Vulnerable Family Members and Income in Chepang Minority

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Abstract

Chepang, an indigenous minority comprising of about 0.26% of Nepal's population, are 'highly marginalised'. The presence of vulnerable family members such as single women, people with disability and elderly in the Chepang household may further marginalise them. We used 2019 census data of a rural municipality to estimate farm, non-farm and total incomes in the Chepang households' and conducted regressions analysis to identify influencing factors, including the effect of the presence of single women, disability and elderly members on household incomes. The study found that Chepang households were mainly engaged in farms, however, the share of non- farm income was significant. On average, a Chepang individual earned US$330 per year. Per capita farm income estimated was US$120, and that of non-farm was US$279. Non-farm income was however constrained by the presence of single women and people with disability. The presence of a single woman caused to reduce non-farm income by 13.4%. Likewise, non-farm income reduced by 20.5% when a Chepang household had disabled member. We suggest further studies on vulnerable members, particularly on their health conditions, and access to government services under the changing social, cultural, and environmental conditions.

***Keywords*:** Disability, single women, elderly, income, earthquake

JEL Codes: I15 , I32

INTRODUCTION

Nepal government has recognised 59 indigenous nationalities, altogether comprising of about 35.8% of the total population of 26.5 million. The Chepang community is one of them, which is about 0.26% (68,399) of the 2011 Census population (CBS, 2012a), and Nepal Federation of Indigenous Nationalities categorised them as 'highly marginalized'(Piya et al., 2011a). More than 96% of Chepang communities reside in Central Nepal, mainly Chitwan, Makawanpur, Dhading, and Gorkha districts. Literature suggests drastic change in livelihoods of Chepang in the last century - from a nomadic (hunting wild animals with 'che' – meaning dog, and 'pang' – meaning arrows) to shifting cultivation (farming forested areas in rotations) and to sedentary

subsistence farming (Piya, Maharjan, Joshi, et al., 2019). Despite this shift, Chepang communities still experience a high degree of poverty, illiteracy, and food insufficiency (Piya, Maharjan, Joshi, et al., 2019); furthermore, they often lack resources, access to government services such as citizenship, health care services and are excluded from development processes. Their own agricultural production is insufficient for a year (Aryal, 2016; Piya et al., 2011b) and often they visit jungles for edible fruits (Sharma & Aryal, 2016). Improvements in their livelihood has been observed in recent years, for example, their dependency on wild fruits has declined as a result of increasing consumption of market-based non-traditional food items (Piya & Joshi, 2018). In addition, some of them have initiated income source diversification: labouring skills, raising farm animals, farming vegetables, and working abroad (Piya et al., 2011a; Piya, Maharjan, & Joshi, 2019). Nonetheless, access to these economic opportunities for Chepang households is still limited.

Further, the presence of family members such as single women, disability and elderly within a household may reduce households' economic wellbeing (Atreya et al., 2020; Goldstein & Beall, 1986; Mitra et al., 2017; Weiss, 1999). Nepal, being traditionally a patriarchal society, empowerment of women is one of the main issues. Often women have low level of education and technical skills, and suffer from traditions and customary laws, as well as discrimination- altogether compromising economic wellbeing. The situation of women may further worsen if the male counterpart is either deceased/absent, or physically and mentally disable. Studies observed (i) an increasing trend of female-headed households in Nepal, from 12.4% in 1996 (Pradhan et al., 1997) to 31.3% in 2016 (Ministry of Health, 2017), and (ii) reducing economic wellbeing in the single women-headed households (Atreya et al., 2020; OXFAM, 2016). Similarly, disability, in any form, may affect household economic wellbeing. Disability refers to difficulties in functioning, activity limitations and participation restrictions (WHO, 2011). Prevalence data on disability though inconsistent in Nepal-1.94% (CBS, 2012b), 3.6% (CBS, 2011) and 21.7% (WHO, 2011) of the total population - it is likely that people with disability under-utilize government and community services even when available for free. It is also possible that people with disability are deprived of education and technical skills, economic participation and employment opportunities, and could be living at high rates of poverty (Dhungana, 2006; Lamichhane & Okubo, 2014). Further, disabled members may have to bear additional economic burden while purchasing assistive devices, seeking medical care and personal care giver (Bright et al., 2018). Similarly, presence of elderly member in a Chepang household may also compromise economic wellbeing. An increasing trend of elderly population in Nepal has been observed. The size of elderly population in Nepal has been estimated at 2.1 million (8.1% of the total population) in the national Census 2011. Elderly people have limited access to government support, nutrition opportunity, and additional

