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Household economy and its contribution to the livelihood among the farmers in Dang-Deukhuri, Nepal

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Abstract

Household economy and income-generating activities play significant roles in the livelihood improvement of the farmers in developing countries including Nepal. Thus, it is crucial to comprehend the household economy for better understanding the livelihood strategies at the household level including the income and expenditure sources. Diverse economic opportunities are available among the farmers even in the rural areas of Nepal such as livestock, fish farming, beekeeping, poultry and riverbed farming. Riverbed farming has become widespread among the farmers, especially among poor, marginalized and landless farmers in Terai plains of Nepal. This paper analyzes the contribution of different economic options to the household economy in the Deukhuri-Dang district. The paper analyzes the household economy of 524 farmers. Riverbed farming/agriculture is found as the most common income-generating option practiced by 507 farmers with a mean annual income of US\$ 571.45. Likewise, daily wages (N=369) and livestock (N=305) with an average of US\$ 1009.02 and US\$ 276.63 are the 2nd and 3rd most common sources of household income. The government service (N=57) and Foreign remittance (N=62) are the sources with the highest mean household incomes among all options US\$ 2009.19 and US\$ 1885.42 respectively. The major household expenditures registered among the households in the area are food (27.74%), clothing (11.25%), health (10.36%), education (12.67%), festivals (8.33%), entertainment (4.85%), assets (8.76%),

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agriculture (5.17%), livestock (2.92%), loan/interest payments (6.56%). Likewise, caste/ethnicity and family size have a significant influence on the household economy, whereas religion has a negative effect on it.

Keywords: household economy, livelihood, riverbed farming, agriculture, climate adaptation

Introduction

The household economy approach (HEA) is a unique livelihood-based framework to understand clear and accurate household economies – how people commonly make a living, manage expenditures and savings, reserves and assets. This framework also explores how households use markets for income generation and obtain the foods and basic goods and services needed and the way to trickle down to the household levels (Save the Children, 2008). It includes the activities to generate income, fulfill the expenditures and cause of savings through production, consumption, and employment and other means for livelihood.

Agriculture is the main source of household economy and rural livelihood in Nepal (Barrueto et al. 2017). Sustainable and multiple sources of household economies and food are vital for sustainable livelihood in Nepal. In recent years, diverse economic options either farm-based or non-farm activities are emerging. However, agriculture remains an important sector with 66% of the workforce directly engaged in it, contributing 39% to the national Gross Domestic Product (GDP) (Dolma Development Fund, 2014). Ministry of Agriculture, Land Management and Cooperatives recently stated 33% contribution of agriculture to the national GDP (GoN/MoALMC, 2018). However, the share has declined over the years due to the shrinkage of the agricultural sector and expansion of rural non-farm activities (Davis et al. 2009).

Riverbed farming is one of the alternatives and innovative forms of agriculture especially in the Tarai region for the poor and landless farmers, which contributes to household income, family nutrition, livelihood and food security (Schiller et al. 2013; Maharjan 2017). The poor and landless farmers utilize the degraded and unused lands in the river banks as the sources of food and income. They utilize these plots to cultivate seasonal vegetables mainly cucurbits that are adapted to the environmental conditions in the riverbeds (Helvetas, ND). In fact, they are depending on it for food security and livelihood, which is adopted differently by different households based on household economy, access to education, information and resources within the community (Gentle et al. 2017). Schiller et al. (2013) further endorsed riverbed

farming as an economically, environmentally, socially and technologically sound and sustainable agricultural practice suitable for poor and marginal farmers.

Several national agricultural policies such as Agricultural Perspective Plan (APP) emphasized transforming subsistence farming. Riverbed farming is an example of such transition in degraded, unproductive and uncultivable lands as the source of food, nutrition and incomes for the households. The riverbed farming strategy and guidelines have been developed by the Ministry of Local Development in collaboration with the Riverbed farming alliance in Nepal. However, technology, agri-inputs used, land holdings and skilled manpower, infrastructures and value chains are still challenging (Dolma Development Fund 2014). There are diversified sources of food, incomes and an increased share of non-farm activities in rural areas (Davis et al. 2009).

