

Assessing the impact of remittance income on household welfare and land conservation investment in Mardi Watershed of Nepal: A village general equilibrium model

Jeetendra Prakash Aryal

1. Introduction

International remittance has a vital role in most developing countries on poverty, income distribution, and economic development, especially in rural areas. Migrant remittance flows surpass official development aid receipts in many developing countries (Ratha, 2003). Migration is an increasing phenomenon in Nepal, particularly among young men (Gurung 2003; Seddon et.al. 2002). One out of every 11 Nepali adults is in foreign employment (NLSS, 1997). The people in foreign employment stood well over 1 million in 2004 with a total remittance earning 1 billion USD to the country. Remittance thus has a profound and growing impact on the poverty and resource distribution in the country.

Studies have shown that remittances can have different effects at various levels. At households' levels, it helps increase in income and consumption smoothing (Kannan and Hari, 2002); increase saving and asset accumulation (Hadi, 1999); and improve access to health services, better nutrition (Yang, 2003) and to better education (Edward and Ureta, 2001). Likewise, at village/community level, remittance income can help generate local commodity markets and local employment opportunities. The impacts of remittances on poverty and inequality however, depend on how far poor households are able to join in the process.

Participation in off-farm activities changes resource endowments of households, especially labor and capital (Xiaoping et.al. 2005). Thus the increased international and internal migrants' remittances have dual impacts on the village economy. Firstly, it affects the factor market in the village. Households having more migrated member may require more labor to carry out farm activities. It therefore, creates the labor market in the village. Through this, the remittance income may also affect the household welfare and land conservation activities of the households not participating directly in the migration. However, in case of rural areas in developing countries where market imperfections are common phenomenon, migration may reduce the incentives for land conservation as land conservation activities are mostly labor intensive. It is because the family labor and the hired labor are not close substitutes (Thapa, 2003) and land conservation activities are mostly labor intensive. Land rental market is another market where the impact of remittances can be observed. As farm production is the main linkage between economy and environment in developing countries like Nepal, the remittance income can influence the environmental aspects.

Several studies conducted in Nepal focus on the impact of remittances either in macro level or in partial equilibrium framework. By using general equilibrium framework this study tries to analyse the problem in the new perspective. Another major departure in this study is to explore the linkage the between social variable like caste/ ethnicity in explaining the economic issues like household welfare and environmental issues like land conservation investment.

Of the several impacts of migrant remittances, the study only focuses on its impact on household welfare and the land use sustainability in a village of western Nepal. The study considers increased income and consumption as the indicators of household welfare and the land conservation investment as the indicator of land use sustainability. Furthermore, it will also inquire if internal and international migration remittances have differential impact on household welfare and land conservation.

2. Village Economies and Inter-Dependence

Nepalese society is ethnically diverse and complex. There exists a wide disparity between ethnic groups in their access to local resources (Adhikari, 1992). Though efforts to reduce disparities between these groups are on the way, the disparities have not yet reduced as expected. This is because it is deep-rooted in the society. Access to off-farm income is not uniform across the various ethnic groups. Some ethnic groups are highly dependent on off-farm income, while others are not (Adhikari, 1992). Differences in access and possession of local resources, in educational and social status, and access to off-farm income lead to the differences in household livelihood strategies and also their relative economic position (Adhikari, 1992).

Rivan village development committee, a village in western Nepal, is the study area. Presence of Brahmin, Chhetri, Gurung and Occupational caste households in this area justifies the ethnic diversity in this area. Differences in access to and use of resources and the composition of income exist among these ethnic groups. The difference among these caste groups is also found in terms of land use intensity. Most of the Brahmin and Chhetris are involved in intensive farming and have a high share of farm income in their total household income. On the contrary, income from outside sources- mainly from service in the Indian or British armies- constitute major share in case of Gurungs. There are many households that receive pensions from British and India army and still have one of the serving in the Indian Army and obtaining remittances. Another interesting issue is that many Gurung households with remittances income have rented out more than half of their total land holding (Adhikari, 1992). However, most of the occupational caste households are still landless, despite the apparent availability of land for renting (Adhikari, 1992) and dependent on wage what they get from hiring out labor.

