A Study of Labor Migration and Remittance Economy of Nepal; a System Dynamics Approach

By

Sandesh Lamichhane

Thesis

Submitted to the Department of Geography

in Partial Fulfillment of the Requirements for the Degree of

Master of Philosophy in System Dynamics

System Dynamics Group

Department of Geography

University of Bergen

January, 2018

ACKNOWLEDGEMENTS

ABSTRACT

There is an increasing trend in emigration from Nepal to developed countries as a migrant worker since last two decades. With an increase in labor emigration there is increasing share of international migrant workers remittance on GNI of Nepal. It has become an area of interest for researchers and economists when the number of people emigrating and amount of inward remittance they send back started to increase. There is substantial debate regarding the relative contribution of inward remittance to sustainable economic development in remittance receiving countries. At the same time increasing labor emigration have different social, economic, political influence to both labor sending and receiving countries.

Unavailability of job due to slower economic growth in comparison with increasing labor force entering to labor market and earning difference between Nepal and other labor welcoming countries are key factors influencing migration decision. Similarly, social network people have who are already working in different destination countries and reduction on migration cost due to social network also influence the migration decisions of many people who wish to emigrate as a migrant worker.

Rapid increase in inward remittance can be observed to Nepal with an increase in labor emigration since last couple of decades. Officially recorded remittance inflow to Nepal has increased enormously over the last two decade, academic and policy oriented researchers have come up with different findings and conclusions regarding long term impact of remittance on economic growth of the country. However, there is no consensus over, whether remittance contribute to sustainable economic growth by reducing poverty, or weaken long term growth by creating the problem of labor shortage and brain drain.

This research analyzes the current mechanism and structure of labor migration, remittance income and use, and how it is influencing economy of the country as a whole. Use of system dynamic approach , causal loop diagram, stock and flow diagram, simulation result from definitive modeling tool 'Stella architect' along with complex characteristics of structure of the system such as; time delay, non-linearity, feedback etc. are

the factors of this research which makes it unique from other research on same topic. After analyzing the past, present and future trend of different economic variables with the help of simulation result from the model, this study suggests that remittance can exert a weakly favorable impact on long term economic growth. This research also concludes that sustainable economic development can only be achieved with the presence of sound economic policies and institutions.

Keywords: labor, migration, remittance, GNP, GDP, growth,

LIST OF ACRONYMS

AD: Aggregate Demand

CPI: Consumer Price Index

FDI: Foreign Direct Investment

FY: Fiscal Year

GCC: Gulf Cooperation Council

GDP: Gross Domestic Product

GNI: Gross National Product

ILO: International Labor Organization

PC Disposable Income: Per Capita Disposable Income

NI: National Income

UAE: United Arab Emirates

UN: United Nations

UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

Table of Content

INTRODUCTION

Labor Migration

Globalization and migration are relatively new global experiences which are growing rapidly for past few decades and changing the world. International migration refers to the movement of people across national frontiers, that might be caused by both push and pull factors. The circulation of migration system consists of immigration and emigration of the people. Migration includes various types of movements of people such as; for employment, for family reunifications, for study, or it can be due to conflict or natural disaster in home country (forced migration) (Acharya & Leon-Gonzalez, 2013). International labor migration refers to movement of people from one country to another country for the purpose of employment. Migration has been an issue of great interest as workers' remittance has appeared as major source of external financing for many developing countries in recent years (T. W. Bank, 2016).

Nepal is one of the important sources for migrant workers for the countries suffering from the labor shortage and migrant worker's remittance have become increasingly important source of income for the country. Recent data on migration trend shows that middle east countries like Qatar, UAE, Saudi Arabia and Malaysia have been attractive destinations for Nepalese workers (M. o. L. a. E. Government of Nepal, 2016)[1]. Increasing unemployment, political instability and slower growth of industrial sector (push factors) are some of the major reasons to push people for foreign employment. At the same time, even people who are employed get motivated to migrate if there is high difference in earning between home and destination countries. According to ILO Country office for Nepal, poor availability of employment opportunities mostly in rural areas of Nepal and the probability of getting higher income abroad force people to migrate abroad in Nepal (Nepal, 2017).

World Bank country data suggests that, approximately 66.5% of the total population of Nepal were employed in agriculture in year 2013 and still large portion of population are depending on agricultural sector for livelihood. International labor migration and

---

[1] See figure 1.

remittance both have different economic, social, political and other influence on the labor sending countries. On the research paper based on international migration, remittance, inequality and poverty Adams and Page (2005), come up with the findings that both migration and remittance plays significant role in reducing poverty in developing world.

