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Exploration of Variables Predicting Livelihood Assets Status of Tribal Communities Subsisting in Forests of Jharkhand, India

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ABSTRACT The study examined the predictive variables of livelihood assets (physical, natural, financial, human and social capital) status of tribal communities (*Munda, Oraon* and *Lohara*) subsisting in forests in Bundu block of Ranchi district in Jharkhand. Multi-stage sampling was employed in selecting 9 sample villages and 164 representative households for field study conducted through structured interviews and personal observations. The correlation analysis revealed that out of twenty two socio-personal, economic, psychological, communication and situational independent variables, twenty attributes had exhibited positive and significant correlation with the livelihood assets status, whereas, the migration status was found negatively and significantly associated with the livelihood assets status and there was non-significant relationship between age and the livelihood assets status. The regression analysis indicated that all the independent variables of the tribal people put together had contributed to 71.30% (R^2 = 0.713) variation on the livelihood assets status. Further, among these variables, only level of aspiration exerted positive and significant contribution on livelihood assets status. The path analysis revealed that the social participation, level of aspiration and gross annual income were the crucial variables for livelihood assets status. To make livelihoods of tribal people stronger and sustainable, the contributor variables of livelihood assets status must be improved to accelerate the forest resources based livelihood diversifications, promotion and development.

INTRODUCTION

The sustainable livelihood synthesizes all human activities including five core assets: physical, natural, financial, human and social capital upon which the livelihoods are built (Carney 1998). The households utilize these assets in their productive activities in order to create income and satisfy their consumption needs, maintain their asset levels and invest in their future activities (Scoones 1998; Ellis and Freeman 2005). The sustainable livelihood approach aims to find out about livelihoods to improve the design and implementation of poverty reduction efforts (Prasad 2014). It helps to analyze opportunities and constraints of the rural poor, builds better understanding of multiple perspectives, identifies what options have better potential to reduce poverty and what enabling conditions, policies and incentives are needed for the poor to increase the range of better livelihood options (Scoones 1998; Lankford 2005). The framework delineates a set of livelihood outcomes for the people as increased well-being, more income, reduced vulnerability, improved food security and a more sustainable use of the natural resource base (Ashley and Carney 1999).

The livelihoods among forest dwelling tribal people in Jharkhand is complex, dynamic and multidimensional phenomenon, constrained to earn from forest resources (Singh et al. 2009; Islam et al. 2013). Forests are not only a source of subsistence income for millions of poor households but also provide employment to the poor living in forest fringe villages (Bhatia and Yousuf 2013; Bedia 2014; Nayak et al. 2014). The livelihood assets status consisted of physical, natural, financial, human and social capital of these tribal people is vulnerable, thus, there is an urgent need to create sustainable livelihoods for

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them. The livelihood assets status of the tribal people in the state is the resultant outcome of collective performance of independent variables such as socio-personal (age, education, social participation and family composition), economic (size of land holding, main occupation, housing status, farm power, farm implements, livestock possession, material possession, income from forestry and gross annual income), psychological (level of aspiration, knowledge about forestry practices, adoption of forestry practices and attitude towards forestry), communication (extension contact and use of information sources) and situational (employment status, migration status and utilization of forest resources). All these variables have direct or indirect influence on livelihood assets status through interaction with each other. Despite the influential potential of these independent variables on the livelihood assets status, the work in this area is limited. Moreover, the choice of pathways and frameworks for livelihoods promotion and development through diversification of livelihood interventions is scanty. Hence, the study was designed to ascertain the relationship between independent variables and the livelihood assets status, to determine the extent of contributions of the independent variables to the livelihood assets status and to get a clear picture of the direct and indirect effects of the independent variables on the livelihood assets status.

MATERIAL AND METHODS

Study Area

The study was conducted in Bundu block of Ranchi district in Jharkhand lying between $23^0$11'- $23^0$18' North latitude and $85^0$35'- $85^0$58' East longitude at an altitude of 337 meters (1105 feet) 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%) forest dwelling tribal people belonging to *Munda*, *Oraon* and *Lohara* who extract the local northern tropical dry deciduous forest (5B/C2) traditionally for livelihood and food security. Rain fed agriculture using dry land varieties of paddy is 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.

