International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com Volume 3, Issue 5 (September-October, 2015), PP. 219-223

A STUDY ON COST AND ECONOMY OF CULTIVATION OF TRANSPLANTED PADDY AND JHUM PADDY IN MANIPUR

A. Konar[1], A. Choudhury[2], Md H. Ali[3]
Department of Agricultural Economics, Faculty of Agriculture
Bidhan Chandra Krishi Viswavidyalaya
Mohanpur, Nadia, West Bengal
[1]arunimakonar90@gmail.com

Abstract— **The present study has been undertaken with Manipur as the focus area of the research work with the objectives to examine the cost of cultivation and return analysis of transplanted paddy of tribe and non-tribe sample respondents and to analyze the cost and return of jhum paddy of tribal sample households. Chandel District and Chandel sub-division had been purposively selected for this research work. 200 samples (150 tribal households and 50 non-tribal households) have been selected at random from four sample villages. After the selection of villages, a list of households with their operational holdings is prepared for the four villages from the secondary data obtained from the Sub-division Office. All the households are classified into four groups, viz., non-agriculturists, Group I (no operational holdings); marginal, Group II (less than 1 hectare of operational holdings); small, Group III (1.01-2 hectares of operational holdings); and large, Group IV (2.01 hectares and above of operational holdings).The reference period of the study is the agricultural year 2006-07. In the study, Cost concepts have been extensively used. The cost of cultivation of transplanted paddy for tribal sample households is found to be highest in Group IV (Rs.12,198); followed by Group III (Rs.11,837); and lowest in Group II (Rs.11,637). Irrespective of groups, human labour accounted for a major portion of the total cost. It is also found that in case of transplanted paddy the gross return increases with the increase in operational holdings for both tribal and non-tribal sample households, which ranges from Rs.18,000 for Group II to Rs.19,200 for Group IV for tribal sample households; and from Rs.27,200 (Group II) to Rs.30,400 (Group IV) for non-tribal sample households. The total cost of cultivation of 0.25 hectares of paddy under *Jhum* cultivation is found to be Rs.8027 in the sample area. And Cost A_1 is found to be about Rs.2827. The gross return from cultivating 0.25 hectares of *Jhum* paddy is worked out to be Rs.8100. The surplus over Cost A_1 is about Rs.5272, but there is very little surplus over Cost D. The Return – cost ratio at Cost A_1 is 2.86 but the same at Cost D is 1.01, which is almost equal to unity.**

***Index Terms*— Cost, Return, Economy of cultivation, Jhum cultivation, Transplanted paddy, etc.**

I. INTRODUCTION

Jhum (Shifting cultivation) is a primitive practice of cultivation in States of North Eastern Hill Region of India. It is an ancient method of agriculture that is still practiced by tribal communities in many parts of the world, particularly in wet tropics(Schlippe,P.D, 1956). Settled agriculture is the primary source of livelihood for the vast majority of the tribal population though in the North East Himalayan region the major portion of the agricultural area is under shifting cultivation or *jhum* cultivation. According to the Task Force on Shifting Cultivation (RTFSC, 1983) as many as 70,000 families in Manipur practiced *jhum* cultivation bringing 90,000 ha under this method of Cultivation annually. The mainstay for majority of tribes, whether living in hills or plains, is agriculture supplemented by forestry and animal husbandry. Most of the tribal populations are still dependent on primitive methods of agriculture and their livelihood is supported by different types of forest and animal products. The role of both land and forest claimed high place in resurgence of the tribal economy because both these economic sectors shared the overall responsibilities to provide subsistence economy to the tribal people on a sustainable base. In different parts of the country, generally, three agricultural patterns are followed by the tribes. They include shifting cultivation, settled cultivation and cultivation of plantation crops such as coconut, pineapple, etc. Shifting cultivation locally known as *Jhuming* is widely practiced farming system in the hills of North East India. This type of farming system also known as *Podu* cultivation is practiced in Orissa, Bihar, Madhya Pradesh and Andhra Pradesh in India. Settled

