

Contribution of rattan cane in livelihood resilience in relation to Community Forest User Groups and Rattan Processing Enterprises in Nepal

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Abstract

This study highlights the contribution of rattan cane in livelihood resilient of rural people in Nepal. Rattan cane is used as raw material for rattan processing enterprises as well as livelihood resilient of community people. The study was designed based on the exploratory research and was carried out in Community Forest User Groups (CFUGs) Kailali and Bardia district including rattan processing enterprises of major cities in Nepal. The main objective was to assess the contribution of rattan on capitals of Sustainable Livelihood Approaches (SLA) that increase resilient of community people. Systematic random sampling method was followed to take the sampling of rattan processing enterprises and CFUGs. Primary data was collected through open-ended questionnaire, and direct observations; and secondary data was collected from business reports, Forest Operational Plans, and audit reports. The questionnaire survey was conducted to 35 rattan entrepreneurs and rattan traders, and ten executive committee members of CFUGs and 526 household members. The quantitative data was analyzed using frequency of SPSS 20 software tools. The study found that rattan has been important source of income to improve their human capital, natural capital, physical capital, social capital and financial capital in relation to livelihood resilient in the community level, and creation of job in the enterprise level. The major constraints concerning the livelihood resilient was that investment was focused community development

rather than household income, investment on rattan development and management was low, and weak employability focus. The study also identified a number of opportunities in the livelihood perspective such as enterprise development, employment generation to youths and linkage with service providers.

Keywords: community development , , income, livelihood resilient, Rattan cane

Introduction

Rattan cane has been identified as one of the economic potential Non-Timber Forest Products (NTFPs) (Siebert, 2002; Paudel & Chowdhary, 2005). Nine species of two genera of rattan are recorded in Nepal (Chowdhary & Paudel, 2008; Paudel & Chowdhary, 2005). Among them, *Calamus tenuis Roxb* is an endemic and widely distributed species throughout the lowland areas of the country, and mostly protected in community forests (Chowdhary & Paudel, 2008). Out of the 57 rattan SMEs recorded in Nepal, about 66% are operated using raw rattan cane of Indian and other countries, and they are located in urban and semi-urban areas; rest of 30% SMEs rely on domestic rattan (Chowdhary, 2017; Chowdhary & Dutta, 2021). A rattan furniture unit creates employment and income generating opportunities for a wide range of people and helps to improve the economies of the rural communities in which is established Benton *et al* (2011).

There are 20 CFUGs currently managing natural rattan, particularly *Calamus tenuis*, in their community forests of Kailali and Bardia districts. They provide good prospects for enhancing the livelihood and income of local communities. The main benefits come from the selling of raw rattan, rattan seed and seedling. Besides, income of rattan also supports to various community development and environmental conservation to improve the climate resilient activities. In order to promoting well-being of forest proximate people in the forest conservation, regulation and enforcement should be minimal providing economic incentives in the low-intensity and non-deleterious manner that provide conservation and livelihood benefits (Herbij *et al* 2018). Community based rattan resource management approaches has been proven that trade oriented management of sustainable rattan forests can provide alternative income for rural communities (Campbell & Knowles, 2011).

Rattan-based enterprises in Nepal are involved mainly in manufacture of furniture and other household items. Major rattan products are indoor handicrafts such as chair, table, sofa set, hanger, stool, baskets, cradle and decorative items. The industry accounts for over Rs.17 million and has substantial market potential in urban areas of Nepal (Sharma, 2017). Rattan is processed in 89 ways to make 34 designs for 17 types of rattan product in Nepal (MDBRPP/DFRS, 2010).

Rattan is very important source of livelihood for the economically and socially weaker section of the Nepalese community. These are used as raw materials for a variety of products, the demand for which is increasing both in national and international market (MDBRPP/DFRS 2010). Rattan resources have contributed in social, economic, environmental, biodiversity and cultural aspects to the community people (Chowdhary & Paudel, 2008). With careful management and added value, they can provide sustainable livelihood opportunities for million of people, especially in rural area, and thus can be used

to help achieve greener development (INBAR 2015). Community managed rattan resources has contributed to improve the "livelihood" five capitals- natural, human, social, physical, and financial capital (Warner, 2000) and hence reduces the vulnerability of different groups, such as shocks and stresses (Slee, 2005).

The Forest Act 1993 and its Amendments in 2019 has made provision to utilize the community forestry fund for community forest development as well as social development. According to it, at least 25% of the total community fund must be used in forest development, conservation and management, 35% for income generation to poor and women households and remaining fund for community development activities (DoF, 2014).

This paper attempts to explore contribution of community managed as well as rattan enterprises in livelihood improvement in the perspective of sustainable livelihood framework.

Methods and Material

The study was carried out in Community Forest User Groups of Kailali and Bardia districts, and rattan processing enterprises of Nepal. This study was designed based on the exploratory research. The research has explored research framework includes combination of livelihood and socio-economic. For this, simple random sampling method was followed to take the sampling of rattan processing enterprises and CFUGs. Sampling was determined from the total availability of community managed rattan processing enterprises available in the areas. Data was collected using semi-structured questionnaire through face to face and self-administered techniques to CFUGs' executive members, users and owner of rattan processing enterprises. The interviewee include 35 rattan processing SME, 526 households survey, and 10 executive members of the CFUGs, 3 Key Informant Interviewees (KIs).