The cross caste interdependence is found in the study area mainly in case of land rental market and the labor market. As Brahmin and Chhetri households practice intensive farming, they face labor shortages during the peak seasons in June-July and November-December. The remittance income earned by Gurung households has created the economic interdependence in the village households and this is often seen across the caste divisions. This interdependence has strong implications especially in the use of productive resources and the factor rental market in the village.

Income from external remittances has improved the economic position of the Gurungs in the village and they are now capable to purchase more land. However, Gurung households lack own farm labor due to migration of the adult family member and therefore, often rent out the land to the Brahmin and Chhetri households. This has increased the share cropping practices among these households. Occupational caste households are not often rented out land by Gurungs. Increased income of Gurung households has however, helped increase the labor market for the occupational caste group. Many Gurungs employ occupational caste group as wage laborer- for both farm and household activities. As occupational caste households are

often landless or near landless, their main source of income is wage employment in the village.

The occupational caste households have two major options in the village. Firstly, as Brahmin and Chhetri households cultivate their land intensively, the occupational caste group have opportunity to work as wage labor in the village. Secondly, they are engaged in the traditional occupational like making or repairing of the farming tools, and other bamboo related works. However, some of them have changed little bit due to increase in education and information in the village. In general the injection of remittance income in this village has created the general equilibrium effects throughout the village economy.

Many studies, while analysing the impact of remittances, ignore the fact that these ethnic groups are nonhomogeneous and can have different implications. But in Nepal, where ethnic diversity still explains, to a larger extent, the participation in different activities and access to resources, it is important to consider this in policy analysis. A study by Adhikari (1992) in this study area also stated that different groups tend to be affected in different ways, even within the same or neighbouring villages, due to their differential access to outside job opportunities (Adhikari, 1992). This differential access to international migrant remittances has linked with some of the historical events. The process of recruiting Nepalese people by the British East India Company began after 1816 when Anglo- Nepal war ended. However, the government of Nepal was not in support of recruiting its citizen in such a way before 1886. After 1886, government of Nepal (Rana government) not only permitted the British for recruitment but also encouraged young Nepalese people to join British army (Kansakar, 1982).

The differential access to British and Indian army services to different ethnic groups is often a major issue. Reports state that Gurungs and Magars have been preferred for the military services in both British and the Indian army forces. They are considered as Gurkhas. Though many Nepalese youths were recruited in British and Indian Army in World War I and II and till now, rarely any Brahmins are accepted.

Another important aspect ignored in analysing the impact of remittances is the complex interrelationships across the different ethnic groups in the village (Adhikari, 1992). Other studies carried out in the same study area either focuses on the impact of remittances in household welfare (Sesabo, 2001) or only on the conservation investment under the credit market imperfections (Debela, 2001). Some studies (Poudel and Thapa, 2001; Awasthi 2004; Awasthi et.al., 2002) in the same study area have analysed the land conservation issues without addressing the issues like labor availability, even though few of these studies (Awasthi, 2004; Thapa and weber, 1992) pointed out that the soil erosion is also influenced by cultivation practices and the way farmers manage and use the land.

In this context, this study analyses the impact of remittances on household welfare and land use sustainability focusing on the ethnic diversity and differences in the access to resources.

3. Theoretical Framework

Theoretical frameworks for this study mainly based on two concepts. Firstly, transaction costs and market imperfections need to be considered in understanding the Nepalese rural economy. Secondly, the typology of the village economies matters in the selection of the type of methodology to analyse the impact of policies on the households.

Market Imperfections

When transaction costs and market imperfections are important, the separability of equity and efficiency does not hold. Efficiency in resource allocation crucially becomes dependent on the ownership structures and property relations (Bardhan, 1989). Market imperfections are common in rural markets in developing countries (Hoff et al., 1993) and the presence or absence of market imperfections may have significant efficiency and other policy implications (Holden et al. 2001). The resource distribution is likely to be important for the existence of and participation in rural factor markets (ibid). When markets are imperfect, socio-economic variables affect land use decisions and cannot be ignored when appropriate policies are to be designed. Therefore, the study of the Nepalese rural economy and especially poor, requires the approach which is different from the traditional neo-classical approach under perfect markets.

Previous studies in the study area have indicated that there are significant market imperfections in the factor markets. Debela (2001) states there is credit market imperfection in the study area and the fact that consumer-worker ratio, total liquidity and capital assets are determinants of soil conservation investment indicates the nonseparability between production and consumption. His study further pointed out that caste, a social variable also has important role in explaining soil conservation investment. Study by Thapa (2002) concluded that the heterogeneity between the family labor and hired labor inputs in the farm production is significant and hence, there is labor market imperfection in the study area. This implies the differences in marginal products of family labour and hired labour.

