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Impact of Land Tenure System in Watershed Development Programmes in the Meghalaya State, North-East India

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Abstract

Besides the analysis of technical and ecological viability, knowledge of the existing land tenure systems is an essential pre-requisite for the success of watershed projects and policy reforms required for their effective implementation. Using descriptive analysis, Lorenz curve and Gini concentration ratio (GCR), this study has explained the relationship between the existing land tenure systems and the prospects for the success of watershed projects in the Meghalaya State, North-East India. The study has revealed that the Umsiang watershed project having community ownership system of tenure produced more positive changes in the land-use pattern after the project implementation than the Maweit watershed project practising individual ownership system. The area under *jhum* cultivation in the Umsiang watershed decreased significantly due to transformation of *jhum* sloppy lands into permanent contour cultivation. The area under horticulture plantations particularly fruit crops increased by 2118 per cent; afforested and aquaculture areas also increased by 296 and 2480 per cent, respectively after the project. The area under *jhum* cultivation in the Maweit watershed decreased only marginally (by 2%) and the area under permanent contour cultivation was negligible after the project. The absence of ownership rights to the tenants in the Maweit watershed has resulted in little incentive for the adoption of long-term development measures. The annual average income per household increased to Rs 40,227 (36% increase) in the Umsiang watershed and to Rs 36,313 (19% increase) in the Maweit watershed after the project. The off-farm income went up by 49 per cent in the Umsiang watershed and 38 per cent in the Maweit watershed. The watershed projects under the Community ownership system of land tenure would be more successful in

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increasing farm income and employment opportunities. The income inequality also decreased in the Umsiang watershed after the project as shown by Lorenz curve and GCR. But the gap between the rich and the poor in the Maweit watershed increased after the project. The study has clearly indicated that land tenure system is an important factor in the implementation of watershed projects successfully. Effective land reform policy would be essential for the successful implementation of watershed development programmes.

Introduction

Shifting cultivation, locally known as *jhuming*, is a predominant system of farming in the Meghalaya State of North-East India. One-eighth of its geographical area (2,65,000 ha) is at present affected by shifting cultivation, and the annual harvested area is 76,000 ha. Farmers fell and burn the fallow vegetation to cultivate the cleared land (usually for 1 to 3 years) and then abandon the site (for 3 to 20 years) to forest or bush cover (Sachchidananda, 1989). Owing to population growth and increasing scarcity of agricultural land in many parts of the state, traditional farming system like shifting cultivation, different fallow systems and extensive grazing systems are under increasing pressure. For centuries these traditional farming systems have permitted land cultivation along with preservation of natural resources. During the past few decades, however, the ever decreasing fallow periods and overexploitation of grazing lands have led to a decline in the soil fertility and increase in degradation (Moursi, 1984; Christanty, 1986). The average annual loss of top soil from hill slopes (60-70%) during the first year, second year and abandoned *jhum* in Meghalaya was estimated to be 147, 170 and 30 tonnes per hectare, respectively (Singh & Singh, 1978). The problem may get escalated further if suitable measures are not taken in time. With a view to alleviating the food-shortage and resources-degradation problems in Meghalaya, the Government of India under the Ministry of Agriculture and Co-operation formulated a Central sector scheme on "Watershed Development Programmes in Shifting Cultivation Areas" (WDPSCA) during the Eighth Five-Year Plan. This scheme aims at mitigating the ill effects of shifting cultivation resulting from the reduction of *jhum* cycle, introducing land-use/technologies which will improve production and productivity of crops in the *jhum* areas and incorporating measures that will enable the *jhumias* to make use of land according to its capability.

Numerous articles have appeared on the analysis of ecological, technical and economic aspects of watershed development programmes. But, the socio-cultural and institutional issues of watershed projects have often been neglected by both scientists and development practitioners. An essential

condition for ensuring success of the watershed management projects is the land tenure system, where the target groups have sufficient access to land as well as of rights to own and avail the benefits of the project. Insecure land tenure is generally considered to hamper the access to credit and the willingness of peasants to adopt long-term innovations and to invest in the long-run. Indigenous land tenure system in the Meghalaya state has often been blamed for impeding the development of the agricultural sector because of the absence of secure and private land rights to farmers (Singh *et al.*, 2002). Keeping these points in view, this paper has elucidated a relationship between the existing land tenure systems and the prospects for the success of watershed projects in terms of changes in the land-use pattern, farm income, employment and pattern of income distribution.