household member may be needed to care of elderly people (Ghimire et al., 2017; Goldstein & Beall, 1986; Shrestha, 2013; Subedi et al., 2015)– thus may affect household economic wellbeing.

Studying the impact of having a vulnerable member in a minority indigenous community, such as Chepang, is vital because, at one hand Chepang community are 'highly marginalised'; and on the other, the presence of vulnerable family members has the potential to further reduce households' economic wellbeing. Both Chepang households and vulnerable members have minimum capacity to cope with any kind of environmental shock and natural disaster (Duwal et al., 2017; Piya et al., 2011a, 2011b, 2016). Additionally, for indigenous communities of a nation highly prone to natural disasters, such as earthquake and landslide, it is important that possible impact of these environmental disaster is well explored. Disasters make people vulnerable because they damage means of livelihood and access to existing services, marginalizing and disempowering the poorest of the poor (DiCarlo et al., 2018). Studies in Nepal have shown exclusion of the marginalised people from the disaster recovery process, such as reconstruction following the Gorkha earthquake (ACAPS, 2015; Lam & Kuipers, 2019). An understanding of income sources of the highly marginalized Chepang people and their respective earnings are thus necessary in the changing situation to help develop evidence-based policies and interventions in the recovery period. The objective of this study thus is to analyse Chepang households' farm, non-farm and total incomes and identify their determinants, including the effect of the presence of vulnerable members, particularly that of single women, person with disability and the elderly.

METHODOLOGY

Study area

The study was conducted in Gandaki Rural Municipality (GRM, area: 124 km^2) in the Gandaki province of Nepal (Figure 1), which is very nearby the epicentre of the 2015 earthquake. Gandaki RM lies about 80km west of Kathmandu, adjoining a national highway. A recent study in the GRM observed an increase in households by 9% (total household - 5,763) and population by 28% (total population - 32,145) compared to the Census 2011. High ethnic diversity characterises the municipality in the province. Chepang constituted 12.3% of the total households in the municipality (see Table 1).

Operational Definition

For the purpose of this study, single woman has been defined as "a woman who is left with the sole responsibility of parenthood often taking the role of the head of the household, and a woman receiving social security allowances, and not necessarily

only who is a widow." The Civil Code 2017 provides social security allowances to women under following conditions: (i) aged 60 or more who are divorcee, widow, living separately in legal provision with her husband, and unmarried; and (iii) who are widow at *any age*.

Elderly has been defined as any person above 60 years old in the Census. Note that elderly aged 70 years and above are only eligible for social security allowance, henceforth this study considered them more vulnerable, and thus accounted in data analysis.

Similarly, people with disability included were those defined in the Nepal's Disability Right Act 2017 - who had long-term physical, mental, intellectual or sensory impairments.

DATA

In March/April 2019, Practical Help Achieving Self-Empowerment (PHASE) Nepal carried out a census survey in collaboration with GRM under the DFID funded and Mott MacDonald managed "Purnima Programme: Leave No One Behind". The objective of the census was two folds: the first was to identify vulnerable population mainly single women, people with disabilities, elderly, internally displaced persons due to earthquake, and poor and food insecure people; the second was to collect basic household level information to build a baseline foundation for the municipality's long-term planning process.