Household Survey

Multi-stage random sampling approach was followed to select the sample villages and the respondents for the study. Nine sample villages viz., Korda, Jojoda, Husirhatu, Banaburu, Nehalgara, Ghagrabera, Hesapiri, Roredih and Kuchidih were selected out of the 88 revenue villages having around 10% sampling intensity in the block. A sample of 164 forest dwelling households having 20% of the total number of the households in the sample villages were drawn by simple random sampling for field survey. Household heads were treated as respondents. The data on socio-personal, economic, psychological, communication and situational variables of the tribal people and the livelihood assets status consisted of physical, natural, financial, human and social indicators, were collected by personal interviews through a well structured pre-tested interview schedule and personal observations. The traits included in the interview schedule were quantified using appropriate scales developed/ modified by the earlier workers (Venkataramaiah 1990; Pandey 2005; Singha et al. 2006) after certain necessary changes. Suitable statistical tools like linear correlation, multiple regression and path analysis were used for analysis of the data as per standard procedure suggested by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Correlation Analysis

Karl Pearson's product moment co-efficient of correlation (r) was worked out for ascertaining the relationship between the various independent variables (socio-personal, economic, psychological, communication and situational) and the livelihood assets status of the tribal people and summarized in the Table 1.

A. Socio-personal Variables

Out of four socio-personal variables of the tribal people, three attributes viz., education, social participation and family composition had exhibited positive and significant correlation with the livelihood assets status, whereas, there

was non-significant relationship between age and the livelihood assets status (Table 1). The positively significant correlation between education and livelihood assets status is well articulated by the facts that the education results in bringing desirable changes in human behaviour and helps the individual to move in right direction (Ponnusamy and Gupta 2006), the knowledge is built up through education, which makes the person aware of new innovations (Thamban et al. 2008; Sood et al. 2008), and the change in attitude is partly a function of education (Singha et al. 2006). The social participation of the tribal people paves the way for sharing their views and experiences with other members of the organization (Nagesha and Gangadharappa 2006; Ponnusamy and Gupta 2006; Bedia 2014), clarifying their doubts and getting opinion from different people and enriching their knowledge (Prakash and Sharma 2008; Thamban et al. 2008). This is how the significant influence of this variable on livelihood assets status can be explained.

The positive and significant relationship of family composition with the livelihood assets status could be attributed to the fact that the tribal people being an important member of their nuclear family might have taken up independent decision regarding any matter concerning to the livelihood generation for their family (Thamban et al. 2008; Ajake and Enang 2012) and the larger sized families were having more livelihood diversification and opportunities resulting in higher livelihood assets status (Chaudhary and Panjabi 2005; Ponnusamy and Gupta 2006; Sood et al. 2008; Anonymous 2013b). The involvement of tribal people of different age groups in livelihood earnings was more or less similar indicating that the variations in age has no influence at all on the livelihood assets status. Similar results were reported by Sood et al. (2008) and Thamban et al. (2008) while the findings are contradictory to Atmis et al. (2007) who found a positive correlation between women's age and livelihood dependence on forestry in Turkey.

Table 1: Correlation and multiple regression analysis of independent variables of the tribal people with the livelihood assets status (N=164)

S. No.	*Variable code*	*Independent variable*	*Co-efficient of correlation (r)*	*Regression co-efficient (b)*	*Standard error of 'b'*	*'t' value*
A.		*Socio-personal Variable*				
1.	X_1	Age	-0.137NS	0.195	0.114	1.707
2.	X_2	Education	0.761*	1.379	2.757	0.500
3.	X_3	Social participation	0.771*	5.028	2.968	1.694
4.	X_4	Family composition	0.674*	-2.502	3..014	-0.830
B.		*Economic Variable*				
5.	X_5	Size of land holding	0.454*	2.556	1.625	1.573
6.	X_6	Main occupation	0.676*	1.748	1.643	1.064
7.	X_7	Housing status	0.634*	1.040	2.385	0.436
8.	X_8	Farm power	0.586*	0.795	2.215	0.359
9.	X_9	Farm implements	0.578*	-0.135	0.399	-0.399
10.	X_{10}	Livestock possession	0.556*	-1.220	2.607	-0.468
11.	X_{11}	Material possession	0.454*	-0.532	0.408	-1.303
12.	X_{21}	Income from forestry	0.714*	-2.498	2.544	-0.982
13.	X_{22}	Gross annual income	0.768*	4.127	2.639	1.564
C.		*Psychological Variable*				
14.	X_{12}	Level of aspiration	0.706*	0.909	0.430	2.136*
15.	X_{18}	Knowledge about forestry practices	0.613*	0.246	0.504	0.488
16.	X_{19}	Adoption of forestry practices	0.580*	0.503	0.430	1.172
17.	X_{20}	Attitude towards forestry	0.614*	0.137	0.316	0.432
D.		*Communication Variable*				
18.	X_{13}	Extension contact	0.593*	0.271	0.401	0.674
19.	X_{14}	Use of information sources	0.555*	0.099	0.354	0.280
E.		*Situational Variable*				
20.	X_{15}	Employment status	0.770*	0.626	1.126	0.556
21.	X_{16}	Migration status	-0.643*	0.163	0.797	0.205
22.	X_{17}	Utilization of forest resources	0.689*	0.546	0.647	0.843