Land Tenure System in Meghalaya

In general, two types of land tenure system are widely practised in Meghalaya: (i) Community ownership system, and (ii) Individual ownership system. In the Community ownership system, the land belongs to different clans or *Machongs* under the custody of head of the clan called *Nokma*. The land held by the clan or *Machongs* is called *Akhing*. Selection and allotment of land for any type of cultivation to each person or family within the *Akhing* is made by the *Nokma* of that particular *Akhing* in consultation with other residents of that *Akhing*. The inhabitants of the *Akhing* do not pay any fee but an outsider has to pay a fee to the *Nokma* for using a plot of land. The individual farmer has no transferable rights over the community lands. In a few cases, community lands are freely accessible to any member of the community. However, in this system of tenureship individual ownership exists only in the case of valley lands and lands under homestead.

In the Individual ownership system, the lands belong mostly to individual big landlords and the tenants have to pay some fees as rent for using the land. This rent varies from Rs 500 to Rs 1000 per hectare, depending on the discretion of landlords.

Distribution of Size of Holding

The study on distribution of size of holdings in the selected two watersheds has indicated that in the Maweit watershed, 93 per cent of the total land is owned by the richest 23 per cent of the total households and the remaining 7 per cent of the land is owned by 77 per cent households who are mostly landless, marginal and small farmers. It shows skewed distribution of households in the watershed. In the case of Umsiang watershed, only 12 per cent of the total lands is having private ownership and the remaining 88 per cent belongs

to the community land. Out of the 12 per cent private land, the poorest 70 per cent households owned 63 per cent of the total land and richest 7 per cent owned 15 per cent of the total land, indicating uniformity in the distribution of size of holdings.

Data and Methodology

During the IXth Five-Year Plan, 12 watershed projects were implemented under the central government-sponsored scheme, "Watershed Development Programme under Shifting Cultivation Areas" (WDPSCA). The Department of Soil Conservation, Government of Meghalaya, implemented this scheme. The selection of watersheds was done using the stratified random sampling technique and the watersheds were stratified on the basis of types of land tenure system (Community ownership and Individual ownership systems). In order to select representative watersheds, a list was prepared of completed watersheds practising Community ownership and Individual ownership systems separately with the help of Coordinators of WDPSCA. It was assumed that all the 12 watersheds had similar topographic and agro-climatic conditions. Finally, two watersheds, viz. Umsiang and Maweit from the list containing both land tenure systems were selected using the random sampling technique. A sample of 170 farm households was selected randomly from each selected watershed using the proportional random allocation method. Thus, 170 farmers from the Umsiang watershed and 170 from the Maweit watershed were selected for the study. The primary data relating to the existing land-use system, various aspects of crop, livestock and other enterprises, output and prices, etc. before and after the watershed project were collected through the survey method, adopting the personal interview technique using specially structured and pre-tested questionnaires. The data pertained to the agriculture year 2000-01.

The descriptive analysis was carried out using percentages, means, etc. to estimate the changes in the land-use pattern and farm income after the project. Lorenz curve and Gini Concentration Ratio (GCR) techniques were used to measure the impact of land tenure on farm income distribution among the farmers of the two watersheds. The quantitative measure of Gini Concentration Ratio (GCR) was given Eq. (1):

$$L = 1 - \sum P_i (I_i + I_{i-1}) \quad \dots(1)$$

where,

P_i = Proportion of farms at the i th class

I_i = Cumulative proportion of total income at the i th class

$I = 1, 2, 3, \dots, n-1, n$

n = Number of classes in the distribution, and

L = Gini coefficient

Results and Discussion

Land Tenure and Land-use Pattern

The implementation of watershed projects under different land tenure systems, i.e. Community ownership (Umsiang watershed) and Individual ownership (Maweit watershed) is likely to have a visible impact on the land-use pattern of farm households. The land-use pattern before and after the project in the two selected watersheds is outlined in Table 1. This table indicated that the Umsiang watershed having Community ownership system of land tenureship effected more significant changes in the land-use pattern after the project than the Maweit watershed, practising individual ownership system. The area under wetland paddy cultivation in the Umsiang watershed project increased by 11 per cent after the project. The reason being development of irrigation infrastructure, which increased by 17 per cent after the project and thus, permitted conversion of wastelands into wetland cultivation. An interesting feature was that the area under *jhum* cultivation in the watershed decreased significantly by 27 per cent after the project due to transformation of *jhum*/sloppy lands into permanent contour cultivation. The area under permanent contour cultivation increased from a minimal 7 ha before the project to 31 ha after the project, i.e. by 339 per cent. The area under horticulture plantations, particularly fruits, increased by 2118 per cent; afforested and aquaculture areas also increased significantly by 296 per cent and 2480 per cent, respectively after the project. Ultimately, the current community fallow lands declined significantly, by 29 per cent.

