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No Longer Wild Food Utilization-Farm Based Agroforestry Production Alleviate Poverty: A Case Study of Ethnics of Raksirang Rural Municipality within Central Nepal

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Abstract

Agroforestry is typically a sustainable land-use system that maintains or increase the total yield by combining food crops with tree crops and/ or livestock on the same unit of land. Farm based agroforestry focus mainly on food production and associated with timber yield gives several benefits. This study examines that how farm-based agroforestry alleviate poverty among the marginalized ethnics of Kankada in Central Nepal.

A total of 60 (9%) HHs of Chepang with farm practiced taken as purposive samples, primary data and various research methods have been applied to obtain the result. The result revealed that- prior to agroforestry, farmers do plantation in non-terraced land and produce maize (*Zea mays*) and millet (*Pennisetum glaucum*) which supported for 3-4 months. Rest of the month they cope through skipping meal, consuming wild Food-Cush Cush yam (*Dioscorea deltoidea*), and Air potato (*Dioscorea bulbifera*). Now with agroforestry a good production of banana (Musa paradisiacal), pineapple (*Ananus comosus*), broom grass (*Thysanolaena maxima*) and peach (*Prunus persica*), the situation has changed. Livestock has increased due to copious grass in the area. An average of $700-750 per annum earning from the sale of agroforestry, and additional $1000-1500 per annum earning from sale of livestock have been recorded.

The study concluded that farm-based agroforestry is the only one mode of livelihood among the Chepang which can help to sustain the livelihood in sustainable manner. Still slash and burn practice that are ongoing which need to be replaced through plantation. Communities are requiring market for sale. Agroforestry model has been explained which underpin the importance of the agroforestry system in the area.

Keywords: Agroforestry; Marginalize; Chepang; Poverty; Livelihood

Introduction

According to Glimour and Nurse, the word agroforestry or Krishiban in Nepali is a new word in the farmers' vocabulary, but the practice has been in their farming systems for many generations. Farmers have cultivated trees on farm from time immemorial. According to a study by Tejwani and Lai, agroforestry practices in Nepal can be described in two broad categories: farm –based and forest-based. The farm-based practices are home gardens, planting trees on and around agriculture fields, tree wood lots and commercial crop under shade trees or agriculture crops inter-cropped with commercial trees. The forest-based practices involve specific agricultural practices associated with forests where farmers collect food, fruits and gums [1,2].

According to Nair agroforestry is a collective name for land use systems and technologies involving trees combined with crops and/ or animals on the same land management unit. According to a report by Chew, agroforestry can play a vital role to meet the need of the growing population in terms of sustaining crop agriculture and livestock, production of commodities for exchange and as a form of energy and providing diverse tree products for sustaining rural livelihoods [3,4].

According to Rai, Chepang lived a fully nomadic life, depending fully on forest resources for hunting and gathering. Nearly a century after Hodgson, a comprehensive study about Chepang, reported that though Chepang's still practiced a good deal of hunting and gathering, agriculture formed the mainstay of their livelihoods, and they practiced khoriya. Chepang are the ancient settlers of the study area with 350 households recorded in the VDC. According to the Yearly book of CBS, the population of Chepang in Nepal total about 52,000 (0.23% of Nepal's population) and are one of the less developed communities with only 13.9% being literate [5-7].

According to IFAD more than fifty percent of Chepang live below poverty line. According to DDC, Chepang are the most vulnerable and marginalized inhabitant of Makwanpur district who are below poverty line. According to SNV and NCA, the Chepang are marginalized by a larger section of society. Where most of the Population are landless mostly, they did not have any interest towards the low-lying fertile lands because of their primary interest in forests. It resulted in occupying the land by the other influential group making the Chepang live in the hilly slopes [8-10].

Literature Review

In a study by Piya, Chepang depend upon a diversified livelihood strategy comprising of agriculture, livestock, wage labor, collection and

sale of NTFPs, skilled and salaried jobs, handicrafts, and remittance. A research by MDI stated that the development of fruit orchard in shifting cultivation area is found to be an attractive alternative for people generating income provided the soils and slopes are favorable and location is closure to market. Makawanpur is one of the high rainfalls receiving districts with the fruit crops successfully grown are banana and pineapples which grown in altitude ranges from 300 meters to 900 meters. Tree fodders include Ipil-ipil (*Leucaena lecocephala*) and Bakaino (*Melia azedarach*) which are intermixed with banana and pineapples. Stylo grasses (*Stylosanthes spp*) which are protein rich perennial grass are also promoted in fruit orchards [11,12].