cultivation is followed by the tribes and semi-tribes who are more or less settled down in rural area. Majority of them are small farmers, marginal farmers and agricultural labourers. The areas inhabited by the tribal population constitute a significant part of the underdeveloped areas of the country. About 93 percent of the tribal people live in rural areas (Census of India, 1981) and are engaged in agricultural pursuits. The natural resources and people are basic resources of tribal belts and the culture of tribal communities is also reflected in their agricultural operations. Since majority of the tribes are living in the hilly and interior forest regions, the production of agricultural crops is possible only in such areas where soil erosion is at minimum and on the gentle slopes of the valley areas where sufficient irrigation potential is available. It is an established truth that the agricultural practices in tribal areas are mostly subsistence nature and are characterized by the production of food-grains and other millets just sufficient to meet their own requirements, generally at low living. There is a difference of cost and return analysis between transplanted paddy cultivation and *jhum* paddy cultivation. *Jhuming* or shifting cultivation involves great waste in terms of soil erosion and forest covers. *Jhuming* have to be improved through the adoption of a new strategy of agricultural development, which includes easy access to improve technology and supporting measures like liberal credit, crop insurance to cover risk, should be adopted to motivate the tribal farmers in taking up permanent cultivation.

II. Research Methodology

Chandel district had been purposively selected for this research work. The reason behind the selection of this particular district lays in the fact that the majority of the population in this district belong to tribal (91.9 percent of the total district population, according to 2001 Census). Chandel sub-division is purposively selected. Zaphou village is selected randomly as the nuclear village. Then two adjacent villages namely Monsang Pantha to the South-East and Lambung village to the South-West of the nuclear village are randomly selected to form a cluster of three villages. These three villages are tribal dominated villages. For the purpose of comparison, Kakching Mantak, a non-tribal dominated village has been selected. It is the nearest non-tribal dominated village from the cluster of three villages. Thus, in total, four villages are selected from Chandel sub-division for the research work. After the selection of villages, a list of households with their operational holdings is prepared for the four villages from the secondary data obtained from the Sub-division Office. All the households are classified into four groups, viz., non-agriculturists, Group I (no operational holdings); marginal, Group II (less than 1 hectare of operational holdings); small, Group III (1.01-2 hectares of operational holdings); and large, Group IV (2.01 hectares and above of operational holdings). Then 150 sample households from the cluster of three villages are selected at random by Probability Proportional to Number method. Then another 50 respondent are selected from the non-tribal village in the same manner. Thus, in all 200 samples (150 tribal households and 50 non-tribal households) are selected at random from the four sample villages. The study is confined to Chandel district of Manipur. The reference period of the study is the agricultural year 2006-07.

A. Interviewing

Good rapport has been established with the respondents before interview. They have been explained regarding the purpose and objectives of the study very clearly. For the purpose of collecting information, an adult member (preferably the head) of the household has been selected for interview. But for collecting information regarding consumption, female members have also been interviewed.

B. Cost Concepts

For economic analysis Cost A_1 and Cost D concepts are used. Cost A_1 constitute the value of hired human labour (permanent and casual), bullock labour, machinery charges, manures and fertilizers, seed or planting materials, plant protection chemicals, irrigation changes, land revenue, taxes and cases, depreciation of farm assets and interest on working capital and miscellaneous expenses such as artisans, ropes, repairs to small farm implements, etc.

Cost D = Cost A_1 + Imputed value of family labour – land revenue, tax, cess.

The following farm income measures are considered in the present study –

a) Surplus over Cost A_1 = Gross return – Cost A_1
b) Surplus over Cost D = Gross return – Cost D
c) Return – cost ratio = Return / Cost A_1 or Cost D.

