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Characterizing Livelihood Opportunities Arising from Collaborative Forest Management - A Comparative Case of Uttara Kannada, Karnataka and Mau Forest, Kenya

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Abstract

Understanding the nature of benefit outcomes from participatory natural resource management is crucial in gauging its performance. More so, comparative assessment offers best learning platform. The study sought to understand opportunities associated with collaborative forest management through the lens of community livelihood. It examined existing avenues, types of benefits and modes of scheme implementation in Karnataka (India) and Kenya. The study assessed nine village forest committees (VFCs) in Uttara Kannada and four community forest associations (CFAs) in Mau Forest. The primary gain to VFC members was benefit sharing from the proceeds of sale of forest plantation products and auction of non-timber forest product. This granted average income ranging between USD 54-380 to each participating household alongside use rights to forest. Revolving seed funds managed as micro-credit facility by VFCs further supported individual members economic and welfare activities. In Kenya, forest use right under collaborative forest management was the main livelihood benefit. CFAs members in Mau forests benefitted from access to forest for collection of non-timber forest products and undertaking forest-based enterprises within the forest. This was conducted for subsistence, commercial or for both purposes. Average monthly revenues from sale of non-timber forest products ranged between USD 2-22 from fruits or vegetable, while USD 14- 109 for fuel wood. Average semi-annual income from sale of honey as a key forest-based enterprise was USD 4.5-324. Evidently, collaborative forest management affords direct and indirect livelihood opportunities to rural households. The extent and nature however vary depending on respective forest policy guidelines and the manner of execution. These findings have relevance in appraising collaborative forest management in line with amplifying rural livelihood opportunities, especially those dependent on forests resources.

Keywords : Collaborative forest management, Community members, Benefits, Mau forest

Globally, participatory approaches in natural resources have gained traction over the years on account of enhancing sustainable natural resource utilization and community empowerment. Specifically, collaborative forest management engages different stakeholders, particularly the rural forest adjacent population, who are highly dependent on forest resources (Gilmour, 2016 and Vimal *et al.,* 2017). This provides opportunities to eke out living by participating in forest management.

Collaborative forest management (CFM) approach variously involves communities. It can take active engagement through benefit sharing, participation in decision-making process, access to the resources and utilization to passive involvement through information sharing (Dressler *et al.,* 2010). Nonetheless, level of community engagement largely depends on policy provisions dictating the implementation manner. Diverse outcomes therefore emerge particularly on benefits derived, due to the different policy directions guiding implementation mechanisms and strategies, even though the central discourse is rural community involvement and empowerment (Hajjar *et al*., 2016).

In recent times, numerous studies have documented outcomes of participatory forest management (Park and Yang, 2021; Mawa *et al.,* 2021; Kaskoyo *et al.,* 2017; Chinangwa *et al.,* 2016 and Tara & Man, 2013), highlighting consequential contribution of CFM to community livelihood.

However, relatively modest comparative cases exist for instance Angelsen *et al.,* 2014. The study therefore, explored contribution of collaborative forest management to community livelihood taking a comparative approach by focussing on existing livelihood opportunities in Karnataka, India and Kenya. The joint forest management planning of India adopted in the 90's positioned the country among the pioneers of participatory forest management. Periodic adjustments have thereafter been formulated to improve the guidelines to ensure communities involved substantially benefit from the engagement (Dhanapal, 2019). Similarly, a considerable number of African countries, endowed with rich forest resources yet highly threatened with widespread destruction adopted participatory approaches to actively engage the forest adjacent communities (Duguma *et al.,* 2018). Kenya's revised forest legislation outlining collaborative forest management was enacted in 2005 (Odero, 2009) and subsequently reviewed in 2016. Based on dynamics and prevailing conditions, adaptive strategies have continually been introduced to improve effectiveness CFM to address matters related to community livelihood. Recognizing, periodic difference of CFM existence, in the two countries with slight variances in implementation mechanism this study explored influences of varying CFM implementation mechanisms through the lens of community livelihood. The study specifically investigated the nature of benefits accrued to community members involved in CFM and the extent to which benefits were availed and comparing collaborative forest management dispensation in Karnataka, India and Kenya. It examined the manner which village forest committee (VFCs) and community forest association members (CFA) benefitted from collaborative forest management.