Major destination countries for Nepalese migrant worker

- Malasiya (33.34%)
- Qatar (19%)
- Saudi Arabia (18.93)
- Kuwait (13.22)
- UAE (9.82%)
- Other (5.69%)
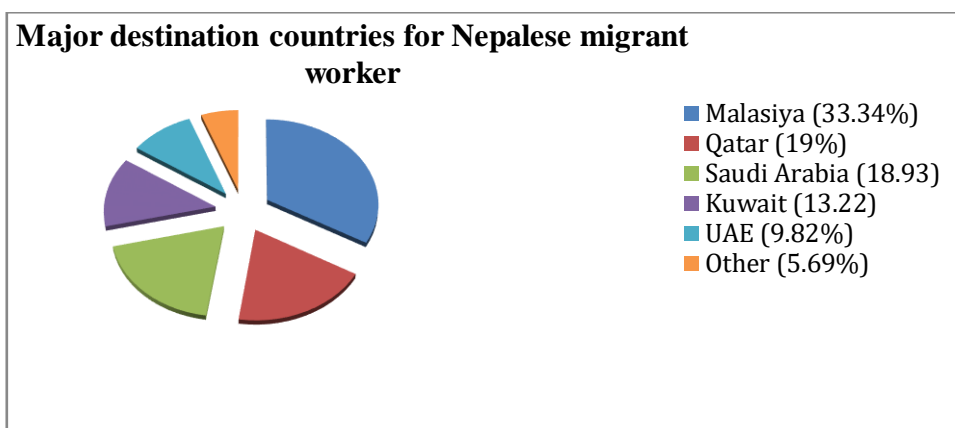
Figure 1: Major destination for Nepalese migrant worker

Source : (M. o. L. a. E. Government of Nepal, 2016)

Agriculture is the main sources of livelihood of Nepal; however production is insufficient to fulfill the domestic consumption needs. Labor migration is important for livelihood of most of the Nepalese household and remittance is becoming important components of the economy.

Economic survey of Nepal 2014/2015 explains that approximately 500,000 labor forces are entering to labor market and unavailability of employment opportunity in Nepal has led to more and more people to migrate abroad for employment. As a result, inward remittance to Nepal is also rising with increasing labor emigration and influencing the country in micro and macro level both. Same survey suggests that major portion of remittance is being used in consumption in Nepal and which are generally met through import, which led import volume to rise and there is need of policy measure to boost the remittance in productive sectors (M. o. F. Government of Nepal, 2015).

Remittance and its importance

Remittances are transfer of money from the migrant workers to their families in their home country. In general, remittance refers to the portion of migrants earning sent from the destination country to the country of origin. Although they can also be sent in other sorts, the term "remittance" is normally limited to denote monetary and other cash transfers from migrant worker to their home country.

According to International Monetary Fund (IMF, 2006) remittances denote "household income from foreign economies arising mainly from the temporary or permanent movement of people to those economies. Remittances include cash and non - cash items that flow through formal channels, such as via electronic wire, or through informal channels, such as money or goods carried across borders. They largely consist of funds and non - cash items sent or given by individuals who have migrated to a new economy and become residents there, and the net compensation of border, seasonal, or other short-term workers who are employed in an economy in which they are not resident.

Similarly World Bank W. Bank (2018) defines remittance as;
"Personal remittance is the sum of personal transfers and compensation of employees. Personal transfers, a new item in the Balance of Payments Manual 6th Edition (BPM6), represent a broader definition of worker remittances. Personal transfers include all current transfers in cash or in kind between resident and nonresident individuals, independent of the source of income of the sender (and regardless of whether the sender receives income from labor, entrepreneurial or property income, social benefits, and any other types of transfers; or disposes assets) and the relationship between the households (regardless of whether they are related or unrelated individuals)"

Remittance is relatively new financial phenomenon and one of the major and growing sources external financing for many developing countries. It is equally important to person/families getting it and for the economy of the recipient country as a whole. The inflow of recorded remittance to developing country reached more than twice as large as official aid and nearly two third of foreign direct investment (FDI) (Meyer & Shera, 2016). For most of the developing countries money received as remittances are extremely important source of income adding to their Gross National Income (GNI). Ne-

pal is struggling to become developing country from least developed country since last few years. Still agriculture is the main source of employment for most of the Nepalese household and they are depending on subsistence farming. Although, recently people are becoming attracted towards commercial farming the growth rate of commercial farming is not satisfactory. Almost half of all household in Nepal have at least one migrant abroad or returnee[2] and migrant workers remittance is a strong source of foreign exchange earnings for Nepal since last two decades.