III. Results and Discussion

A. Method of Cultivation of the Sample Respondents

Table 1. shows the distribution of the sample households on the basis of methods of cultivation *i.e.* whether they follow *jhum* cultivation alone or permanent cultivation alone or both *jhum* and permanent cultivation together. From the table it is clear that only the tribes follow *jhum* cultivation. On the other hand, all of the non-tribal sample respondents follow permanent cultivation only. Majority of the tribal respondents (74.81 percent) followed both *jhum* and permanent cultivation. But none of the tribal sample respondents practice permanent cultivation alone. 25.19 percent of the tribal respondents practice *jhum* cultivation only. Majority of the tribal respondents in Group II (51 percent) and all the respondents in Group III and Group IV practice *jhum* and permanent cultivation together. While in Group II, about 49 percent of the tribal respondents practice only *jhum* cultivation. Thus, it was only the tribes who practice *jhum* cultivation. Shah[118] (1992) reported that *jhum* cultivation is practiced by the tribes in the North Eastern region of India. Ahsan and Begum[3] (1992) also found that shifting cultivation (*jhum* cultivation) is practiced in the hilly regions of Bangladesh along its Eastern and Southeastern border by the various hill tribes.

B. Cost and Economy of Cultivation of Transplanted Paddy

Table 2 presents the group-wise breakup of cost of cultivation of one hectare of transplanted paddy in the sample area. It is observed that per hectare cost of cultivation of paddy is about Rs.11,891 for tribal sample households and Rs.17,646 for non-tribal sample households. The cultivation of the paddy is more expensive in case non-tribal sample households than that of tribal sample households. This may be due to more use of fertilizer and plant protection chemicals by the non-tribal than the tribal sample respondents. Another reason may be more expensive labour in the non-tribal area than that in the tribal area. Labour wage is calculated @ Rs.100 per manday in the non-tribal area while, it is calculated @ Rs.70 per manday in the tribal area. Human labour, which accounts for a bulk percentage of the total cost for both tribal and non-tribal sample households and is noted to be the most expensive item. Hired human labour accounted for about 51.53 percent of total cost for tribal and 44.54 percent of total cost for non-tribal sample households. It is further noted that family labour also plays a crucial role in supplying physical labour accounting for about 36.84 percent and 12.56 percent of total cost for tribal and non-tribal sample households respectively. Seeds consumed about 5.05 percent and 3.4 percent of the total cost for tribal and non-tribal sample households. Manures and fertilizers and plant protection chemicals, the crucial inputs for better production, together accounts for only 3.35 percent of total cost for tribal sample households. Whereas, in case of non-tribal households, these inputs accounted for about 8 percent of the total cost.

It is further observed from the table that there is a direct relationship between the cost of cultivation and size of operational holding for both tribal and non-tribal sample households. The cost of cultivation of paddy for tribal sample households is found to be highest in Group IV (Rs.12,198); followed by Group III (Rs.11,837); and lowest in Group II (Rs.11,637). Irrespective of groups, human labour accounted for a major portion of the total cost. A positive relationship between operational holding and expenditure on hired human labour is observed for tribal sample households. Whereas, an inverse relationship between operational holding and utilization of family labour is observed. This may accounted to the use of machines by the larger size groups. Other costs including FYM, fertilizers and plant protection chemicals consumed negligible percentage of the total cost, though it increases with the increase in farm size.

Table 3 shows the group-wise cost and returns analysis of transplanted paddy in the sample area. It can be observed that an amount of Rs.18,600 can be earned by investing Rs.11,891 as Cost D in case of tribal sample households. On the other hand, an amount of Rs.28,800 can be earned by investing Rs.17,646 as Cost D in case of non-tribal sample households. It is also found that gross return increases with the increase in operational holdings for both tribal and non-tribal sample households, which ranges from Rs.18,000 for Group II to Rs.19,200 for Group IV for tribal sample households; and from Rs.27,200 (Group II) to Rs.30,400 (Group IV) for non-tribal sample households. Surpluses over cost, i.e., over Cost A_1 and Cost D, are also quite lucrative for both the tribal and non-tribal sample households. Return – cost ratios at either of cost concepts are found to be more than unity for all the groups. Return – cost ratio at Cost A_1 decreases with increase in the size of operational holdings for both the tribal and non-tribal sample households. While the return – cost ratio at Cost D increases with the increases in the size of operational holdings. This may be due to more dependence of family labour in smaller farm than in larger farms.