The scenario of farm-based and non-farm-based economic options has been changed since the formulation of APP (1995/96 to 2014/15). The APP highlighted agriculture as subsistence oriented with minimum modern production inputs, low yields and lowest average per capita income. The low agricultural growth limits overall economic growth and causes low growth in the non-agricultural sectors restricting employment growth (NPC/GoN and ABD, 1995). Thus, it is important to analyze the contributions of farm-based and non-farm-based activities in the household economy in the context of shrinkage of agriculture in the national context. This paper analyzes the contributions of different economic options, both farm-based and non-farm-based, to the household economy and livelihood in the Dang-Deukhuri district of Nepal. It further analyses the household expenditures to fulfill the livelihood requirements in the household. Moreover, the paper also analyzes the determinants or the factors affecting the household economy in the study site. Very few studies were carried out in the Nepalese context focusing on the household economy, though several such studies were conducted in Africa. The findings of the study are important to understand the household economy and its contributions to livelihood, especially among the poor and marginalized farmers in the district.

Methodology

The study used the secondary source of data of GIZ/INCLUDE and Shakti Consumer Cooperatives in the Dang-Deukhuri district. The Shakti cooperative is located in the Rapti Rural Municipality (previously known as Gadhawa village development committee-VDC) in Deukhuri valley. The questionnaire was administered to the 524 members of the cooperatives randomly selected, who have been undertaking riverbed farming in the district. The questions mainly included information on demographics, incomes, expenditure patterns and socio-economic status. The data was mainly concentrated on the household & family characteristics and household economy, which was analyzed using Stata for the household economy. The data interpretation was carried out mainly through descriptive analysis of farm and non-farm-based economies and their contributions to the household economy approach (HEA).

Furthermore, a multiple regression analysis was done to determine and understand the determinants/factors of the household economy using Stata. The regression model was estimated as follows:

$$Y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \dots + \varepsilon$$

Where Y_i is the dependent variable i.e., household economy, while x_i is a vector of explanatory variables, β_0 is the vector of unknown parameters (intercept) and ε is an error term. For the regression analysis, the socio-demographic characteristics such as age (X_1) and gender (X_2) of household head, caste and ethnicity (X_3), religion (X_4), education (X_5), occupation (X_6) and family size (X_7) were applied in the model analysis.

The study sites are located in the south of the Dang-Deukhuri district which is one of the pilot districts of riverbed farming. Almost 2/3rd of its population engaged directly in agriculture as a source of livelihood. Rapti and Babai are two major rivers with many small tributaries for the water resources and irrigation, which also destroy the agricultural lands through riverbank erosions particularly because of heavy and erratic rains in the monsoon (DDC-Dang 2071 V.S.³).

³ V.S. is *Vikram Sambhat*, Nepali Calendar, which is 57 years late than A. D.

The district has tropical, sub-tropical and temperate climates. The study sites are under the high (more than four times) and moderate (two or three times) flooded in the years from 2006 to 2014 (UN-NIP 2017). Deukhuri valley faces the issues of the flood, riverbank erosion, drought, forest exploitation, reduced agricultural production and emergence of new insects, diseases, drying of the water sources (Gangaparaspur VDC 2070 V. S.).

Results and Discussion

The study sites were highly dominated by the Tharu (95%), followed by Madhesi (0.04%) and Brahmin/Chhetri. The women-headed households are remarkable (35.31%). The age of the household heads ranges from 16 to 80 with an average of 40.73 and a standard deviation of 12.48. The average household had almost 7 members with the least of 2 and the highest of 23. In terms of education, the maximum (67.37%) of the household heads were literate (read and write basics), only 8.59% were illiterate and almost a similar percentage of the household heads had primary and secondary levels of education. More than 90% of the household heads' main occupation was agriculture.

