



Characterization of Forest Fringe Tribal People in View of Land Holding Inequality in Jharkhand, India

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ABSTRACT

The study was conducted to analyze the role of land holding inequality in characterizing the socio-economic, psychological, communication and situational characteristics in tribal people living in forest fringe villages of Jharkhand, India. A total of 164 tribal households were selected using stratified random sampling technique based on size of land holding. Structured interview schedule and direct observations were used in the data collection. Descriptive statistics and F test were applied for analysis. Results revealed that the land-use is mostly dominated by cultivation (53.06%) followed by forest (28.47%), cultivable waste (10.68%), non-agricultural use (6.53%) and uncultivable waste (1.26%) in the sample villages. The sample villages cover an operated land of 1543.83 ha which is occupied under different farmer's group as marginal (42.40%), small (42.40%), medium (17.77%) and large (8.95%). The soils in the sample villages are acidic in reaction with pH of 5.6 having low organic carbon content (0.45%) with medium available nitrogen (327.60 Kg/ ha), phosphorous (22.88 Kg/ ha) and potassium (142.27 Kg/ ha) status. The mean values of the variables viz., education, social participation, family composition, occupation, housing status, farm power, farm implements, livestock possession, material possession, level of aspiration, extension contact, use of information sources, employment status, knowledge about forestry practices, adoption of forestry practices, attitude towards forestry, income from forestry and gross annual income were significantly different, whereas, the attributes namely, age, migration status and utilization of forest resources have shown insignificant differences among various farmer groups. This study highlighted and reinforced the values of socio-economic, psychological, communication and situational characteristics for livelihood diversification using unconventional interventions through emphasizing policy initiatives based on land holding inequality in tribal communities.

Introduction

Land is very important to tribal people with the common belief of “we don’t own the land, the land owns us” (Sivaji, 2009). Land to tribal people is a major part of their identity and spirituality. They have a connection and sense of belonging to their land and because of this connection many tribal people will not leave their country. Those who do leave, tend to always come home to visit, keeping the connection (Singh and Quli, 2011). They gain their strength through their land because the land is a powerful healer. Many believe this is because old ancestors were buried in their country that invokes serenity and connectedness and the spirits protect and care for the land and those still alive (Anonymous, 2013). Land is a story place for tribal people holding the stories of human survival across the generations. Land shapes tribal people, just as tribal people shape their countries. Land has recuperative aspects that are essential to tribal well-being and survival. Tribal people use the land to produce food, fibre, timber and energy – things they depend upon for their existence (Sarmah and Arunachalam, 2011). The way the use of the land is managed directly influences the environment - from the character of the landscape to wildlife and natural resources (Quli and Singh, 2009). It provides jobs for the tribal people who live there - an economic basis for rural communities that influences the quality of life of those people (Islam *et al.*, 2014a).

The relationships between farming, forestry, local communities and the environment have changed over recent decades (Quli and Singh, 2009). Rural land management practices have become more intensified and more specialized. These changes have been linked to declines in biodiversity - the range of species to be found - as well as reductions in soil and water quality (Nayak *et al.*, 2014). We have also seen a fall in the numbers employed in agriculture and forestry, with a significant effect on many rural communities. These changes have probably been driven by a combination of factors namely, the effect of the common agricultural policy, technological advances, changing consumer patterns and more demanding societal expectations (Dodd and Nyabvudzi, 2014). Increasingly, issues such as market globalization, climate change and public expectations of the countryside added to the pressures on traditional rural land use and communities (Nayak *et al.*, 2014). These transforms aggravated the problems of poverty, migration, unemployment, under-employment, food insecurity and malnutrition for millions of tribal people in India (Mourlin, 2007). The livelihoods of tribal communities in the area have traditionally been dominated by subsistence agriculture having clear-cut limitations as an employment and income provider for growing labour force (Islam *et al.*, 2014a). The forestry interventions integrated with agricultural, animal husbandry and industrial ventures has great potential to enhance livelihood sustainability, poverty reduction and food security for vulnerable section of society including illiterate, unskilled, resource-poor, jobless, landless and labourers people (Islam *et al.*, 2014a). Nonetheless, the livelihood diversification using unconventional interventions in tribal communities is a very problematic assignment among scientists, social workers, extension workers, Governmental employees and Non-Governmental Organization officials which needs scrupulous knowledge of socio-economic, psychological, communication and situational values of stakeholders (Islam *et al.*, 2014b). Conversely, the role of land holding inequality in socio-economic, psychological, communication and

situational characteristics is an integral part of the tribal people living in forest fringe villages in Jharkhand, India. Keeping the above facts in view, the present study has been undertaken to investigate the effect of land inequality on socio-economic, psychological, communication and situational characteristics of tribal people living in forest fringe villages in Bundu block of Ranchi district in Jharkhand.