C. Cost and Economy of Cultivation of Jhum Paddy

Table 4 shows the average cost of cultivation of one *Sangam* (0.25 hectares) of paddy under *Jhum* cultivation. This area is considered because none of the sample respondents practice *jhuming* in more than 0.25 hectares of land. From the table, it can be observed that jungle is cut within mid January to mid February and left to dry. This work requires about 30 mandays at the most. Then after two months, when the cut wood is dried, firing is done. This requires about 1 manday. The burnt ashes will increase the fertility of the soil. After this the field is clean and prepared for planting. This requires about 2 weeks. Then fencing and making boundary of the field is done to protect from wild animals and others. This work requires about 5 mandays. All these works is mostly done by the family members.

Then, the paddy seeds are sown directly into the field. About 10 mandays are required to sow one *Sangam*. The seed rate is 3 tins (1 tin = 12Kg.) and the cost of 1 tin is Rs.65. Thus, the expenditure for seeds is Rs.195 (2.42 percent of the total cost) for planting one *Sangam* (0.25 hectares) of *Jhum* paddy. Spacing between the holes is 1 feet and 2-5 seeds are placed in each hole. Weeding is done three times; the first one is done after one month of planting; the second and third is done as and when weeds emerges. This work requires about 30 mandays. Harvesting, threshing and transportation require about 21 mandays. All these works *i.e.* sowing of seeds, weeding, harvesting, threshing and transportation cannot be done by the family members alone, these required hired labour. These hired labour are usually not paid in cash, but there is exchange of labour between the people. The cost of the hired labour, calculated @ Rs.70 per manday comes to about Rs.2540 which is 31.53 percent of the total cost. The imputed value of family labour is found to be about Rs.5230, which accounted for 64.91 percent of the total cost. The total cost for cultivation of 0.25 hectares of paddy under *Jhum* cultivation is found to be Rs.8057 in the sample area. And Cost A_1 is found to be about Rs.2827.

Table 5 shows the cost and return analysis of cultivating 0.25 hectares of paddy under *Jhum* cultivation. From the table it can be seen that the gross return from cultivating 0.25 hectares of Jhum paddy is worked out to be Rs.8100. Again, it is found that there is very little surplus over Cost D. The surplus over Cost A_1 is about Rs.5272. The return – cost ratio at Cost A_1 is 2.86 but the same at Cost D is 1.01, which is almost equal to unity. Thus, it can be said that *Jhum* cultivation is not much economical if Cost D, which include imputed value of family,

is considered. But, since most of the work is carried out by family members and there is usually exchange of labour, this kind of cultivation is still practiced profitably among the tribal people in the sample area.

IV. Conclusion

Majority of the tribal respondents (74.81 percent) followed both *jhum* and permanent cultivation. But none of the tribal sample respondents practice permanent cultivation alone. About 25 percent of the tribal respondents practice *jhum* cultivation only. An amount of Rs.18,600 can be earned from one hectare of transplanted paddy by investing Rs.11,891 at Cost D in case of tribal sample households. On the other hand, an amount of Rs.28,800 can be earned by investing Rs.17,646 at Cost D in case of non-tribal sample households. Human labour, which accounts for a bulk percentage of the total cost for both tribal and non-tribal sample households, is noted to be the most expensive item. There is a direct relationship between the cost of cultivation and size of operational holding for both tribal and non-tribal sample households. Gross return from one hectare of transplanted paddy increases with the increase in operational holding for both tribal and non-tribal sample households, which ranges from Rs.18,000 (Group II) to Rs.19,200 (Group IV) for tribal sample households; and from Rs.27,200 (Group II) to Rs.30,400 (Group IV) for non-tribal sample households. For transplanted paddy, surpluses over Cost A_1 decreases with increase in the size of operational holding for both the tribal and non-tribal sample households. While the surpluses over Cost D increases with the increases in the size of operational holding. Return – cost ratios at either of cost concepts are found to be more than unity for all the groups. The total cost of cultivation of 0.25 hectares of paddy under *Jhum* cultivation is found to be Rs.8027 in the sample area. And Cost A_1 is found to be about Rs.2827. The gross return from cultivating 0.25 hectares of Jhum paddy is worked out to be Rs.8100. The surplus over Cost A_1 is about Rs.5272, but there is very little surplus over Cost D. The Return – cost ratio at Cost A_1 is 2.86 but the same at Cost D is 1.01, which is almost equal to unity.

