Performance of Community Forestry on Social Organization and Livelihoods under Terai Arc Landscape Program, Nepal

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ABSTRACT: In Nepal, Terai Arc Landscape (TAL) program is under implementation as a priority program and the Community Forestry (CF) has been lauded as a better approach to manage different forest regimes than conventional and top-down management approach. Based on relevant literature, field observations and primary data of 2009 and 2013 from three active and heterogeneous Community Forest User Groups (CFUGs) of Mohana-Laljhadi corridor of TAL area, this study assesses the performance of CF on the livelihoods benefits and social outcome of conservation as the proxy measures of conservation success.This study has shown several positive changes and achievements in balancing social organizations and improving various livelihood capitals. Heavy pressure on government managed forests (GMF), increased human wildlife conflicts, problem of elite dominancy, undue political pressures and conflicts still persist. Improvement in CF is considered necessary due to changes in priorities, perspectives and lessons learnt.

KEYWORDS: Terai Arc Landscape Program, Community Forestry, Social organizations, livelihood capitals, Impacts

I. INTRODUCTION

Nepal is rich in biodiversity, but it has experienced enormous challenges in conserving the forests of the Terai region (Wagley and Ojha, 2002) due to modification by cutting, cultivation, burning, grazing and other anthropogenic actions (Chakraborty, 1999; FAO, 2009) and many of these forests types have been significantly reduced in quality and quantity (NBS, 2002; NPC, 2010; Sapkota 2009). As a result, a series of policies and strategies have been experienced (MSFP; 2013; NPC, 2013) and the landscape-based conservation approach has been adopted as an opportunity to scale up conservation initiatives (WWF, 2004), with Terai Arc Landscape (TAL) programme as the recent example. TAL brings government, communities and stakeholders together to conserve forests and biodiversity through community forestry (CF) (TAL, 2005), thereby sharing the roles, rights and responsibilities (MFSC/CSUWN, 2010) between different stakeholders while communities benefit directly from conservation and livelihood improvement (MSFP, 2013). TAL program Nepal serves as a model for how CF could provide the foundation for linking biodiversity conservation and livelihood improvement.

Landscape level conservation with community based approach has been lauded as a better approach to manage different forestry regime than conventional, top-down management approaches. However, in Nepal, both the traditional top-down management and the community-based conservation approach have been operating concurrently and this studyassesses the performance of CF on the livelihoods benefits and social outcomes.

II. OBJECTIVES

The objectives of this study were: a) asses the performance of CF on social organization and livelihoods, b) identify what both positive and negative impacts have occurred and how; and c) present what livelihood capitals have changed over time, the main lessons learnt and some key changes required.

III. STUDY SITES AND METHODS

Three active and heterogeneous Community Forest User Groups (CFUGs) of TAL area were selected as the study sites namely Dilasaini CFUG, Dhangadhi, Aishorya CUFG, Geta and Jaikalika CFUG, Malakheti (Table 1). The study area is located in Kailali and Kanchanpur districts along the Mohana River, which works effectively as both a biological and stream corridor. The study is based on primary data and literature reviews. Different participatory tools such as focus group discussion, discussion with committee members, key informants' survey and semi-structured questionnaire survey were used to generate the primary data. The sample size (n=83) was determined based Cochran's formula for categorical data collection using sampling error of 10 percent. In addition, CF inventory data were analyzed and compared the growing stock of years 2009 and 2013.

Table 1: Sample CFUGs selected for the study

CFUGs	Location	Area (ha)	Households (HH)	Formation year	Nature of Forest
Dilasaini	Dhangadhi	89	278	2002	Plantation
Aishorya	Geta	46.5	225	2003	Plantation
Jaikalika	Malakheti	35.5	84	2005	Natural

IV. RESULT AND DISCUSSION

Social organization
Some important sociological dimensions are embedded in the design and content of corridor CF, relying on certain assumptions about people's organizational characteristics and attempts to improve conservation patterns by influencing them. Accordingly, the performance assessment effort must be fully aware of these sociological variables (Table 3), so that the method of assessment tends to balance both science and society. Table 2 shows the total proportion of research participants responding on level of performance using 1 to 5 likert scale; 1– no performance; 2– low performance; 3 – medium performance; 4 – high performance and 5 – excellent performance to each perception statement.. The statistically significant positive perceptions at 5% with $p<0.05$ using cut point value 2.5 and test proportion 50 percent under one sample median test were: a) empowerment of community members, b) maintenance of trust and unity, c) clarity on role and responsibilities, d) peaceful interaction and social control and e) interrelationship among members. However, the perceptions which were not statistically significant at 5% with $p>0.05$ were a) commitment to collective aim and actions, b) recognition of social rules and process, c) focus on village institutions and d) adaption of consensus based approach.