Materials and Methods

Study Site, Demography and Climate

The study was conducted in Bundu block of Ranchi district in Jharkhand lying on the undulated surface of Chhotanagpur plateau between 23⁰11' - 23⁰18' North latitude and 85⁰35' - 85⁰58' East longitude at an altitude of 337 meters above mean sea level with total geographic area of 25097 ha. The block is a backward area, with 4377.50 ha (17.44%) of geographic area under forest cover and inhabited by 32528 (60.74%) tribal people belonging to *Munda*, *Oraon* and *Lohara* who use the local Northern Tropical Dry Deciduous Forest (5B/C2) (Champion and Seth, 1968) to extract non-timber forest products (NTFPs) for self-consumption and economic subsistence. Rain fed agriculture using dry land varieties of paddy form the main land use in the area. The study site enjoys typical tropical climate with three distinct seasons viz., (June-October), winter (November-February) and summer (March-June), average rainfall of 1413.60 mm and temperature varying from 24°C to 37.2°C (Anonymous, 2009).

Sampling Procedure

The study involved 9 sample villages viz., Korda, Jojoda, Husirhatu, Banaburu, Nehalgar, Ghagrabera, Hesapiri, Roredih and Kuchidih selected out of the 88 revenue villages having around 10% sampling intensity in the block employing random sampling technique (Ray and Mondol, 2004). Selection of respondents was done by proportionate stratified random sampling technique (Ray and Mondol 2004) based on size of land holding namely, marginal (up to 1.0 ha), small (1.1 to 2.0 ha), medium (2.1 to 4.0 ha) and large (4.1 ha and above) as per categorization of Haque *et al.* (2010). The sample size was consisted of 164 tribal people having 20% of the total number of the households comprising 77 marginal, 43 small, 29 medium and 15 large sized land holders. Household heads or eldest members were treated as respondents.

Data Collection and Analysis

The study included both qualitative and quantitative methods. Using both secondary sources and primary field survey collected data. Secondary data were collected from official records of different governmental and non-governmental agencies, village records, annual reports and internet. Primary sources included structured interviews with selected respondents and direct observation. The socio-economic, psychological, communication and situational characteristics included were quantified using appropriate scales of the earlier workers (Venkataramaiah, 1990; Singha *et al.*, 2006) after certain necessary modifications. The variables were; age, education, social participation, family

composition (family type, family size), main occupation, housing status (type, number), farm power, farm implements, livestock possession, wealth status, income from forestry, gross annual income, level of aspiration, knowledge about forestry practices, adoption of forestry practices, attitude towards forestry, extension contact, use of information sources, employment status, migration status and utilization of forest resources. The statistical tools viz., frequency (f), percentage (%), average (x), standard deviation, range and F test were applied for analysis of the data as per Snedecor and Cochran (1967).

Results and Discussion

Land Use Pattern

The patterns of rural land use are invariably associated with micro-geographical conditions such as topography, geology, soil fertility, climate and weather conditions. The analysis of the land-use data (Table 1.) within each sample villages indicates the dominance of land area under cultivation (53.06%), out of which the greater proportion (47.10%) of the total land area is un-irrigated and a very little percentage (5.96%) of the total land area is irrigated. The total net sown area comprises 58.89 percent lowland (*Doin*) and 41.11 percent upland (*Tanr*) in the sample villages.

The second important land-use category in the sample villages is forest accounting 28.47 percent of the total geographical area. The land area under cultivable waste was about 10.68% of the total land and the extent of land area put under non-agricultural use was 6.53 percent of the total geographical area. The percentage of uncultivable wasteland is only 1.26 percent of the total land. Per household net sown area and forest area in the sample villages were 1.87 and 1.0 ha respectively. The land area under cultivable waste, non-agricultural use and uncultivable waste land per household in the sample villages were 0.38, 0.28 and 0.05 ha, respectively.