In the presence of these market imperfections, the increased involvement of the household members in internal and the international remittance earning activities can affect the production as well as other activities of the households. Increased remittance income in this context may have two possible impacts in village economy. One of these possible impacts can be seen from the labor market perspective and the other from the credit market or liquidity aspects. Remittance incomes, on the one hand, reduce farm households' dependency on agricultural income and thus possibly decrease investment on soil conservation and on the other; it can enhance the investment on soil conservation by softening the liquidity constraint. In addition, as the soil conservation activity in the study area includes labor to manage the terrace, and to constantly manage waterways during the heavy monsoon period in order to prevent raser fall and land slide (Paudel and Thapa, 2001). The involvement of household member in remittance earning activities will have effect on these activities.

Despite this, there is high transaction cost in the commodity market, as the village is about 20 km far from the nearest market. There is only fair weather road, which links the village to the outside markets. The situation during the rainy season is the worst one as there is no good bridge over the river.

Typology of the Village

The typology of the village economies determines the type of the analytical model to be used. This study therefore, follows the framework developed by Holden et.al. (1998). If high transaction costs isolate a village market for labour, credit, food, or insurance from the outside markets, a village wide modelling approach is critical to capture local general-equilibrium effects (Holden et.al., 1998). Presence of high transaction costs and the high differentiation in

the village economy call for the village CGE modelling with non-separable household farm models (Holden et.al., 1998).

Recent studies show that there is high differentiation in the study area with regards to the distribution of productive resources like land and income-earning opportunities like participating in the off-farm jobs. Despite that, the ethnic diversity has implication in several issues like political participation, social ranking, and access to different occupations. A study in the study area indicates that there is high inequality in land holding (Aryal, 2002). Aryal found that the Gini concentration ratio for ownership holding of land is 0.63 while it is 0.60 in case of operational holding. Similarly, another study shows that remittance earnings increased inequality (Sesabo, 2001). Her study shows that Gini Coefficient for income distribution in the study area is 0.48 if remittance income is included while it reduces to 0.40 if remittance income of the household is excluded. There is inequality in access to army jobs in Britain and India by caste (Adhikari, 1992) and that has enhanced the differentiation among the households groups. This differentiation has increased interdependence between households/caste groups in the village and helped emerge of labour, land rental, and commodity market in the village.

Differences in capital and resource endowment lead to differentials in access to off-farm activities, and differentiation among households (Zhao, 2001). Households participation in off-farm income stimulates local factor markets (Xioping et.al., 2005). Migration of household members for internal and external remittance earning activities may lead to labor shortage in the farm production in the village. This will generate labor market or the land rental market in the village, as household with less labor will either hire the wage labor, or rent out the land. Increased labor outmigration enhances labor exchange and labor hiring in the study area. Households hire labor for land preparation and harvesting. Likewise, oxen rental activities and shared oxen ownership have also been developed. Oxen are very important for farm production in the study area.

Remittance earnings increase household income and the households can use it for several purposes. Purchasing input to increase farm productivity, investing in non-farm activities or increasing consumption are some of the possible areas where households can spend the money. Therefore, the household can increase its level of welfare via increased consumption of both food and non-food commodities.

Household-market interactions and the type of market matter much in explaining the farm household responses to policy changes. These shocks are contained in the price changes under the perfect market situation. However, in the study area as in many villages of the developing countries, unfavorable physical conditions and the lack of infrastructural development cause high transaction costs in trading commodities and factors with the outside world and that may make the village isolated from exchange with the outside world for some of these commodities or factors and results in local exchange between households within the village. Under such circumstances the interlinkage among the households shapes the households' response to the policy changes.

Holden et al (1998) state that when households are highly differentiated and transaction costs with the outside world are high, village markets will usually arise, with price formation independent of market prices outside the village. Remittance income increases the differentiation of households and facilitates market exchanges among households in the village. Therefore, change in remittance earning may have important implications for inside-village activities. Under such situation, high transaction costs between households and the

outside village will generate general equilibrium effects on a village economy. Therefore a general equilibrium approach is required to explain the overall impact of the policy changes. In order to develop the village CGE model, this study first tries to develop the village social accounting matrix and see the possible interactions between the several sections of the village economy.