The census has identified a total of 707 Chepang households in the municipality. Here, we report the census survey data primarily focused on incomes of Chepang households and individuals' vulnerabilities within Chepang households. A total of 685 Chepang households provided incomes from different sources. The amount of money that a household received in return of the services, sales of goods and from investment over the last 12 months was considered. The gross cash income that can be spent (consumed) immediately was included, and own agricultural commodities consumed within household was excluded. For this study, we divided household total income into two categories: farm income & non-farm income. Ethical approval for this study was received from Nepal Health Research Council (Registered # 146/2019). Each respondent was informed about the research scope and their right to withhold any information. The person who was responsible for the overall household decision making signed the informed consent and was then interviewed. Census process, methods applied, and data collection tools and techniques are described in detail elsewhere (Atreya et al. 2020).

DATA ANALYSIS

Statistical Package for Social Sciences software (SPSS ver. 24 Mac) was used for data analysis. Descriptive statistics and frequency tabulation are provided. Linear regression was used to identify factors determining farm, non-farm and total incomes. The dependent variables (farm, non-farm and total incomes) were highly skewed (a large majority on the low-income side), assumption of normality violated, so log-transformed. We arrived at a robust equation using "enter" method primarily for total income, especially considering the significant determinants, vulnerable members, and our understanding of literature. Once determinants were identified for the total income, we looked at the effect of the same factors on farm and non-farm incomes. Regression coefficients were transformed back (antilog) for interpretable results. The % change in incomes (y_i) by one-unit change in independent variables (k_j) were estimated by exponentiating the respective coefficient ($ß_{ij}$) following Eq. 1.

$$\% \text{ change in } y_i = (e^{ßij} - 1) * 100 \text{ ---------- (1)}$$

The statistical test was done at the 95% confidence level. The factors determining household incomes and their expected hypothesis are provided in Table 2. We used elderly aged 70 years and above in the regression model because they are more vulnerable, and there is high chance of productivity loss of care-taker in a household.

RESULTS

Respondent and household characteristics

Respondents and households' characteristics are provided in Table 3 and Table 4 respectively. Females constituted 43% of total respondents. The average age of the respondents was 41 years. Nearly 70% of respondents identified agriculture as their main occupation followed by labour wage (21%) and job (5%). Approximately 28% respondents were illiterate - not able to read and write at all, and in addition 24% of respondents never attended schools but reported being able to read and write. Very few (3%) respondents had completed Grade 10 of schooling.

Many of the Chepang households (98.4%) owned agricultural land (see Table 4). They also leased- in agricultural land (12.4%) for crop production. About 91% of households raised farm animals such as goat, chicken, and cattle. Approximately 18% of the Chepang households in the study area are yet to connect in national electricity grid line, whereas nearly half of the households (47%) had no access to tap water. One in four Chepang household used Liquid Petroleum (LP) gas for cooking, and only 32% of them had television set. Approximately 25% of Chepang household contained elderly

people aged 60 years and above, 11% contained single women, and 6% contained people with disability.

Household Income

Household income from various sources along with descriptive statistics is provided in Table 5. Many households reported cash earnings from vegetable sales (58%), labour wage (56%) and livestock sales (56%). Very few households received incomes from the sale of non-timber forest products (<1%), dairy product (1%), and cereal crops (3%). A total of 528 households (77%) received cash from farm sources and 582 households (85%) from non-farm sources. Many Chepang households stated cultivating farmland (>98%) and raising livestock (91%), however, cash earnings from these sources was limited to nearly half of the Chepang households. The households' annual farm income was US$607 (median $318). Median income from the sale of vegetables and livestock were $273 and 145, respectively. Likewise, households' annual non-farm income was $1406 (median $ 909). Average earning from job was the highest, followed by remittance, and non-farm business; however, few households received earnings from job (16%), remittance (11%), and non-farm business (4%).