Each capital of Sustainable Livelihood Approaches (SLA) was described using most five relevant indicators. Each indicators were ranked between 1 to 5 ranking score where 5 being the excellent or the highest score and, 1 is the poorest score. Score was judged based on the overall contribution of rattan and rattan forest in the defined indicators. This score was assessed not only by rattan but also rattan forests, non-timber forest products, and biodiversity. The aggregate score of the livelihood capitals was the sum of individual score of indicators. There are five indicators in each capital. Thus 25 was the highest score of a capital

Households were selected from users of CFUGs managing rattan in their community forests, executive members were the board members of CFUGs and KIs were entertained to the governmental officials and non-governmental organization those who provide services. Table 1 explains major study sites with reference to SMEs and CFUGs, geographical information and market centers.

Table 1: Description of the major study sites with reference to types of SMEs, geographical information and market centers

Study sites	Types of SMEs	Geographical locations
Kathmandu valley	Private rattan processing SMEs	Central
Pokhara	Private rattan processing SMEs	Mid –West
Narayangadh	Private rattan processing SMEs	Central
Bharatpur	Private rattan processing SMEs	Central
Kakarvita	Private rattan processing SMEs	Eastern
Tikapur	Private rattan processing SMEs	Far- West
Sati	Private rattan processing SMEs+ CFUGs- Community managed rattan forests)	Far-West
Rajapur	Private rattan processing SMEs+ CFUGs- Community managed rattan forests)	Western
Nepalganj	Private rattan processing SMEs	Western
Dhangadhi	Private rattan processing SMEs	Far West

Data analysis

The qualitative data obtained from transcripts of personal observation, and voice records were coded into themes and prepared the note. Themes were analyzed for connections between data, concepts and theories. The quantitative data were analyzed as descriptive statistics using Frequency of the Statistical Package for the Social Science (SPSS) version 20. Qualitative data was analyzed using descriptive method and narratives were presented in relevant to contents.

Result

Uses

Rattan is very important source of livelihood for the economically and socially weaker section of the Nepalese community. These are used as raw materials for a variety of products, the demand for which is increasing both in national and international market. Rattan, although used for various small construction and basketry, Nepalese rattan were mainly used for seven major purposes such as furniture and handicraft (basketry, furniture, household items and handicraft), decorative material (lamp cover, bangles stand, dolls, curtain rings), medicinal (Ayurvedic pharmacology- dysentery, ulcer, anti-snake and insect bite, tonic, food material of fruits and shoots), environmental conservation (controlling of soil erosion, recharging of water sources, greenery and improvement of edaphic quality), source of income (income source of community forest user groups), cultural and religious (worshiping as a holy plants, stick kept in the goddess home).

Revenue from sell of rattan and SMEs

According to record of CFUGs of Kailali and Bardia district from 2005 to 2016, NRs 12.29 million was earned from selling of 265.5 Metric Ton rattan cane, but income from selling of rattan canes was not regular. Out of which, NRs 4 million (32.54%) was invested directly to

improve sustainable livelihood capitals of the CFUGs. However, harvesting of rattan was reduced over 90 % after 2007 due to failure to meet the standard of Initial Environment Examination (IEE) by CFUGs. Some of the CFUGs had stopped to harvest the rattan in their CF even they were getting mature. Fig 1 depicts income earned from sell of rattan in Kailali and Bardia districts and quantity of rattan harvest from CFUGs.

More than 15 CFUGs had neither renewed their forest operational plan (FOP) nor they had IEE report. However, Ganesh, Shiva, Durga, Sanoshree, Ayodhyaphanta, Sarswoti, Lalai, Ganeshpur Sishahaniya, Tharu CFUGs have harvested less than 5000 Kgs in 2015 and 2016 rattan from their CFs based on their valid FOPs. As a result, local entrepreneurs did not get adequate raw material to sustain their enterprises. Entrepreneurs of Rajapur area revealed that they got 25 to 50% raw rattan supply from community forests. Rattan derivatives i.e. leaf sheath, leaf and fruits were another source of income for CFUGs. About NRs 0.42 was earned from selling of rattan derivatives in Sati Karnali CFUG of Kailali. Community people use derivatives for household purpose such as broom making, thatching, fencing etc. The rattan fruits was also sold by CFUG over the period.