a = -13.252 F = 15.89* R^2 = 0.713 Multiple R = 0.844 Adjusted R^2 = 0.668

* = Significant at 5% level of probability, NS = Non-Significant

B. Economic Variables

The co-efficient of correlation (r) of all the nine economic variables of the tribal people namely, size of land holding, main occupation, housing status, farm power, farm implements, livestock possession, material possession, income from forestry and gross annual income with the livelihood assets status were recorded to be positive and significant (Table 1). The persons who have big size of land holding will have good economic condition (Nagesha and Gangadharappa 2006; Ponnusamy and Gupta, 2006; Thamban et al. 2008) and more scope for sustainable livelihoods by encompassing appropriate combinations of farm enterprises (Kumar and Siddaramaiah 1996; Prakash and Sharma 2008). This might be the probable reason to have positive and significant association between size of land holding and the livelihood assets status. The main occupation of the tribal people exhibited direct bearing on the earning of money (Chaudhary and Panjabi 2005; Thamban et al. 2008; Kumaresan and Devi 2009; Anonymous 2013b), facilitating the possession of livelihood assets among the tribal people that's why the higher the occupational pattern the higher will be livelihood assets status.

The other economic attributes viz., housing status, farm power, farm implements, livestock possession and material possession are the major indicators of physical capital possessed by the tribal people (Chaudhary et al. 2004; Nagesha and Gangadharappa 2006; Singha et al. 2006) and the physical capital is a core contributor, a major part and the representative of the livelihood assets status (Chaudhary and Panjabi 2005; Pal et al. 2009). These assets of physical capital play an important role in their economy (Prakash 2007; Prakash and Sharma 2008) and help them to facilitate the other types of capitals to be owned and traded (Kumar and Siddaramaiah 1996; Ponnusamy and Gupta 2006). The above variables thus, had contributed positively and significantly to the livelihood assets status.

The income from forestry and gross annual income of the tribal people are the prominent indicators of financial capital possessed by the tribal people (Nagesha and Gangadharappa 2006; Singha et al. 2006; Prakash and Sharma 2008; Bhatia and Yousuf 2013; Hogarth and Belcher 2013) and the financial capital occupies central position governing the livelihood assets status (Srivastava 2006; Sood et al. 2008; Thamban et al. 2008). The persons thus, who have higher income from forestry and gross annual income will also have higher livelihood assets status.

C. Psychological Variables

The level of aspiration, knowledge about forestry practices, adoption of forestry practices and attitude towards forestry of the tribal people were found to have positive and significant relation with the livelihood assets status (Table 1). As the level of aspiration concerns with the future level of possible achievement, socio-economic development and household security (Kumar and Siddaramaiah 1996; Satyanarayan and Jagadeeswary 2010), therefore it implies that higher the level of aspiration, the higher would be the livelihood assets status. Similarly, as the level of knowledge and adoption of forestry practices among the tribal people increased, people could do nursery operations, tree plantation, protection and management of plantation, harvesting, conversion and processing of forest products, household consumption of forest products and grading and sale of forest produces in a better way, which enhanced the yield and fetched higher financial returns (Singha et al. 2006; Malathesh et al. 2009; Pal et al. 2009; Yadav and Kalpana 2013) and gave a window of opportunity to achieve livelihood security. The positive and favourable attitude among the people develops self-confidence and motivation in adoption of new technologies and innovations in their enterprises which creates new livelihood options for socio-economic improvement (Nagesha and Gangadharappa 2006; Ponnusamy and Gupta 2006). This means that higher the attitude level towards forestry of the tribal people higher will be livelihood assets status.