References

Ahsan, E. and Begum, S. (1992). Problems of sustainable agriculture: shifting cultivation in hills of Bangladesh. *Annals of Bangladesh Agriculture*, **2**(1):1-12.

Government of India. *Census of India*, 1981.

Government of India. Census of India, 2001, *Administrative Altas – Manipur*, Office of the Registrar General, India.

Government of India. *Census of India*, 2001.

Government of India. *Census of India*, 2001. *Manipur – Data Highlights: The Scheduled Tribes*, Office of the Registrar General, India.

RTFSC (1983), Basic Statistics of NER, 2002, Government of India, North Eastern Secretariat, Shilong p.42.

Schlippe, P. D. (1956). Shifting cultivation in Africa, Routledge and Kegan Paul, London. *In Agro-forestry Based Farming System as an Alternative to Jhuming*. (Reprinted from proceedings of a Seminar on Agro-forestry organized by ICAR at Imphal, Manipur, May 16-17, 1979.

Shah, S.L. (1992). Tribal economy in India with special reference to the Himalayan region – important development issues. *Indian Journal of Agricultural Economics*, **47**(3):381-390.

List of Tables:

Table 1: Distribution of Sample Households on the Basis of Method of Cultivation (2006-07)

Methods Of Cultivation	Group II		Group III		Group IV		Overall	
	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes
Jhuming only	34 (49)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	34 (25.19)	0 (0)
Permanent Only	0 (0)	17 (100)	0 (0)	15 (100)	0 (0)	10 (100)	0 (0)	42 (100)
Jhum and Permanent	36 (51)	0 (0)	43 (100)	0 (0)	22 (100)	0 (0)	101 (74.81)	0 (0)
Total	70 (100)	17 (100)	43 (100)	15 (100)	22 (100)	10 (100)	135 (100)	42 (100)

* Figures in the parentheses indicate percentage to the total.

Table 2: Group-Wise Breakup of Cost of Cultivation of One Hectare of Paddy under Transplantation of the Sample Respondents (Rs./ha.) (2006-07)

