Common Property Resources Degradation and Migration: A Case Study of Assam

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ABSTRACT Deterioration of common property resources increases the incidence of poverty level because poor people depend on forest resources. Earnings of rural people are mostly the combination of income from private property and common property resources. Reduction in common property resources reduces earnings of rural people leading them to migrate to nearby urban areas in search of livelihood. Thus, there is a link between common property resource degradation, poverty and migration. On the basis of these arguments, an attempt has been made to study the linkage between common property resource degradation and migration in the state of Assam. With the help of thirty variables at two points of time, 1991 and 2001, thirteen indicators have been constructed to represent demographic, natural resource and livestock related indicators. Factor analysis has been used to find the linkages between common property resource degradation and migration. The study finds that decreasing common property resources distress out rural people to urban areas in search of livelihood.

I. INTRODUCTION

Common property resources (CPRs) could be simply described as community's natural resources where every member has access and usage facility with specified obligation, without anybody having exclusive property rights over them (Jodha 1995). In the context of Indian villages, the resources falling under CPR category include community pastures, community forests and wastelands, common dumping and threshing grounds, watershed drainages, village ponds, rivers/rivulets as well as their banks and beds (Gowda and Savadatti 2004). CPRs have been steadily declining in quantity and quality over the years (Chopra and Gulati 1998). This declining CPR extent and quality is important both for sustainability of CPR dependent livelihoods and the natural resources themselves (Chopra and Dasgupta 2002). According to the agricultural statistics of India, total CPR land in the 16 states of India was 70.042 million hectares in 1990-91[1]. Of this, 44.983 million hectares or about 64.23 percent was non-forest land. This estimate didn't include north-eastern states of India due to lack of reliable land record statistics. On the basis of available estimates, it can be concluded that had these states been included, the total CPR would have increased to 74.573 million hectares. Further, CPR area varies from 25 to 52 percent of geographical area in these states (Kadekodi 1997). There are changes over time in the magnitude of CPR land both as percentage of the geographical area and in per capita terms. The percentage of land over which CPR rights exist has decreased over the years in the majority of the Indian states.

The fact may have severe impact on the lives of rural poor as CPR plays significant role in the life and economy of rural people by providing income and livelihood (Jodha 1986; Pasha 1992; Singh et al. 1996; Gowda and Savadatti 2004). Environmental degradation through reduction of common property resources decreases earnings of the rural mass. This deterioration of resources increases the incidence of poverty, as these poor are exclusively dependent on the stock of natural resources. Including India, most of the world's poor are rural. About three in four poor people live in rural areas, where they depend on natural resources for their livelihoods (USAID 2006; Lee and Neves 2009). Poor environmental conditions, coupled with low investment levels, can create a downward spiral of resource degradation, poverty, and migration. It has been found that absolute poverty is often responsible for stronger inclination to migrate (Stark et al. 2009). Increased poverty due to degradation in CPRs forces people to migrate to

urban areas in search of livelihood. The environmentally induced migration gives birth to a new group of refugee. They are called environmental refugees. Environmental refugees are a dramatically growing group of refugees, mostly migrating from rural areas to cities (Rechkemmer 2009).

Therefore, it may be said that degradation in common property resources causes migration through its impact on poverty. Information is not available on the common property resource degradation in the state of Assam, which is situated in the North Eastern Region of India. It has been found that common property land resource per household was 0.31 hectare at national level whereas it is only 0.05 hectare for Assam. The figure is much higher for Arunachal Pradesh where the common property land resource per household was 1.15 hectare (Govt. of India 1999). Henry et al. (2003) have found that besides socio- demographic factors, land degradation, land availability and climatic variability are significant variables in explaining migration. Such environmental problems obviously change livelihood and forces to migrate (Black et al. 2011; Poston Jr. et al. 2009). Besides, social network availability of land is another factor to influence migration (Dribe 2003). At the same time, rural-to-urban migrants in the period 1991-2001 as a percentage of urban population for Assam were 7.12 (Mitra and Murayama undated). Taking into consideration the facts and figures which represents low availability of common property resources, it may be a cause of distress migration in Assam also. Therefore, the main objective of the paper is to

- Study the linkage between common property resources and migration in Assam.

The hypothesis to be tested is - a decline of common property resources associated with environmental degradation pushes rural people to migrate to urban areas.

II. METHODOLOGY

Study Area

The study covers the state of Assam consisting of 23 districts. Although at present there are 27 districts in Assam but due to non-availability of data, the recently created 4 districts have not been shown explicitly in the analysis.