In case of Makwanpur, MDI quoted that Chepang are widely using agroforestry plantation from since 2003 with the help of several development agencies including UNDP, WFP and WB. The agroforestry plantation has brought Changes in the life of Chepang.

This objective of the study is:

- To analysis the socio-economic status of Chepang community.
- To determine the contribution of agroforestry to the farm household economy in the life of Chepang.

These objectives have bearing upon the intended scope of the study and eventual evaluation of the findings.

Materials and Methods

Study area

Raksirang Rural municipality (Gaun Pallika in Nepali) of ward number 4 (Kankada) within Makwanpur district was purpoefully selected to conduct this research. Only, Chepang HHs with agroforestry practices were selected for this study. Through various study and literature, it was found that agroforestry was largely planted only in ward no-2, 4, and 6 in the study area within the village institute, therefore ward number 4 (Kankada; 27°36'42" N and 84°50'0" E) was selected purposefully. Among the agroforestry Chepang HHs only 60 HHs (9%) were selected as a sample size for this study.

Respondent selection and pre-test through questionnaires

A total of 60 HHs were chosen among which purposefully agroforestry users were chosen for this study, in study area. Nearly, 5 questionnaires were tested as part of the pilot study for the finalization of the questionnaires and it was conducted in 12-14, October 2017. The experience of pilot study assisted in finalization of the actual questionnaire and it developed a concept of Check list, Observation and FGD importance in the study area.

Data collection

Primary data collection: To determine the tenancy status of the farmers of the command area of the canal, the farmer's interviews were conducted at the head, middle and tail of the canal. Twenty-five farmers were interviewed, ten at head, seven at middle and eight at tail of the canal. Then the tenancy status was determined based on the data collected.

Secondary data collection: A secondary data (published/ unpublished) such as journals, report, article by government, non-government and other sources were also analyzed, noted and used to make a good link between the objective and fact of the study area.

Case study: A total of 2 case studies from Chepang HHs were collected to support the result of this study. The information was also collected through field observation and regular diary notes from the field visit.

Focus group discussion (FGD): In this section of methodology, a total of 2 FGD were conducted in Kankada (Silinge and in Devitar). Following a standard process of research, a total of 8 Chepang from the above settlement were requested and through a structured FGD format was used to conduct the discussion. For the participatory cases, each member could express their views.

Observation methods: This method was used to consider the following situation of the HHs to get a better information's of the HHs. Following information's were acquired through Observation mentioned here: Roof situation, standing crop situation, toilet type, drinking water situation, tree plantation, land types, topography, etc.

Consultative cum individual (key) informant interview: In this section of methodology, the following agencies were interviewed individually in a group or through Consultative meetings in the following respective institutions.

- Raksirang Village Institute Office (Consulted- Chairman, vice Chairman and Executive Officer).
- District Agriculture Development Office (Interacted- Sr. District Agriculture Officer).
- District Livestock Support Office (Interacted- Head).
- District Forest Office (Interacted District Forest Officer).
- Nepal Chepang Association (NCA)-Member.
- Manahari Development Institute (Interviewed with Programme Officer).
- Centre for Development Institution of Nepal (Contacted Programme officer).
- Plan Nepal, INGO (Contracted Programme Officer).
- Makwanpur Chamber of Commerce and Industries (Contacted Programme Officer).
- Annapurna Post daily (Reporter of Makwanpur).
- Vegetable and Fruits traders (Contacted traders of Manahari market).

Mixed method interpretation: The result of the research will be explained through descriptive method. This means that a data from the table, graph and test will be explained in this way. In addition, a mixed method will be going through to better explain the fact which will not only explain the relation of the table and fact also will show the empirical data from the previous literature in the similar topics. In addition, this will also cover the fact and phenomena captured through the observation, Key interview and FGD method.

Test applied: The respondent of the study area is Chepang practicing agroforestry, so, the similar characteristics in data will derive minimum, maximum, mean and Standard Deviation in each section of the result.