Methodology

Description of the Study Area

The study was undertaken in Uttara Kannada forests in Karnataka and Mau forest in Kenya. Uttara Kannada forms the central portion of the Western Ghats of India. It is composed of mixed tropical species. Mau forest is an afro montane mixed forest located at the south western part of Kenya, within the Great Rift Valley. Both sites are biodiversity hotspots. The high conservation status has seen intense investments on collaborative forest management involving forest adjacent communities.

Data Collection and Analysis

Mixed methods comprising cross sectional survey and focus group discussions were conducted. Two stage cluster sampling based on forest divisions in Uttara Kannada and secondly forest ranges was used in selection of village forest committees (VFCs). This included VFCs from the low plain ghat, mid ghat and coastal plain ghats sections, thus nine sample villages were selected from Sirsi and Karwar forest divisions. The list of all VFCs was obtained from respective forest range offices thereafter VFC members were selected randomly. In Kenya, the main clusters were based on forest blocks making up Mau forest and later forest compartments forming common head waters of the Mara river were selected for the study. As such, community forest association members affiliated to Nairotia, Olenguruone, Nyangores and Kiptunga forest compartments were involved in the study. The CFA members were selected from the forest adjacent locations, with list of registered members obtained from CFA register. The final sample size was 45 VFC members and 240 CFA members.

Both quantitative and qualitative analysis were applied in examining key livelihood streams benefitting the VFC and CFA members as espoused in the collaborative forest management. Analyses focused on the following elements: forms of benefits accrued to members, mode of implementation and the number of beneficiaries.

Results and Discussion

Types of Benefits Accruing to Village Forest Committee and Community Forest Association Members from Collaborative Forest Management

Members of the village forest committees (Uttara Kannada) and community forest association

(Mau forest) alluded to existence of benefits associated with their involvement in collaborative forest management.

In Uttara Kannada benefit sharing scheme between the Karnataka Forest department and the VFCs was prominent gain to VFC members. This arose from sale of forest produce including minor forest produce, disposal of forest assets such as older fuel wood, timber plantation and other natural growth according to the Government order No. FEE 50 FAP, 2000. The nature of forests largely determined the types of benefits to the community members. Most VFC members (55.56%) resided adjacent to natural forests while, 44.44 per cent near plantation forest of medium to long term rotation period of 15 to over 20 years. The nature of forests determined benefits types accrued to the members. Benefit sharing scheme was the key benefit to the VFC members from collaborative forest management. Additional gains to the benefit sharing scheme were forest use rights (68.90 %) including collection of non-timber forest product and wage labour (19.90%). However, 11.20 per cent did not perceive any additional benefit from CFM (Table1).

On the other hand, forest use rights in form of access to forest for collection of non-timber forest product and establishment of forest-based enterprises within the forest were chief benefits to the CFA members. Most CFA members (72.60 %) were affiliated to natural forests, whereas the remaining 27.40 per cent lived adjacent to mixed forest comprising both natural and long-term plantation forests of rotation cycle between 20-30 years. Majority of the CFA members (88.05%) cited that they derived benefits from collaborative forest management, 11.95 per cent did not perceive any benefits from their participation. Forest use rights inform of access to forest for collection of non-timber forest products and establishment of forest-based livelihood activities were main benefits to the community forest association members (66.40%). Privileges linked to committed and active membership in the CFA was a benefit stream, although cited by few members

TABLE 1

Forest types and nature of benefits associated with collaborative forest management

		Village Forest Comm itteesn = 45	Community Forest Association sn=226
Existence of benefits associated with collaborative forest management	Yes	40 (88.90)	199 (88.05)
	No	5 (11.10)	27 (11.95)
Forest type	Natural	25 (55.56)	164 (72.60)
	Plantation	20 (44.44)	0.00
	Mixed	0.00	62 (27.40)
Benefit types	Benefit sharing (100.00)	45	NA
	Access to forest for non-timber forest product collection	39 (68.90)	150 (66.40)
	Wage labour	9 (19.90)	NA
	Gains associated with active CFA membership	NA	42 (18.60)
	Lack of (additional benefits)	5 (11.20)	34 (15.00)

In Karnataka, India and Keya
Figures in parenthesis indicate percentages to the total responses

(18.60%). These included skill development, trainings and donations of diverse materials such as energy efficient cooking stoves, beehives and fruit tree seedlings of avocadoes (butter fruits) and tree tomatoes. Fifteen per cent cited lack of benefits from collaborative forest management arrangement (Table 1).