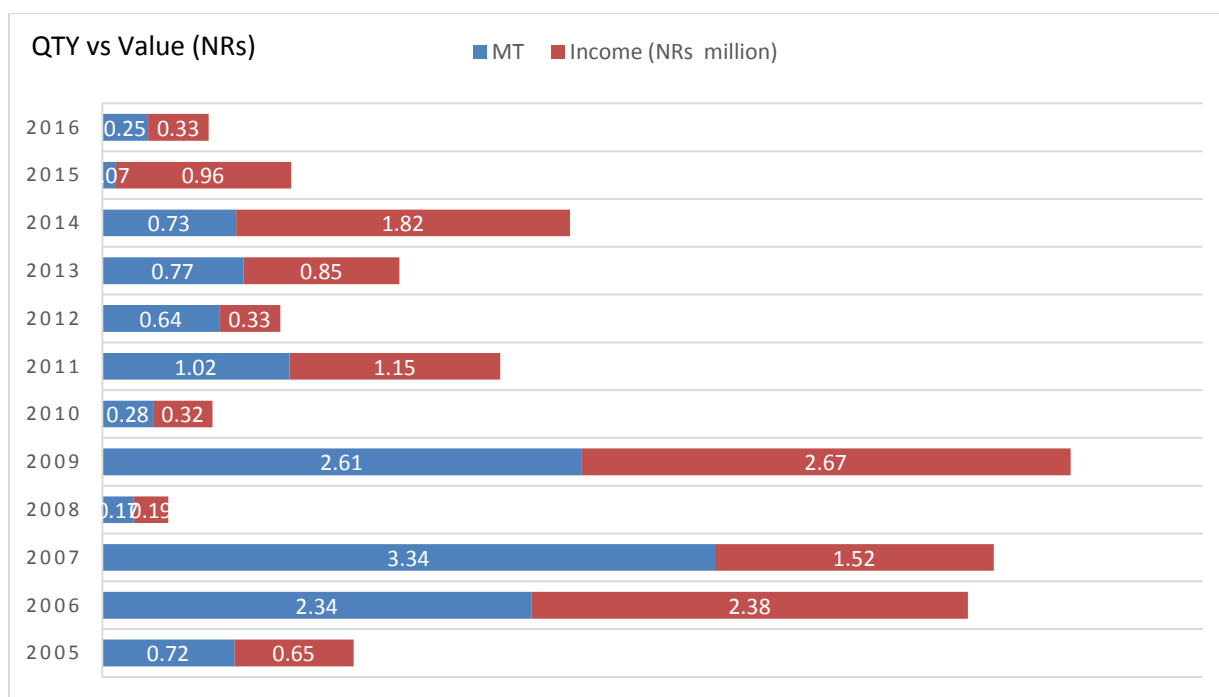


Fig 1: Collection of rattan quantity and income generated from CFs of Kailali and Bardia

Income at household level

The survey of 57 households of four CFUG showed that livelihood support was provided to them to conduct rattan enterprises, have average income NRs 7004 per month, income ranged from NRs 2000 to NRs 9500 (Table 2). Rattan processing enterprises was supported to their members by CFUGs to increase income of households through green employment

opportunities of youths. However, total CFUG members supported for rattan processing enterprises was 5.25% out of the 1086 users, which is very low.

Table 2 Income of households from enterprises

District	CFUG	No. of households	Involvement in enterprises	Average monthly income (NRS)
Kailali	Sati Karnali CFUG	880	30	9500
Bardia	Shiva CFUG	105	11	8500
	Durga CFUG	36	10	2000
	Sonhaphanta CFUG	66	6	7000
Total		1086	57	7004

Perception of CFUG members on livelihood increment

Despite the huge potentialities of rattan in livelihood support, community forest users' had mixed perception about it. The survey revealed that they needed tangible benefits for poor people that improve the livelihood assets. On the other hand, CFUG executive members used the fund for community development. A survey carried out in 526 community people, 219 (41.6%) people answered “YES” that rattan supports for livelihood improvement, 302 people answered “NO” that do not support rattan in livelihood improvement and 5 people answered “Don't' know”. Majority of community people do not agree that rattan has direct contribution in livelihood of poor people (Fig 2).