Contrary to the Umsiang watershed, the area under *jhum* cultivation in the Maweit watershed decreased marginally by 2 per cent after the project. The area under permanent contour cultivation in the watershed was found to be negligibly zero before and after the project. Although there was a significant increase in the area under fruit crops in the Maweit watershed, the farmers were more or less confined to short-duration fruit crops like pineapple and banana, whereas in the Umsiang watershed the composition of fruit crops in horticulture plantations was mostly of long-gestation fruits like pear, guava and oranges. The absence of ownership rights to the tenants in the Maweit watershed resulted in little incentive in the long-term development measures, attached to the traditional shifting cultivation for their livelihood. However, moderate increase in area under forest trees was observed in the Maweit watershed after the project. It indicated that

Table 1. Land-use pattern of sample farms under watersheds of Community and Individual ownership land tenure systems in the Meghalaya state
(Area in hectares)

Particulars	Community ownership (Umsiang watershed)		Individual ownership (Maweit watershed)	
	BP	AP	BP	AP
Sample size	170	170	170	170
Total operated area	695.55	703.72	809.34	813.99
(a) Private land	83.00	91.17	809.34	813.99
(b) Community land	612.55	612.55	0.0	0.0
Arable land				
a. Wetland cultivation	73.00	81.28	6.68	16.35
		(11.34)		(144.94)
b. Upland/contour cultivation	6.95	30.54	2.3	2.5
		(339.42)		(8.70)
c. <i>Jhum</i> cultivation	77.26	86.40	163.05	159.30
		(-27.00)		(-2.30)
d. Orchard	1.48	32.82	3.05	30.75
		(2117.57)		(909.90)
e. Afforested area	26.81	106.16	23.39	37.25
		(295.97)		(59.27)
f. Aquaculture	0.05	1.29	0.00	0.07
		(24.80)		(-)
Sub-total	185.55	308.49	198.46	246.25
		(62.87)		(24.08)
Current fallow/natural forest	510.00	395.34	610.88	567.74
		(-29.00)		(-7.06)
Irrigated area	62.78	73.56	7.5	12.00
		(17.17)		(60.00)

BP=Before project; AP=After project

Figures within the parentheses indicate percentage change

watershed projects in the areas, where individual land ownership system prevailed, failed to check attachment of farmers to the traditional *jhuming* system which was against the objective of the project

Land Tenure and Farm Income

To assess the impact of land tenure systems on the farm income, a comparison was made between the households of Community ownership (Umsiang watershed) and Individual ownership systems (Maweit watershed) in terms of percentage changes in income before and after the project. A

perusal of Table 2 indicated that annual average income per household increased to Rs 40,227 (37% increase) in the Umsiang watershed and to Rs 36,711.40 (19% increase) in the Maweit watershed after the project. The farm income from agriculture, fruits and livestock including fisheries increased by about 27.48, 633.43 and 118.11 per cent in the Umsiang watershed, and the corresponding figures were 7.24, 541.81 and 37.62 per cent in the Maweit watershed after the implementation of the watershed project (Table 3). Further, it was observed that the average increase in the farm income obtained by the households of the Umsiang watershed (41.62) was significantly higher than that in the Maweit watershed (15.40). The relative share of the farm income in the total household income in the Umsiang watershed increased from 70 per cent to 73 per cent, while in the Maweit watershed it declined from 84 per cent to 81 per cent. The off-farm income, particularly from labour within the watershed, increased by 49.46 per cent in the Umsiang watershed, and 38 per cent in the Maweit watershed. This showed that watershed projects under the Community ownership system of land tenure were likely to be more successful in increasing the farm income and employment opportunities. Interestingly, the average household income from selling of forest products such as charcoal, firewood, poles and timber, etc. in the Umsiang watershed project declined significantly from Rs 1199 to Rs 398, i.e. by 66.81 per cent. The implementation of watershed projects provided better avenues for alternative income-earning opportunities to the households dependent on forest products for their livelihood. The above facts showed that the watershed projects under the community ownership system of land tenure increased not only farm income but also environmental sustainability of the area.