Table 1 Land use pattern in the sample villages

Land use categories	Area (ha)	Percentage
Forest	819.50	28.47
Cultivable waste land	307.51	10.68
Uncultivable waste land	36.28	1.26
Non-agricultural land	188.01	6.53
Net sown area	1527.64	53.06
a. Irrigated	171.49	5.96
b. Un-irrigated	1356.15	47.10
Total geographical area	2878.94	100.00

Source: Anonymous (2009)

Land Distribution Pattern

The pattern of land distribution among various farmer groups in the sample villages (Table 2.) indicated that 73 large land holding households occupied about 30.99

percent of the total operated land in the study area. The proportion of land owned by the 145 households belonging to medium land holding category was 29.87 percent of the total operated land holding in the area.

Table 2: Land distribution pattern among different farmer's group in the sample villages

Farmer's group (Land ownership range in ha)	No. of households	Land holding (ha)	No. of people	Per capita land holding (ha)
Landless (0.00 ha)	36 (4.41%)	0.00	185 (4.22%)	0.00
Marginal (< 1.00 ha)	346 (42.40%)	253.22 (16.40%)	1845 (42.07%)	0.14
Small (1.01-2.00 ha)	216 (26.47%)	351.10 (22.74%)	1159 (26.42%)	0.30
Medium (2.01-4.00 ha)	145 (17.77%)	461.12 (29.87%)	791 (18.03%)	0.58
Large (> 4.00 ha)	73 (8.95%)	478.39 (30.99%)	406 (9.26%)	1.18
Total	816 (100.00%)	1543.83 (100.00%)	4386 (100.00%)	0.35

Figures in the parentheses indicate percentages

Source: Anonymous (2009)

The percentage of operated land under 216 small land holding households was 22.74 percent of the total holding. The size of land holding accounted by the 346 marginal farmers families was 16.40 percent of the total operated land holding in the villages. The per capita land holding among marginal, small, medium and large land holding households is 0.14, 0.30, 0.58 and 1.18 ha, respectively, whereas among all the households together, the per capita average operated land holding was 0.35 ha.

Chemical Analysis of Soil

Most of the land lying unproductive in the sample villages is upland and predominantly red sandy loam, 1.0-1.5 m deep. Mixed calcareous and *murrammy* soils are also found in some areas. The chemical analysis of soil indicates that the soils in the sample villages are acidic in reaction with pH of 5.6 resulting in low availability of several plant nutrients and poor soil fertility status. The organic carbon content is low (0.45%) and the available nitrogen (327.60 Kg/ ha), phosphorous (22.88 Kg/ ha) and potassium (142.27 Kg/ ha) status is medium (Table 3.).

These nutrient-impoverished soils are inadequate for cultivation of agricultural crops. However, these lands can be utilized and mobilized efficiently through agroforestry, energy plantation, pasture development, timber plantation, tasar silk rearing, lac cultivation, bamboo planting and fruit farming (Islam *et al.*, 2013). The livelihood diversification through these interventions have tremendous potential to improve food

and nutritional security, hunger elimination and poverty reduction, socio-economic development, improvement in quality of life, ecological stability and infrastructure development in the sample villages (Singh and Quli, 2011).

Table 3 Chemical analysis of soil of the sample villages

Parameter	Mean value	Range	Remarks
pH	5.6	5.2-5.9	Strongly acidic
Organic carbon (%)	0.45	0.41-0.48	Low
Available N (Kg/ ha)	327.60	252.72- 402.48	Medium
Available P (Kg/ ha)	22.88	20.50-24.70	Medium
Available K (Kg/ ha)	142.27	138.80- 145.00	Medium

Socio-economic Characterization of Forest Fringe Tribal People

The mean values along with standard error of the socio-personal and economic variables of different farmer's group were computed and the significance of the difference among the groups was studied applying F-test (Table 4.). The results revealed that the mean values of the attributes viz., education, social participation, family composition, main occupation, housing status, farm power, farm implements, livestock possession, material possession, income from forestry and gross annual income were found increasing as the size of land holding increased from marginal to large farmers, whereas the mean values in case of age of various farmer groups was unsystematic *i.e.* not in increasing or decreasing order with the increase of size of land holding from marginal to large.