4. Brief introduction of the study area

The study will be conducted in one of the villages in Mardi watershed, which covers the area of 63 square kilometres. This area is located in the middle hill belt of the Western Development Region of Nepal. It is about 15-45 km far from Pokhara city centre. Mardi watershed is the major source of drinking water for people settled in the river valley of Pokhara. Mardi watershed area includes 5 Village Development Committees (VDCs): Lachok, Ribhan, Lwagallil, Dhital and Dhampus.

Agriculture is the main occupation. Income from remittances also plays a vital role in the economy of this area (Gurung, 1999; Sesabo, 2001). Pokhara city centre is the main market place where people carry out their commercial activities. The use of land under agriculture is increasing in the area. Agricultural land occupied 55.4 per cent of the total land in 1978, whereas it had accounted for 46 per cent in 1957 (Thapa and Weber, 1990). The major crops in this area are paddy, maize, millet and wheat.

Based on location, agricultural land can be divided into two major categories - the valley lands and the terraces lands. Valley lands are characterized by warm temperate humid climate, with average temperatures ranging from 15 to 20 degree Celsius. Roughly, the 1200 meter contour line separate the valley lands from the terraces lands (ibid). On the other hand, terraced lands are located in ridges and hill slopes and are above the 1200m to 2200 m altitude with warm, temperate humid type of climate. In Mardi Watershed, of the total agricultural land, 31.1 per cent have slope gradients of more than 30 degree, 47.6 per cent have slope gradients of 5-30 degree, and 21.3 per cent have slope gradient of less than 5 degree (Thapa and Weber, 1995).

Participating in the off-farm activities can be seen as a compulsion for the people who reside in the study area. Thapa and Weber (1990) stated that nearly 50 per cent of the farm households with landholdings smaller than 0.5 hectare were unlikely to be able to fulfill their basic requirements by field crop cultivation per se, even if they adopted improved seeds and applied chemical fertilizers. In addition, there is also a massive problem of food deficit in the area. Only 27 per cent of the total households in the study area reported that they have sufficient food production by their own farming (ACAP, 1998). Therefore, involving into the offfarm works is a major alternative in order to overcome the problem of food security.

5. Market Characteristics of the Village

Village economy has imperfect integration to outside markets. Differentiation across the household groups in combination with the high transaction cost associated to the exchange with outside economy constitutes specific market characteristics of the village.

Labor market

Participation in labor market varies with the time period of the year due to seasonality in agricultural sector. Caste is one of the major factors that determine the labor market participation. Brahmin and Chhetri households follow intensive farming and are mostly busy in their own farming. Gurung households are often involved in remittance earning activities and migration is highest among them. Occupational caste households are mostly involved in labor market. Labour market participation is taken as inferior in the society and only poor Brahmins, Chhetri or Gurungs involve in it. There is some sort of social restriction to participate in labor market for rich and also to higher caste families even if they are poor (Thapa, 2003).

There are mainly two types of labor market in the village- exchange labor and hired labor. The system of labor exchange, which is called *Perma* in local language, is common in the village. Perma system of labor exchange involves the provision of labor exchange by one household to another household in the village (Sesabo, 2001). Labor is exchanged in the same unit with same gender of labor hired as exchange (Thapa, 2003). Labor of this sort may or may not involve feeding the laborers; it may involve one meal or three meals; and the particular households whose fields are tilled cover the expenses (Sesabo, 2001). Hired labor is another form of labor in the study area. Labor can be hired individually for a day's work and be paid on the basis of time worked. The wage rates vary according to the type of task done and the gender. Wage rate of male is about 40 per cent higher than female (Thapa, 2003).

There is division of labor by gender also. Female labor force is confined to work like weeding, hoeing, planting, cutting, and carrying. Females are not allowed to plough because there is a social belief that if female use the plough, the yield will not be good. Another interesting issue is that the members of the higher caste families' donot plough. There is a cultural and religious belief that Brahmin and Chhetri's should not plough the land by using oxen, but they can dig the land. Even rich Gurungs follow the same belief. The *Occupational Caste* households are involved in land ploughing activities. Adhikari (1992) states that every household hires at least one *Occupational Caste* man for ploughing land. The person hired for ploughing the farm is called *Hali* in local language. They are often paid on the basis of the area of land ploughed and the frequency of ploughing. They are mostly paid in kind.