Figure 2 shows the growth in remittance flows in comparison with foreign direct investment (FDI), official development assistance (ODA) and, private debt and portfolio equity.

Compared with other major external financing, remittance remained more stable to developing countries, which demonstrate importance of remittance as a source of external financing to labor exporting countries.
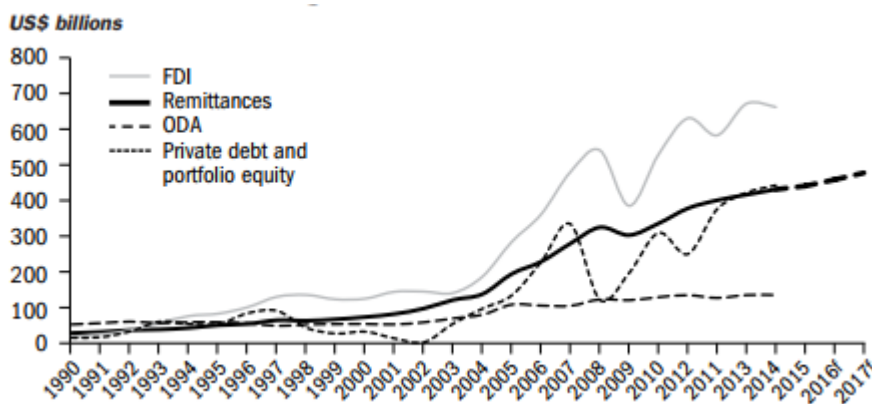
Figure 2: Remittance compared with other resource flows
Source (T. W. Bank, 2016)

More than 247 million people, or 3.4 percent of the world population, live outside their countries of birth. Although the number of international migrants rose from 175 million in 2000 to more than 247 million in 2013 and will surpass 251 million in 2015, the share of migrants has remained just above three percent (of world population) for the last fifteen years (T. W. Bank, 2016). Current data of the World Bank suggest that Nepal is in second position in highest remittance recipient country as a share of GDP (T. W. Bank, 2016). Lokshin, Bontch-Osmolovski, and Glinskaya (2010) suggest that,

there is strong impact of migration and remittance on living standard of household having migrant worker and remittance helped to reduce the people under poverty line.

As number of people migrated abroad is increasing every year and so is the extent of the remittance they send. With increase in number of individual migrating abroad, inward remittance has become one of the important components of the Nepalese economy. The inflow of remittance in Nepal is influencing not only household income, consumption and investment; it is also influencing overall structure and dynamic of the economic system.

Problem Description

Despite of growing remittance inflows in Nepal as share of GDP, average GDP growth remained below 4% with increasing trade deficits. At the same time, average industrial growth rate was only 0.3% during period with declining contribution to GDP since last decades. Since remittance helps people improve the living standards, it has been observed as a good contributor for the poverty reduction in Nepal. Nevertheless, it might further deteriorate the trade balance, causing higher demand for consumable goods, most of which are imported in Nepal (Bhatta Guna Raj, 2013).

Remittance recipients in Nepal are less motivated to invest in business due to the poor investment environment, lack of entrepreneurial skills (Dilip, 2013). Furthermore, there is lack of clear government policies to direct remittance income into productive sectors reducing additional consumption which can reduce trade deficit as well. Therefore, I want to examine to what extent unproductive remittance creates negative impact on sustainable economic growth and how this problem can be addressed by introducing policies to make people to invest remittance in productive sectors.

Research Objective and Research Questions

On the basis of above mentioned problem description research objective and questions have been developed. To define the problem following research objectives and questions have been formulated.

First objective of this study is to implement the methods and theories of System Dynamics to represent the labor migration dynamics within Nepalese economy. Among all the factors, this study focuses on the labor migration dynamics and influence of remittance on Nepalese economy focusing on household income, poverty reduction and GDP growth.

This study has tried to represent the current structure of the Nepalese labor market dynamics using the system dynamic models which can link different aspects of labor migration and economy based on stock and flow approach and produce intelligent information. By quantifying the real world data and modeling it into computer simulation, it helps in explaining Nepalese labor migration dynamics with identifying, exploring and explaining different factors that influence the migration decisions. . However, this study is limited to exploring the impacts of growing labor migration and increasing inward remittance on various sectors of Nepalese economy.

