisture is available. Continuous aberrant weather demands the inclusion of forest
43 resources to be exploited in a diversified and integrated manner as forest interventions require little water.
44 Diversification and intensification of the rice-based system to increase productivity per unit resource are
45 very pertinent. Crop diversification show a lot of promises in alleviating these problems besides, fulfilling
46 basic needs for cereals, pulses, oilseeds and vegetables and, regulating farm income, withstanding weather
47 aberrations, controlling price fluctuation, ensuring balanced food supply, conserving natural resources,
48 reducing the chemical fertilizer and pesticide loads, ensuring environmental safety and creating
49 employment opportunity (Gill and Ahlawat, 2006). Crop diversification has been recognized as an
50 effective strategy for achieving the objectives of food security, nutrition security, income growth, poverty
51 alleviation, employment generation, judicious use of land and water resources, sustainable agricultural
52 development and environmental improvement (Hedge et al., 2003). The crop diversification may enhance
53 profitability, reduce pests, spread out labour more uniformly, reduce risks from aberrant weather by
54 different planting and harvesting times and source of high-value products from new crops (Reddy and

55 Suresh, 2009). In the era of the shrinking resource base of land, water and energy, resource use
56 efficiency
57 is an important aspect for considering the suitability of a cropping system (Yadav, 2002). Hence, selection
58 of component crops needs to be suitably planned to harvest the synergism among them towards efficient
59 utilization of resource base and to increase overall productivity (Anderson, 2005).

60 Lac has been a traditional source of livelihood for thousands of tribal families living in the forest
61 fringes. These families primarily depend on agriculture for their livelihood, which is insufficient to provide
62 them with food security and round-the-year income. Poor families living in forests and forest fringe
63 villages have historically suffered from challenges like an infertile or barren land, low asset base, lack of
64 irrigation facilities, small land holding, poor linkages with the market and their low risk-bearing capacity,
65 forcing them to migrate in search of work. Lac cultivation with host resources readily available within the
66 periphery of their habitat does provide appreciable income. Lac host plants are abundant but Lac which is
67 a traditionally grown enterprise was almost stopped due to non- availability of brood lac at the local level
68 and poor institutional support and inter-institution linkages.

69 Considering the above generalization experiments were carried out in two blocks of Saraikela-
70 Kharsawan district in Jharkhand with the objective of profit maximization of upland production system
71 through the inclusion of lac production in monocropping with rice.

72 **Methodologies**

73 The experiments were carried out in the purposively selected state of Jharkhand. Two blocks
74 namely Nimdih and Ichagarh were selected. Fifty respondents on whom field front line demonstration
75 (FLDs) were conducted on lac cultivation were selected from Lakri, Tengadih and Gorangkocha villages.
76 FLDs were carried out on five lac host tree per farm families in and around bund of rice plot. Crop
77 production data for rice were taken for one acre of land.

78 **Conceptual Background**

79 Lac is the hardened resin, secreted by the tiny lac insect belonging to a coccid group. The widely
80 known Indian Lac insect is *Laccifer lacca*. Lac insect settles on the twigs of certain host trees, suck the
81 plant sap and grow, all the while secreting lac resin from their bodies. Since the insects are closely spaced
82 on the twigs, the resin forms continuous encrustations over the twigs of the host trees.

83 Two strain of lac insects are cultivated grown in the district i.e. rangeeni on Butea monosperma
84 (palash), and Zizyphus mauritiana (*ber*) kusmi on *ber* and Schlerichera oleosa (*kusum*) tree. So ber tree
85 plays an important role in the production of brood lac as it can play as an alternate host for rangini as well
86 as kusmi. Both palash and ber tree are available in plenty and around bund of upland and their economic
87 use had been stopped for many years. Also, gravel upland rice undergoes climatic stress every year so
88 economic utilization of these appears to be a viable option to integrate the resource to cope up climatic
89 stress also.

90 Recent studies carried out by Indian Institute of Natural Resin and Gums (IINRG), Ranchi revealed that
91 the income form lac cultivation is about 28% of their total agricultural income. And most of the lac
92 growing families are among the poorest of the poor in the state. The cultivation is done extensively in the
93 remote interior pockets of the state. Further, it was also reported that despite the presence of a large
94 number of host trees, lac cultivation is not carried only on a few host trees.

95 Cultivation of lac is simple and investment is very low. It is eminently suited to the farmers living
96 in the vicinity of the forests including women as it demands only their part-time attention. In the district, its
97 cultivation provides an important additional income next only to agriculture. Farmers are also dependent
98 on lac cultivation for their livelihood and Lac is regarded as an important source of cash flow to the
99 marginal, small and large farmers in the district.

100 While conducting PRA by Krishi Vigyan Kendra, in the study area it was observed that palash , ber
101 tree are available on upland but not utilized for lac and hence farmers take only rice crop. Although is
102 some families still cultivating lac traditionally. Their institutional support very meagre and also lack of
103 institution at the local level is a major constraint in stopping this enterprise to scale up. Although different
104 species of lac host tree are available but poor technical knowledge for its utilization leads to scarcity of
105 brood lac at the local level. If these lac hosts could be utilized for cultivation of lac, it would not only
106 increase the national production of lac and add to the income of the farmers but also help prevent
107 indiscriminate felling of trees for fuel and timber purposes.

108 The data were collected by personally interviewing the respondents through a structured scheduled.
109 Apart from the use of schedule, detailed information was collected through informal discussion with the
110 respondents and by critically scrutinizing the practices followed for vegetable production. Use of PRA

111 tool, field observation and non-participant observation techniques were thoroughly used. Field observation
 112 was done in the rice field. “Focused Group discussion” of PRA was also followed to gather data on the
 113 opinion of respondent’s towards the demonstrated technology.

