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An Economic Analysis of Cost and Returns of *Jhum* Paddy Cultivation in Mizoram State

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ABSTRACT

A study entitled economic analysis of cost and returns of *Jhum* Paddy cultivation in Mizoram State was conducted.Two stage sampling method was used in selection of sample. In Mizoram state,three districts viz. Aizawl, Kolasib and Serchhip and four villages from each district and ten farmers from each village were selected to make a sample of 120. A pre-tested and well-structured schedule was used to collectcost and returns of *Jhum* paddy pertaining to the agricultural year 2017-2018. The total variable cost and fixed cost for *Jhum* paddy cultivation were Rs. 42677 and Rs. 5010 respectively. Using cost concepts, the per hectare cost A, cost B_1, cost B_2, cost C_1 and C_2were worked out to be Rs. 8232, Rs. 8687, Rs. 13187, Rs. 43187 and Rs. 47687 respectively. The profitability analysis indicates that the per hectare gross income, farm business income, family labour income, net income and farm investment income were Rs. 65170, Rs. 56937, Rs. 51982, Rs. 17482 and Rs. 22437respectively. The benefit cost ratio was 1.37. It can be concluded that there existed heavy dependency on family labour for farming operations. Weeding and jungle cutting/slashing were found to be the most labour demanding operations.

Key words: *Cost concepts, Jhum paddy, Slash and burn, Subsistence farming,*

Jhum farming or slash and burn method is the most prominent method of cultivation in Mizoram state. As much as 19857 hectares out of 36114 hectares of land under paddy cultivation is occupied by *Jhum*paddy (Directorate of Agriculture, Mizoram, 2018). *Jhum* is the form of agriculture in which a piece of forest land is slashed, burnt and cropped without tilling the soil and the cropped land is subsequently fallowed to attain preslashed forest status through natural succession (Ramakrishnan,1993). In *Jhum*, all the agricultural operations are performed manually, using only a few traditional and primitive tools and also regeneration of forest and soil fertility is achieved with free of cost. It is completely rainfed and the use of chemicals is negligible. *Jhum* practice in the state of Mizoram in North-eastern India revealed that the most common *Jhum* cycle is 4-6 years and the *Jhum* cycle with more than 20 years is scarce (Tawnenga, 1990).

Rice is the main crop in Mizoram which occupies more than 75% of the total cropped area under field crops out of which *Jhum* paddy constitutes 41% of the total cropped areaand the rest 34% is under wet rice cultivation (WRC) (Directorate of Agriculture, Mizoram, 2018). Mostly, *Jhum* rice is grown in monoculture. However, several other crops like maize, mustards, tapioca, vegetables like chillies, brinjals, mock tomatoes and pulses like pigeon pea, garden pea are also mixed with rice. In *Jhum* farming, farmers are allotted land through lottery system conducted by the Village Council (VC). The area to be cultivated is decided by the cultivator on the basis of size and working capacity of his family. The forest fallow is slashed during December-January and left it for drying. The burningof slash is done in March-April i.e before onset of monsoon. Rice is sown mostly from the middle of April to the middle of May.

The present study was undertaken to analyse cost and returns of *Jhum* paddy cultivation in Mizoram state.

MATERIALS AND METHODS

Two stage sampling method was employed in selection of the sample. Three districts viz. Aizawl, Kolasib and Serchhip of Mizoram state were selected for the study. Four villages were selected from each district randomly out of which ten farmers were selected randomly from each village to make a sample size of 120. With a pre tested and well-structured schedule, cost and returns of *Jhum* paddy cultivation pertaining to the agricultural year 2017-2018 was collected from the selected sample of farmers.

Tabular analysis method was used for estimating costs and returns. The input costs were calculated using cost concepts based on Dr. Sen's Committee report (1979) and approved by Commission for Agricultural Costs and Prices (CACP) which include Cost A, Cost B_1, Cost B_2, Cost C_1 and Cost C_2.

Table 1. Cost structure of *Jhum* Paddy

S. No.	Particulars	Rs/ha	Percentage to Sub total	Percentage to Total
A	Variable costs			
1	Hired human labour	4500	10.54	9.44
2	Imputed value of family labour	34500	80.84	72.35
3	Seed	2785	6.53	5.84
4	Fertilizer	282	0.66	0.59
5	Plant protection	335	0.78	0.70
6	Miscellaneous	150	0.35	0.31
7	Interest on working capital	125.23	0.29	0.26
	Sub total	42677.23	100.00	89.49
B	Fixed costs			
1	Rental value of land	4500	89.81	9.44
2	Depreciation	55	1.10	0.12
3	Interest on fixed capital	455.5	9.09	0.96
	Sub total	5010.5	100.00	10.51
	TOTAL	47687.73		100.00

Table 2. Labour utilization in *Jhum* paddy cultivation

S. No.	Particulars	Labour (mandays/ha)	Percentage to total (%)
1	Jungle cutting/slashing	32	24.62
2	Burning of slash	3	2.31
3	Field cleaning and field preparation	21	16.15
4	Sowing	15	11.54
5	Weeding	34	26.15
6	Harvesting and threshing	25	19.23
	Total	130	100.00