Secondly, this study aims to explain the labor migration dynamics and remittance scenario in Nepal. It also aims to investigate the impact of increasing inward remittance flow to the economy of the country as a whole. A labor migration model has been developed which is linked with remittance and economic model to investigate how remittance is influencing migration, key economic and development indicators of the country. The objective of this study is to develop a model which can explain the relationship between remittance flow and economic growth, the possible impacts of remittance on different economic factors such as poverty index, consumption expenditure patterns, household income levels etc. Such a model can help explain current scenario of Nepalese economy and help in creating sustainable development policies. *This research aims to study how increasing inward remittance is influencing other economic indicator of the economy and to what extent.*

Finally the study aims to forward a policy based on the results generated by the model. Based on the developed model and simulation behavior analysis, which explains underlying basic structure of the labor migration, one policy will be suggested to address the

problem. Introduced policy is expected to enhance the utilization aspect of the inward remittance. Suggested policy will facilitate the interaction of different variables of the model. Simulation result of the different important indicators with or without the policy option can also be analyzed in the model. The simulation result with and without policy option will allow us to compare the behavior of chosen variables to measure the effectiveness of introduced policy.

Following research questions were formulated to address the stated research objectives;

1. Explaining the labor migration dynamics and remittance flow to Nepal using system dynamic approach.

2. What is the role and influence of labor migration and remittance in Nepalese economy?

3. Is there any healthy policies to utilize remittance income in a way that can contribute long term economic growth?

Reference Mode

Recent data shows there is increasing trend in labor migration from Nepal. Data on labor permit issued by government of Nepal demonstrate that more and more people are migrating from Nepal in search of employment opportunities. Nepalese economy before was dominated by agro economy and now it seems that slowly it's moving towards becoming remittance economy. At the same time, increasing labor migration is creating shortage of agricultural labor and adversely affecting agricultural yield in Nepal (Tuladhar, Sapkota, & Adhikari, 2014).
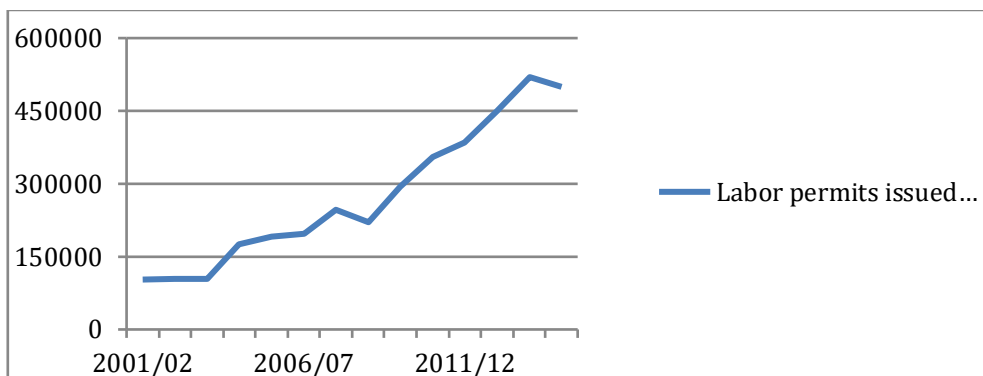

Figure 3: Yearly labor permit issued

Source: (M. o. L. a. E. Government of Nepal, 2016)

Figure 1 shows the yearly labor permit issued by government; data demonstrate that people going abroad in search for employment is in increasing trend from the year

7

2001/02 to 2007/08. Global financial crisis of 2009 might be the reason for decreasing demand for international migrant worker in year 2008/09. After that, again it was in increasing trend until earthquake hit Nepal in 2015 which disrupted every aspect of everyday life and economy. Beside decrease in labor permit issuance in those two fiscal years, it is in increasing trend. Increasing labor migration and remittance both influence the economy through income, consumption, investment, production. Hence, it is important for policy makers and government to realize it and focus to increase production and create employment opportunity to satisfy growing demand of jobs.