Sources and its contributions to the household economy

Multiple economic sources per household were found in the study sites. Among these sources, riverbed farming, daily wages and livestock are the most common among the farmers. However, non-farm-based economic activities such as government and private services, foreign employment and business dominate in terms of mean and maximum earnings though comparatively fewer households depend on these sources, which indicates that the maximum number of farmers are still relying on farm-based activities, but non-farm-based activities provide a high amount of incomes per household. It is also observed that multiple sources of economies are increasing per household in recent years, which makes it more sustainable than the single source of income.

Rural farm-based activities are shrinking (only \$571.45 per household) whereas rural non-farm-based activities are expanding over the years (Table 1). One of the key reasons is the labor migration to the non-farm-based activities within the rural areas and the urban areas and abroad, especially to the middle-east countries for better opportunities, which has positive impacts in

terms of foreign employment and remittances. Carletto et al., (2007) also emphasized the importance of rural non-farm activities within the complex income strategy. The average earning of women from government service is found higher than the average of men in this study, which is an interesting finding. In recent years, women are highly empowered to engage in services both in the public and private sectors. Mohyuddin and Hussain (2014) also found a similar trend because of the higher economic empowerment of women with greater contribution to the household in their study.

A very interesting scenario was realized in terms of the contributions of these sources in total and average household economy in the study sites. The contributions of daily wages (30.06%) and riverbed farming (21.50%) were the highest contributing more than 50% to the total household economy (Figure 1.1. & 1.2.), whereas, in the average household economy, the contributions of daily wages (10.77%) and riverbed farming (6.10%) came in the 5th and 6th positions as compared to the government services (21.45%), for

foreign employment (20.13%), business (17.04%) and private service (12.08%). A similar study conducted by Sekhampu and Niyimbanira (2013) also found 50.5% contributions of services and wages to the total household economy in South Africa.

Household Expenses

The highest average expenses were found on the purchase of assets followed by the food and others in the study sites. The others category included the expenses of marriage, construction of houses and insurance, which was not included in the regular festivals, as per the Nepali calendar, whereas the entertainment category included the expenses of communication and transportation including the expenses of television channels. The household expenses for loan repayment, food and livestock were shown highly deviated from the average expenses. The expenses for food, assets and livestock were shown the maximum in the area. The major household expenditures registered among the households in the area are food (27.74%), clothing (11.25%), health (10.36%), education (12.67%), festivals (8.33%), entertainment (4.85%), assets (8.76%), agriculture (5.17%), livestock (2.92%), loan/interest payments (6.56%) (Table 2 & Figure 2).

Factors of household economy

The results on the determinants/factors of the household economy (Table 3) showed that age (Age_HH) and gender (Gender_HH) of household head, caste and ethnicity (Cas_eth), religion (Rel), education, occupation, family size influence the household economy. The factors such as landholding size, agri-inputs and technologies are not included in the analysis. The main reasons were that some of the farmers haven't held any pieces of land for riverbed farming instead they cultivated in the public lands and the benefits have been shared among themselves. Those farmers cultivating in their pieces of land were not certain either since the land was destroyed due to riverbank erosion and change of the river courses. The agricultural inputs and technologies are also supported by non-government organizations and agricultural cooperatives to some extent.

Most of the variables were found to exert a positive impact on the household economy, except religion. For this model, the family size $t(524) = 10.83$ and the caste and ethnicity $t(524) = 2.47$ are significant predictors of household economy. The family size and caste and ethnicity significantly influence the household economy in the study sites. The age and gender of the household head were not important in explaining the household economy. The higher the family size has higher the household income since different household members could be engaged in diverse income generating sources contributing to the household income. Since most of the farmers living in the study sites are of the same caste/ethnicity, they have supported each other in agricultural activities and marketing as well. It was found that the women farmers are also leading and contributing to the household economy in the study sites, thus, gender and age factors are not that influencing in the study sites.