Per capita farm income estimated was $120, and that of non-farm was $279 (Table 6). Income from vegetable sale comprised 76% of the farm income, and 40% of the total income. In the 10% of the households, vegetable sale was the only source of household income. Similarly, share of livestock income to the farm income was 58%, and that of total income was 22%. About 5% of total households were totally (100%) dependent on livestock for household income. Daily wage, on the other hand, contributed 86% of the non-farm income and 63% of the total income (see Table 7). More than 20% of households had no other income sources than daily wage labour.

Income Determinants

Descriptive statistics of household income determinants are given in Table 8. Chepang households, on average, consisted of equal number of male and female members. Approximately 17% had at least one senior member aged 70 years and above. About 13% of the households had leased-in agricultural land for crop cultivation. Chepang households had diversified income sources – ranged from a minimum of one to at maximum six income sources.

As previously mentioned, dependent variables are log-transformed and marginal effects were estimated following Eq. 1. The regression analysis (Table 9) revealed that age of household head (AGE), households with vulnerable members such as single women (SW), disability (PWD), and elderlies aged 70 years and above (ELD70);

and leased in agricultural land (AGRILEASE) negatively determines households' total income. The negative association of SW, PWD and ELD70 on the household total income were, however, statistically non-significant at the 95% confidence level. Likewise, number of male (MALE) and female (FEMALE) household members, number of income sources (INSOURCE) and the LPG (proxy for "economic status") were found positively and significantly associated with household total income. For the farm income, the directions of the association (sign of the coefficients) were similar (except PWD and AGRILEASE) and only two determinants (INSOURSE and LPG) were found significant at the 95% confidence level. Similarly, for the non-farm income, the directions of association are almost similar to that of total incomes, however, AGE and AGRILEASE were found statistically non-significant, and interestingly SW and PWD were found statistically significant at the 5% confidence level. ELD70 was negative and non-significant for all the income categories.

The analysis, interestingly also revealed that, when a Chepang household leased-in agriculture land, it could add minimum amount (3.4%) to the farm income ($p>0.05$), however it significantly ($p<0.05$) decreases household total income by 9.1% (see Table 10). Similarly, when a household member is disabled, result showed positive but non-significant association ($p>0.05$) on the farm income, however disability was found to be significantly decreasing non-farm income ($p<0.05$) by 20.5%.

DISCUSSIONS

This study found that the presence of vulnerable family members such as single women, people with disability, and elderly aged 70 years and above can reduce income in the Chepang households. Agriculture and local labour market were the main sources of income for Chepang households. Most of them received cash from vegetable sales, labour wage and livestock sales; and very few Chepang households received cash from skilled job, remittance and non-farm business. It is evident that Chepang community were more dependent on farm activities, which, however, contributed less to the total household income, compared to those who reported earnings from labour, remittance, and skilled jobs. A higher per capita median earning from the non-farm sources ($170) compared to that from farm sources ($64) was observed (see Table 6). However, incomes from vegetable and livestock sales contributed to about 76% and 58% of the farm incomes, respectively. We further observed that a few Chepang households had no other sources of income other than vegetable sale (10%), and livestock sale (5%). This indicates a need to continue vegetable farming and livestock raising activities for the survival of poorest of the poor Chepang households who are deprived of other non-farm income sources.

The median earning of the Chepang household was calculated at US$455, mainly from daily wage labour. About 20% of the Chepang households solely depended on unskilled wage earning. The share of daily wage to the household total income was about 63%. This is in fact enormous contribution, indicating their active participation in local labour market. Development organisations, local government bodies, and National Reconstruction Authority (NRA) offered unskilled and skilled labour/job opportunities immediately after the Gorkha earthquake. Accordingly, they provided a number of skill trainings. During the study time, reconstruction of nearly 72% of the houses in the municipality had been fully completed, so it is likely that present labour demand may have been reduced- possibly a sharp decline in income from wage labour. This indicates a need of intervention for those Chepang households who will be out of local labour market in the recent future. Probably, establishing a synergy between farm and non-farm income sources and providing skills enhancing trainings may be vital for them. For example, providing trainings on vegetable/livestock farming, and establishing linkages with local cooperatives for vegetable/livestock marketing could be one option. Institutionalization of the very poor sector of the society through establishing cooperatives helps them not only in product sales, but also make them resilient during climatic shock if the established institution is closed tied up with other institutions, for example local body, bank and finance, and other service providers.