With the increasing labor emigration from Nepal to rest of the world inward remittance is also in increasing trend since last two decades. It became one of the important components of the Nepalese economy and seeking attention from government and policy-makers as it might influence the whole structure of the economy.
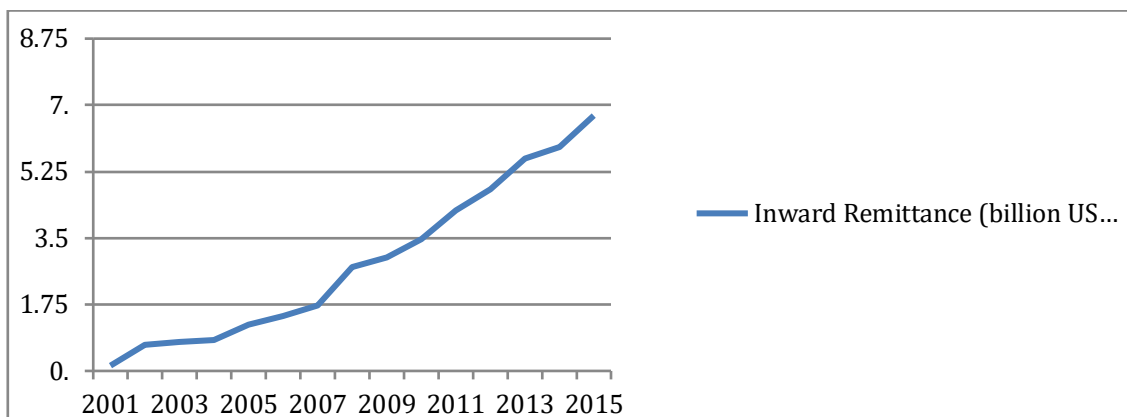
Figure 4: Yearly Inward Remittance
Source: (T. W. Bank, 2016)

Figure 1 shows the inward remittance to Nepal starting from the year 2001 to 2015. The graph above demonstrates that there is an increasing trend in inward remittance. Increasing labor permit issued and inward remittance can be seen after year 2001, at the same time Nepal was going through very difficult time due to Maoist insurgency and people from started to go abroad to seeking security. Even though Nepal came up with new constitution after peace process, unrest political situation led people to migrate abroad to work for themselves and their families. Remittance income reached to $7 billion in the year 2015 from $ 146 million during the period of 15 years. Despite of having increasing remittance income, Nepal's GDP growth rate is below 4 percent.

Stakeholders

There are number of stakeholders who will be benefited by this research. Researcher and academicians will get new insight related to remittance and its long term impact on economic growth of the country with the use of system dynamic approach. Similarly, policy makers from Nepal and other developing country can get insight on how over dependency of remittance impact overall economy of the country in the long run. Similarly, policy introduced in the model can be beneficial to take decisions on using inward remittance on productive sectors for sustainable development. Furthermore, to all who are interested to study remittance and economy, they can use as a reference for further study. Similarly, there are many areas uncovered due to different constraints which can be addressed in future research.

Key Concept

Remittance: Remittance refers to the transfer of money by international migrant worker to their family and relatives back to their country of origin.

Gross Domestic Product (GDP): GDP is the aggregate amount of goods and services produced over specific period of time within the territorial boundary of the country.

Import: Import represents the purchase of goods and services produced in other countries.

Disposable Income: Disposable income is the income of household or an individual after income tax that is available to spend, save or invest.

Household Income: Household income is the total combined income of all household members which includes salary and wages, government transfer and subsidies, remittance income etc.

Labor Productivity: Rate of output per labor at given period of time in comparison with standard output.

Consumption expenditure: Consumption expenditure is expenditure made on consumption of goods and services.

Limitation of the study

The research depends on the secondary data available at the different levels of the government organization of Nepal and different international organization such as World Bank, International Labor Organization etc. By using different secondary data available, simple macroeconomic model for Nepalese economy is developed using system dynamic modeling technique to analyze the different variables associated with remittance income and its influence on economy.

A country´s economy is affected by a lot of micro and macroeconomic factors. The model developed in this study has tried to encompass all possible factors but still the study is limited to primary and secondary data sources, which is why there might be some factors affecting the Nepalese economy that might have been neglected under this model.

There is free boarder between Nepal and India, and people can easily travel India without VISA. So, there is no official record on how many people working currently India. Although India is one of the major destinations for Nepalese migrants, this study excludes Nepalese working in India. Similarly, migrant worker from Nepal works abroad at different levels with different level of earning and face different difficulties as well. This study only considers the total number of people working abroad and average remittance they send back to Nepal. Although, in some cases people move abroad with family as well, it excludes this part.