Labor market in the study area is interlinked with the land market and this interlinkage is explained more by the imperfections in other markets such as credit market than the imperfections in labor market itself (Debela, 2001). It is mainly due to the fact that poor households are not able to pay cash to the laborers to have their farm work done.

Overall, there exists differences in access to off-farm employment across the household groups. Wage rate in the market varies by gender, by season, and by place (higher wage in valley area than in uplands). Hired labor is not perfect substitute of family labor (Thapa, 2003) and there are search, screening and monitoring costs related to hiring labor (Sadoulet and de Janvry, 1995; Jacoby, 1993; Skofias, 1994). Therefore, there is a need to add 10-20 % of the wage rate in order to capture the transaction costs incurred in hiring labor.

Oxen rental market

Oxen are very important for farm production in the hills and mountain of Nepal, as there is not possibility of using tractors. Oxen are used mainly for land preparation for paddy cultivation and maize. Oxen rental activities and the shared oxen ownerships are common practice in the village. As keeping oxen is labor-intensive and time consuming activity, it is

often kept by those households whose members are not migrated. It is also a very seasonal market. Moral hazards and seasonal timing constraints lead to the market imperfections in this market (Holden et al., 2004).

Land and Land rental market

Land is one of the critical productive assets in agricultural production. . Imperfections in the land market can be viewed in two ways viz; thin or missing land sales markets and the imperfections in the land rental market. The land sales market is very thin because only large farmers are able to finance land purchases (Aryal, 2002). In addition, possession of land has a link with social prestige and hence, households donot want to sale land unless they are in critical situation. Previously, the enactment of the legislation '*land to the tiller*' had constrained large landowners in Nepal in making long-term lease contract in land because of the possibility of the losing land. In Nepal the legislation stated that the tenant would obtain one-fourth of the total land which he is renting in from the landowner. Not only this, the tenant had first right to buy the land if the landowner would be willing to sell it. Therefore, renting out land was associated with cost due to probabability of property loss. Though this law was abandoned, there is still confusion among the farmers regarding this. The land rental market found in this area is share cropping (Adhikari, 1992; Debela, 2001) and is interlinked with the output market as rent is paid in the form of a share of the output (Holden et al., 2004). The land rental market is interlinked with the labor market due to the presence of share corpping in this area (Debela, 2001).

Credit market

There exists both formal and informal credit markets in the study area. Informal sources of credit consist of local moneylender, businessmen, Mother Groupss and relatives, while the formal credit sources are Agricultural Development Bank and the other commercial banks. As none of the formal credit institutions are in the village, most of the households find it easier to deal with the informal sources of credit. The interest rates vary very high between the formal and informal sectors. In the formal sector, interest normally ranges between 15 to 18 per cent whereas it varies from 25 to 60 per cent in the informal sector (Thapa, 2003).

Output market

A large share of total farm production goes to own consumption. The household with surplus production is found to sale their products within or near the village. In this area, more households are engaged in crops and livestock buying activities rather than selling. Buying price of the output is found to be higher than the selling price and thus creates a price band. Similar situation can be found in the seed market too.

6. The Village Social Accounting Matrix

A village Social Accounting Matrix (SAM) is constructed based on the data collected in the Rivan village of the Mardi Watershed, Nepal. The complete data sets for the construction of the SAM are collected through the household survey and the participatory rural appraisal. The SAM is supposed to capture the linkages among the different sectors in the village economy such as production activities, institutions, the rest of the village and the rest of the world. Unlike the national level SAM, it contains the two outside world of the village. The rest of the village here refers to the other parts of the Nepal except the village under study and it helps us to understand the impact of internal migration or internal remittances in flow to the village under study. The rest of the world thus reflects the transaction of the village with the outside world and tries to capture the impacts of the international transactions of the village. In this

respect, the SAM thus constructed here resembles with the SAM developed by Adelman et al (1988) for the Mexican village. However, the activities and commodities in the present SAM is disaggregated at the household group level and it is expected to explain the participation of the each household group in different transactions.