A number of factors were found to be affecting Chepang households' farm, non-farm and total income. In the regression analysis, we observed that as the age of the household head increases by 1 year, the total income reduced by 0.4%, this is because younger individuals likely to prefer non-farm activities (McNamara & Weiss, 2005). Increase in the number of household members (any gender) increases total income, perhaps through non-farm activities. An increase in neither the male nor the female members in the Chepang household cause a significant increase in farm income. Perhaps because of cultivating on the low productive and marginalised farm land, and availability of off-farm income opportunities, they may face acute labour shortage on their farm. We observed reduced non-farm income when the Chepang household contained vulnerable members. For example, the presence of a single woman caused to reduce non-farm income by 13.4%. Likewise, non-farm income reduced by 20.5% when a household possessed disabled member. The effect of elderly aged ≥70 years on the non-farm income was statistically not significant at the 95% confidence level. Total household income decreased by 9.1% when a Chepang household leased-in agricultural land. We did not observe significant increase in farm income despite leased-in land. Chepang households may lease-in additional land when they have no other income options and use it mainly for subsistence. Income source diversification was found vital; this could depend on household's income gradients, for example, richer households diversify non-farm income, whereas poorer households diversify

farm income (Omotayo, 2016). Finally, existing 'economic status' had positive effect on household incomes, illustrated by significantly higher income in the households who used LPG for cooking.

The findings of this study raise a number of policy implications. The study showed that both farm and non-farm incomes are equally important for Chepang households, however, the linkages between income sources are missing, so policy that establish synergy between both farm and non-farm income sources is needed. This is because, most of the non-farm income may be used for consumption, and farm production is hardly sufficient. An increasing trend of vulnerable population in our society has been observed, and their presence may affect household wellbeing – so priority should be given on raising awareness on issues of vulnerable population by highlighting their rights, health conditions, and access to social security provisions including special allowances – otherwise deprivation from these may push such households into deeper poverty. Studies have shown that social security allowances positively contributed to the economic wellbeing and health of recipients (Banks et al., 2019; Roelen & Chhetri, 2016). Increasing access to employment opportunities through individual tailored interventions and market potentials and establishing sustainable linkages of vulnerable groups with local governments and private sectors could be a few strategies for reducing poverty in vulnerable households as well as increasing their resilience to any kind of environmental shocks. Diversification of income sources increased incomes in the study population; thus, development strategies need to consider livelihood enhancing interventions in such a way that it has local demand, social acceptance and generates positive effects on wellbeing. Additionally, the development models should shift from – from "reaching many" and "technology transfer" towards "reaching local for sustainable system change" (Woltering et al., 2019). For example, instead of just providing assistive devices to people with disabilities, it would be better to institutionalise them and establish their linkages with public and private service providers and rehabilitation centres for building more resilient society. Likewise, instead of just providing a goat, or chicken, or vegetable seed kits to poor farmers, it would be better in addition to link them with agricultural service providers, agrovets, financial services, insurance company and so on.

A few limitations of this study are notable. Incomes are self-reported, and some respondents may have been reluctant to reveal their income sources and respective incomes. This study accounted for immediate cash of the earthquake affected households, so future income dynamics in the study area may be different, and the study findings may not be comparable with non-earthquake affected areas. This study, however, showed that both farm and non-farm incomes are equally vital to the marginalized Chepang household's, and their economic wellbeing reduced when

households had vulnerable family members, henceforth, suggested to safeguard health and social systems of the country to adjust increasing population of vulnerable members in Nepal.