Content of the Report

Chapter 2 includes the review of different available literature related to remittance and economy. This chapter consists of literature review on topic such as migration, remittance, economy etc.

Chapter 3 is about research methodology which includes research design, data collection and analysis.

Chapter 4 includes CLD and its discussion along with description of the built model (SFD), sub model and feedback analysis.

Chapter 5 deals with model validation, model run, simulation result description and analysis with and without policy option.

Chapter 6 comprises the summary and conclusion part along with some suggestions for future research.

LITERATURE REVIEW

Labor Migration

As discussed above, migration has been an issue of immense interest as more have people started to move from one place to another due to different reasons. Indeed, migration flow from least developed countries to developed countries has increased making remittance one of the most important source of foreign incomes for receiving countries. Millions of people around the globe leave their home country for employment opportunity to make their own and their family's life better. Many migrant workers are motivated to work abroad because of higher wage and opportunities, at the same time many others are forced to migrate due to reasons like; natural disaster, unstable political situation and lack of decent work in their country of origin.

The main drivers of migration continue to be employment related. Recent ILO figures on migrant workers in the country of destination estimate that, in 2013, 207 million international migrants were of working age (15 years and over). Of these, 150.3 million were working or economically active i.e. 72.7 per cent of the estimated working age migrant population (International Labour Office, 2016)

Nepal is one of the major suppliers of labors for the countries suffering from labor shortage and remittance from migrants became one of the important sources of household income. Migration flows from Nepal to rest of the world has become an important and debatable issue in the economic, political and social affairs of the country.

Over the past decade, most of the Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) experienced robust economic growth. The main force behind this growth is a strong labor force, composed mainly of expatriates. Largely due to its geographical proximity, the Gulf has been a preferred destination for workers from South Asia for years. More recently, however, the GCC has attracted foreign labor from all over the world. Though extraordinarily diverse, expatriate workers share one common goal: to send as much money home as possible (Termos, 2010).

Despite being an agrarian economy and major portion of workforce (approximately 74%) are engaged in agriculture sector, the contribution of agriculture in national income is 33.8% only (T. W. Bank, 2014). This shows the underutilization of available

labor and lower productivity as well. The disparities between growth in labor force and availability of job has increased the level of unemployment. As a result, foreign employment plays vital role for livelihood of many families.

Foreign employment is indeed the most significant motivation for international migration from Nepal in the twenty-first century. More than 3.8 million permits to work abroad (excluding India) were issued by the Government during the 1993/94–2014/15 fiscal years, which represents almost 14 per cent of the current population. As well, according to the recent census data (2011), nearly 71 per cent of the total absent population (1,921,494), or people living out of the country (including living in India) cited private and institutional jobs abroad as the reasons for leaving (M. o. L. a. E. Government of Nepal, 2016).

Job creation in Nepalese economy is lower than labor force entering annually in labor market. Those new entrants therefore have no choice than going abroad for employment. Liberalization of economy in 1985 opened the door for international migration. As a result, people who faced difficulty in finding job in Nepal started to seek employment opportunity abroad.

Subsequently, there has been a huge increase in the inflow of remittances, from 58.6 billion rupees (NPR) in 2003/04 to NPR 589.5 billion in 2014/15. Remittances contributed a 10.9 percentage share of the gross domestic product (GDP) in 2003/04 and 27.7 per cent in 2014/15. The remittance flow, therefore, is a major contributor to development financing in Nepal (M. o. L. a. E. Government of Nepal, 2016).

Remittance, Uses and Economic Growth

REMITTANCE DYNAMICS AND USES

Most of the research shows that there is positive impact of inward remittance in developing world in areas like increase in standard of living, people being able to fulfill their basic needs. However when it comes to know about long term sustainable development in overall economic indicators, researcher come up with different results and findings. Some researches such as Connell and Conway (2000); (Cooray, 2012; Walmsley, Aguiar, & Ahmed, 2017), support the idea that remittance helps to overall growth in the economy by increasing economic activity in the country. On the contrary, others came up with the findings that even though remittance helps to achieve short term economic growth, in the long run, depending more on remittance decreases the total output (GDP) as it reduces the workforce available to work.

It depends, how remittance is being used in receiving countries to know about the influence of the remittance in the economy. Inward remittance influences the GDP and other economic and development indicators through consumption and investment. For most of the countries remittance not just contributes to recipient families and communities but to the whole national economy where they are being used (Arnold, 2017). The number of migrants has doubled in the past two decades, as have remittances to developing countries (Martin, 2006).