Data analysis: For this section, IBM SPSS Vol-20 was used to interpret the data as well as excel sheet was used to figure out the table and graphs.

Limitation of this study: This study is limited to the certain facts as only Chepang HHs with agroforestry farm-based practitioner are

purposely selected for this study. No other caste is included in the study. The study result will reflect the effect of only study area which means the finding and result is the result of Chepang with their Socio economical condition and agroforestry impact. The study is limited and do not claim that the similar result of other Pallika will have the same situation as well as the similar situation of Chepang.

Importance of study and its contribution in the scientific society: Research always deal with new fact and figure. The following importance of this study and its contribution in the scientific world as noted below:

Importance: A study of Chepang, ethnics of Makwanpur, Food Insecure rural municipality, Farm based agroforestry intervention, Remote location settlement, Slash and Burn practice area of Chepang, less opportunity of market access, Challenges for service providing, Study conducted in 2017, New study.

Contribution: Information on the evaluation of Socio-economics status, Information on the evaluation of Food security situation, Information on the evaluation agroforestry impact, Challenges for agroforestry promotion, Situation of traditional farming system, Way forward for the future market development strategy, Way forward for the newly elected rural Municipality for the Planning, Model Proposed.

Results and Discussion

Socio economic status

Chepang in the study area are residing nearby 3-4 hours walking distance from the Manahari market. The rugged and fragile land is the genuine land feature in the study area. Most of the houses are constructed with CGI sheets. Agroforestry, livestock, wage (skilled/ Unskilled) work in nearby area in are the common source of income. However, after agroforestry practice, the socio-economic status compare to last decade has been changed a lot as per the data revealed obtained from the field visit. To verify the above statement some data, and supporting evidence is trying to be illustrating the fact below:

	Minimum	Maximum	Mean	Standard Deviation
Registered Land	1	30	8.8158	6.16342
Unregistered Land	0	24	6.3478	5.26294
Khoriya or Forest	0	2	1.8889	3.40751
Goat	0	10	12.5263	13.3979
Cow/ Buffalo/ Ox	0	0	2.8596	3.36706
Pig	0	80	1.34	1.80261
Poultry	2	23	14	4.86426

Table 1: Descriptive statistics for the type of land and cattles (Source: Field survey, 2017). *=1 kattha is 0.3 Hectare.

The result of the survey revealed (Table 1) about the land and cattle's description, according to which the mean value of registered land is 8.8158 (minimum-1, and maximum land-30 kattha*). On the other hand, the unregistered land mean is 6.3478 and Stand Deviation is 5.26294 (vary from 0-24 kattha). The trend proves that the Chepang of the studied area do use own land for farming and not using khoriya farming indicates that Chepang of surveyed area have not used Khoriya land for farming. In case of cattle, goat value is higher than cow/buffalo, pig and poultry, since poultry is also important source of income for the Chepang which are emerging day by day due to heavy demand.

FGD participants and Rural Muncipality (RM) official also stated that, after agroforestry plantation number of cattle's and grasses increased in the surveyed area which indicate that the social, economic situation is increased compared to last decades. Similarly, individual interview cum key informant interview from RM office (Sectoral officers from Livestock Development) and from Ilaka Forest Office pointed that portion of green grasses and the number of cattle, poultry, goat, pig increased in case of Chepang who are practicing agroforestry. In a study by Khadka, it is finding out the fact through survey that the mean value stands for 3.5883 and stand Deviation is 2.27447 in case of livestock number (poultry). Since, the study was conducted in 2009-2010 years and this study are the result of comparative analysis of the Chepang group with and without agroforestry. The study result proves that agroforestry plantation increased the number of livestock and grasses both [13].

	Frequency	Percent (%)	Mean	Standard Deviation
Electricity	2	3.3	2.0167	0.43146
Solar	57	95		
Tuki	1	1.7		
Pipe Installed	60	100	1	0
Thatched	16	26.7	3.4667	2.00395
Soil	6	10		
Wood	1	1.7		
CGI	27	45		
Cement	1	1.7		
Bamboo	9	15		

Table 2: Descriptive statistics of Electricity, drinking water and Roof situation (Source: Field survey, 2017). *=In Nepali tradition rural people uses kerosene lamp known as Tuki.