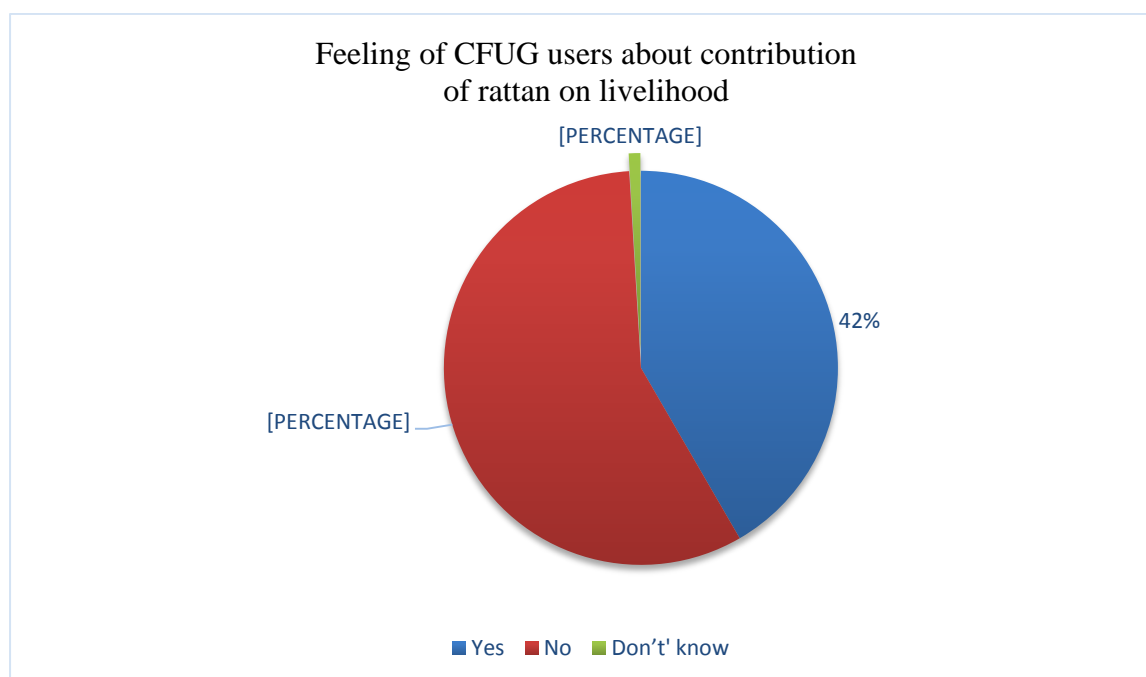


Fig 2 Realization of community on improvement of income by rattan management

Rattan processing enterprises and employment generation

Currently there are about 57 rattan processing industries running in 17 cities of 13 districts. Based on size and capital investment, highest number of artisans employed full time in them are 479. However, the largest rattan processing industries have employed up to 40 artisans and small size industries have employed 3 artisans. Each artisan earn in an average NRs 240,000 per annum. However skilled artisans earn NRs 0.36 to NRs 0.42 million excluding residential facilities. Average earning by large size enterprises is NRs 0.54 million per annum whereas NRs 0.42 million by small and medium size of enterprises. There are about 13 selling outlets where cane furniture is sold. In totality, earning from 57 enterprises are about NRs 33.33 million per annum. There are 12 CFUGs employed 2-5 forest watchmen and 2-3 staffs. More than 70 persons are involved in rattan selling in fancy shop, transportation, harvesting and trading. With this figure, NRs 52.27 million is earning by artisans, whereas NRs 2.88 million by CFUG and NRs 4.2 million by service providers. Total earning by entrepreneurs, CFUGs and service providers are NRs 59.35 million per year. Estimated job creation by rattan subsector in Nepal is presented in Table 3.

Table 3 Job Creation to local people from rattan sub-sector

Types of enterprise	Number of processing industries	Number of employment (PERSON)
Rattan processing industries (12 districts)	57	349
Fancy shop, hardware	10	30
CFUGs	10	30
Part time employment		70
Total		479

There are about 409 persons directly employed whereas 70 persons are indirectly employed. After earth quake disaster in Nepal, over 60 % Indian artisans have left their job and went back to India. It was the critical period for rattan processing industries to sustain them with the limited number of unskilled laborers. In such a condition, most of the entrepreneurs trained their family members, particularly their wife, nephew, brother in law and involved them in processing works. On the other hand, some development organizations provided skill training to women and Dalit community members where Ganapati women were leading rattan processing enterprise. It was observed that rattan processing industries are increasing in the major cities gradually, whereas decreasing in rural areas those depending on Nepalese raw cane is facing severe scarcity of cane (Pradhan, 2018). The survey of 35 rattan processing industries shows that 55 to 66% rattan industries were increased in the each decade before 2015 (Fig 3). More than 15 rattan processing centers were closed in Birganj, Hetauda, Rajbiraj, Itahari, Janakpur, Banke, Bardia and Kailali in the past. Among them five rattan industries were closed from 2013 onwards facing continuous scarcity of raw material from community forests due to lack of approved IEE. In addition, some processing industries were collapsed in the earth quake and could not restart. Supply of Indian rattan was also obstructed due to banning on supply of raw rattan outside India. It was estimated that 30-40 % enterprises are opening and closing frequently due to scarcity of raw material and labor shortage (MDBRPP/DFRS 2010).

The field survey of enterprises from 2016 to 2017 shows that out of the 35 enterprises in Nepal, 7 enterprises (20%) were led by women whereas 28 (80%) led by men. By ethnicity, 7 (20%) were run by Brahmin, 10 (28.6%) by Chhetri, 17 (48.6%) by Janajati and 1 (2.9%) by Dalit. It indicates that Janajati are higher % involved in the rattan industries. Noting that Far Western and Mid-Western Terai of Nepal are dominated by Janajati ethnic group who are involved in rattan processing.