When remittances are saved in financial institutions, this increases credit availability and can enable entrepreneurs to realize investments that have a positive impact on development (Carling, 2004). Remittances can generate a positive effect on the economy thorough various channels such as savings, investment, growth, consumption, and poverty and income distribution (B. Pant, 2008). Similarly, most of the literature shows that one of the major positive impacts of remittance on receiving countries is that it helps to alleviate poverty. Ratha (2013) come up with the finding that remittances increase household incomes and is therefore powerful anti-poverty force in developing countries.

In micro level, large portion of the remittance are being used in real estate sector in most of the countries and Nepal is no exception. Moreover, Buch and Kuckulenz (2004) argue that remittances can have a strong positive impact on the current account,

but they can also have less beneficial features, such as leading to a Dutch disease effect[3]. After reviewing 50 different literature on the topic, Adams Jr (2011) concludes that international remittance in most of the case have positive impact on poverty reduction and healthcare at the same time it can have negative effects like labor supply, education and economic growth.

Research from all around the world suggests that remittance receiving families generally have higher level of consumption expenditure. Similarly, it helped a lot to reduce poverty in most of the remittance receiving countries. Puri and Ritzema (1999) argues that remittances are used for daily expenses such as food, clothing and health care, basic subsistence needs and they make up a significant portion of the income of those households. The world bank report on impact of migration and remittance suggest that, remittance and large scale migration have significant impact on macro economy and in household level remittance has increased income and consumption level (Poverty Reduction and Economic Management Sector Unit, 2011).

Similarly, Connell and Conway (2000) conclude that it is possible to spend more, import more and invest more with the help of remittance, which is more applicable to small developing economy. Cooray (2012) found that remittance incomes have positive and significant effect on economic growth in south Asia. Moreover, Walmsley et al. (2017) supports the view of positive impact of remittance, it concludes that in overall both labor sending and receiving countries has gained from international labor migration in terms of real GDP or income.

Literature in remittance use suggests that most significant portion of the remittance income is used in consumption, land and housing, and other unproductive sectors. Those most common practices of spending remittance do not support long term economic development. There is a debate going on how we define productive and non productive use. As some researcher argues that investment made on health and education should be considered as productive use as it helps to develop human capital.

---

[3] When economy experience sudden large increase in income, it can be more harmful. More about dutch disease effect can be found at http://www.imf.org/external/pubs/ft/fandd/basics/dutch.htm and http://blogs.worldbank.org/growth/dutch-disease-theory-and-evidence

Some of the research on use of remittance argues that, it depends on the place where the remittance is sent and being used. For example, Taylor (1999) suggest that remittance produces the large multiplier effect if it's used in rural household that uses domestically produced goods and with labor intensive production process and few technological use. On the other hand same research suggests that remittance sent to urban household helps to accumulate demand for imported products that leads to increase in import.
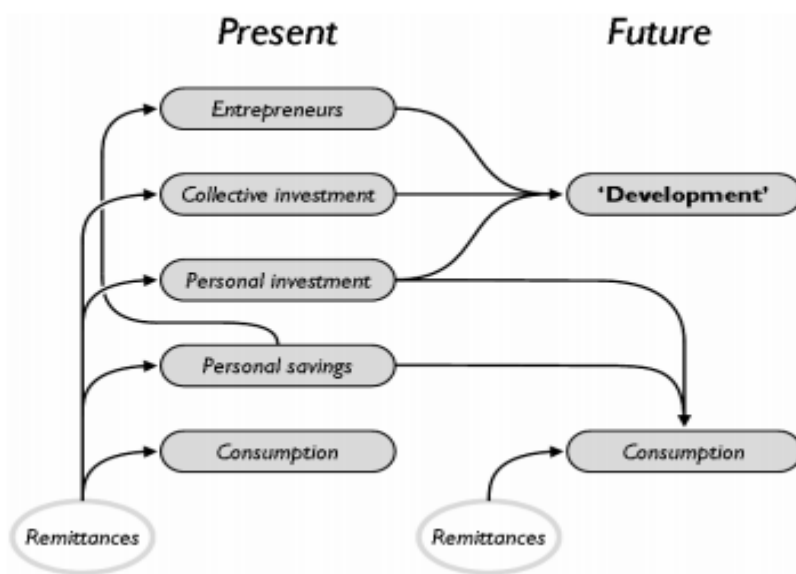
Figure 5: Remittance-development linkage
Source: (Carling, 2004)

Figure 5 above explains the present and future use of remittance and its influence on development. Carling (2004) mentions that using remittance income in entrepreneurs' development, collective and personal investment helps to overall development economy. Barajas, Chami, Fullenkamp, Gapen, and Montiel (2009) suggest that remittance income have contributed little to economic growth in remittance receiving countries and may have even delay growth in some.