For the methodological details of the construction of the SAM, the study followed the concepts developed by the Erik Thorbecke (1997). Furthermore, for managing the data requirements and building the SAM, it followed the article by Kiyoshi Taniguchi (2003) and by Shiferaw and Holden (...). Therefore, the basic assumptions, methods for calculation of SAM multiplier and the theoretical details are not discussed in the present paper.

Based on the social structure prevailing in the village, the classification of the household groups is done by the ethnic/ caste. Caste is found to be significant component in defining the type of migration or access to many other resources in the study area. In order to capture this, three household groups are formed, namely *Brahmin and Chhetri Households group* (HH1); *Gurung Households Group* (HH2) and the *Occupational Caste Households group* (HH3). The distribution of important socio-economic variables by caste is as follows.

Table 1: distribution of some major variables by Household Groups

Variables	HH1	HH2	HH3
Average land holding (in Acre)	0.61	0.44	0.14
Remittance income	8122	50242	4231
Farm income	27757	30780	6900
Total income	53657	99968.2	27367.37

There are 46 accounts in this SAM- 42 endogenous and 4 exogenous. Rest of the village, rest of the world, government and the transaction costs are considered as exogenous accounts in the SAM, while the accounts like activities, commodities, factor of production and household institutions comprise the endogenous accounts. As all the transactions at the distant markets incur significant transaction costs in terms of the time and cost of transportations, a separate account is made to include that in the model.

7. Simulations and Conclusions

In order to find out the effect of the internal and the international remittance on the household welfare and land conservation investment, the impact of 10 per cent increase in these remittance incomes are simulated (see Appendix 1).

From the appendix, it is clear that the increase in remittance has a positive effect on the household welfare and the soil conservation investment. Households production as well as consumption level have improved. Similar results are found in case of soil conservation investment of the household. It is quite interesting to note that both the use of family labor and hired labor have increased with the increase in remittance income of the households in the village. The positive impacts may be due to the increase in liquidity with the households having remittance earnings. That might help generate land rental and the labor hire market within the village, which in turn increases the income of the households that donot have remittance earnings. The inter-dependence across the household groups in the village and their behaviour need to be studied carefully to understand clearly the factors explaining this relation.

The results of simulation in the SAM model however, need to be cautiously interpreted. It is because the SAM multiplier is the linear multiplier and it is based on the Leontief production function relation. Some of the unrealistic assumption of the SAM can limit the applicability of the results. Despite this, the SAM thus constructed can be a base data source for the construction of the village CGE model, where we have the possibility of including the behaviour of producer, consumer and also many other practical reformation in the model. Hence, this is a primary model to go for the further analysis with the village general equilibrium model.

References:

- Adelman, I., Taylor, E. and Vogel S., 1988. Life in a Mexican Village: A SAM Perspective, *Journal of Development Studies*, Vol. 1: pp 5-24.
- Adhikari J. 1992. Ethnicity, Off-Farm Income and Resource Use in the Semi-subsistence Farming System of Kaski District, Nepal. A thesis submitted for the degree of Doctor of Philosophy of the Australian National University.
- Aryal J.P. 2002. Unequal Distribution of Land and its Impact on Land Productivity and Land Use Intensity: The Case of Western Development Region of Nepal. A thesis submitted in partial fulfillment of the degree of Master of Science in Development and Resource Economics, Agricultural University of Norway.
- Awasthi K.D. 2004. Land Use Change Effects on Soil Degradation, Carbon and Nutrient Stocks and Greenhouse Gas Emission in Mountain Watersheds. Doctor of Philosophy (PhD) thesis, Agricultural University of Norway.
- De Janvry, A., Fafchamps, M., and Sadoulet E. 1991. Peasant Household Behavior With Missing Markets: Some Paradoxes Explained. *The Economic Journal*, Vol. 101: pp 1400-1417.
- Hoff, K., Braverman, A., and Stiglitz, J., E. (Eds.) 1993. *The Economics of Rural Organization. Theory, Practice, and Policy*. Oxford University Press, Oxford.
- Holden, S., T., Taylor, J., E., and Hampton, S. 1998. Structural Adjustment and Market Imperfections: A Stylized Village Economy-wide Model with Nonseparable Farm Households. *Environment and Development Economics*, Vol. 4: pp 69-87.
- Sadoulet, E. and de Janvry, A. 1995. *Quantitative Development Policy Analysis*. The John Hopkins University Press, Baltimore.
- Bardhan P. 1989 .The New Institutional Economics and Development Theory: A Brief Critical Assessment, *World Development*, 17 (9): 1389-95.
- Binswanger H. P. And M.R. Rosenweig 1986. Behavioural and Material Determinants of Production Relations in Agriculture. *Journal of Development Studies* 22 (3): 503-39.
- Debela A.T. 2001. Impact of Liquidity and credit constraint on soil conservation investment and Farm Productivity: The Case of Western Development Region of Nepal. A thesis submitted in partial fulfillment of the degree of Master of Science in Development and Resource Economics, Agricultural University of Norway.
- Dyer G., A.Y. Naude, J.E. Taylor 2001. Effects of Land Degradation in a Diversified Economy with Local Staple and Labour Markets: A Village-Town CGE Analysis form Mexico (P: 185-97). *Economic Policy and Sustainable Land Use*, Physica-Verlag, A Springer-Verlag Company.
- Edward A.C. and M. Ureta 2001. Income Transfer and Children's Schooling: Evidence from El Salvador. California State University, Working Paper. <http://www.csulb.edu/_acoxedwa7rem0607.pdf>
- Gurung N. R. 2000. Forest Degradation / Regeneration in the Hills of Nepal: A Study at Watershed Level. A Thesis Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Science (Management of Natural Resources and Sustainable Agriculture), Agricultural University of Norway.
- Hadi A. 1999. Overseas Migration and the Well-being of Those Left Behind in Rural Communities of Bangladesh. *Asia-Pacific Population Journal* 14(1): 43-58