In contrast to the electricity, drinking water and roof situation (Table 2) data signify that 95% Chepang of surveyed area using Solar as a source of electricity in daily life, whereas 3.3% electricity and 1.7% are using Tuki* as a source of electricity. The mean value is 2.0167 and Stand Deviation is 0.43146. In case of drinking water facility cent percent HHs has said that piped are installed within the HHs area for drinking water. In case of roof condition through observation methods it was notified that 45% HHs haze CGI sheet in the roofs, 26.7% with thatched, some 15% are with Bamboo, some 10% are with soil on the roof, wood and cement are 1.7% respectively. The mean value of roof situation is 3.4667 and stand deviation is 2.00395.

FGD and Nepal Chepang association stated that, compared to last 5-10 years' situation Chepang HHs have installed solar from the source of electricity, however, CGI and bamboo uses are high in case of roof. Since, Manahari market is nearby for purchase and bamboo is plentility available after the agroforestry practices. Similarly, the DWASH, CCDN and PLAN Nepal, also revealed (who had done their

drinking water project in the surveyed area) through the interview that compare to the last few years, now source of drinking water to the Chepang HHs are well connected with pipe facility. In case of toilet facility, the support through various organisations such as Pallika Office, MDI, PLAN had increased several toilets in the Chepang HHs. However, the awareness to the hygiene is not satisfactory and requisite a training.

Impact of agroforestry in the chepang life

After agroforestry plantation it was prominent that HHs food security, number of cattles, income opportunity, market networking, bilateral agency support, grasses, wood and other social things was incline due to the farm gate plantation. The recent visited HHs are practising kitchen garden-based agroforestry whereas vegetables, timber, Fisheries, bee keeping, fruits are intercropped and planted in the study area. Compare to last few years practice agroforestry plantation alleviates the poverty level which indicate stocks, income situation, social and technical awareness, assets and so on. After the plantation HHs food stock level and cash income are increased. In addition, local awareness with technical knowledge and networking relation with bilateral agencies also enlarged in the study area.

Input Services	Period	N	Percent (%)	Mean	Standard Deviation
Food Sufficiency from own production	Up to 3 months	3	5	3.75	0.856
	Up to 6 Months	22	36.7		
	Up to 9 Months	22	36.7		
	1 Years and above	13	21.7		
	Total	60	100		
Uses of Improved seed and technical services	Yes	54	90	1.1	0.303
	No	6	10		
	Total	60	100		
Fertilizer use	Yes	56	93.3	1.07	0.252
	No	4	6.7		
	Total	60	100		

Table 3: Descriptive statistics of Food self-sufficiency and technical input services (Source: Field survey, 2017).

In contrast to the food self-sufficiency and input details (Table 3), the data signify that 36.7% HHs respondent have said that "food sufficiency from own cereal stock" remain for 9 months as well as same 36.7% HHs said for up to 6 months. 21.7% has have said stock remains for 1 years and more. Mean value stands for 3.75, Stand Deviation is 0.856. As similar study in the study area by Chidambaramkutty find out that more than 70% HHs have food stock from own production is remain for up to 3 to 6 months. She also added that the food self-sufficiency is very less for the case of Chepang [14].

The empirical data and present research data are the gap of last 9 years, Manahari Development Institute (MDI) have initiated agroforestry (Kitchen garden) plantation support to the study area and a result of farm-based agroforestry plantation, the overall production was increased from its practice. According to above table it can be said that 90% respondent have said "Yes" and only 10% have said "No" for the use of Improved seed and technical services in case of farm-based agroforestry practices. Mean value stands for 1.10, Stand Deviation is 0.303 for this case. In case of fertilizer use 93.3% Chepang respondent have said "Yes", 6.7% said "No" for the use of fertilizer in crops. Mean value stands for 1.07, Stand Deviation is 0.252 in this case. The above statistics matched with forest, agriculture and AIC individual or key informant interview that: Uses of fertilizer and technical support are in demands for Chepang HHs. Agricultural sectoral Officer, Forest Officer of Rural Municipality (Pallika in Nepali) and section officer of AIC (Agricultural Input corporation) have said that an extension service at ward level is urgently required to provide the technical services. "Uses and demands of fertilizer is higher on the grounds, earlier, it was only used for the paddy farmers but now a days Chepang a community have empowered for the technical support in case of maize, millet and in case of vegetable and fruits production".