Particulars	Group II		Group III		Group IV		Overall	
	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes
Land preparation	1680 (14.78)	2083 (12.14)	1669 (14.10)	1888 (10.76)	1648 (13.51)	1744 (9.56)	1666 (14.01)	1905 (10.80)
Nursery bed preparation & sowing	420 (3.61)	600 (3.50)	420 (3.55)	800 (4.56)	420 (3.44)	800 (4.39)	420 (3.53)	733 (4.16)
Uprooting & transplanting	2800 (24.06)	4000 (23.31)	2800 (23.65)	4000 (22.80)	2800 (22.96)	4000 (21.93)	2800 (23.55)	4000 (22.67)
Weeding	2100 (18.05)	3000 (17.48)	2100 (17.74)	3000 (17.10)	2100 (17.22)	3000 (16.45)	2100 (17.66)	3000 (17.00)
FYM, Fertilizer & PP chemicals application	72.1 (0.62)	376 (2.19)	117 (0.99)	507 (2.89)	223 (1.82)	800 (4.39)	137 (1.15)	561 (3.18)
Harvesting, threshing, winnowing & bagging	2800 (24.06)	4000 (23.31)	2800 (23.65)	4000 (22.80)	2800 (22.96)	4000 (21.93)	2800 (23.55)	4000 (22.67)
Transportation	700 (6.02)	1000 (5.83)	700 (5.91)	1000 (5.70)	700 (5.74)	1000 (5.48)	700 (5.89)	1000 (5.67)
Seed	600 (5.16)	600 (3.50)	600 (5.07)	600 (3.42)	600 (4.92)	600 (3.29)	600 (5.05)	600 (3.40)
FYM, fertilizers & PP chemicals	221 (1.90)	1119 (6.52)	363 (3.07)	1318 (7.51)	610 (5.00)	1802 (9.88)	398 (3.35)	1413 (8.01)
Miscellaneous	244 (2.10)	380 (2.21)	268 (2.26)	430 (2.45)	297 (2.43)	490 (2.69)	270 (2.27)	433 (2.46)
Total Cost	**11637 (100)**	**17158 (100)**	**11837 (100)**	**17543 (100)**	**12198 (100)**	**18236 (100)**	**11891 (100)**	**17646 (100)**
Hired labour	3166 (27.21)	6392 (37.25)	6471 (54.67)	8438 (48.10)	8743 (71.68)	8749 (47.98)	6127 (51.53)	7860 (44.54)
Imputed value of family labour	7495 (64.41)	3945 (22.99)	4035 (34.09)	1613 (9.19)	1611 (13.21)	1089 (5.97)	4380 (36.84)	2216 (12.56)
Cost A_1	4142	13213	7802	15930	10587	17147	7510	15430
Cost D	11637	17158	11837	17543	12198	18236	11891	17646

Figures in parenthesis represent the percentage to the total cost.

Table 3: Group-Wise Cost and Return Analysis of Transplanted Paddy for the Sample Respondents (Rs. /ha.) (2006-07)

Particulars	Group II		Group III		Group IV		Overall	
	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes	Tribes	Non-Tribes
Cost A_1	4142	13213	7802	15930	10587	17147	7510	15430
Cost D	11637	17158	11837	17543	12198	18236	11891	17646
Gross return	18000	27200	18600	28800	19200	30400	18600	28800
Surplus over								
a) Cost A_1	13858	13987	10798	12870	8613	13253	11090	13370
b) Cost D	6363	10042	6763	11257	7002	12164	6709	11154
Return-cost ratio at								
a) Cost A_1	4.35	2.06	2.38	1.81	1.81	1.77	2.48	1.87
b) Cost D	1.55	1.59	1.57	1.64	1.57	1.67	1.56	1.63

Table 4: Average Cost of Cultivation of *Jhum* Paddy of the Tribal Sample Households (Rs./Sangam) (2006-07) (1 Sangam = 0.25 ha.)

Sl. No.	Particulars	Labour Reqd (Mandays)	Cost (Rs.)	% to Total Cost
1	Jungle cutting (Mid Jan. to mid Feb.)	30	2100	26.06
2	Firing (after two months)	1	70	0.87
3	Field cleaning and field preparation	14	980	12.16
4	Fencing/ Boundary	5	350	4.34
5	Sowing	10	700	8.69
6	Weeding (three times)	30	2100	26.06
7	Harvesting and threshing	12	840	10.43
8	Transportation	9	630	7.82
9	Seeds	-	195	2.42
10	Miscellaneous	-	92	1.14
	Total (1 to 10)	**111**	**8057**	**100.00**
	Hired labour	36.29	2540.30	31.53
	Family labour	74.71	5229.70	64.91
	Cost A_1		2827.30	
	Cost D		8057	

Table 5: Cost and Return Analysis of Jhum Paddy of the Tribal Sample Respondents (Rs./Sangam) (2006-07) (1 Sangam = 0.25 ha.)

Cost A_1 (Rs.)	Cost D (Rs.)	Gross return (Rs.)	Surplus over		Return-cost ratio at	
			Cost A_1 (Rs.)	Cost D (Rs.)	Cost A_1	Cost D
2827.30	8057	8100	5272.70	43	2.86	1.01