- HMGN/CBS 1995 Population Monograph of Nepal, Central Bureau of Statistics, Kathmandu, Nepal
- HMGN/CBS 1997. Nepal Living Standard Survey, Central Bureau of Statistics, Kathmandu, Nepal
- Holden S.T. 1997. Adjustment Policies, Peasant Household Resource Allocation, and Deforestation in Northern Zambia: An Overview and Some Policy Recommendations, *Forum for Development studies*, 1. 117- 134.
- Holden S.T., J. Taylor and S. Hampton 1998. Structural Adjustment and Market Imperfections: a Stylized Village Economy-wide Model with Non-separable Farm Households. *Environment and Development Economics* 4: 69-87.
- Holden S. T., B. Shiferaw and J. Pender. 2001 Market Imperfections and Land Productivity in Ethiopian Highlands, *Journal of Agricultural Economics*, 52(3): 53-70.
- Holden S.T. and B. Shiferaw 2001. Land degradation, Drought and Food Security: A Bio-economic Model with Market Imperfections. Paper Presented at the National Workshop in Ethiopia (Jan 26, 2001), Addis Ababa.
- Holden S. T., B. Shiferaw and J. Pender 2001 Off –Farm Income, Household Welfare and Land Management: A Bio-economic Model with Market Imperfections (Draft Report). Department of Economics and Social Sciences, NLH.
- Holden S.T. and B. Shiferaw (2002) Poverty and Land Degradation: Peasants’ Willingness to Pay to Sustain Land Productivity. CAB International. *Natural Resources Management in African Agriculture* (eds. C.B. Barrett, F. Place and A. A. Aboud).
- Kannan K.P. and K.S. Hari 2002. Kerala’s Gulf Connection: Emigration, Remittances and their Macroeconomic Impact 1972 – 2000. Centre for Development Studies Working Paper 328. <http://cds.edu/download_files/328.pdf>
- Paudel G. S. 2001 Farmers’ Land Management Practices in the Hills of Nepal: A Comparative study of Watershed ‘with’ and ‘without’ External Intervention. A dissertation submitted in partial fulfillment of the requirement for the award of Doctor of Philosophy, Asian Institute of Technology, School of Environment, Resources and Development, Bangkok, Thailand.
- Ratha D 2003. Workers’ Remittances: An Important and Stable Source of External Development Finance. *Global Development Finance 2003-Striving for Stability in Development Finance* P. Suttle Washington DC, The World Bank: 157-175. <www.worldbank.org/prospects/gdf2003/gdf_ch07_web.pdf>
- Sesabo J. K. 2001. Assessment of the Impact of Labour Out Migration on Household Agricultural Production and Distribution. A thesis submitted in partial fulfillment of the degree of Master of Science in Development and Resource Economics, Agricultural University of Norway.
- Taniguchi K 2003. Village Level Social Accounting Matrices: Data Requirements, in the book ‘Approaches to Assessing the Impact of globalization on African Smallholders: Household and Village Economy Modelling, Proceedings of Working Session, Globalization and the African Small holder study, edited by J. Dixon, K. Taniguchi, and H. Wattenbach.
- Thapa G.B. 1990. Integrated Watershed Management in the Upper Pokhara Valley, Nepal. A dissertation submitted in partial fulfillment of the requirement for the degree of Doctor of Technical Science, Division of Human Settlements, Asian Institute of Technology, Bangkok, Thailand.
- Thapa G.B. and K.E. Weber 1995. Managing Mountain Watershed, The Upper Pokhara Valley Nepal, *Studies in Regional Environment planning*, HSD, Monograph 22, Division of Human Settlements Development, AIT, Thailand.
- Thapa G.B. and K.E. Weber 1995. Status and Management of Watershed in the Upper Pokhara Valley, Nepal, Published in *Environmental Management*, 19(4): 497-513, Springer-Verlag New York Inc.
- Xiaoping S., N . Heerink, S. Holden and Q. Futian 2005. Off-farm Employment, Factor Market Development and Input Use in Farm Production- A Case Study of a Remote Village in Jiangxi Province, China. Discussion Paper, Norwegian University of Life Sciences.
- Yang D. 2003. Remittances and Human Capital Development: Child Schooling and Child Labor in the Origin Households of Overseas Filipino Workers: Havard University, Department of Economics Literature Center Working paper. <www.people.fas.harvard.edu/~dyang/papers/yang_remittances.pdf>