Market	Location	N	Percent (%)	Mean	Standard Deviation
Sale of farm product	Within the Village	9	15	1.87	0.389
	Nearby market	50	83.3		
	In nearby collection Centers	1	1.7		
	Total	60	100		
Marketing Practise	Self-Carrying	34	56.7	1.78	0.94
	Traders collect at home	5	8.3		
	Through transportation	21	35		
	Total	60	100		
Farm gate price	Enough	3	5	1.95	0.22
	Average	57	95		

	Total	60	100		

Table 4: Market situation of agroforestry product (Source: Field survey, 2017).

About market situation the data illustrating that 83.3% HHs sale their product in nearby market, some 15% within the village, and 1.7% in nearby collection centre, the majority of respondents (Table 4) have said the nearby market which is known as Manahari market which is 4-5 hours walking distance in both side. The mean value is 1.87, and stand Deviation is 0.389. In case of marketing practices, 56.7% said self-carrying, 35% through transportation and 8.3% said that traders collect the agroforestry product from the home. Mean value stands for 1.78, Stand Deviation is 0.940.

At the end the data (Table 4) signify that 95% respondents have said average and 5% said enough market price of their farm-based product. The mean value stands for 1.95, Stand deviation is 0.220. The table concluded that the majority of respondent are carrying their product through self-carrying and sale to nearby Manahari market and the majority of Chepang are not getting adequate farm gate price for the product due to mainly unavailability of all-weather roads, lack of trader's availability.

Vegetable and Fruits Traders Association (Manahari) and MCCI, Manahari chapter also stated that, the Chepang mostly self-carried their product to the market as a general trend for selling due to lack of road network.

Agroforestry farming	N	Percent (%)	Mean	Standard Deviation
Felting fodder for cattle's	48	80	1.25	0.541
Wood for fire	9	15		
Cash Income	3	5		
Total	60	100		

Table 5: Benefit from agroforestry plantation (Source: Field survey, 2017).

In contrast to the benefit from agroforestry farming (Table 5), the data shown that 80% majority of surveyed HHs have said the major benefit of agroforestry farming is felting fodder for cattle's, some 15% said wood for fire and 5% said cash income. The Mean value stands for 1.25, Stand Deviation is 0.541. It is also illustrated the similar fact of FGD about the increase of grasses after plantation (Table 1).

The FGD Participants also stated the relevant fact that, after agroforestry practice, green grass, wood and cash income have comparatively increased compare to traditional khoriya farmers of the same Chepang community within the study area. Similar study by Piya have expressed the same view that number of cattle's and green grassed with Cash Income have increased for Chepang HHs who are practising agroforestry [11].

Source	Mean	Standard Deviation
Major Source of livelihood (Agroforestry)	1.22	0.415
Major source of Livelihood (Agriculture)	1.2	0.403
Major source of Livelihood (Livestock)	1.03	0.181
Maize Production	1135.33	1029.197
Millet Production	551.95	987.386
Paddy Production	113	380.477
Fruits Production	46.25	87.559
Vegetable Production	60.35	100.364
Income from agroforestry product*	6891.67	5050.668
Income from agriculture product*	5266.67	3746.712
Income from livestock product*	4941.67	3747.419

Table 6: Source of Livelihood, Cereal Production, and income. Source: Field survey, 2017) (*=Income from agriculture product means a selling of fruits, vegetables, timber, NTFP only, whereas income from agriculture product means just a value of all cereals and legumes only, whereas income from livestock product explain the overall product under livestock activity including milk, meat etc).

The major source of livelihood for surveyed community is agroforestry (Mean-1.22, Stand Deviation), whereas (Table 6) after agroforestry the second source of livelihood is agriculture (Mean 1.20, Stand Deviation 0.403), and at last the third potential source of Livelihood is Livestock income (Mean 1.03, Stand Deviation-0.181). The data also included that maize production (Mean 1135.33, Stand Deviation 1029.197) is higher than other cereal as millet (Mean 551.95, Stand Deviation 987.386) than paddy production (Mean 113.00, Stand Deviation 380.477).