Rather the new districts, namely, Kamrup Metro, Baksa, Chirang and Udalguri of Assam are clubbed with the districts from which these have been carved out. Assam is the only plains state (except two hill districts) of the north-eastern region. Total geographical area of Assam is 78,438 sq. km. According to 2001 census, decadal population growth is 26.21 percent with a density of 340 persons per sq. km. It has 64.28 literacy rate, having 932 female against 1000 male. The annual average value of collection from CPR is about Rs.519 for Assam while it is Rs.693 at all India level. On the other hand, the value of CPRs as a percentage of consumer expenditure is only 3.02 per cent at the national level while it is 4.89 percent in case of Assam. No separate estimates have been found in the literature review for CPR use for the state of Assam. But for the Eastern Himalayas[2] including Assam, the percentage of households collecting CPR products is 51 while it is 48 percent at national level for India (Menon and Vadivelu 2006).

Data Source and Variables

The study is entirely based on secondary data collected from Census Report 1991 and 2001, Statistical Handbook of Assam and various government sources. To carry out the study, 30 relevant variables have been taken into consideration to represent different demographic, natural resource and livestock related variables at two points of time 1991 and 2001 (see appendix). With the help of these thirty variables, thirteen indicators have been constructed to represent demography related indicators, natural resource indicators and livestock indicators as follows:

a. Demography Related Indictors: Migration is one of the major problems in Assam. It is believed that most of the immigrants are from neighbouring countries and states. There is also migration from rural to urban areas but there is no clear-cut estimation of net migration from rural to urban areas. Due to non-availability of data regarding migrational movement at district level, natural growth index (NGI) and migrational growth index (MGI) have been constructed for all 23 districts. To construct NGI and MGI, factor scores have been obtained by applying factor analysis on crude birth rate, percentage of married females in age group 15-19, population density, percentage of literacy rate, percentage

of urban population, percentage of agricultural workers, percentage of industrial workers and sex ratio. The other demographic indicators are change in district population growth (Pop_growth), change in district urban population (Urban_pop), change in district literacy rate (Lit_rate), change in district agricultural workers as percent of total main workers (Agri_work) and change in district industrial workers as percent of total main workers (Ind_work). These indicators constructed give an idea about urbanization and migrational motivation to industrial areas from neighbouring rural areas.

 b. Natural Resource Indicators: Structural change in land use help to know about the change in common property resources. At the same time, change in forest cover and net sown area over the years also indicate the change in common property resources. It is so because any change in net sown area affects food grain production. Coupled with this, a change in irrigated area and amount of rainfall also affect production of grains. Higher irrigated area absorbs higher rural people in the agricultural land and prevents distress migration. Moreover, district common property area has also been estimated by combining the following three types of area, namely, permanent pastures and other grazing land, land under miscellaneous trees and groves not included in net area, cultivable wasteland and fallow land other than currently fallow. Accordingly, the following indicators have been constructed: change in district forest area as percent of total geographical area (Forest_area), change in district net sown area as percent of total geographical area (Net_sown_area), change in district per capita food grain production (Food_prod), change in district irrigated area as percent of total cropped area (Irri_area) and change in district common property resources area (CPRs).

 c. Livestock Indicators: There is a strong positive relation between deforestation and livestock population. Deforestation results in decline in fodder availability and affects the survival of livestock population. It can be argued that any change in composition of livestock accelerates the process of deforestation and land degradation. An increase in the percentage of sheep and goat in the total livestock is taken to imply degradation of environment, as these animals survive better in degraded areas.

Therefore, environmental degradation index can be calculated on the basis of structural composition of livestock. This indirect measure is more preferable than the direct measure of forest degradation due to non-availability of time series and cross- section data (Chopra and Gulati 2001). Accordingly, district wise data on change in the number of sheep and goat as percent of total livestock (Sheep_goat) has been used as one of the important indicators of CPRs degradation.

 After constructing these13 indicators mentioned above, factor analysis has been used to explore the inter linkages among population movement, environmental degradation and common property resources.

III. RESULTS AND DISCUSSION

 To find out the linkages between migration, common property resources and environmental degradation factor analysis has been applied on these13 indicators. The rotated factor structure using varimax technique has been presented in Table 1. Following five factors have been extracted by using factor analysis.