Table 2: One sample median test on variables of social organizations

Statements	Category	OP*	p
Committed to collective aims and actions	<= 2.5	0.41	0.051
	> 2.5	0.50	
Empowered the community members	<= 2.5	0.18	0
	> 2.5	0.82	
Maintained trust and unity	<= 2.5	0.14	0
	> 2.5	0.86	
Clear on role and relationship	<= 2.5	0.18	0
	> 2.5	0.82	
Peaceful interaction and social control	<= 2.5	0.2	0
	> 2.5	0.8	
Interrelationships among members	<= 2.5	0.18	0
	> 2.5	0.82	
Recognized social rules and process	<= 2.5	0.42	0.187
	> 2.5	0.58	
Focused on village Institutions	<= 2.5	0.48	0.826
	> 2.5	0.52	
Applied consensus based approach	<= 2.5	0.59	0.124
	> 2.5	0.41	

(* = OP= observed proportion) (Source: Field Survey, 2013)

Sustainable livelihood (SL) assets

In line with DFID (1998), the SL capitals studied were: (a) social (b) physical, (c) financial, (d) natural, (e) human; (f) vulnerability and (g) policy, intuitions and process.

Social capital

The social networks and collective actions as well as the relationship of individuals with the networks play a crucial role in creating and sustaining social capital. The main sociological variables considered under the performances of social capitals are as listed in Table 3. For analysis of questions with 3 options as answers: Yes, No, Don't Know, Chi square test was applied. The answer of Don't know was taken nearer to No and recoded as one variable and Yes as the other. Chi square test with a p value of < 0.05 was taken as significant.

In 2009, statistically significant positive response at p<0.05 was on clarifying role and responsibilities; and negative responses at p<0.05 were on a) participation in decision making, b) effectiveness of decision implementation and c) transparency and democratic functioning. Similarly, in 2013, statistically significant positive response at p<0.05 were on a) adaption of CF process, b) development of leadership and gender, c) transparency and democratic functioning, d) clarity on role and responsibilities and f) managing conflicts. Improvements were observed in between 2009 and 2013 on increased frequency of positive responses on a) organizing meeting and attendances, b) participation in decision making process, c) effectiveness of decision implementation, d) participation of women and target groups and e) effectiveness of accountability of committees. The negative performances during this period have been on increased negative responses on a) relations between committee and members, and b) satisfaction of performance of committees (Table 3)

Table 3: Comparison of responses on variables of social capitals

Variables	Year 2009				Year 2013			
	Y	N	X2	p	Y	N	X2	p
Adaption of process based on guidelines	38	45	0.590	0.442	51	32	4.349	0.037
Regular meetings and attendance	43	40	0.108	0.742	45	38	0.590	0.442
Participation in decision making	33	50	3.482	0.062	44	39	0.301	0.583
Effectiveness of decision in implementation	27	56	10.133	0.001	33	50	3.482	0.062
Participation of women and target group	21	62	20.253	0.000	35	48	2.036	0.154
Development of the leadership and gender	46	37	0.976	0.323	52	31	5.313	0.021
Harmonized relation between committees and members	49	34	0.271	0.100	41	42	0.012	0.913
Satisfaction of member for committee's performance	49	34	0.271	0.100	45	38	0.590	0.442
Transparency and democratic functioning	30	53	6.373	0.012	33	50	3.482	0.062
Clarity on role and responsibilities	51	32	4.349	0.037	52	31	5.313	0.021
Effectiveness of accountability of committee to users	39	44	0.301	0.583	44	39	0.301	0.583
Managing conflicts	51	32	4.349	0.037	52	31	5.313	0.021

(Responses: Y= Yes; N= No; X2 test with df=1) (Data source: Field survey, 2009 and 2013).