Pattern of Income Distribution

It may be observed from Table 3 that the share of the poorest 89 per cent of the households in the Umsiang watershed before the project was 65 per cent of the total income which increased to about 70 per cent after the project. On the other hand, the share of the upper 4 per cent in the total income was 14 per cent before the project, and it decreased to about 12 per cent after the project. However, in the Maweit watershed, where individual land ownership system existed, the share of the poorest 92 per cent declined from 64 per cent to 55 per cent of the total income after the project. Contrary to the Umsiang watershed, the share of richest 5 per cent increased from 27 per cent before the project to 38 per cent after the project. This increase in the share of the poorest group and the decline in the share of the richest group after the project in the Umsiang watershed indicated an improvement in the farm income distribution in the areas where Community ownership

Table 2. Family income under watersheds of Community and Individual ownership land tenure systems in Meghalaya state
(in Rs/household)

Components	Community ownership (Umsiang watershed)			Individual ownership (Maweit watershed)		
	BP	AP	Change, %	BP	AP	Change, %
A. Farm Income						
i. Agriculture	19525	24890	27.48	23818.15	25543.08	7.24
ii. fruits	353	2589	633.43	305.23	1959.02	541.81
iii. Livestock including fisheries	878	1915	118.11	1509.62	2077.46	37.62
Sub-total	20756	29394	41.62	25633	29579.55	15.40
	(70.53)	(73.07)		(84.02)	(81.47)	
B. Off-Farm Income						
i. Service including business	4655	5766	23.87	3833.85	5295.39	38.12
ii. Labour within watershed	2760	4125	49.46	1040	1438.46	38.31
iii. Selling of forest products	1199	398	-66.81	335.00	398.00	18.80
iv. Small scale industries	58	544	837.93	0	0	
Sub-total	8672	10833	24.92	5208.85	7131.85	36.92
	(29.47)	(26.93)		(16.89)	(19.42)	
Total	29428	40227	36.70	30841.85	36711.40	19.03

BP=Before project; AP=After project

Table 3. Distribution of household income under watersheds of Community and Individual ownership land tenure systems in the Meghalaya state

Income group (Rs)	Community ownership (Umsiang watershed)				Individual ownership (Maweit watershed)			
	Percentage of households		Percentage of income		Percentage of households		Percentage of income	
	BP	AP	BP	AP	BP	AP	BP	AP
Below 20,000	47.06	38.47	21.32	19.82	72.31	66.15	30.97	22.11
20,000–40,000	33.53	38.24	28.99	33.97	15.38	22.00	24.56	25.81
40,000–60,000	8.24	12.05	14.61	16.42	4.62	3.08	8.10	6.86
60,000–80,000	5.88	3.35	14.59	10.20	1.54	1.08	4.79	6.90
80,000–100,000	1.76	4.53	6.55	8.05	1.54	0.00	4.30	0.00
100,000–120,000	1.76	2.35	6.37	7.08	1.54	3.08	8.24	12.54
Above 120,000	1.76	1.18	7.58	4.84	3.08	4.62	19.04	25.78

BP=Before project; AP=After project

system existed. The reverse was true in the Maweit watershed where individual ownership system of land ownership was practised.

The Lorenz curves for farm household in the Umsiang and Maweit watersheds before and after the project drawn from the data in Table 3 are shown in Figures 1 and 2, respectively. In the Umsiang watershed, the Lorenz curve of the households after the project lies above that for before

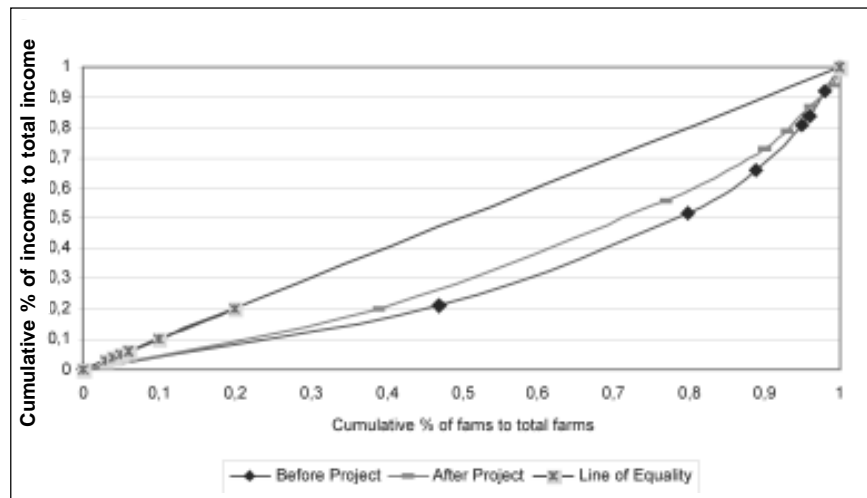


Fig. 1. Lorenz curve on distribution of income among farms under community ownership system (Umsiang Watershed, Meghalaya)