Benefits to Village Forest Committee Members in Uttara Kannada

VFC's assessed derived revenue from sale of forest plantation products mainly timber or fuelwood from acacia plantations. This was on account of joint involvement in silvicultural activities during the

rotation period. Additionally, sale of non-nationalized non-timber forest products formed revenue share to the VFC's. Total revenues accrued to the VFC's assessed ranged between USD 2036 to USD 146, within a decade between 2010 and 2020 (Table 2).

Half of the total revenue earned by VFCs was invested in village development funds (VDF) kitty directly benefitting VFC individual members or the households. This could either be dividends, where the village development funds would be equally shared among the members in form of cash money or translated to projects supporting household welfare.

An average funding of USD 11,308.30, USD 28422.20 and USD 834.30 was earned as village development funds by VFC's in the low plains, mid and coastal plain ghats, respectively. In turn, each household affiliated to the VFC was allocated funding ranging between USD27-382, depending on revenue received by the VFC as VDF and the number of households registered as VFC members. The study established that all the VFC's utilized VDF funds in purchase of household items related to clean and energy efficient devices. Occasionally, items supporting economic activities such as bee boxes and concrete poles for fencing were considered thus improving community welfare and reducing over dependence on forests. In other cases, projects benefitting community within a village were implemented using the village development funds (Table 3).

Collection and sale of non-timber forest products formed an additional benefit stream to the VFCs. Although a variety of non-timber forest products were available, *Garccinia gummigutta* (Uppage) was the most important commercial non-timber forest product, particularly for VFCs within the mid ghat. Others included *Garccinia indica* (Kokum), cashew and cinnamon. Collection of *Garcinia* occurred annually, while auctions were undertaken once in every two years. Average revenue earned ranged between USD 203 and USD1953.

Wage labour offered by forest works during plantation establishment and harvest of non-timber forest products formed part of opportunities arising collaborative forest management. Community members in the respective villages undertook casual work at a rate of USD 3.5 for women and USD 5 for men per man day for specific tasks. The number of working days varied depending on plantation size to be established. Silvicultural works involving plantation establishment was open to all community members irrespective of membership status in VFC. However, collection of non-timber forest products particularly for commercial purposes was preferentially offered to the VFC members as

TABLE 2

Total revenue accrued to VFCs from benefit sharing scheme

Forest Regions	VFC	Total revenue earned (USD)	Mean revenue (USD)	VDF (USD)	Mean VDF (USD)
VFCs in plains of ghat	Umblekoppa	32568.00	22616.70	16284.00	11308.30
	Mudankeri	12213.00		6106.50	
	Bilur	23069.00		11534.50	
VFCs in hilly ghat	Khurse	146555.00	58083.70	73277.50	28422.20
	Teppar	8145.00		4072.50	
	Benagaon	15833.00		7916.50	
VFCs in coastal ghats	Todur	0.00	1673.70	0.00	834.30
	Sathgeri	2985.00		1492.50	
	Baghatwada	2036.00		1018.00	

TABLE 3

Projects implemented by VFC's under village development funds

Region	VFC Name	Number of house holds in the Village	Number of beneficiaries	Items provided to each household
Low plain ghat	Umble Koppa	55	15 (27.27)	Beeboxes-Scheduled tribe/caste, solar panel and LPG connection.
	Madankeri	100	70 (70.00)	LPG connection and LED bulbs - *Construction of bus shade***
	Bilur	133	126 (94.73)	LPG connection, electric burner stoves and utensils. - *Construction of temple***
Mid ghat	Khurse	120	120 (100.00)	LPG gas connection, solar lamps & LED bulbs, energy saving stoves, concrete poles for fencing - *Construction of Social Hall***
	Teppar	115	115 (100.00)	Water heater, LPG connection, solar fencing- *Social hall***
	Benagaon	175	175 (100.00)	Gas Cylinders, solar lamps and cement poles
Coastal plain ghat	Todur	55	10 (18.18)	LPG connection- SC/ST
	Sathgeri	70	70 (100.00)	Solar Lamps, energy saving stoves and LPG connection. - *Social hall** and Street lighting***
	Baghatwada	110	15 (13.63)	LPG connection - *Group farm fencing***

** Projects implemented by VDF for entire community benefit

opposed to the general public. Contractual arrangement for harvesting non-timber forest products for instance *Garcinia* was granted to self-help groups within VFC's or VFC's as whole. *Garcinia* fruit collection period lasted for roughly two to three months, thus providing on the lower side about 75 work days.