D. Communication Variables

The communication characteristics that is extension contact and use of information sources of the tribal people were positively and significantly related with the livelihood assets status (Table 1). This correlation illustrated the impact of extension contact which created awareness among the tribal people in acquiring more and more information about how to make a liveli-

hood improved, diverse and effective (Kumar and Siddaramaiah 1996; Nagesha and Gangadharappa 2006; Ponnusamy and Gupta 2006; Singha et al. 2006; Thamban et al. 2008; Pant 2011; Islam et al. 2014). Likewise, the use of information sources by the tribal people had played important role in solving their livelihood stresses and shocks besides adopting new livelihood avenues (Nagesha and Gangadharappa 2006; Ponnusamy and Gupta 2006; Singha et al. 2006; Thamban et al. 2008; Islam et al. 2014).

E. Situational Variables

Among situational variables the employment status and utilization of forest resources of the tribal people had shown positively significant 'r' value with the livelihood assets status while the correlation between migration status and the livelihood assets status was existed to be negative and significant (Table 1). The household income level, consumption standard and the incidence of poverty mainly depends on the employment status of the tribal people (Rahman et al. 2006; Surayya et al. 2008; Mitra and Verick 2013). This implies that higher the magnitude of employment status of the tribal people higher will be the livelihood assets status. The wealthier households having more livelihood diversifications could supplement their socio-economic condition and standard of living by way outing alternative livelihood avenues at their door steps (Surayya et al. 2008; Kareemulla et al. 2009). Whereas, the low livelihood opportunities among poorer people such as landless labourers, unskilled petty workers, small arsons, carpenters, craftsmen, marginal and small farmers and other small scale vendors, migrate to nearby areas for survival and coping the livelihood stresses and shocks (Palanisami and Kumar 2009; Anonymous 2013a). That is why the migration status had shown negatively significant bearing on the livelihood assets status. The forest resources are dominant contributor and an integral component of the natural capital of sustainable livelihood (Chakraborty et al. 2009; Kandary and Omprakash 2009; Bedia 2014). These resources are being accessed by the people for sustained employment, income earnings, energy, raw materials for cottage industries, subsistence goods, food materials, agricultural and livestock supports, utensils, tools, ornaments, medicines, handicrafts and decorative items, safety net and other goods and services (Singh et al. 2009; Pathania et al. 2010; Nayak et al. 2014). The households thus, using forest resources on a regular basis and in meaningful quantities for direct household consumption and sale in the markets usually enjoy a profound livelihood assets status.

Multiple Regression Analysis

The multiple regression analysis was performed to delineate the relative contribution of independent variables of the tribal people on the livelihood assets status (Table 1). The coefficient of determination (R^2) worked out to be 0.713 which signifies that all the independent variables of the tribal people put together had contributed to 71.30% variation on the livelihood assets status. The analysis of 't' values of regression co-efficient indicated that out of the twenty two independent variables of the tribal people, only level of aspiration ('t' value= 2.136) had significant contribution in influencing the level of livelihood assets status. This lead to conclude that the level of aspiration of the tribal people had the maximum contribution to the livelihood assets status and it turned out to be potential predictor in explaining the variation in the livelihood assets status. The reason was that the level of aspiration of the tribal people has direct influences on their future expectations, possible achievement, positivism, favouritism, decision making, self-confidence, motivation, socio-economic soundness, household security etc. facilitating livelihood diversifications. The fitted multiple regression equation for livelihood assets status should be written as:

$$Y = -13.252 + 0.195\ X_1 + 1.379\ X_2 + 5.028\ X_3 - 2.502X_4 + 2.556\ X_5 + 1.748X_6 + 1.040X_7 + 0.795X_8 - 0.135X_9 - 1.220X_{10} - 0.532X_{11} + 0.909X_{12} + 0.271X_{13} + 0.099X_{14} + 0.626X_{15} + 0.163X_{16} + 0.546X_{17} + 0.246X_{18} + 0.503X_{19} + 0.137X_{20} - 2.498X_{21} + 4.127X_{22}$$

Where Y = Livelihood assets status

$X_1 - X_{22}$ = Independent variables

The F value (15.89) showed that the analysis was significant at 5% level of probability and all the twenty two variables contributed significantly in the variation of the livelihood assets status of the tribal people. Similar findings were reported by Singha et al. (2006).