CONCLUSION

Chepang households were mainly engaged in farms, however, the share of non- farm income to the household total earnings was significant. The sales of vegetables and farm animals were the major sources of farm income; whereas daily labour wage was the main non-farm income source. Earning from non-farm sources is however constrained by the presence of single women and people with disabilities in the Chepang household. Diversification of income sources increases household economic wellbeing. More studies on vulnerable members, particularly on their health conditions and access to social security services are recommended.

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Conflict of Interest

The authors have no conflict of interests. The views and opinions presented here are those of the authors, and do not reflect the views of support agencies and collaborators.

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List of Tables

Table 1. Ethnic Composition in Gandaki Rural Municipality, Nepal

Caste/Ethnicity	Household	Percent
Brahmin/Chhetri/Thakuri	1439	24.97%
Magar	1054	18.29%
Dalit	826	14.33%
Gurung	808	14.02%
Newar	765	13.27%
Chepang	707	12.27%
Other	164	2.85%
Total	**5763**	**100%**
Source: PHASE Nepal (2019)		

Table 2. Determinants of Household Incomes and Expected Hypothesis

Determinants	Explanation	Expected hypothesis		
		Total	Farm	Non - farm
AGE	Age of the respondents. Higher the age lower will be the total income, because older individuals are less likely to engage in multiple income sources, and younger individuals prefers non-farm activities.	-	+	-
MALE	Total number of male household members. Higher male members in the households likely to increase overall household incomes, both farm and non-farm - because they are earners in rural society.	+	+	+
FEMALE	Total number of female household members. Higher female members in the households likely to increase farm income because of increased responsibility in farm activities (agricultural feminisation).	+	+	-
SW	Household with single women (if YES 1, 0 otherwise). Increased risk of discrimination and labour constraint; overall negatively affecting incomes.	-	-	-
PWD	Household with disability (if YES 1, 0 otherwise). Acute labour shortage, productivity loss, and additional care giver needed, resulting minimal incomes.	-	-	-

ELD70	Household with elder 70 years and above (if YES 1, 0 otherwise). Low human productivity due to increased risk of illness and injury, ageing effect, and additional caregiver – resulting minimal incomes.	-	-	-
AGRILEASE	Household leased in agricultural land (if YES 1; 0 otherwise) for crop production. Incomes from leased-in agricultural land is an addition to the household's farm and total incomes.	+	+	-
INSOURCE	Number of income sources (out of 10). Income diversification increases household incomes.	+	+	+
LPG	Household using LPG for cooking (if YES 1, 0 otherwise). It indicates better "economic status", than who does not use, thus is a proxy of economic wellbeing. Increase in income tends to shift traditional fuels to modern fuels like LPG for cooking in developing countries (Morgan, 2018)	+	+	+

Table 3. Respondent Characteristics of the Chepang Households (N = 707)

Percentage of female respondents	43%
Percentage of male respondents	57%
Average age of the respondents	41.1
Main Occupation %	
Agriculture	69.7
Labour wage	20.8
Job	4.9
Foreign employment	2.0
Business	1.3
Student	1.3
Education level %	
Can't read/write	28.3
Informal education	23.8
Primary (1-5)	30.9
Secondary (6-10)	14.0
Higher secondary (11-12)	1.9
Bachelor	1.2

Table 4. Chepang Household Characteristics

Characteristics	Response	Count	%
Own agricultural land	Yes	696	98.4%
	No	11	1.6%
Leased in cultivable land	Yes	88	12.4%
	No	619	87.6%
Raise livestock	Yes	643	90.9%
	No	64	9.1%
Access to electricity	Yes	584	82.6%
	No	123	17.4%
Access to tap water	Yes	376	53.2%
	No	331	46.8%
LP gas for cooking	Yes	175	24.8%
	No	532	75.2%
Television	Yes	223	31.5%
	No	484	68.5%
Family members aged 60 years and above	Yes	178	25.2%
	No	529	74.8%
Single women	Yes	78	11.0%
	No	629	89.0%
Disability	Yes	40	5.7%
	No	667	94.3%