Appendix 1

	Accounts	% change when the remittances from ROV increases by 10 %	% change when the remittances from ROW increases by 10 %
1. Activities	1. Agri-HH1	5.472227905	6.880207434
	2. Agri-HH2	5.067437234	6.777177068
	3. Agri-HH3	5.767499599	7.826389744
	4. Lives-HH1	1.108828134	6.82942882
	5. Lives-HH2	0.821412072	6.813515307
	6. Lives-HH3	1.111512172	7.185896666
	7. Other-HH1	4.852025185	6.836912586
	8. Other-HH2	4.175323288	6.743037852
	9. Other-HH3	5.844574461	8.101779389
2. Commodities	10. Agric goods-HH1	5.834828121	6.74429377
	11. Agric goods-HH2	5.273429608	6.743037852
	12. Agric goods-HH3	5.844574461	8.101779389
	13. Others-HH1	5.83430497	6.672965655
	14. Others-HH2	5.273429608	6.743037852
	15. Others-HH3	5.844574461	8.101779389
	16. Hhchore\leisure-HH1	5.83430497	6.672965655
	17. Hhchore\leisure-HH2	5.273429608	6.743037852
	18. Hhchore\leisure-HH3	5.844574461	8.101779389
3. Factors	19. Family labor- HH1	2.994605521	6.852343301
	20. Family labor- HH2	2.573113798	6.768417744
	21. Family labor- HH3	2.943540764	7.802299985
	22. Hired labor-HH1	5.288969355	6.820266481
	23. Hired labor-HH2	5.277354691	6.817406109
	24. Hired labor-HH3	4.629810952	6.874639618
	25. Oxen labor-HH1	5.325879624	6.860033358
	26. Oxen labor-HH2	5.325879624	6.860033358
	27. Oxen labor-HH3	5.325879624	6.860033358
	28. Seed	5.326839117	6.861686341
	29. Fodder	1.017311141	6.876313746
	30. Rentland- HH1	4.68904585	6.763247332
	31. Rent land- HH2	5.472227905	6.880207434
	32. Rentland- HH3	5.274270652	6.986278508
	33. FYM	5.28491421	6.994721034
	34. Fertilizer	5.326837741	6.861684005
	35. Family labor- SC	5.423034221	6.91816549
36. Hired labor- SC	5.439288382	6.937232737	
37. Cash- SC	5.354295745	6.87585321	
4. Capital	38. Seeds	5.635906387	6.759842491
5. Institutions	40. BrahminChhetri-HH1	5.83430497	6.672965655
	41. Gurungs-HH2	5.273429608	6.743037852
	42. OccupationalCaste- HH3	5.844574461	8.101779389