Table 3. Cost of Cultivation of *Jhum* Paddy

S.No.	Cost particulars	Rs/ha	Percentage to total (%)
1	Hired Human labour	4500	9.44
3	Seed	2785	5.84
4	Fertilizer	282	0.59
5	Plant protection	335	0.70
	Depreciation	55	0.12
8	Miscellaneous	150	0.31
9	Interest on working capital	125.23	0.26
	Cost A	8232.23	17.26
10	Interest on fixed capital	455.5	0.96
	Cost B_1	8687.73	18.22
11	Rental value of land	4500	9.44
	Cost B_2	13187.73	27.65
12	Imputed value of family labour	34500	72.35
	Cost C_1	43187.73	90.56
	Cost C_2	47687.73	100.00

Table 4. Profitability of *Jhum* paddy

S. No.	Returns	Quantum
1	Output (q/ha)	18.62
2	Gross Income (Rs/ha)	65170
3	Farm business income (Rs/ha)	56937.77
4	Family labour income (Rs/ha)	51982.27
5	Net income (Rs/ha)	17482.27
6	Farm investment income	22437.77
7	Benefit cost ratio (BCR)	1.37

Cost concepts.

Cost A :This includes value of hired human labour + value of seed (both farm produced and purchased) + value of fertilizers + value of plant protection chemicals used + repairs and maintenance of farm implements and farm buildings + interest on working capital.

Cost B_1:This covers Cost A + interest on owned fixed capital excluding land.

Cost B_2:This covers Cost B_1 + rental value of owned land.

Cost C_1:This covers Cost B_1 + imputed value of family labour.

Cost C_2:This covers Cost B_2 + imputed value of family labour.

Farm income measures

Different income measures, which are used for farm business analysis, derived using the cost concepts were utilized in this study to test the farm efficiency. These measures include farm business income, family labour income, net income and farm investment income.

Farm business income = Gross income – Cost A

Family labour income = Gross income – Cost B_2

Net income = Gross income – Cost C_2

Farm investment income = Farm business income – imputed value of family labour

RESULTS AND DISCUSSION

Cost structure

The cost structure of *Jhum* paddy cultivation is represented in Table 1. The results reveal that the total variable cost and fixed cost for *Jhum* paddy cultivation were Rs. 42677 and Rs. 5010 respectively. More than 90% of the total variable cost was contributed by human labour out of which 80% was family labour. Heavy utilization of family labour indicates the existence of subsistence economy. The least capital was spent on plant protection chemicals.

Labourutilization in *Jhum* paddy cultivation

The employment distribution for different farming operations in *Jhum* paddy cultivation is presented in Table 2. The table reveals that weeding was most labour intensive operation consuming 26.15% of the total labours employed. Since, direct seeded method is practiced in *Jhum*, there was high intensity of weed infestation but most farmers were devoid of using weedicides and manual weeding was mostly done. Slashing and clearing of forest land, which accounted for 24.62% of total labour, was found to be second most expensive operation. Similar result was obtained by Konar *et al*. (2015) who stated that weeding and jungle cutting were most labour demanding operations in *Jhum* paddy cultivation. Field preparation, which accounted for 16.15% of total labour, is usually considered to be simpler than transplanted method. But in some cases, slashes are not burnt properly due to onset of spring rain which consequently leads to high labour demand for clearing of the field.

Cost concepts

The cost of cultivation of *Jhum* paddy is presented in Table 3. The table reveals that the average estimate of costs viz. A, cost B_1, cost B_2, cost C_1 and C_2 of *Jhum* paddy cultivation on per hectare basis were Rs. 8232, Rs. 8687, Rs. 13187, Rs.43187 and Rs. 47687 respectively.

Per hectare Profitability

The profitability of *Jhum*paddy per hectare at different profitability measures is presented in Table 4. The average productivity of paddy on sample holding was found to be 18.62quintal per hectare. The meager output is mainly attributed to concentrated use of low yielding traditional varieties, lack of use of yield enhancing inputs like pesticides, weedicides, etc. Due to prevalence of subsistence farming, farm products are generally not disposed in the market but stored for family consumption. So, the imputed value of the farm product, assumed as Rs. 3000 per quintal was utilized to calculate farm profit. The per hectare average gross income, farm business income, family labour income, net income and farm investment income were found as Rs. 65170, Rs. 56937, Rs. 51982, Rs. 17482 and Rs. 22437respectively. The wide difference in farm labour income and net income indicates the heavy dependency on family work force for farming operations which is the characteristic feature of subsistence farming. The average Benefit Cost Ratio was found to be 1.37 which indicates that for every one rupee investment on farm, there is a gross income of 1.37.

CONCLUSION

The total variable cost and fixed cost for *Jhum* paddy cultivation were Rs. 42677 and Rs. 5010

respectively.More than 90% of the total variable cost was contributed by human labour out of which 80% was family labour. The per hectare cost A_1, cost B_1, cost B_2, cost C_1 and C_2 were worked out to be Rs. 8232, Rs. 8687, Rs. 13187, Rs. 43187 and Rs. 47687 respectively.. The profitability analysis indicates that the per hectare gross income, farm business income, family labour income, net income and farm investment income were Rs. 65170, Rs.56937, Rs. 51982, Rs. 17482 and Rs. 22437 respectively. The benefit cost ratio was 1.37. It can be concluded that that there existed heavy dependency on family labour for farming operations.Weeding and jungle cutting/ slashing were the most labour demanding operations.

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