 First Factor: The first factor reveals a strong linkage between depletion of common property resources with positive and significant factor loading on migration growth index and people engaged in industrial activities. The positive and strong factor loading of percent of sheep and goat to total livestock with negative and strong factor loading of CPRs is the indication of environmental degradation. Such environmental degradation is apparent from the negative factor loading for the indicator of forest cover area. The decline in common land area forced people to migrate to nearby towns in search of livelihood. The concept of environmental degradation falls within the domain of environmental change because the concept of environmental change encompasses natural disasters and the gradual deterioration of environmental conditions. Environmental degradation increases distress out migration (Chopra and Gulati 2001; Poston Jr et al. 2009). There is much evidence gathered in the last five years that environmental degradation induces migration (Morrissey 2009). Environmental degradation is gradual and households can determine how they respond to environmental change, say for example by using of water and soil conservation techniques,

Table 1: Factor loading matrix

Indicators	First factor	Second factor	Third factor	Fourth factor	Fifth factor
Urban_pop	-.176	.073	.897	-.027	.070
Lit_rate	-.073	.017	.113	-.193	.790
Net_sown_area	-.002	-.051	-.159	.928	-.069
Forest_area	-.738	-.060	-.093	-.101	.131
Food_prod	.219	.585	.056	.654	-.105
Irri-area	-.077	.399	-.205	.076	.725
Agri_work	.027	.846	.116	.342	.173
Ind_work	.672	.262	.390	-.040	-.269
NGI	.094	.611	.232	-.015	-.032
MGI	.790	-.102	-.566	.050	-.123
Sheep_goat	.542	-.285	.225	.480	-.192
CPRs	-.712	-.026	-.166	-.045	.216
Pop_growth	.401	-.400	-.535	.347	.099
Eigen value	2.427	1.945	1.895	1.876	1.656
% of variance	26.080	16.081	12.424	10.865	9.470

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization
Source: Calculated by authors
Change in district urban population (Urban_pop), change in district literacy rate (Lit_rate), change in district net sown area as percent of total geographical area (Net_sown_area), change in district forest area as percent of total geographical area (Forest_area), change in district per capita food grain production (Food_prod), change in district irrigated area as percent of total cropped area (Irri_area), change in district agricultural workers as percent of total main workers(Agri_work), change in district industrial workers as percent of total main workers (Ind_work), natural growth index (NGI), migrational growth index (MGI), change in the number of sheep and goat as percent of total livestock (Sheep_goat), change in district common property resources area (CPRs) and change in district population growth (Pop_growth).

migration, off-farm job, etc. (Henry et al. 2003). Such environmental change may threaten people's livelihoods, and a traditional response is to migrate. Many times migration is the only response to environmental degradation. Environmental degradation will affect migration now and in the future, specifically through its influence on a range of economic, social and political drivers which themselves affect migration (Foresight 2011).

Second Factor: The second factor shows strong positive association between the indicator for food grain production and agricultural worker. At the same time the loading for the indicator representing irrigated area is also high. In other words, increasing irrigational facility enhances the employment possibility of rural people as agricultural workers. It helps curtailing migration to urban areas as shown by negative loading for MGI. Employment opportu-

nities determine the economic condition of a household. Economic factors may be of paramount importance to determine whether to migrate or not (Fielding 2011). Usually rural people migrate to urban area because of lack of employment facilities mainly in agricultural activities (Kundu and Sarangi 2007). Possibility of employment reduces economic vulnerability of households and may prevent migration.

Third Factor: The third factor is basically a composite of demographic indicators. It generates positive loading for urban population growth but loading for MGI is negative which shows an inverse relation between population growth and MGI. The argument behind the statement is that an increase in urban population in not because of increasing population growth in urban areas itself. The possible cause may be migration. For example, in China the major cause of urban population growth is migration from rural areas (Zhang and Song 2003). The positive factor loading of industrial workers also supports the possibility. The results demonstrate that, as expected, demographic and socio-economic characteristics are associated with migration patterns. However, the contribution of environmental variables in the explanation of migration was slightly lower than the socio-demographic variables (Henry et al. 2003). Therefore, an increase in urban population in relatively shorter period is attributed to migration. In some cases migration rate significantly influence the level and composition of human capital (Maria and Lazarova 2011).

Fourth Factor: A close look at the fourth factor reveals that net sown area is positively and strongly related with food grain production. It is a fact that an attempt to increase food grain production may increase the net sown area. Often in the rural areas an increase in net sown area is at the cost of decrease in forest area. The negative factor loading on forest area also implies the same thing. Again as explained earlier, number of sheep and goats is inversely related with forest area, therefore the strong and positive factor loading on sheep and goats implies natural resource degradation. This implies that rural people who are poor cannot go for intensive cultivation and rather adopt extensive cultivation with the help of livestock. Thus, there is environmental degradation coupled with an attempt to increase food grain by increasing net sown area. It has been found that an increase in

net sown area may increase agricultural activities and may significantly affect migration (Gray 2009). Population-driven pressure on croplands, pasturelands, and forestlands coupled with rural poverty triggered rural out migration to urban and industrial centers for wage employment (Gulati and Sharma 2000).