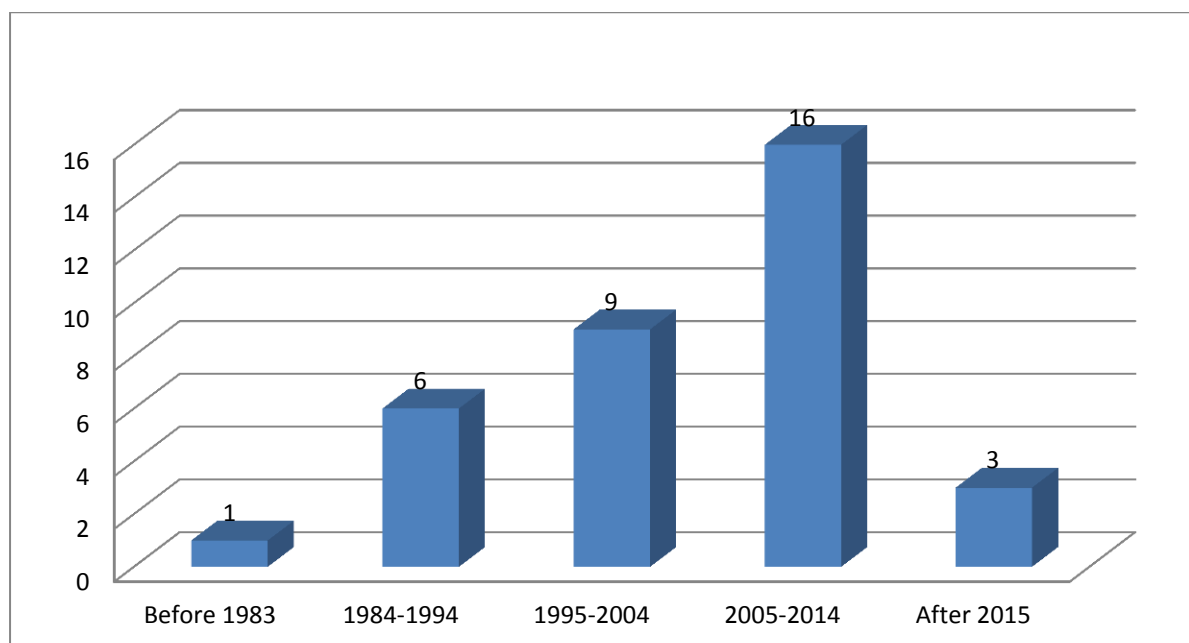


Fig 3: Number of rattan processing industries established up to 2015

Analysis of contribution of rattan in livelihood in the perspective of Sustainable Livelihood Analysis Framework

Contribution of rattan income in the livelihood improvement of local communities were analysed based on five major capitals i. Human capital, ii. Natural capital, iii. Physical capital, iv Social capital, and v. Financial capital. Each capital was assessed in terms of five most relevant indicator. They are summarized in the the Fig 4 and Table 4 and detail analysis is presented in **Annex I and Annex II**.



Fig 4: Contribution of rattan on livelihood capitals of CFUGs

Table 4 Summary result of Sustainable Livelihood Capitals

Capital	Score	Obtained	%	Conclusion
Human capital	25	15	60	Among the indicators of human capital, contribution of health, education and capacity to adapt is comparatively higher, whereas contribution in knowledge and skills, and capacity to work is relatively poor. Still contribution on human capital needs to improve.
Natural capital	25	17	68	Out of the five SLA capitals, contribution of rattan on this capital is highest. Out of them, trees and forest products, and biodiversity is highest, rest of the indicators such as land and produce, wildlife, and environmental services are still to improve
Physical capital	25	13	52	Infrastructure, energy, and Communication are less performed indicators whereas tools and technology and traditional technology contribute significant in this capital.
Social	25	15	60	Community managed rattan were

capital				contributed equally to network and connection, formal and informal group, common rules and sanction, Mechanism for participation in decision making-3, and leadership development. Total contribution of rattan is 60% that indicates moderate contribution.
Financial capital	25	10	40	Saving, and Credit/ debt-formal, informal, NGO indicators are contributed higher whereas rest of the indicators such as remittance, pension and wages were contributed about 20%. In total rattan contributes about 40% in financial capital
Total	125	70	56	

Discussion

Market analysis and development (MA&D) analyses the social and environmental concerns into consideration as well as technological, commercial and financial aspects of small enterprises development (Lecup, 2011). Rattan is very important source of livelihood for the economically and socially weaker section of the Nepalese community. These are used as raw materials for a variety of products, the demand for which is increasing both in national and international market (MDBRPP/DFRS 2010)

In the bamboo and rattan producing countries of South and Southeast Asia (China, India, Indonesia and the Philippines), over two million people formally work with bamboo and another half a million in rattan based activities (INBAR, ND) Bamboo and rattan industries play significant role in generating additional employment in the country. A study conducted by German Technical Cooperation/ Private Sector Promotion in 2006, bamboo and rattan growers, traders, manufacturers and sellers, the monthly turnover of the bamboo and rattan enterprises ranges from NRs 5000 to NRs 10,000 in general and NRs 300,000 to NRs 500,000 in special cases (INCON, 2006). In recent days, rattan is popular in much rural area for varieties of indoor construction. Community Forest User Groups (CFUGs) are planting rattan in their forest area for the sake of quick income generation and environmental purpose. Validity of more than 60% FOPs were already been expired. They have neither renewed their FOPs nor prepared IEE report. Even those CFUGs had valid operational plan, they were not able to prepare the IEE due to lack of technical expertise and financial resources (Sharma D. R., 2016)(in personal communication on bottleneck of rattan enterprises in Bardia district). Dhakal (2016) argues that Durga Community Forest, Shiva Community Forest, Saraswati Community Forest including more CFUGs routinely harvested nominal quantities of rattan from their community forest despite validity of forest operational plan were expired. Another rattan entrepreneur KC (2017) added (in personal communication on constraint and opportunities in rattan enterprises in Bardia) that due to lack of raw material and unnecessary administrative burdens after imposing of IEE, three rattan enterprises have been closed their business for ever. Member of Sati Karnali, Durga, Shiva, Sarswoti, Badalpur, Sonhaphanta CFUGs had already started their rattan processing enterprise, but it was challenging to

continue them when rattan harvesting was restricted. For example, Shiva community forest lies in the Khata Biodiversity Corridor had neither revised their OP nor harvested rattan from last nine years back, although members of this community forest were positive towards the rattan in community forest.