Psychological, Communication and Situational Characterization of Forest Fringe Tribal People

The mean values along with standard error of the psychological, communication and situational variables of different farmer's group were computed and the significance of the difference among the groups was studied applying F-test (Table 5.). The results revealed that the mean values of the attributes viz., level of aspiration, extension contact, use of information sources, employment status, knowledge about forestry practices, adoption of forestry practices and attitude towards forestry were found increasing as the size of land holding increased from marginal to large farmers, whereas the migration status have shown reverse trend *i.e.* decreased with the increase of size of land holding. The mean values in case of utilization of forest resources of various farmer groups was unsystematic *i.e.* not in increasing or decreasing order with the increase of size of land holding from marginal to large. Out of the twenty one variables, the F values for eighteen variables viz., education, social participation, family composition, occupation, housing status, farm power, farm implements, livestock possession, material possession, level of aspiration, extension contact, use of information sources, employment status, knowledge about forestry practices, adoption of forestry practices, attitude towards forestry, income from forestry and gross annual income are significant at 5% level of probability, whereas,

the remaining attributes namely, age, migration status and utilization of forest resources have shown insignificant differences among various farmer groups.

Table 4 Inequality in socio-economic variables of farmer's group (N=164)

Variables	Farmer's group				F-value
	Marginal (n=77)	Small (n =43)	Medium (n =29)	Large (n =15)	
Age	41.30±1.08	42.74±1.39	41.14±1.88	40.20±2.73	0.36NS
Education	1.07±0.13 ^a	1.33±0.20 ^{ab}	1.69±0.30 ^{bc}	2.40±0.48 ^c	4.74*
Social participation	0.82±0.11	1.33±0.18 ^a	1.55±0.24 ^a	1.93±0.36 ^a	5.99*
Family composition	2.75±0.10 ^a	3.07±0.14 ^{ab}	3.10±0.17 ^{ab}	3.47±0.19 ^b	3.75*
Main occupation	2.61±0.13 ^a	2.93±0.16 ^{ab}	3.04±0.18 ^{ab}	3.47±0.34 ^b	2.98*
Housing status	3.12±0.06 ^a	3.40±0.14 ^{ab}	3.72±0.21 ^b	3.73±0.32 ^b	4.97*
Farm power	0.69±0.06	1.26±0.08 ^a	1.48±0.13 ^a	1.53±0.22 ^a	19.26*
Farm implements	8.52±0.42	10.61±0.57 ^a	11.59±0.58 ^a	11.87±0.87 ^a	8.05*
Livestock possession	1.81±0.06 ^a	2.00±0.08 ^{ab}	2.14±0.10 ^b	2.20±0.11 ^b	4.28*
Material possession	6.34±0.32	8.88±0.47 ^a	10.14±0.49 ^a	10.27±0.68 ^a	18.87*
Income from forestry	2.03±0.12	2.42±0.14 ^a	2.59±0.17 ^a	2.73±0.21 ^a	4.22*
Gross annual income	1.70±0.07	2.47±0.11	2.93±0.16 ^a	3.07±0.15 ^a	34.29*

* = Significant at 5% level of probability, NS = Non-significant,
Values bearing same superscript in a row did not differ significantly

Cultivable land is the productive asset playing vital role in sustenance and improvement of the livelihoods, farming system, cropping pattern, incorporation of subsidiary occupations, on-farm employment and income opportunities, standard of living, nutrition and health, institutional credit facility, financial, technical and input support from Governmental and Non-Governmental Organization, local recognition and socio-economic condition of the people in the area (Ajake and Enang, 2012; **Bedia, 2014**). Consequently, the higher the size of land holding under the possession of the sample households of different farming categories, the higher is the levels of education, social participation, family composition, occupation, housing status, farm power, farm implements, livestock possession, material possession, level of aspiration, extension contact, use of information sources, employment status, knowledge about forestry practices, adoption of forestry practices, attitude towards forestry, income from forestry and gross annual income (Bijalwan *et al.*, 2012; Bhatia and Yousuf, 2013). As regards migration status, it has been observed that the respondents with smaller size land holding did not depend solely upon agriculture for their livelihood (Islam *et al.*, 2014a). Further, the lack of alternative livelihood options to supplement their economic condition

enhanced unemployment resulting in seasonal migration for employment of small sized land holders compared to respondents with big farms (Singh *et al.*, 2007; Sood *et al.*, 2008). The extent and pattern of utilization of forest resources among young, middle or old aged respondents belonging to different land holding categories was more or less similar showing no significant differences (Singha and Talukdar, 2006).