However, the fruit production (Mean 46.25, Stand Deviation 87.559) is increasing day by days as per statement by FGD respondent. Mango, banana, pineapple, pitch, are the commonly found in the study area. Income from vegetable production (potato, tomato, brinjal, lady finger etc) is also increasing (Mean 60.35, Stand Deviation 100.364). From surveyed HHs, it was found that income from agroforestry production received $700-750 Per annum in average from the sale of banana (*Musa paradisiaca* L.), pineapple (*Ananus comosus*), broom grass (*Thysanolaena maxima*) and peach (*Prunus persica*), whereas income from the livestock production sale became $ 1000-1500 Per annum in average from the sale of small animals (poultry and goat).

At the end the table signify that income from agroforestry (Mean 6891.67) is higher than agriculture (mean 5266) and Livestock (mean 4941) respectively. FGD participants as well as local correspondence of Annapurna Post also Illustrated that: Agroforestry is the major source of income among the Chepang than agriculture and then livestock-based Income. The data from the field and various interview shows that agroforestry, livestock and agriculture income is gradually enhancing from the farming cycle which is higher compare to decade ago practise. This evidence also prove that agroforestry practices detract poverty level in Chepang.

Input Services	Y/N	Number	Percent (%)	Mean	Standard Deviation
Livestock increased	Yes	34	56.7	1.4333	0.49972
	No	26	43.3		
	Total	60	100		
Fodder sufficient	Yes	56	93.3	1.0667	0.25155
	No	4	6.7		
	Total	60	100		
Wood sufficient	Yes	58	96.7	1.0333	0.18102
	No	2	3.3		
	Total	60	100		
Got income from wood sale	Yes	7	11.7	1.8833	0.32373
	No	53	88.3		
	Total	60	100		

Table 7: Benefits (Source: Field survey, 2017).

In context of livelihood (Table 7), the majority had told "Yes" (56.7%) and 43.3% said "No" in a question of livestock increased (Mean 1.4333, Stand Deviation-0.49972). Similarly, in a case of fodder sufficiency, majority had said "Yes" (93.3%) and 6.7% "No" in a case of fodder sufficiency (Mean 1.0667, Stand deviation 0.25155). The result is also matched with a statement (Table 1). In case of wood sufficiency 96.7% have said yes and 3.3% said no in a question of wood sufficiency with mean 1.0333 and Stand Deviation 0.18102.

At the end, majority had said "No" (88.3%) and only 11.7% said "Yes" in a question of income from the wood sale. Mean stands for 1.8833, and Stand Deviation is 0.32373. The table signify that agroforestry plantation increased livestock, enough fodder and wood for the use but in case of income from the wood the fact is not accepted because legally the wood required a long process of clearance for cutting and some paper burden because of which legal income from timber is hassle for Chepang HHs.

FGD participants also stated that, tree cutting required a long process of acceptances from the government system. The owner is nothing to do against the government rules for the clearance of own tree from the state. On the other hand, Chepang with Khoriya farming (slash and burn) practices are mostly engaged with traditional farming in the study area which is a matter of further research in the study area. They are same groups of Chepang with a smaller number of cattle's, inadequate land and access as well as technical knowledge for the farming system. A case study of Chepang also revealed that "agroforestry plantation had a multiple benefit for improved livelihood" whereas another case study stated that "traditional farming left surviving livelihood on which farmers have to live in a survival way.

		N	Percent (%)	Mean	Standard Deviation
Bee Keeping details	Not a single one	44	73.3	1.9833	1.70236
	Up to 1	1	1.7		
	Between 2-3	1	1.7		
	More than 5 number	14	23.3		
	Total	60	100		
Chuiri Trees	Not a single one	5	8.3	0.14588	0.12977
	Up to 4	1	1.7		
	More tha 5 number	54	90		
	Total	60	100		

Table 8: Tree and its details (Source: Field survey, 2017).

About the availability of tree, the data (Table 8) signify that 73.3% did not have a single bee-keeping, however 23.3% HHs have more than 5 number of trees (Mean 1.9833, Stand Deviation is 1.70236) In case of chuiri which is called Nepali butter fruit (*Aesendra butyraceae*) 90% HHs have said that they have more than 5 number of trees with them, However, 8.3% said they did not have a single tree with them (Mean 0.14588, Stand deviation 0.12977).