In spite of this restriction, rattans was harvested from community forests like Durga, Sonhaphata, Shiva and Sarswoti CFUG at mutual understanding of members and authority of community forest for commercial need of members of CFUG. Entrepreneurs of Rajapur area revealed that they were getting 25 to 50% raw rattan supply from community forests in emergency period to sustain the enterprises. Beside this, members of CFUG could collect rattan culms from CF on occasions like ceremonies, house construction and maintenance etc.

CFUGs have more simplified decision to utilize 25% fund for forest development, conservation and management, up to 35% for livelihood improvement and employment generation for poor and women, 15 to 35% for social development and 5 to 10% for administrative. The forest development works includes all the works related to conservation, management and utilization of forest development. Social development work refers infrastructure development, socio-economic, health and educational activities (DoF, 2014). This has been also supported by Bhattarai (2018) that community people have realized that rattan management has contributed to improve the income and Dhurba *et al* (2016) argue that wise and effective use of forest resources can definitely contribute to the

Rattan is major source of income to the community forest user groups of Kailali and Bardia districts. Although rattan is great potential for income generation of CFUGs, harvesting of rattan from community forests is not regular in the recent years. Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) process imposed by the Government of Nepal is major bottleneck. According to Environmental Protection Act (EPA) 2007, CFUGs required to conduct IEE and get approval from Department of Forest (DoF) to harvest more than 5000 kg of rattan or forest products at a time. There are more than 15 CFUGs of Kailali and Bardia district waiting for IEE preparation and approval. However, the EPA 2078 (amendment) has revised the threshold level from 5 quintal to 150 MT which is important decision to remove the IEE bottleneck.

Conclusion

Despite rattan is very important source of livelihood for the economically and socially weaker section of the Nepalese community, contribution of rattan on livelihood capitals limited households and communities. Rattan is used for various small construction and basketry, Nepalese rattan contributes in livelihood through seven major facets such as furniture and handicraft, decorative material, medicinal, environmental conservation, source of income, and cultural and religious. Rattan has created jobs in community level, traders level and entrepreneurs level. In total about 479 persons are employed out of which about 409 persons are directly and 70 persons are indirectly employed in rattan processing, conservation, and marketing activities. Mainly youths and women are employed in rattan processing enterprises whereas CFUG members in rattan conservation and management activities. Assessing the contribution of rattan on community level as per Sustainable Livelihood Analysis framework, contribution of rattan on human capital, natural capital,

physical capital, social capital, and financial capital is significant. Nevertheless, contribution in household level of community people is still matter of debate and acceptability by community people are less than 50% of the CFUG members of community managed CFUGs of Nepal.

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Annex 1 Analysis of sustainable livelihood and scoring of indicators

SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
Human capital	Health	Minimum investment of community fund in the health sector	Investment of community fund, awareness raising to their community members	Investment of community fund, awareness raising, improvement of health posts of their community members	Investment of community fund, awareness raising, improvement of health posts, support to poor and marginalized groups for treatment cost of their community members	Investment of community fund, awareness raising, improvement of health posts, support to poor and marginalized groups for treatment cost and ambulance facility of their community members	3	5
	Education	CFUG fund earned from rattan invested for school construction	CFUG fund earned from rattan invested partially for school construction, payment of salary of teachers	CFUG fund earned from rattan invested fully for school construction, payment of salary of teachers	CFUG fund earned from rattan invested for school construction, payment of salary of teachers, scholarship to students	CFUG fund earned from rattan invested for school construction, payment of salary of teachers, scholarship to students, improvement of sports and administration	3	5

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
	knowledge and skills	Support for skill development training through sending participants to outside training institutions	Conduct knowledge & skill development training to some number of participants hosted by CFUG	Conduct knowledge & skill development training to greater number of participants hosted by CFUG	Conduct knowledge & skill development training to greater number of participants hosted by CFUG, provide equipment for implementation	Conduct knowledge & skill development training to greater number of participants hosted by CFUG, provide equipment for implementation, post formation and institutional strengthening support	3	5
	Capacity to work	CFUG members are able to manage rattan in their community forest	Community members are able to manage rattan in their community forest, decision made by EC member	Community members are able to manage rattan in their community forest, ensure full participation	Community members are able to manage rattan in their community forest, ensure full participation, business orientation	Community members are able to manage rattan in their community forest, ensure full participation, business orientation, and inclusive for environmental concerns	3	5
	Capacity to adapt	Developing adaptive capacity of community people during resource management to business	Adaptive capacity of community people through firewood and other forest products	Adaptive capacity of community people through firewood, NTFP and other forest products,	Adaptive capacity of community people through firewood, NTFP and other forest products, policy transformation	Adaptive capacity of community people through firewood, NTFP and other forest products, policy transformation, and commercialization of resources	3	5
						Sub-Total	15	25