Path Analysis

The path analysis of the various independent variables of the tribal people was carried

out to determine the direct and indirect effects on the level of livelihood assets status (Table 2). The results demonstrated that out of twenty two independent variables, seventeen attributes had positive direct effect whereas the remaining five attributes had shown negative direct effect on the livelihood assets status of the tribal people. The social participation (0.282) had maximum positive direct effect followed by level of aspiration (0.181), gross annual income (0.169), size of land holding (0.120), utilization of forest resources (0.108), main occupation (0.094), education (0.091), age (0.088), adoption of forestry practices (0.079), employment status (0.067), extension contact (0.045), housing status (0.043), knowledge about forestry practices (0.037), attitude towards forestry (0.033), farm power (0.026), use of information sources (0.019) and migration status (0.017). The farm implements (-0.024) was found having maximum negative direct effect followed by livestock possession (-0.032), material possession (-0.082), family composition (-0.103) and income from forestry (-0.115).

Among the twenty two independent characteristics, twenty attributes exhibited positive total indirect effect and rest two had shown negative total indirect effect on the livelihood assets status of the tribal people. Further, it can be observed that income from forestry (0.829) had maximum positive total indirect effect followed by family composition (0.777), employment status (0.703), education (0.670), farm implements (0.602), gross annual income (0.599), housing status (0.591), livestock possession (0.588), main occupation (0.582), utilization of forest resources (0.581), attitude towards forestry (0.581), knowledge about forestry practices (0.576), farm power (0.560), extension contact (0.548), material possession (0.536), use of information sources (0.536), level of aspiration (0.525), adoption of forestry practices (0.501), social participation (0.489) and size of land holding (0.334). The age

Table 2: Path analysis showing direct, total indirect and substantial indirect effects of independent variables of the tribal people on the livelihood assets status (N=164)

S. No.	*Independent variable*	*Direct effect*	*Indirect effect*	*Total effect*	*Substantial indirect effects*		
					I	*II*	*III*
A.	*Socio-personal Variable*						
1.	Age (X_1)	0.088	-0.225	-0.137	X_{21}- 0.023	X_4- 0.016	X_{11}- 0.008
2.	Education (X_2)	0.091	0.670	0.761	X_3- 0.266	X_{12}- 0.141	X_{22}- 0.134
3.	Social participation (X_3)	0.282	0.489	0.771	X_{12}- 0.137	X_{22}- 0.136	X_{17}- 0.089
4.	Family composition (X_4)	-0.103	0.777	0.674	X_3- 0.243	X_{22}- 0.124	X_{12}- 0.122
B.	*Economic Variable*						
5.	Size of land holding (X_5)	0.120	0.334	0.454	X_{22}- 0.102	X_3- 0.089	X_{12}- 0.057
6.	Main occupation (X_6)	0.094	0.582	0.676	X_3- 0.211	X_{12}- 0.118	X_{22}- 0.110
7.	Housing status (X_7)	0.043	0.591	0.634	X_3- 0.214	X_{12}- 0.120	X_{22}- 0.109
8.	Farm power (X_8)	0.026	0.560	0.586	X_3- 0.180	X_{22}- 0.109	X_{12}- 0.097
9.	Farm implements (X_9)	-0.024	0.602	0.578	X_3- 0.186	X_{12}- 0.114	X_{22}- 0.107
10.	Livestock possession (X_{10})	-0.032	0.588	0.556	X_3- 0.185	X_{22}- 0.099	X_{12}- 0.098
11.	Material possession (X_{11})	-0.082	0.536	0.454	X_3- 0.135	X_{22}- 0.094	X_{12}- 0.081
12.	Income from forestry (X_{21})	-0.115	0.829	0.714	X_3- 0.249	X_{12}- 0.133	X_{22}- 0.130
13.	Gross annual income (X_{22})	0.169	0.599	0.768	X_3- 0.227	X_{12}- 0.127	X_{17}- 0.075
C.	*Psychological Variable*						
14.	Level of aspiration (X_{12})	0.181	0.525	0.706	X_3- 0.214	X_{22}- 0.119	X_{17}- 0.075
15.	Knowledge about forestry practices (X_{18})	0.037	0.576	0.613	X_3- 0.180	X_{22}- 0.112	X_{12}- 0.098
16.	Adoption of forestry practices (X_{19})	0.079	0.501	0.580	X_3- 0.161	X_{22}- 0.107	X_{12}- 0.090
17.	Attitude towards forestry (X_{20})	0.033	0.581	0.614	X_3- 0.194	X_{22}- 0.113	X_{12}- 0.105
D.	*Communication Variable*						
18.	Extension contact (X_{13})	0.045	0.548	0.593	X_3- 0.161	X_{12}- 0.108	X_{22}- 0.104
19.	Use of information sources (X_{14})	0.019	0.536	0.555	X_3- 0.163	X_{22}- 0.100	X_{12}- 0.093
E.	*Situational Variable*						
20.	Employment status (X_{15})	0.067	0.703	0.770	X_3- 0.247	X_{12}- 0.142	X_{22}- 0.135
21.	Migration status (X_{16})	0.017	-0.660	-0.643	X_{21}- 0.085	X_4- 0.072	X_{11}- 0.035
22.	Utilization of forest resources (X_{17})	0.108	0.581	0.689	X_3- 0.232	X_{12}- 0.126	X_{22}- 0.117