Besides, VFC's maintained revolving funds of USD 1400 as local micro credit facility to support economic activities of the VFC members either through self-help groups or directly to individual members. The VFC's operated non-forest-based enterprises for income generation, which would be reinvested in the micro credit kitty for utilization by VFC members (Table 4). The opportunities associated with collaborative forest management presented avenues of diversifying livelihood sources by virtue of households participating in organizational membership as observed by Kumar and Umesh (2020). Further, Minithira *et al*. (2021) demonstrated availability of credit facilities as a factor encouraging livelihood diversification

Benefits to Community Forest Association Members in Mau Forest

Community forest association member's dependent on the forest for multiple non-timber forest products, mainly firewood, grass for livestock grazing and honey. These products were mainly collected for domestic purposes (60.20%), 23.40 per cent collected for both subsistence and commercial purposes, while 16.40 per cent engaged in collection for sole commercial purposes.

Firewood as the main non-timber forest product was collected for domestic and commercial purposes. An average quantity of three head loads per week was collected by individuals for domestic purposes, while those undertaking for commercial purposes collected 4-7 head loads per week. Sale of firewood fetched monthly revenue ranging between USD14-

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USD109, with an average monthly income of USD 51. Other members engaged in collection and sale of vegetable and fruits from the forest, generating monthly revenue USD2 -USD22 (Table 5). Besides collection of non-timber forest products, collaborative forest management provided opportunities for CFA members to set up forest based entrepreneurial activities such as apiculture, livestock grazing and crop production in the form of plantation establishment for livelihood improvement scheme (PELIS). However, PELIS was confined to mixed forests with plantation sections. This directly benefitted individual households mainly bonafide CFA members. Selected beneficiaries were eligible for single plots of 0.5 acres for a period of three years. Average income generated from crop harvest per season was USD 200 to USD 900 depending on agricultural tending activities applied and prevailing weather conditions. Honey harvests per season ranged between 1 kg - 50 kg depending on investment in terms of type and the amount of hives. This earned an average income ranging between USD 4.5 -USD 320 to individual CFA member (Table 5).

Privileges associated with active membership resulted from project implementation of specific activities

TABLE 4
Income generating activities undertaken by VFC

Region	VFC Name	Seed Money (USD)	Additional IGAs	Income generated p.a. (USD)	Number of SHG	Range of Loans advanced (USD)	Purpose
Low plain ghat	Umble Koppa	1358.69	Not mentioned	Not mentioned	2	135.86-407.60@4%	Social Development
	Madankeri	1358.69	Chair hiring	13.58	4	135.86-271.73@4%	House construction For agriculture: purchase of planting materials and farm preparation. Purchase of livestock -Cattle
	Bilur	0	None	0	0	Not applicable	Not applicable
Mid ghat	Khurse	1358.69	Marriage instruments Fixed	584.23 6793.47	5	271.73-2717.39 @3-5%	Business, enterprise Poultry and dairy Deposits farming projects
	Teppar	1358.69	Utensils for hire	67.93	5	543.471630.43@5%	Soap & detergent making.Flower gardening
	Benagaon	1358.69	Marriage instruments	95.10	3	135.86-271.73 @ 4-5%	Home construction - Purchase of properties such as scouter
Coastal	Todur	1358.69	Sale of NTFP such as cashew from	135.87	3	135.86@ 3-5%	plain ghat Small entrepreneurship forests Tour bus hire
	Sathgeri	0	Chairs & Utensils hire	135.86	Not applicable	Not applicable	Not applicable
	Baghatwada	1358.69	Utensils for Hire	339.67	3	135.86-271.73 @ 3.5%	Business: stitching, vegetable vending and coconut selling.

TABLE 5
Livelihood opportunities granted through collaborative forest management

Livelihood opportunity from CFM	Product Type	Revenue generated (USD)	Period of time within which revenue is earned
Collection of non-timber forest product	Firewood	14.00-109.00	Monthly
	Fruits and vegetable	2.00-22.00	Monthly
Forest based entrepreneurial activities	Forest apiculture (forest honey collection and harvests from apiary set in the forest).	4.5-320.00	Semi-annual
	Crop production under PELIS	200.00-900.00	Annually

within the forest adjacent areas. This was linked to initiatives executed by non-governmental organizations in line with experimenting or promoting specific technologies. Therefore, CFA was an entry point to the community, playing roles in site and beneficiary identification. Two categories of benefits were documented, namely household welfare improvement and income generating activities. Household welfare improvement activities related to clean and or alternative energy sources, that saw provision of energy efficient cooking devices to identified active CFA members and in few cases installation of biogas plants. Income generating initiatives included purchase of tree seedlings from member's tree nurseries, provision of horticultural fruits trees and establishment apiculture through provision of bee boxes to selected groups and skill development through assorted trainings such as apiculture, dairy production, farm planning and organic farming (Table 6).