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
Natural capital	Land and produce	Ensure tenure right and products obtained from the forest	Ensure tenure right and products obtained from the forest	Ensure tenure right and products obtained from the forest in full participation	Ensure tenure right and products obtained from the forest, diversified product for usage	Ensure tenure right and products obtained from the forest, diversified product for usage, and access of community people on benefit sharing	3	5
	Trees and forest produce	Availability of trees and rattan in the forest	Increased change of trees, rattan and other NTFPs slowly	Progressive change of trees, rattan and other NTFPs	Progressive change of useful trees, rattan, NTFPs and forest amenity	Progressive change of useful trees, rattan, NTFPs, forest amenity and biodiversity	4	5
	Wildlife	Availability of wildlife in the forest	Consideration of wildlife conservation without incorporating in the operation plan	Consideration of wildlife conservation in the operation plan	Consideration of wildlife conservation in the operation plan	Consideration of wildlife conservation in the operation plan and active participation of community people	3	5
	Biodiversity	Rattan forest promoting biodiversity	Increased biodiversity to some extent in rattan forest	Increased biodiversity in rattan forest	FOP includes rattan forest with focusing biodiversity	FOP includes rattan forest with focusing biodiversity of biodiversity corridor area connecting to landscape approach	4	5

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
	Environmental services	Rattan forest accounting environmental and biodiverse	Rattan forest contributing to environmental services	Rattan forest pivotal to environmental services	Rattan forest pivotal to environmental services with human, nature and ecology focus	Rattan forest leading element of environmental services with human, nature, ecology and genetic conservation perspective	3	5
						Sub-Total	17	25
Physical capital	Infrastructure	Income of rattan contribute to local infrastructure development	Income of rattan utilized in small scale for road, electricity, school, public place	Income of rattan utilized for road, electricity, school, public place, and health and sanitation	Income of rattan utilized for road, electricity, school, public place, health and sanitation, environmental conservation	Income of rattan utilized for road, electricity, school, public place, health and sanitation. Environmental conservation, biodiversity and climate change	3	5
	Energy	Rattan income and biomass contribute to firewood	Rattan income and forest contributes firewood and biogas	Rattan income and forest contributes firewood including rural electrification	Rattan income and forest contributes firewood including rural electrification, improved cook stoves	Rattan income and forest contributes firewood including rural electrification, improved cook stoves, solar, biogas and skill development	2	5
	Communication	Promoting telephone and mobile	Promoting telephone, mobile, FM	Promoting telephone, mobile, FM network installation	Promoting telephone, mobile, FM, TV installation and operation	Promoting telephone, mobile, FM, TV, other electronic media, training and awareness	2	5

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
	Tools and technology	Promoting existing tools and technologies	Adapting tools and technologies	Innovative tools and technologies	Introducing adaptive technologies	Introducing adaptive technologies, scale up them	3	5
	Traditional technology	Acknowledge of traditional technologies	Documentation of traditional knowledge	Documentation of traditional knowledge and technologies	Documentation of traditional knowledge and technologies	Documentation of traditional knowledge and technologies, preservation of them	3	5
						Total	13	25
Social capital	Network and connections	Poor network and connections among CFUGs and government institutions	Inter-cooperation among CFUGs, and local government institutions	Strong Inter-cooperation among CFUGs, and local government institutions	Strong cooperation among CFUGs, government institutions, civil societies	Very strong cooperation among CFUGs, government institutions, civil societies	3	5
	Formal and informal groups	Exist officially registered and unregistered groups	Officially registered groups dialogue and exchange of experiences	Officially registered groups dialogue and exchange of experiences	Officially registered groups dialogue and exchange of experiences and forms federation, networks together	Officially registered groups dialogue and exchange of experiences and forms federation, networks together benefitting cross the CFUG boundary	3	5

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
	Common rules and sanctions	Exist common rules and sanctions	Approved common rules and sanctions	Approved common rules and sanctions developed and binding by the community	Approved common rules and sanctions legitimate to government policy	Approved common rules and sanctions legitimate to government policy and broader replicated	3	5
	Mechanism for participation in decision making	Monopoly practices of decision making process	Partially democratic practices of decision making process	Democratic practices of decision making process	Sharing and dissemination of decisions made by community	Role model decisions making process of the community	3	5
	Leadership	Poor leadership	Regular but poor democratic practice of leadership development	Democratic practice of leadership development	Democratic practice of leadership development in the group and representation in the social development as well	Democratic practice of leadership development in the regional and national level social and political services	3	5
						Total	15	25
Financial capital	Saving	CFUG fund promoting group saving	CFUG fund for individual membership for members	CFUG promoted cooperative for members	Cooperative for members, share in bank and contribution in membership as well	Cooperative, share in bank and financial institutions, group share in other development sectors	3	5