Table 5. Annual Household Incomes (US$) [1US$ = 110 NRs)

Income sources	Number of households	N%	Min	Max	Mean	Median	Std. Dev. Mean
Vegetable crop sales	395	58%	9	4545	572	273	809
Wage labour	385	56%	45	5455	926	455	1039
Livestock sales	383	56%	18	7273	237	145	540
Pension/social security	132	19%	18	9273	426	218	890
Job	107	16%	91	11564	2013	1545	1585
Remittance	78	11%	182	13636	1978	1818	1779
Business other than agriculture	30	4%	73	5455	1176	773	1362
Cereal crop sales	23	3%	18	1818	148	45	368
Milk & milk product sales	9	1%	36	91	52	45	17
NTFPs sales	2	<1%	12	182	97	97	120
Farm	528	77%	9	9091	607	318	904
Non-farm	582	85%	12	16145	1406	909	1801
Total	685	100%	22	23418	1662	1000	2096

Table 6. Per Capita Income Disaggregated by Farm and Non-Farms (US$)

Income category	Min	Max	Mean	Median	Std. Deviation of Mean
Farm	2.27	1298.70	120.25	64.29	163.20
Non-farm	2.95	2727.27	278.96	170.45	328.61
Total	7.58	2727.27	329.70	212.12	362.76

Table 7. Share of Vegetable Sale, Livestock Sale and Daily Wages on Income Category

Income category	Vegetable sales	Livestock sales	Daily wage
Farm	75.6%	58.2%	-
Non-farm	-	-	86.2%
Total	39.8%	22.2%	62.9%

Table 8. Descriptive Statistics of Household Income Determinants

Determinants	Min	Max	Mean	Standard deviation
AGE	15	95	40.85	16.52
MALE	0	9	2.61	1.29
FEMALE	0	8	2.58	1.43
SW	0	1	0.11	0.31
PWD	0	1	0.06	0.23
ELD70	0	1	0.17	0.37
AGRILEASE	0	1	0.13	0.33
INSOURCE	1	6	2.25	0.99
LPG	0	1	0.25	0.43

Table 9. Results of Linear Regression Analysis (Dependent Variables Are Log-Transformed)

Determinants	TOTAL income				FARM income				NON-FARM income			
	Unstandardized Coefficients		t	Sig.	Unstandardized Coefficients		t	Sig.	Unstandardized Coefficients		t	Sig.
	B	Std. Error			B	Std. Error			B	Std. Error		
Constant	2.458	0.059	41.343	0.000	2.094	0.085	24.772	0.000	2.582	0.077	33.406	0.000
AGE	-0.004	0.001	-3.521	0.000	-0.002	0.001	-1.554	0.121	-0.002	0.001	-1.630	0.104
MALE	0.041	0.012	3.353	0.001	0.015	0.015	0.948	0.344	0.060	0.016	3.861	0.000
FEMALE	0.024	0.011	2.186	0.029	0.025	0.014	1.833	0.067	0.032	0.014	2.285	0.023
SW	-0.097	0.05	-1.928	0.054	-0.061	0.067	-0.913	0.362	-0.144	0.064	-2.263	0.024
PWD	-0.062	0.068	-0.916	0.360	0.016	0.083	0.188	0.851	-0.229	0.088	-2.612	0.009
ELD70	-0.04	0.045	-0.886	0.376	-0.07	0.057	-1.232	0.218	-0.056	0.056	-0.993	0.321
AGRILEASE	-0.095	0.045	-2.100	0.036	0.033	0.054	0.609	0.543	-0.037	0.063	-0.579	0.563
INSOURCE	0.21	0.016	12.949	0.000	0.145	0.023	6.449	0.000	0.053	0.021	2.479	0.013
LPG	0.248	0.035	7.088	0.000	0.155	0.044	3.527	0.000	0.286	0.046	6.244	0.000
Model summary	N=672, R^2 = 0.327, Adjusted R^2 = 0.318, Standard Error of Estimate = 0.387, F test =35.834, p<0.001				N=519, R^2 = 0.132, Adjusted R^2 = 0.117, Standard Error of Estimate = 0.437, F test = 8.610, p<0.001				N= 571, R^2 = 0.151, Adjusted R^2 = 0.137, Standard Error of Estimate = 0.464, F test = 11.103, p<0.001			