Discussion

Although agriculture is an important sector, its share in the national context has been shrinking over the years. However, new and innovative agricultural techniques such as riverbed farming have been emerging depending on the situation. It is gaining popularity among the poor and landless farmers fulfilling food security and livelihood, especially in the agricultural fields affected by the flood and riverbank erosions. Those agricultural plots are left uncultivated. Most

international and national non-governmental organizations have significant contributions to its promotion throughout the region. It's contributed to the household economy that wasn't studied in the Nepalese context. Very limited research and support from the government initiatives for its promotion and development. The draft policy for riverbed farming was developed but not fully functional yet. However, the number of farmers and areas under riverbed farming has been increasing over the years since the agricultural lands have become barren and degraded due to riverbank erosions every year.

Many researchers have concentrated on the analysis of the household economy and expenditures in livelihood in the world (Sekhampu and Niyimbanira, 2013; Mohyuddin and Hussain, 2014). These papers have analyzed the contribution of women in the household economy and analysis of the factors affecting household expenditure. But very few such studies in Nepal. Gurung et al. (2012) emphasized increased household income through riverbed farming. However, the paper hasn't analyzed the other sources of income and expenditures. Diverse sources of household economies are found in the study including both farm and non-farm income-generating activities. The farm-based economies are the basic source of income for most farmers and riverbed farming is innovative and unique to deal with the changing climatic context and provide incomes to the households. The HEA framework developed by Save the Children (2008) has emphasized how people in different social and economic circumstances get income and food, how their assets such as land and irrigation support in dealing with the constraints and crises such as flood and riverbank erosion, especially in Africa. This study also applied the household economic approach in the study. However, some researchers still emphasized the agricultural and farm-based economies, more specifically in transition to commercial agriculture from subsistence farming (Dolma Development Fund, 2014).

It is found that riverbed farming provides food security and stability, family nutrition and income for the maximum number of farmers on the site. More than 90% of the respondents are directly and indirectly dependent on riverbed farming since they are engaged in the riverbed alliance of Nepal through cooperatives. Riverbed farming has emerged as the best option for the landless and poor farmers to cultivate in the barren lands and riverbanks in the region, also

as a successful adaptation practice in the areas affected by flood and riverbank erosion. It has a greater impact on the livelihood of the landless and poor farmers in the region. More than 10,000 households are generating income from riverbed farming, though it is seasonal in nature (GIZ/INCLUDE, 2015).

GIZ/INCLUDE (2015) further estimated the contribution of US\$ 195 to US\$ 1942 to the household economy from riverbed farming per household in the Terai region. Different scenarios were observed in terms of contributions of different economic sources to the total and average household economies. The daily wages and riverbed farming contributed the most (52.1%) to the total household economy whereas non-farm activities dominated in average household economy, which indicated that a large number of farmers are still relying on farm-based income-generating activities mainly agriculture and riverbed farming. The contribution of farm-based activities to the total household economy is 60.27% which reduced to 29.28% in the average household economy.

The analysis of the household economy, expenditure patterns and determinants/factors affecting the economy are crucial for livelihood and climate change adaptation. Many researchers have concentrated on the analysis of the household economy and expenditures in livelihood such as Sekhampu and Niyimbanira 2013; Mohyuddin and Hussain 2014. These papers have analyzed the contribution of women in the household economy and analysis of the factors affecting household expenditure. Diverse sources of household economies are found in the study which includes both farm and non-farm income-generating activities. Mohyuddin and Hussain (2014) found multiple non-farm activities particularly for women in their study. However, some researchers still emphasized the agricultural and farm-based economies, more specifically in transition to commercial agriculture from subsistence farming (Dolma Development Fund 2014).

The current study also found multiple sources of household economies in the study sites. It is found that agriculture and riverbed farming is still the most common source of the household economy on the site followed by daily wages and livestock. It is considered the backbone of Nepal's economy. However, the income from government services, private

services, foreign employment and business are higher than the agriculture and farming-based economic sources despite only a few households relying on these sources. In terms of the contributions of different sources economies in the household, the daily wages and riverbed farming contributed the most in total household economy and government services and foreign employment in the average household economy.