Table 5 Inequality in psychological, communication and situational variables of farmer's group (N=164)

Variables	Farmer's group				F-value
	Marginal (n=77)	Small (n=43)	Medium (n=29)	Large (n=15)	
Level of aspiration	20.83±0.44 _a	21.91±0.64 _{ab}	23.76±0.76 _{bc}	24.53±1.07 ^c	6.00*
Knowledge about forestry practices	23.03±0.34	25.14±0.49 _a	25.38±0.57 _a	26.53±0.52 _a	9.72*
Adoption of forestry practices	12.04±0.33	14.33±0.45 _a	15.10±0.72 _a	15.80±0.57 _a	12.60*
Attitude towards forestry	30.99±0.58	33.67±0.74 _a	34.55±0.84 _a	35.73±1.00 _a	7.14*
Extension contact	9.90±0.37	12.23±0.48 _a	13.24±0.53 _{ab}	14.80±0.22 _b	16.45*
Use of information sources	15.21±0.43	18.12±0.59 _a	18.62±0.59 _a	20.20±0.63 _a	13.60*
Employment status	5.61±0.21	6.70±0.35 ^a	7.07±0.43 ^a	8.93±0.54	12.62*
Migration status	3.88±0.28	3.30±0.27	3.14±0.40	2.33±0.55	2.51NS
Utilization of forest resources	17.10±0.50	18.05±0.65	18.00±0.74	19.40±0.85	1.48NS

* = Significant at 5% level of probability, NS = Non-significant, Values bearing same superscript in a row did not differ significantly

The significant mean difference in socio-personal, economic, psychological, communication and situational variables among different farmer's group is well articulated by the facts that the size of land holding is the key factor that directly and indirectly contributes to the household livelihood assets status in terms of physical, natural, financial, human and social capital upon which the socio-personal, economic, psychological, communication and situational variables are built (Kumar *et al.*, 2010; Islam *et al.*, 2013). There exists a symbiotic relationship between the land holding inequality and household characteristics. These inter-relationships constitute a determining factor in ensuring sustainable human development (Negi *et al.*, 2002). The various household characteristics nurture the human behaviors in different ways as the knowledge is built up through education, which makes the person aware of new innovations (Sood *et al.*, 2008); the social participation of the tribal people paves the way for sharing their views and experiences (Nagesha and Gangadharappa, 2006); the family composition influences decision making and livelihood diversification and opportunities (Thamban *et al.*, 2008); the main occupation of the tribal people exhibits direct bearing

on the earning of money (Kumaresan and Devi, 2009); the housing status, farm power, farm implements, livestock possession, material possession, income from forestry and gross annual income are the major indicators of physical capital possessed by the tribal people and the physical capital is a core contributor, a major part and the representative of the livelihood assets status (Nagesha and Gangadharappa, 2006); the level of aspiration concerns with the future level of possible achievement, socio-economic development and household security (Satyanarayan and Jagadeeswary, 2010) the knowledge about forestry practices, adoption of forestry practices and attitude towards forestry develops self-confidence and motivation in adoption of new forestry technologies and innovations (Ponnusamy and Gupta, 2006); the extension contact and utilization of information sources helps in acquiring more and more information about how to make a livelihood improved, diverse and effective and to solve their livelihood stresses and shocks (Islam *et al.*, 2014c) the employment status governs the household income level, consumption standard and the incidence of poverty (Mitra and Verick, 2013). Thus, the higher the size of land holding the higher will be livelihood assets status (physical, natural, financial, human and social capital) synthesizing higher status in socio-personal, economic, psychological, communication and situational variables in the households (Pal, 2011; Sarmah and Arunachalam, 2011).

Conclusion

Land to tribal people is a major part of their identity and spirituality. Rural land use is about more than just producing food, timber and energy. It plays a vital role in national economy, rural development, employment and occupation, agro-industries, food and nutrition security, growth and survival, social, economic and cultural conditions, poverty alleviation and livelihood sustainability. The current agricultural policy, technological advances, changing consumer patterns, more demanding societal expectations, market globalization, climate change and modernization of the countryside aggravated the transformation of rural land use from traditional to modern. To facilitate the socio-economic condition, poverty alleviation, livelihood sustainability and food security in tribal communities, coping up with the land use changes is imperative. Reinforcement of the values of socio-economic, psychological, communication and situational characteristics for livelihood diversification using unconventional interventions through emphasizing policy initiatives based on land holding inequality are suggested to be a solution to counter the impacts of land use transform syndrome in the tribal communities. Hence, the socio-economic, psychological, communication and situational values of stakeholders should be given topmost priority as important strategy for livelihood diversification based on existing land resources among tribal people by the scientists, social workers, extension workers, Governmental employees and Non-Governmental Organization official.