114 After collection, the data were systematically arranged and tabulated for analysis and interpretation.
 115 The statistical techniques used for the analysis of data under the study included mean yield, the net return,
 116 B: C, increase in family income in Rs./year

117 For economic analysis, economic evaluation data of crops were used. The gross cost of cultivation was
 118 calculated based on different operations performed and materials used for raising the crops.

119 **Results and Discussion:**

120 **Table. 1. Mean yield and economic return of intervention**

Intervention	Mean Yield	Gross return (Rs.)	Net return (Rs.)	Net Increase in family income (Rs./season)	%Increase in family income	B:C
Rice (q/acre)	4.20	7304.0	3804.0	-		2.08
Lac on Palash (kg/five tree)	78.6	11940.0	7480.0	3676.0	96.63	2.67
Lac on ber (kg/five tree)	123.6	31150.0	25090.0	21286.0	559.56	5.14

121 **1. The economic return of intervention**

122 The result recorded maximum gross return obtained from kusumi lac on ber tree with Rs.
 123 **31150.0** followed by rangeeni lac on *palash* with **11940.0** followed by upland rice with Rs.
 124 7304.0(table 1.) Inclusion of Lac on the abandoned tree of *palash* and *ber* fetch good economic
 125 return to the farm families with a net return of Rs. 25090.0 and Rs. 7480.0 respectively in kusmi
 126 lac on ber and rangeeni lac on *palash* respectively, whereas in upland rice it was only Rs. 3804.0.

127 The benefit per rupee of investment is lowest in the case of growing only rice with Rs. 2.08 and
 128 the maximum benefit was Rs. 5.14 with per rupee investment in case of lac on *ber* tree whereas
 129 benefit per rupee investment was found Rs.2.67 in production of rangeeni lac on *palash* tree.

In respect of net return in family income per season (i.e. 4 months) the kusmi lac cultivation on *Z. mauritiana* was highest (Rs. 21286.0). This is followed by rangeeni lac cultivation on *B. monosperma* (Rs.3676.0). Thus this net increase for kusumi lac cultivation is around 5.8 fold. This is because kusmi lac is more productive than rangeeni and also the tree of *Z. mauritiana* is very suitable for kusmi lac and farmers fetch the price from brood lac, they sold. Besides the market price of kusmi lac is around 20 per cent higher than rangeeni lac.

Although labour cost incurred for pruning was at par in both rangeeni and kusmi labour cost was more in the harvesting of stick lac of rangeeni but it was lighter for the harvest of sticklac of rangeeni than that of kusmi. Ber tree is more family labour friendly. Even women can harvest sticklac and also it took less time in scraping. Rice cultivation was traditional intervention on upland and palas and ber tree was traditionally grown on the bund of upland. Aberrant weather influences adverse effect on the production of rice over the years but its impact on the yield of lac was not significant.

Table 2. Economic return in Integration of lac enterprise in the existing crop production system

Intervention	Gross return (Rs.)	Net return(Rs.)	B:C
Rice	7304.0	3804.0	2.08
Rice + Lac on palash	19244.0	11284.0	2.41
Rice+Lac on ber	38454.0	28894.0	4.83
Rice + Lac on palash + Lac on ber	50394.0	36374.0	3.59

2. Integration of Lac Enterprise in the existing crop production system

The study suggested that inclusion of lac cultivation on host trees available locally in and around bunds of rice plot was found a profitable combination to raise the family income of respondent lac growers. The net return was found Rs. 36374.0, Rs. 28894.0, Rs. 11284. and Rs.3804.0 in rice with lac cultivation on palash and ber tree, rice with lac on ber, rice with lac on palash and only rice crop. Similarly Benefit in per rupee investment was found 3.59, 4.83, and 2.41. and 2.08 accordingly.

155 It was observed that the highest net return was obtained in rice with lac on palash and ber tree,
156 whereas profit per rupee investment was highest in rice with lac on ber tree. Price of kusmi lac has been
157 always more in the local market than rangeeni lac. Besides sustainability on kusmi lac cultivation is better
158 than rangeenias revealed by the respondents. Respondent lac growers opined that lac cultivation on ber is
159 profitable and easy than rangeeni lac on palas. The cost involved for the scrapping of lac from palas tree is
160 higher than on ber. The recovery of scrapped lac is more than two times in case of palas and thus adding
161 more income.

162 **Conclusion**

163 Based on findings of this experiment it can be concluded that under conditions of Jharkhand (rainfed
164 monocropping), upland rice with lac cultivation on ber was more productive, sustainable, resource-use
165 efficient, and remunerative. Since there was abundant of the lac host tree and most of them were on the
166 bund and on upland which otherwise was non-productive if this resource made productive through this
167 intervention it will change the economic situation of villages. Thousand of the tree can be added in the
168 rural economy. It will not only add the additional income to farmers pocket but also bring greenery to the
169 village as the felling of the tree will be checked. It will directly influence the farming ecology and farmers
170 can cope up with aberrant weather. Planting of ber tree on paddy bunds will be more economic farming
171 approach.

172 It will be proved an effective strategy for achieving the objectives of food security, income growth, poverty
173 alleviation, employment generation, judicious use of resources, sustainable agricultural development and
174 environmental improvement.

175 A climatic resilient combination of crop and forest product will harvest the synergism among them towards
176 efficient utilization of resource base and to increase the overall productivity of upland, through agro
177 enterprise convergence revolves around the interactive use and efficient utilization of land, labour, capital
178 cum available resources. Economic analysis of the intervention concludes that lac cultivation in upland
179 host tree which otherwise was abandoned can be advocated for the income security and sustainable
180 livelihood support of small and marginal farmers. Low risk and less labour requirement also make it
181 women-friendly. It will raise the village economy at the household level.

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