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Conclusion

Diverse sources of income-generating activities are found in the study sites contributing to the household economy and farmers' livelihood. However, the income from riverbed farming is very important for most of the poor and marginalized farmers in the area. The study has analyzed the contributions of different income-generating activities (farm and non-farm based) and the factors affecting the household economy. The study has shown the significantly higher number of women-headed households in the study sites contributing to the household economy. Due to the migration of male counterparts & youths to the urban areas and foreign countries,

the number of women-headed households is increasing over the years. The contribution of daily wages and riverbed farming is significant in the total economy whereas, in the average household economy, the contribution of non-farm-based activities vividly increased. The contribution of non-farm income-generating activities is expanding as compared to farm activities, though the maximum number of people are still depending on-farm activities despite comparatively less income. It will be interesting to analyze the multi-year data from wider geographical areas particularly focusing on women in riverbed farming in the future.

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Table 1: Sources of household incomes in the study sites

Variables	Samples	Mean (USD)	Std. Dev.	Max (USD)
Government service	57	2009.19	1533.85	9902.91
Private service	126	1131.30	1240.55	11650.50
Daily wage	369	1009.02	892.03	7767.08
Riverbed farming	507	571.45	703.15	6676.12
Livestock	305	276.63	239.07	1941.75
Beekeeping	15	193.65	112.38	359.22
Poultry	106	275.45	1524.28	14417.48
Fish farming	6	417	748.94	1941.75
Foreign employment	62	1885.42	1642.50	6407.75
Business	100	1595.82	1492.78	10485.44

Table 2: Different household expenditures

Variables	Samples	Mean (USD)	Std. Dev.	Max (USD)
Food	514	454.55	654.42	11902.90
Clothing	522	181.48	227.28	4271.84
Education	466	229.02	621.63	10679.61
Health	520	167.77	140.92	970.87
Festivals	514	136.45	141.71	1941.75
Entertainment	402	101.51	174.58	1456.30
Purchase of assets	117	630.22	1312.75	7330.10
Agriculture	407	107	222.77	3398.05
Livestock	319	77.20	616.09	9605.82
Loan/Interest payment	210	263.11	698.91	5825.24
Others	19	584.23	1546.63	6796.11

Table 3: Regression analysis of factors of household economy

HH_economy	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Age_HH	1.458031	8.409439	0.17	0.862	15.06299	17.97906
Gender_HH	155.6534	213.3838	0.73	0.466	263.5564	574.8632
Cas_eth	901.5159	364.6451	2.47	0.014*	185.141	1617.891
Rel	-202.4571	671.7803	-0.30	0.763	-1522.224	1117.31
Education	16.31803	66.74472	0.24	0.807	114.8074	147.4434
Occupation	25.16413	103.6644	0.24	0.808	178.493	228.8213
Fam_size	335.3866	30.9743	10.83	0.000**	274.535	396.2381
_cons	-791.5437	1052.418	-0.75	0.452	-2859.104	1276.016
R-Squared = 0.1953						