Table 10. Estimated Marginal effects (%) of Determinants

Determinants	Income category		
	Total	Farm	Non-farm
AGE	-0.4%**	-0.2%	-0.2%
MALES	4.2%**	1.5%	6.2%**
FEMALES	2.4%**	2.5%	3.3%*
SW	-9.2%	-5.9%	-13.4%*
PWD	-6.0%	1.6%	-20.5%**
ELD70	-3.9%	-6.8%	-5.4%
AGRILEASE	-9.1%*	3.4%	-3.6%
INSOURCE	23.4%**	15.6%**	5.4%*
LPG	28.1%**	16.8%**	33.1%**
*. Significant at the 0.05 level. **. Significant at the 0.01 level.			

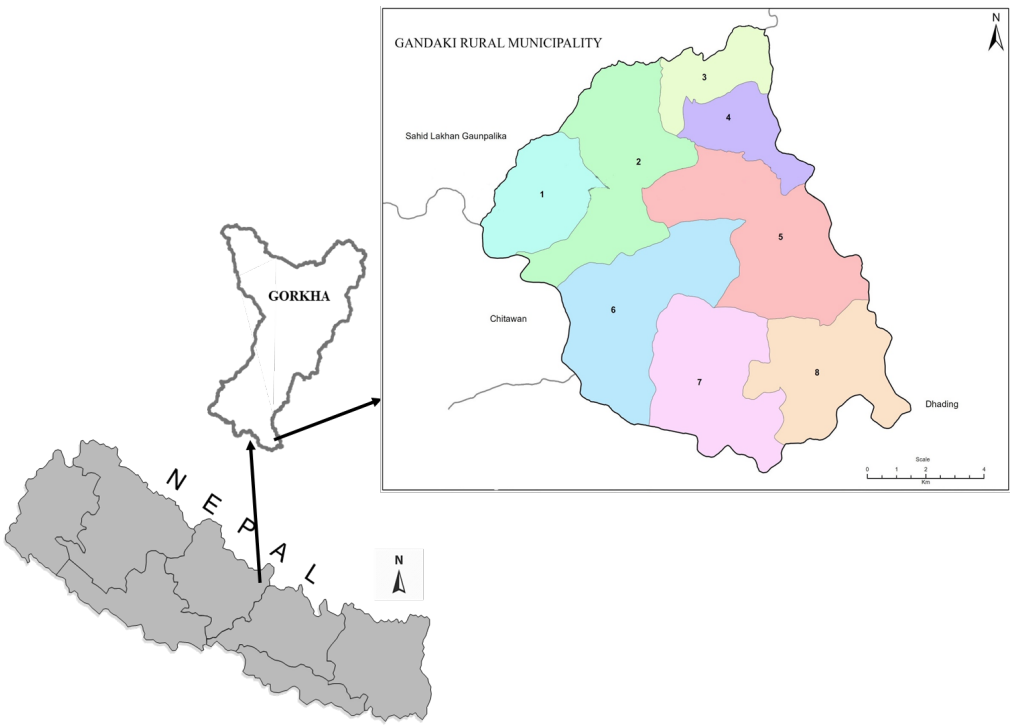

Figure 1. Location of the Study Area