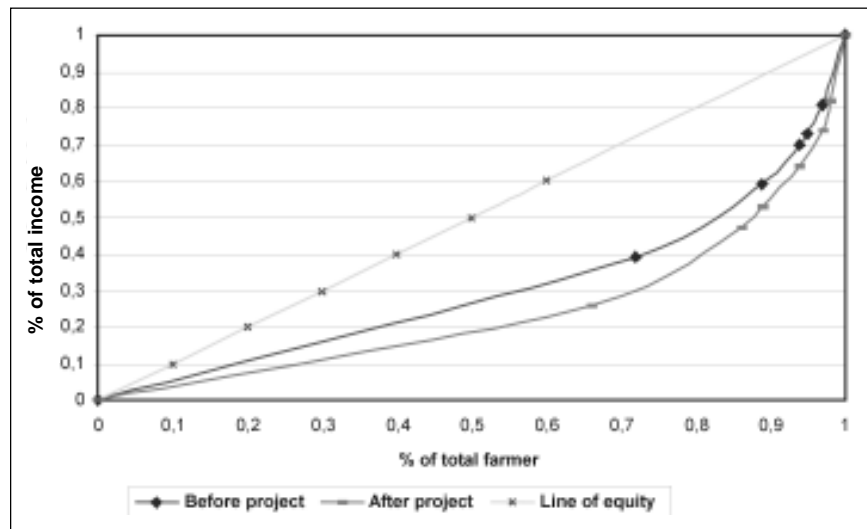


Fig. 2. Lorenz curve on distribution of income among farms under individual ownership (Maweit Watershed, Meghalaya)

Table 4. Concentration of income among households under watersheds of Community and Individual ownership land tenure systems in the Meghalaya state

Particulars	Community ownership (Umsiang watershed)		Individual ownership (Maweit watershed)	
	BP	AP	BP	AP
Gini concentration ratio	0.37743	0.29673	0.44178	0.49302
Co-efficient of variation	0.4932	0.4746	0.5532	0.5794
Standard deviation of logarithm of incomes	0.2432	0.2265	0.2736	0.2987
Test value 'F'	1.965***	1.983***		

*** Significant at 1 per cent level.

the project and the average farm income after the project was higher than that before the project. The trend was opposite in the case of Maweit watershed which indicated that the income in the Umsiang watershed project was more equitably distributed than that in the Maweit watershed after the project. But quantification of the difference in inequality could not be done without resorting to the summary indices of income inequality, i.e. Gini Concentration Ratio (GCR), Standard Deviation (SD) in logarithm of incomes and Co-efficient of Variation (CV).

It could be observed from Table 4 that the income inequality appeared to have decreased in the case of Umsiang watershed after the project. The GCR was lower (0.29673) after the project than before the project (0.37743), indicating that the income was more evenly distributed after the implementation of the project. But in the Maweit watershed, the GCR before the project (0.44178) increased to 0.49302 after the project which indicated widening of gap between the rich and the poor. This was against the equity objective of the watershed project.

Conclusions and Policy Implications

The study has clearly indicated that land tenure is an important factor in the implementation of watershed projects successfully. The reason being that it has affected the farmer's decision to adopt long-term development measures such as land development activities, horticultural plantations, afforestation and aquaculture, etc. which constitute the important components of watershed projects. In the Umsiang watershed where Community ownership system of land tenure exists, every member of the community has equal user rights, although they abstain from individual ownership rights. It has greatly influenced adoption of medium- and long-term development activities. Ultimately, it has altered the land-use pattern positively and has

declined the area under wastelands and *jhum* cultivation. On the other hand, it has increased the area under permanent cultivations, fruit and forest trees and aquaculture, etc. It has led to an increase in the income and employment opportunities without worsening farm income distribution. It suggests that the customary community ownership land tenure system would provide well-understood mechanisms by which land-users could attempt to derive the most economic benefits from the system. Any external attempt to interfere with the basis of that system, therefore, might not only arouse suspicion about their rights but also might not be necessary from an economic point. In the case of Maweit watershed that practises individual ownership system, a majority of the lands belongs to landlords. Since the tenants are lacking ownership as well as user rights, they have no incentive to adopt medium- and long-term development activities, as is reflected by the changing land-use pattern. Finally, their income has increased by worsening the farm income distribution, which is against the principle of social justice. The small and marginal farmers failed to take advantage of the project, thereby, attached to the traditional evil *jhuming* system for livelihood. It would be necessary that the process of implementation of watershed projects should take into account the local land rights; disregarding them may well lead to the failure of watershed projects and lead to an aggravation of social and economic disparity between different groups, such as owner and tenants. Perhaps an effective land reform policy suitable to the area might have to be formulated and implemented prior to watershed projects. Thus, policy and project interventions should focus on the possibilities of reducing restrictions on tenants as to their land-use rights.

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