Chuiri (*Aesendra butyraceae*) is one of the most prestigious and socially affiliated trees for Chepang, so higher number of trees signify the richness in the community as per the Chepang culture. So, it was found that number of trees is higher in case of surveyed HHs. On the other hand, number of bees keeping is also in increasing trends, since, the majority is not much affiliated with bee Keeping but it is in increasing trend. Bee keeping required a technical knowledge and input support for this, because of which only trained family for the same activity.

In addition, study also revealed through a group discussion with NCA, MDI, CCDN, PLAN Nepal, and Pallika official who had explained that Chepang most common traditional practices are wild food consumptions as well as tradition of gifting liquor and homemade foods in religious activity. An interesting fact discover that both Chepang with agroforestry practices and khoriya farmers have common trend of this cultural Practices which somehow put a recommendation in terms of research that changing Cultural tradition taking too long time in society that means some similarities in cultural practices is hugely accepted by all stake holders as a result a model is Prescribed and detailed in the next section (Figure 1). FGD and Nepal Chepang Association (NCA) also stated the similar fact that Chuiri-Nepali butter fruit made a vital role in the life of Chepang, it's a prestige, indication of wealthy person in the community. After agroforestry plantation number of Chuiri tree is increasing.

Agroforestry model

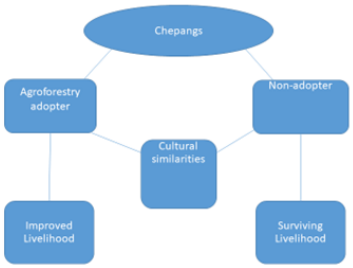

Figure 1: Proposed Chepang adopter and non-adopter model of Kankada under Makwanpur district (Source: Researcher Own).

Based on the result of the study, an agroforestry model was proposed. Proposed model is about adopter and non-adopter groups of Chepang with and without agroforestry farming. Agroforestry farming practice has a multiple benefit from its plantation-such as cash income, green grasses, wood, assets, education bilateral networking and so on. On the other hand, non-adopter Chepang with Khoriya farming (Slash and burn) have a limited food, cash, opportunity, access and stock with less agency networking, because of traditional farming the overall livelihood remains in survival condition.

The model somehow is trying to highlight the fact that in both the cases cultural similarities such as food habits (eating wild food, gifting pattern), uses of brewing, gifting trends, marriage system, other rituals practices (gifting on festivals) are still analogous due to cultural practices. The groups of same Chepang with two different practices are too some extent similar in some cultural phenomena.

Conclusion

Based on the study presented in this paper, it can be confidently concluded that the farm-based agroforestry supports the livelihood of Chepang in major and positive way. Not only it provides with much needed income by the community, it brings in multiple benefits which have helped poverty alleviation in considerable measures. Thanks to the agroforestry, there is noticeable drop in poverty compare to last few years. Still, maximum benefits from agroforestry practice has not been able to be derived due to lack of access to proper market in systematized manner. There is still slash- and- burn (khoriya farming) practice prevalent among the Chepang in the study area. This needs to be improved through a sustained approach of agroforestry practice in future.

The study concluded that farm-based agroforestry plantation enhances grasses and livestock both which not only increased the income level of Chepang family rather noticed multiple benefits from it, therefore this is the major source of Livelihood among the life of Chepang. Compare to last few years' poverty situation of Chepang drop now due to agroforestry plantation. Still market situation of product is not on the proper way because of which Chepang are not getting its maximum benefits. Still slash and burn (Khoriya farming) practices noticed by the same group of Chepang in the study area which need to improve through a sustained approach of agroforestry plantation in future.

Recommendation

Following recommendation have been drawn from the study:

- Road network and transportation connectivity are essential to sell the farm produce at fair and viable price. For this Rural municipality should be more focused and continue construction of the road priority so that Chepang HHs product can access easily to the nearest market.
- A continued technical support is required for the promotion of farm gate production in local level. For this all concern development agencies mainly, MDI, CCDN and Plan Nepal are closely associated agencies working closely working for Chepang for the support of agroforestry and livestock. Technician training to the Chepang family to increase the number of adequately trained residents in the village is in urgent need.
- Bee keeping and Chuiri (*Aesendra butyraceae*) are emerging. This must be encouraged in the village level.
- Farmers practicing Slash and burn methods need to be encourage for the farm-based agroforestry plantation in the area.

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