There is dearth of literature on the socio-economic, psychological, communication and situational values characterized due to land holding inequality in the tribal communities. Therefore, the present study is an attempt to address the integrated understanding of the place of land holding inequality in livelihood diversification through unconventional interventions among the tribes. The findings and perspective presented in

the study should be considered in planning and administration of fresh interventions and employing the various rural developmental installations concerning land holding inequality in the tribal people. The scientists, social workers, extension workers, Governmental employees and Non-Governmental Organization officials should be made aware and acquainted thoroughly with the socio-economic, psychological, communication and situational characteristics of the various farmer's groups, so that they can mobilize and motivate the tribal people to adopt the unconventional livelihood options for their survival and well-being in unproblematic and economical way.

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Reference

- Ajake, A.O., Enang, E.E. 2012. Demographic and socio-economic attributes affecting forest ecosystem exploitation and management in the rural communities of cross river state, Nigeria. *American International Journal of Contemporary Research*, 2(1): 174-184.
- Anonymous, 2009. State of Jharkhand- Overview, Directorate of Economics and Statistics, Govt. of Jharkhand.
- Anonymous, 2013. *Livelihood Secured Through Lac Cultivation in Jamtara District of Jharkhand*. NAIP Sub-Project on Mass Media Mobilization. Indian Institute of Natural Resins and Gums (ICAR), Ranchi, India.
- Bedia, S. 2014. Study on the forest based livelihood for the selected tribal population of Ranchi district of Jharkhand. B.Sc. Dissertation, Unpublished. Faculty Centre for Integrated Rural and Tribal Development and Management, School of Agriculture and Rural Development. Ranchi, India.
- Bhatia, N.K., Yousuf, M. 2013. Reassuring livelihood functions of the forests to their dependents: Adoption of collaborative forest management system over joint forest management regime in India. *Annals of Forest Research*, 56(2): 377-388.
- Bijalwan, A., Sharma, C.M., Kediya, V.K. 2012. Socioeconomic status and livelihood support through traditional agroforestry systems in hill and mountain agro-ecosystem of Garhwal Himalaya, India. *The Indian Forester*, 138(12): 1423-1430.
- Champion, H.G., Seth, S.K. 1968. Revised survey of forest types in India. Manager of Publication, FRI Press, Dehra Dun.
- Dodd, N.M., Nyabvudzi, T.G. 2014. Unemployment, Living Wages and Food Security in Alice, Eastern Cape, South Africa. *Journal of Human Ecology*, 47(2): 117-123.
- Haque, T., Bhattacharya, M., Sinha, G., Kalra, P., Saji, Thomas. 2010. *Constraints and Potentials of Diversified Agricultural Development in Eastern India*, Council for Social Development (CSD), Sangha Rachna, 53-Lodi Estate, New Delhi-110003.
- Islam, M.A., Quli, S.M.S., Rai, R., Ali, A. 2014b. Exploration of variables predicting livelihood assets status of tribal communities subsisting in forests of Jharkhand, India. *Journal of Human Ecology*, 47 (3): 241-249.
- Islam, M.A., Quli, S.M.S. Rai, R., Sofi, P.A. 2013. Livelihood contributions of forest resources to the tribal communities of Jharkhand. *Indian Journal of Fundamental and Applied Life Sciences* 3(2): 131-144.