Comparison of Livelihood Opportunities Arising from Collaborative Forest Management in Karnataka and Kenya

Collaborative forest management (CFM) approach involves communities living adjacent to forests in the management and in turn provide livelihood opportunities to promote sustainable forest utilization. In Karnataka, collaborative forest management implemented through the joint forest planning and management (JFPM) involves communities through the village forest committee, with clear guidelines on the VFC's roles, responsibilities and commensurate benefits to be derived by respective VFC's for their roles in collaborative forest management. As such, the VFC members directly benefitted from proceeds of benefit sharing scheme derived from sale of plantation products and auction of non-timber forest products. This arrangement gives the VFC's a central role in administration of the derived revenues on behalf of the community. In addition to the benefit sharing whose returns are periodic, supplementary mechanisms including non-forest-based investments and VFC managed micro credit facility are in place to support community regular needs.

In Kenya, collaborative forest management is advanced through participatory forest management, thus formally engaging the forest adjacent communities through community forest associations. This arrangement permits sustainable forest use through granted forest use rights, negotiated by the CFAs. Principally, the forest use rights inform of collection of non-timber forest products and establishment of forest-based enterprises are the primary options pursued by CFA members. However, the permissible forest use categories are open to all community members irrespective of one's CFA membership status, as it is largely permit based. In this case, any community member is permitted to engage in any agreed upon forest use upon acquisition of requisite permits from the forest office. In addition, royalties charged for permit remains with the Kenya Forest

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TABLE 6

Benefits granted to active CFA members in Mau Forest and number of beneficiaries

Forest Compartment	Forest adjacent village	Number of HH within the CFA eligible area	Approximate no. of CFA members	Benefit type	Number and percentage of beneficiaries
Nairotia	Kimuchul	4000	165	Energy efficient stoves and skill development.	10 (6.00)
	Kipyosit	1110	60	Training on alternative clean energy	15 (25.00)
	Chemaner	120	50	Provision of horticulture materials and purchase of treeseedlings	20 (40.00)
	Sagamian	600	150	Energy efficient stoves and skill development.	10 (6.60)
Olenguruone	Emitik	42	27	Provision of bee boxes.	15 (55.00)
	Kiptagich	120	36	None	0 (0.00)
	Kaplamai	60	26	Tree seedlings for planting	10 (38.50)
	Chikamba	300	105	Skill development and provision of energy saving stoves.	15 (14.30)
Nyangores Masese	Mugango	1300	300	Provision of horticulture materials, bee boxes and skill development.	36 (12.00)
	Kiromwok	280	44	Provision of horticulture materials, energy saving stoves and skill development.	14 (31.80)
	Ndaraweta	900	40	Horticulture: passion fruit farming.	17 (42.50)
Kiptunga	Enapuiyapui	50	30	PELIS & Bee keeping	30 (60.00)
	Kiptunga	90	30	PELISBee keeping	15 (50.00) 15 (50.00)

Service in entirety. Generally, the CFAs as forest resource co-managers access diminutive gains if any, apart from the forest use rights pursued by individual member. Other permitted forest use such as ecotourism remain largely unexploited due to capital intensive requirements. The insubstantial nature of benefit to the community forest associations can be explained by lack of clear guidelines on collabor ative forest management particularly regarding benefit sharing with the communities involved.

Collaborative forest management offers direct and indirect livelihood benefits to forest adjacent communities. Direct benefits include tangible benefits inform non-timber forest products, revenues earned from sale of forest products and income from forest works. In directly, collaborative forest management provide avenues that configures communities into viable entities thus enabling exploration, creation and implementation of both forest and non-forest-based initiatives further supporting livelihood options. The opportunities and outcomes however vary in scale and extent. It is largely contingent on guidelines specifying the nature of benefits to be derived by communities engaged as forest co-managers and it may also be contextual.

Therefore, effectiveness of collaborative forest management in delivery of benefits and promoting livelihood opportunities can be amplified by learning

and experience sharing. This can be a useful strategy in developing or amending guidelines to create robust community structural framework in collaborative forest management with strong linkage to the local community particularly those dependent on forest resources for livelihood.

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