Residual effect = 0.536

(-0.225) had shown maximum negative total indirect effect which was followed by migration status (-0.660).

It is evident from the results that positive substantial indirect effects of as many as seventeen variables viz., education, family composition, size of land holding, main occupation , housing status, farm power, farm implements, livestock possession, material possession, extension contact, use of information sources, employment status, utilization of forest resources, knowledge about forestry practices, adoption of forestry practices, attitude towards forestry and income from forestry were channeled through the independent variables social participation, level of aspiration and gross annual income. The age had positive substantial indirect effects channeled through income from forestry, family composition and material possession. The positive substantial indirect effect exerted by social participation was routed through level of aspiration, gross annual income and utilization of forest resources. The migration status was observed to have exercised the positive substantial indirect effect through the attributes namely, income from forestry, family composition and material possession. The variables namely, social participation, level of aspiration and utilization of forest resources were found having positive substantial indirect effect on gross annual income.

The findings thus, indicated that the social participation, level of aspiration and gross annual income were the three most important independent variables exerting more positive substantial indirect effect on most of the independent variables. Next in importance was utilization of forest resources, income from forestry, material possession and family composition as positive substantial indirect effect of some independent variables were channeled through these four attributes. Age, education, size of land holding, main occupation, housing status, farm power, farm implements, livestock possession, extension contact, use of information sources, employment status, migration status, knowledge about forestry practices, adoption of forestry practices and attitude towards forestry were considered to be less important as positive substantial indirect effect of no variable was channeled through these variables. The value of residual effect with 0.536 implies that the constellation of the twenty two independent variables of the tribal people taken together could explain more than 50% of the variability on the consequent variable i.e. livelihood assets status. This suggests that there is no need to include any more variable to have a more effective contribution on the livelihood assets status. These results are in conformity with the findings of Gangadharappa et al. (2005).

CONCLUSION

The livelihood assets status of the tribal people is the recipient of contributions of all the selected socio-personal, economic, psychological, communication and situational variables except one i.e. age. The social participation, level of aspiration and gross annual income are the key variables that directly and indirectly contributed the livelihood assets status. To make livelihood assets status of tribal people stronger, secured and sustainable, livelihood diversification using forest resources based specific interventions needs to be implemented in the locality. The contributor variables of livelihood assets status should be given due consideration during planning, implementation and execution of specific livelihood strategies. Further, efforts should be made to improve the social participation, level of aspiration and gross annual income of the tribal people to expedite the livelihoods promotion and development.

RECOMONDATIONS

The livelihoods promotion and development among tribal communities in the block is a major challenge due to their inadequate participation in the developmental schemes and strong reliance on traditional livelihood sources. To cope up with the scenario, the scientists, planners, policy makers and extension workers should strive to diversify and optimize the livelihood options through non-traditional and sustainable interventions under the eco-friendly developmental projects for tribal welfare. Further, appropriate extension and communication strategies should be evolved using the pathways and framework explored in the study for effective implementation of the livelihood interventions. Moreover, particular attention should be paid on the contributor variables at household levels to improve livelihood outcomes i.e. physical, natural, financial, human and social capital. The

tribal communities playing the key role in the sustainable development of the rural area can contribute very significantly in the management of the natural resources provided their needs and interests are duly addressed, through the guidelines explored by the results of the present investigation. The findings of the research requires due consideration by the policy makers for development of eco-friendly strategies for sustainable development of tribals and natural resources both by generating progressive livelihood options.

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APPENDIX

Munda, Oraon and *Lohara*: Indigenous non-Aryan tribal communities of Jharkhand, India.

Sarpanch: An elected head of a village level statutory institution of local self-government in India.