- Islam, M.A., Rai, R., Quli, S.M.S. 2014a. Manpower potential, employment status and forest based livelihood opportunities among tribal communities of Jharkhand, India. *Journal of Human Ecology* 47(3): 305-315.
- Islam, M.A., Sofi, P.A., Rai, R., Quli, S.M.S. 2014c. Communication interventions among forest dependant ethnic communities of Jharkhand. *Trends in Biosciences*, 7(9): 715-719.
- Kumar, P., Rawat, L., Basera, H. 2010. Socioeconomic studies of Henwal Watershed, Tehri Garhwal, Uttarakhand. *Indian Journal of Forestry* 33(2): 149-154.
- Kumaresan, P., Devi, R.G.G. 2009. Factors discriminating the adoption of separate silkworm rearing houses in south India. *Indian Journal of Sericulture*, 48(1): 49-55.
- Mitra, A., Verick, S. 2013. Youth employment and unemployment: An Indian perspective. *ILO Asia-Pacific Working Paper Series*, International Labour Organization, DWT for South Asia and Country Office for India, New Delhi, pp. 14-30.
- Mourlin, K. 2007. NREGA – A key to sustainable rural development: An empirical evidence from Betul district. *Vikas Vani Journal*, 1(4): 14-23.
- Nagesha, G., Gangadharappa, N.B. 2006. Adoption of agroforestry systems in north eastern districts of Karnataka. *My Forest*, 42(4): 337-347.
- Nayak, B.P., Kohli, P., Sharma, J.V. 2014. *Livelihood of Local Communities and Forest Degradation in India: Issues for REDD+*. Tata Energy and Resources Institute (TERI), New Delhi, India.
- Negi, C.S., Maikhuri, R.K., Rao, K.S., Nautiyal, S. 2002. Nanda Raj Jat - Mahakumbha of Uttaranchal: A socio-ecological and religious perspective. *Man in India*, 82: 341-357.
- Pal, G. 2011. Socio-economic characteristics of lac growers in Kanker district of Chhattisgarh. *The Indian Forester* 137(11): 1294-1297.
- Ponnusamy, K., Gupta, J. 2006. Factors influencing sustainable livelihood parameters in different farming systems. *Asian Journal of Extension Education*, 25(1&2): 5-9.
- Quli, S.M.S., Singh, P.K. 2009. Agroforestry for optimizing water and land use efficiency of Jharkhand: Silvicultural techniques and strategies for participatory approach. *Jharkhand Journal of Development and Management Studies*, XISS, Ranchi, 7(4): 3605-3622.
- Ray, G.L., Mondol, S. 2004. *Research Methods in Social Sciences and Extension Education*, Kalyani Publishers, New Delhi, 66-76.
- Sarmah, R., Arunachalam, A. 2011. Contribution of non-timber forest products (NTFPs) to livelihood economy of people living in forest fringes in Changlang district of Arunachal Pradesh, India. *Indian Journal of Fundamental and Applied Life Sciences* 1(2): 157-169.
- Satyanarayan, K., Jagadeeswary, V. 2010. A study on knowledge and adoption behaviour of livestock farmers. *Indian Journal of Animal Research*, 44(2): 100-106.
- Singh, P., Tewari, P., Rani, S. 2007. Socio-economic status of rural households in Kumaon region of Uttarakhand. *Pantnagar Journal of Research*, 5(1): 146-150.
- Singh, P.K., Quli, S.M.S. 2011. Economic valuation of Non-Timber Forest Product's contribution in tribal livelihood in West Singhbhum district of Jharkhand. *The Indian Forester*, 137(11): 1258-1264.
- Singha, A.K., Talukdar, R.K., Singha, J.K. 2006. Maintenance behaviour of forest resources by the people of forest villagers in Assam. *Indian Journal of Forestry*, 29(1): 47-54.
- Sivaji, V. 2009. Sustainability of Jharkhand forests for livelihood support of tribal and rural people. *Jharkhand Journal of Development and Management Studies*, 7(4), 3623-3642.
- Snedecor, G.W., Cochran, W.G. 1967. *Statistical Methods*. Iowa State University Press, Ames, Iowa-50010.
- Sood, K.K., Najjar, C., Singh, K.A., Handique, P., Singh, B., Rethy, P. 2008. Association between socio-economic parameters and agroforestry uptake: evidences from eastern Himalaya. *Indian Journal of Forestry*, 31(4): 559-564.
- Thamban, C., Vasanthakumar, J., Arulraj, S., Mathew, A.C., Muralidharan, K. 2008. Farmer's participation in the field implementation of micro-irrigation systems. *Journal of Plantation Crops*, 36(3): 522-525.
- Venkataramaiah, P. 1990. Development of socio-economic status scale, *Ph.D. Thesis*, Department of Agricultural Extension, UAS, Bangalore.