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SLA pillar	Indicators	1	2	3	4	5	Obtained Score	Full score
	Credit/ debt-formal, informal, NGO	Provision of credit/ debt in formal, informal and NGOs	Credit/ debt and formal and informal groups in primary stage	Community supported credit/ debt and formal informal groups	CFUG initiated formal informal institutions	CFUG and members initiated formal informal institutions	3	5
	Remittance	Contribution of rattan income for remittance	Provided loan, lending and seed money for loan repayment	Provided loan, lending and seed money for remittance	Provided loan, lending and seed money for remittance	Provided loan, lending and seed money for remittance and operating remittance services	1	5
	Pensions	Not contribution of rattan income for pension	Contribution of rattan income for pension initiated only	Contribution of rattan income for pension	Policy and provision for pension	Operating pension camp and education	1	5
	Wages	Low wages opportunity	Locally laborer a for user in wages	Locally laborer and involvement for user in wages	Wages for community and beyond community	Wages for community and beyond community and international	2	5
						Subtotal	10	25

Annex II: Key contributions of Community Forests and Rattan income to capitals of Sustainable Livelihood Approach Framework

Livelihood assets	Indicators	Contribution in livelihood by rattan and community forests	Contribution amount (NRS)
Human capital	Health Education Knowledge and skills Capacity to work Capacity to adapt	<ul style="list-style-type: none"> Constructed a community building (in Sarswoti CFUG of Bardia), from selling of rattan. Scholarship provided to 30 students from poor and Dalit households of 5 to 10 grade retain their study (in Kailali) Sati Karnali Higher Secondary School, Nasiriya lower secondary school, Suryamara Financial support to Sati Karnali Higher Secondary School Financial support to schools for institutional development Training and financial support to rattan cane furniture to 47 youths to start cane furniture enterprises in the communities Provided rattan cane to start rattan enterprises to their members in the subsidized rate, i.e. 10 Kg rattan stems at the rate of NRs 30 per kg. Sarswoti CFUG of Bardia supported to 12 households for vegetable farming, 78 poor households for income generation. Grant support to school building construction and salary of teacher 	Rs 1,738,376
Natural capital	Land and produce Trees and forest produce Wildlife Biodiversity Environmental services	<ul style="list-style-type: none"> Long term tenure security through community forestry SKCFUG has hired five forest watchmen to protect forest against illegal cutting of forest products and protect from fire, Managed forest blocks for rotational harvesting of rattan in the forest, conservation of biodiversity, regulated block management and plantation of 	Rs 1,260,000

Livelihood assets	Indicators	Contribution in livelihood by rattan and community forests	Contribution amount (NRS)
		<p>trees and conservation of biodiversity.</p> <ul style="list-style-type: none"> • Contributed to germinate water in the Karnali and its tributaries • Wild animals like antelope, reptiles, birds, butterfly and endangered animals increased • Enriched of wild flora and fauna including endangered wild animals • Increased medicinal and aromatic plants and other NTFPs • Edible fruits such <i>F. cunia</i> has increased immensely in the forest • SKCFUG constructed a dam in Karnali River which damaged more than 300 households, inundated agriculture lands and damaged the forest area by flood • The SKCFUG also supported to community households to install improved cook stoves as per Disaster Risk Reduction Plan (DRRP) 	
Physical capital	<p>Infrastructure (Transport-roads, vehicle etc, Secure shelter and buildings, Water supply and sanitation) Energy Communication Seed, fertilizer, pesticide Traditional technology</p>	<ul style="list-style-type: none"> • SKCFUG and Sarswoti CFUG constructed office building partially supported from rattan income • SKCFUG constructed a watch tower for forest conservation, a public passengers waiting hall in Sati Bus Park, Kailali • Sarswoti CFUG (Bardia) constructed a community building Chautari construction for public use in Kailali • Collection and distribution of firewood from community forest each year. • Provided soft loan to users to start up their business • Indigenous knowledge of conservation and management of 	Rs 1,298,650

Livelihood assets	Indicators	Contribution in livelihood by rattan and community forests	Contribution amount (NRS)
		rattan documented and adapted.	
Social capital	Formal and informal groups Common rules and sanctions Collective representations Mechanism for participation in decision making Leadership	<ul style="list-style-type: none"> • Job created to 479 youths from rattan enterprises in Nepal, among them 57 persons from rattan related activities in the CFUGs of Kailali and Bardia is with average monthly income raised • Supported to Senior Citizen's Center Tikapur to run and sustain it. • Prize awarded to meritorious students and honored to senior citizens • Supported youth clubs for support activities • Supports to disabled and poor 	Rs 560,989
Financial capital	Saving Credit/ debt-formal, informal, NGO Remittance Pensions Wages	<ul style="list-style-type: none"> • SKCFUG supported to purchase bank share for users • Share purchase of Radio FM • CFUGs encouraged their members in rattan harvesting, processing and development activities as wage laborers. • Supported NRs 10,000 to each household of selected 30 households for enterprise development support without interest. 	Rs 410,000