Financial capital

In line with Lorenz (1999) and DFID (1998), there are two main sources of financial capital-available stocks and regular inflows of money in a group, which is represented in this study by CFUGs. The communities have generated money from the sale of forest products, fees, fines, levies and outside grants. The fund is mainly used for community development, livelihood improvement, creating employments and developing income generation (IG) package (Table 6).

Table 4: Fund, employment and income generation packages

CFUGs	Fund (Rs in thousands)		Employment (number)		IG package (number)	
	2009	2012	2009	2012	2009	2012
Dilasaini	918	1222	7	22	3	7
Aishorya	485	1413	19	34	11	16
Jaikalika	98	236	8	17	5	11

(Source: Field Survey, 2009 and 2013)

The communities under CFs possess a wide range of diversity in terms of economic characteristics. Comparing wellbeing rank data from the Constitution of the CFUGs prepared in 2009 and 2013 using participatory mapping method revealed that there have been shifts from poor to medium and medium to rich. However, the shift values using the Chi square test has not been found statistically significant at df=1 as poor to medium: Dilasaini, $X2=1.328$, $p=0.249$, Aishorya, $X2 =.472$, $p=0.492$; and Jaikalika, $X2 =0.214$, $p=.0.644$; and medium to rich: Dilasaini, $X2 =0.293$, $p= 0.608$; Aishorya, $X2 =0.103$, $p=0.748$; and Jaikalika, $X2 =0.320$, $p=0.572$

Table 5: Economic stratification of users

CFUGs	HH (2013)	2009			2013		
		Poor	Medium	Rich	Poor	Medium	Rich
Dilasaini	278	34.89	44.96	20.14	26.30	49.60	24.10
Aishorya	225	28.89	42.22	28.89	24.10	45.10	30.80
Jaikalika	84	60.71	22.62	16.67	55.60	26.80	17.60

(Source: Field Survey and CFUG constitution, 2009 and 2013)

Physical capital

The largest use of funds is on non-forestry purposes (road, schools and other infrastructure such as electricity, temple buildings and drinking water) with over 70 percent budget. Only a small proportion of funds has been used for forestry (4 percent and 13 percent in 2009 and 2013 respectively) and for poverty reduction activities (12 percent and 17 percent in 2009 and 2013 respectively). Thus, forestry has received the minimum inputs from CFs showing a grave concern for future sustainability and non-compliance of legal provision to place at least 35 percent income on forest development activities, which understood as protection and sustainable management of forest and biodiversity resources (Table 4). However, the condition of forests has improved regardless of the expenditures on forestry activities.

Table 6: Percent of budget used in local development

Activities	Percent of budget		Activities	Percent of budget	
	2009	2013		2009	2013
Forestry	4	13	Electricity	11	4
Soil erosion	5	3	Drinking water	8	9
Poverty reduction	12	17	Office building	12	2
Temple	4	6	Road	20	20
Communication	6	7	School	16	13
Health	4	6	Total	100	100

(Source; Field Survey, 2009 and 2013)

Human capital

Human capital in CF represents the skills, knowledge, capacity and health that together enable people to convert natural capital into human-made capital (Booysen, 2002; DFID, 1998; Flora, et al., 2004). The study shows that from 2009 to 2013, the number of trained people has increased (from 85 to 177), volunteerism or the rate of in-kind contribution to CF

activities has also increased (77-91 percent in 2009 and 84-92 percent in 2013) and number of skilled manpower for jobs at abroad for remittances has increased from 53 to 222 (Table 5).

Table 7: Human capital on training, remittances and volunteer contributions

CFUGs	Trained people (number)		People on remittance (number))		Volunteer Contribution (percent)	
	2009	2012	2009	2012	2009	2012
Dilasaini	32	63	81	84	81	84
Aishorya	44	81	77	89	77	89
Jaikalika	9	33	91	92	91	92

(Source: Field Survey, 2009 and 2013).

Natural capital

The CFUGs have developed a strong sense of ownership of the forests. They have protected forests, operated on the basis of group Constitution and forest Operational Plan (OP), given equal access as well as responsibilities to all members. The rate of forest offences has increased over time (Table 8). The study shows that there are positive changes in forest condition and reduction in the time spent for collecting forest products. The forests have been restored and managed under biodiversity friendly silvicultural operations and utilized for their livelihoods pursuant to their approved operational plans.