Fifth Factor: The fifth factor reveals positive association between change in literacy rate and change in irrigation facility. But at the same time the loadings for NGI and MGI are small and negative. Literacy enhances the possibility of increase in irrigated area. Urban area experiences low population growth because of high literacy and higher standard of living (Henry et al. 2003). Therefore, it can be said that an increase in literacy rate may check migration as literacy may increase the use of irrigation facilities. An increase in irrigation potential is very important and may be used as a checkpoint to distress out migration of rural workers. It is because availability of water is an important factor to determine distress migration. Migration in search of better source of water is a wide spread phenomenon (Mbonile 2005). Such availability of water mainly means facility for irrigation and it is important for both landed as well as landless labourer (Shah 2011; Vos1982). An improvement in water harvesting techniques may help prevent migration.

From the above discussion it is clear that there is environmental degradation causing migration. As a result urban areas are experiencing an increase in population because of distress out migration in rural areas.

IV. CONCLUSION

The study clearly shows that decrease in common property resource have forced rural people to migrate to urban areas. Negative area under forest cover representing depletion of common property resources with strong and positive migrational index shows that people are migrating from rural to urban areas and get engaged as industrial workers. The migrational movement can be stopped provided infrastructure of agriculture such as irrigational facility has been improved to create scope for rural people to be engaged as agricultural workers. Therefore, the hypothesis, which states that decreasing common property resources

distress out rural people to urban areas in search of livelihood, may be accepted.

V. RECOMMENDATIONS

The linkages between environmental degradation and rural people's migration highlight the fact that people's decision to migrate may be influenced by rights of common property resources. This fact implies an important recommendation for policy implications. A well-defined common property resource rights through better management of common property resources can check migration of rural people to urban areas. Better management of common property resources will enhance the stock of natural resources as well as the income of rural people and thereby enhance the probability of involvement of rural people in different activities for livelihood. Greater degree of certainty of income through the common property resources will be significant from the point of view of survival strategy of rural people. Of late, Government of Assam has implemented various strategies for afforestation like social forestry (as has been seen earlier there is a link between deforestation and migration) and other rural development activities to provide employment facilities. These programs also aim at preserving and conserving environment in the rural areas in an indirect way. But very little attention has been given to the enhancement of common property resource management directly. In this respect, institutional reform can do a lot to deal with the dwindling common property resources to make it more sustainable in the long run. The rural bodies like *gram sabha*[3] should be given more emphasis for the management of common property resources.

NOTES

1. The 16 states are Andhra Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.
2. Due to non-availability of data exclusively for Assam, here we are using data for Eastern Himalayas through which we will have an idea about the position of Assam. Eastern Himalayas includes north-eastern states and parts of West Bengal.
3. *Gram sabha* means a village assembly which shall consist of all adult members of a village and in case

of states having no *panachayats, padas, tolas* and other traditional village institutions and elected committees, with full and unrestricted participation of women (Government of India 2007).

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APPENDIX

Table 1: List of variables used for factor analysis

Demographic:
1. District Population growth 1991
2. District Population growth 2001
3. District Crude birth rate 1991
4. District Crude birth rate 2001
5. District number of married females in age group 15-19, 1991
6. District number of married females in age group 15-19, 2001
7. District Natural growth index 2001
8. District Migrational growth index 2001
9. District Population density per sq. km 1991
10. District population density per sq. km 2001
11. District Sex ratio 1991
12. District Sex ratio 2001
13. District percent of Urban Population 1991
14. District percent of Urban population 2001
15. District literacy rate 1991
16. District literacy rate 2001
17. District percent of Agricultural workers 1991
18. District percent of Agricultural workers 2001
19. District percent of Industrial workers 1991
20. District percent of Industrial workers 2001

Natural Resources:
1. District percent of Net sown area 1991
2. District percent of net sown area 2001
3. District percent of Forest cover area 1991
4. District percent of Forest cover area 2001
5. District per capita Food grain production 1991
6. District per capita Food grain production 2001
7. District percent of Irrigated area 1991
8. District percent of Irrigated area 2001

Livestock:
1. District percent of number of Sheep and Goat 1991
2. District percent of number of Sheep and Goat 2001