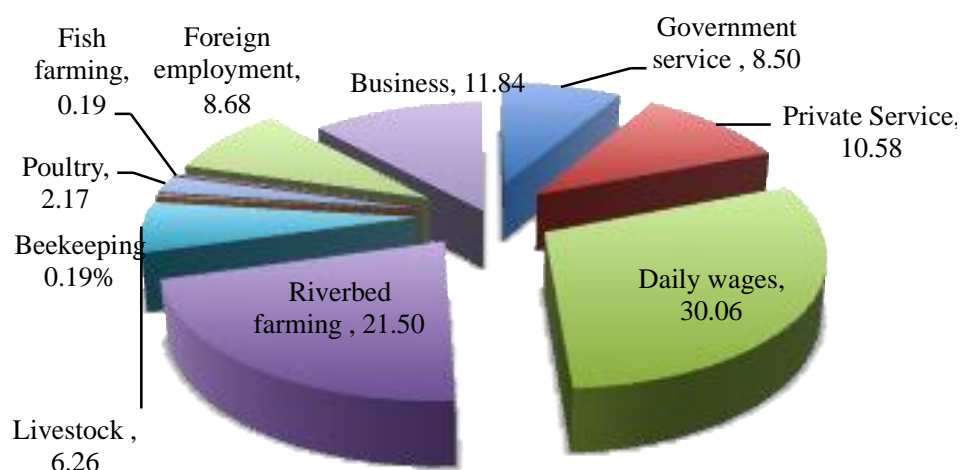


Figure 1.1.: Contributions of different sources to the household economy (total)

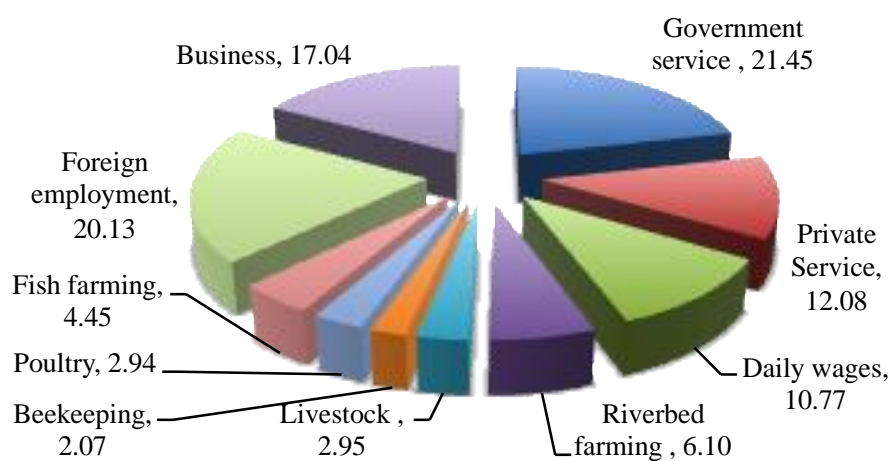


Figure 1.2.: Contributions of different sources to the household economy (average)

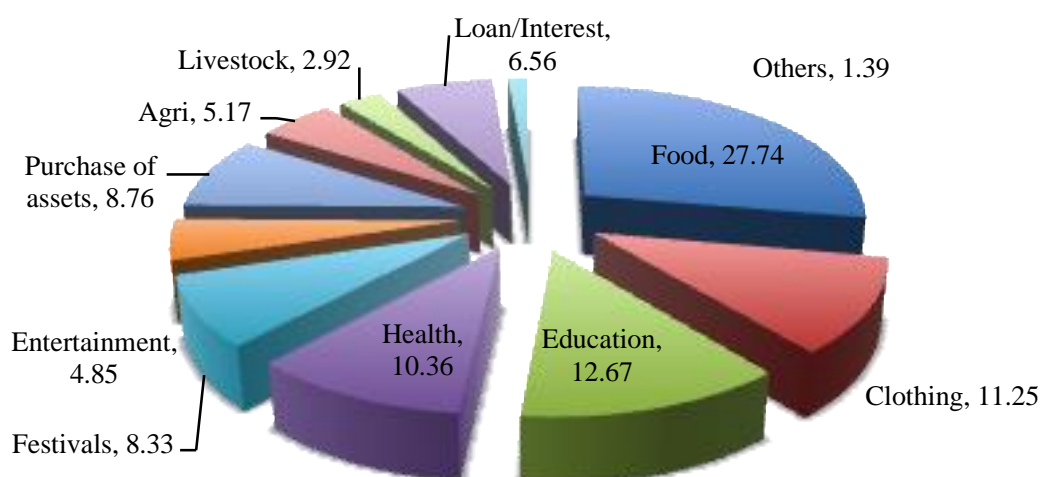


Figure 2: Different household expenditures in the study sites