Table 8: Record of forest offenses.

CF or CFUGs	2009	2013	Percent reduction
Dilasaini	22	9	59.09
Aishorya	17	11	35.29
Jaikalika	14	8	42.86
Total	53	28	47.17

Source: Field Survey, 2009 and 2013.

The condition of forest has been changed positively after taking over by local people as CF. The growing stock in terms of number or density and volume has been found improved. A considerable amount of wood products has been harvested and used by communities. The average basal area increased from 6.11 in 2009 to 11.22 m2/ha in 2013, mean species presence/hectare ranged from 16 in 2009 to 30 in 2013, density/ha ranged from 2134 in 2009 to 11467 in 2013 and total volume ranged from 81 in 2009 to 108 m3 per ha in 2013. There was a general trend of improved performances in CFs as the level of decreased disturbances (Table 9).

Table 9: Growing stock

Variables	Year 2013	Year 2009
Mean basal area (m2/ha)	11.22 (1.44)	6.11 (0.66)
Mean no. of species/ha	11467 (4188)	2134 (334)
Mean species (number/ha)	30 (2)	16 (1)
Mean volume (m3/ha)	108 (9)	81 (6)

The values in parentheses are ± S.E. (Source: Field Survey, 2009 and 2013)

Vulnerability Assessment

The factors used for vulnerability assessment were: number of household, occupation, literacy status, access to natural resources, entrepreneurship and access to market and public awareness to natural disaster. The total score of each CFUG on Vulnerability Indices (VI) were then classified into three categories using Three Categorized Ranking Method (TCR) assigning scores of 1 to 3, 1 being the least vulnerable.

The basic assumptions used were: a) higher household number in a settlement is associated with higher vulnerability, b) people with diversified occupation are considered less vulnerable c) higher level of access to natural resources is associated with lower vulnerability, d) higher degree of entrepreneurship and access to market is associated with lower vulnerability, e) higher degree of literacy and education is associated with lower vulnerability and f) Lower level of awareness to natural disaster and climate change adaptation and mitigation options are associated with higher vulnerability (Shrestha, 2005; and modification of WWF Nepal, 2008). Socio-economic vulnerabilityof the communities was calculated by combining these and ranking of each VI are given in Table 10.

Table 10: Socio-economic vulnerability assessment

CFUGs	VI1	VI2	VI3	VI4	VI5	VI6	VI combined	Vulnerability
Dilasaini	3	2	2	2	1	2	1.83	L
Aishorya	2	3	3	2	3	3	2.83	H
Jaikalika	1	3	2	3	2	2	2.16	M

VI 1: Number of HHs, VI 2: Occupation, VI 3: Access, VI 4: Markets, VI 5: Education, VI 6: Awareness. Vulnerability: L = Low, M = Medium, H = High (Source: Field Survey, 2013). No survey in 2009, VII for 2009-2013 increased by 9.7% (higher vulnerability) and VI2-VI6 improved (lower vulnerabilities).

Policy, institutions and process

Livelihood strategies and outcomes are also determined by the environment of structures, policy processes and institutions. Table 11 shows the total proportion of research participants responding on level of performance using the likert scale based on questionnaire of 1 to 5 likert scale: 1 – strongly disagree. 2 – disagree, 3 – neither agree nor disagree, 4 – agree and 5 – strongly agree to each perception statement. The statistically significant positive perceptions at 5% with p=0.000 using cut point value 2.5 and test proportion 50 percent under one sample median test were: a) cohesion and network of users and b) effective implementation of forest operational plan and negatively significant perception at p>0.05 were harmonization of policy implementation and coordination and synergy among institutions

Table 11: One sample median test on variables of social organizations

Perception Statements	Category	OP	p	Remarks
Policies in implementation harmonized	<= 2.5	0.66	0.004	Negatively significant
	> 2.5	0.34		
Cohesion and network of user groups are effective	<= 2.5	0.18	0	Positively significant
	> 2.5	0.82		
Forest operational plans effectively implemented.	<= 2.5	0.14	0	Positively significant
	> 2.5	0.86		
Co-ordination and synergy among institutions	<= 2.5	0.64	0.015	Negatively significant
	> 2.5	0.36		

(OP= Observed Proportions, Test proportion = 0.05)

Negative performances

Despite many positive outcomes, CFs have faced mounting challenges, limitations and shortcomings, particularly at implementation level. Table 12 shows the total number and proportion of respondents on Yes or No or Do Not Know to each perception statement. Higher proportion of respondents said that they do not know the idea of elite dominancy in CF with statistically significant on Chi-square test (n=39, 46.99%, X22=8.771; P=0.012). Only 40.96 percent respondents said that they have observed the loss of forest dependent communities in recent years, which was not statistically significant at 5% (n=34, X22 =4.361; P=0.113). The statistically significant perceptions at 5% were as: increased political pressures, (n=46, 55.42%, X22=21.772; P=0.000); and increased human wildlife conflicts (n=63, 75.90%, X22=71.229; P=0.000).

Table 12: Perception of local people on negative impacts of CF

Impact statements	Y	N	DK	X2	p
Elite dominancy	27 (32.53)	39 (46.99)	17 (20.48)	8.771	0.012
Increased political pressure	46 (55.42)	25 (30.12)	12 (14.46)	21.227	0.000
Increased human wildlife conflicts	63 (75.90)	17 (20.48)	3 (3.61)	71.229	0.000
Opportunity loss for forest dependent people	34 (40.96)	30 (36.14)	19 (22.89)	4.361	0.113
Increased pressure on GMF	41 (49.40)	33 (39.76)	9 (10.84)	20.048	0.000
Low level of financial inputs to CF	29 (34.94)	35 (42.17)	19 (22.89)	4.723	0.094

(Responses: Y= Yes; N= No and DK= Do Not Know; X2 test with df=2. The figures in parentheses are percent)

Pressure on Government managed forests (GFMs)

The demand and supply scenario of CFs has been very unbalanced and demand outweighs the supply. The study clearly illustrates that the communities still largely depend on the GMFs to fulfil their need, which implies that the CFs are successful at a cost of degrading GMF. Using PRA and associated tools and techniques of triangulation, the average supply of forest products in 2009 was found from 16 to 62.8 percent, while in 2013 it was from 17.94 to 64.75 percent. The scared supply of timber and fuel-wood has created high pressure on GMFs (Table 13).

Table 13: Demand and supply of forest products

Forest products	Unit	Year 2009		Year 2013	
		Demand	Supply	Demand	Supply
Timber /hh/year	Cft	21.50	4.3 (20)	22.35	4.01 (17.94)
Fuel-wood/hh/day	Headload	0.50	0.08 (16)	0.34	0.10 (29.42)
Grass/hh/year	Headload	1	0.60 (60)	1.2	0.73 (60.83)
Fodder/hh/day	Headload	1.13	0.71 (62.8)	1.22	0.79 (64.75)

Source: Field Survey, 2009 and 2013; hh= households; *One headload is approximately 30 kg.; The Figure in parenthesis are percent

Human wildlife conflicts

Biological corridor and its management at landscape level through CF is a new, and yet a challenging concept. Human-wildlife conflicts have become more frequent and severe over recent years as a result of increased conservation initiated by CFs. The study has found that the loss or damage of property from 2009 to 2013 has been increased many folds (Table 14), but not recorded the case of loss of human life. There is no effective conflict management scheme in place at the community level, although the government has recently endorsed a guideline on compensation against the damage caused by wildlife on human and property.

Table 14: Records of wildlife damage

CFUGs	Number of incidents of damage	
	2009	2013
Dilasaini	6	44
Aishorya	12	57
Jaikalika	4	31

(Source: Field Survey, 2009 and 2013)

V. CONCLUSION

The CF in corridor management under TAL has gained much momentum during recent years. Although the conservation interventions have been adequate, they are yet to impact on massive socio-economic transformations. The importance of social engineering is often overlooked and success of CF must not be at the cost of government forests. However, in general, the CF has provided local communities better option than the previous forest management strategies implemented by the government. The result of the study showed that CF program has provided many positive impacts with some important emerging areas of immediate improvements.

Besides the policy and operational procedures, this study also focused on methodological issues on how to assess the success or failure of community-based conservation initiative at landscape level. The study observed two major problems in analysis such studies. First, it is related to measurement problems on how to measure and quantify the results. The second one is related to the attribution problems on how to determine whether and to what extent the programmes caused the results that are observed.

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