REMITTANCE AND ECONOMIC GROWTH

Moreover, on UNESCAP working paper on worker's remittance, economic growth and poverty in developing Asia and the pacific countries, Jongwanich (2007) concludes that remittance can generate marginal positive impact on the economic growth through investment and human capital channels. In the same paper Jongwanich (2007) argues

that as remittance has marginal positive impact on economic growth, government and policy makers should not consider remittance as growth engine such as export and foreign direct investment (FDI).

Lokshin, Bontch-Osmolovski, and Glinskaya (2007) come up with argument that labor migration and remittance income have remarkable contribution for poverty reduction in Nepal between 1995 and 2004.Similarly, on the basis of research carried out on Bangladesh using time series regression result, Ahmed (2010) suggest that remittance flows to Bangladesh have been statistically significant but have negative impact on growth. On similar research on causality between remittance economic growth Siddique, Selvanathan, and Selvanathan (2012) founds that there is only a one way casual relationship from remittance to economic growth in Bangladesh, there is no causal relationship between remittance growth and economic growth in India and there is two way causal relationship in Sri Lanka between growth in remittance and economic growth.

Fayissa and Nsiah (2010) investigate the impact of remittance using panel data of 37 African countries within the conventional neoclassical growth framework and conclude that remittance helps in economic growth in the countries where the financial systems are less developed by providing liquidity and funds for investment. Finding of the research M. Shrestha (2017) suggest that, increase in labor migration to gulf- Malaysia explains 40 percent of the decline in the poverty between 2001 and 2011. This research also explains that migration through remittance increases school enrollment of children and large percentage of consumption expenditure goes to food with estimation of $1 increase in remittance increases $ 0.5 increase in consumption. In a similar way, Cooray (2012) found that migrant remittance have significant positive impact on economic growth through education and financial sector development.

Most important thing to notice while looking for impact of remittance on economic growth is that how the remittance income is being used. In case of Nepal repayment loan taken to migrate is one of the basic uses of remittance until loan is repaid fully. Knerr (2017) in household level analysis of remittance use, advise that only small portion of remittance is used to saving and investment in comparison with loan repayment and consumption. Airola (2007) on the research on remittance use in Mexico presents that household that receives remittance will spend more on durable goods, healthcare and housing, and less on food than those household who do not receive remittance.

17

Similarly, the study conducted in Nepal using econometric model supports the view that remittance increases the consumption expenditure. Acharya and Leon-Gonzalez (2013) suggest that consumption expenditure in Nepal is higher for remittance receiving household and consumption increases even more with an increase in remittance income.

In the contrary, D. Pant (2017) come up with the findings that household receiving remittance spend more on education and less on housing and there is no significant influence of remittance on spending on food, consumer goods and durables. Spending more on education helps to build human capital which might help for overall economic growth in long run. In the meantime, status report of labor migration for employment M. o. L. a. E. Government of Nepal (2016) explains increasing remittance income to Nepal demonstrates decline in manufacturing sector that has deteriorate the export. Increasing labor migration and remittance is adding extra consumption expenditure which leads to increase in import. At the same time, there is lack of utilization of available labor force.

Bhandari and Chaudhary (2017) using calendar method on use of remittance concludes that that most significant portion of the remittance income in Nepal is being used for consumption purpose followed by repaying loan. On the basis of study on dynamic impact of remittance on economic growth in Nigeria between 1971 to 2013, Olusuyi, Adedayo, Agbolade, and Ebun concludes that there is significant relationship between remittance income and economic growth through spillover[4] effects on component of GDP as consumption, investment and import using Keynesian open economy model of income.

Figure 6 shows the sector wise contribution to GDP which demonstrate comparatively decreasing contribution of agriculture and industry, whereas there is growth in contribution of service sector. Rising consumption accumulates the aggregate demand and unsatisfied need through local production must be fulfilled with import.

---

[4]
  Investopedia defines Spillover effect as the impact that seemingly unrelated events in one nation can have on the economies of other nations. And generally it is used to describe negative impact on domestic economy.
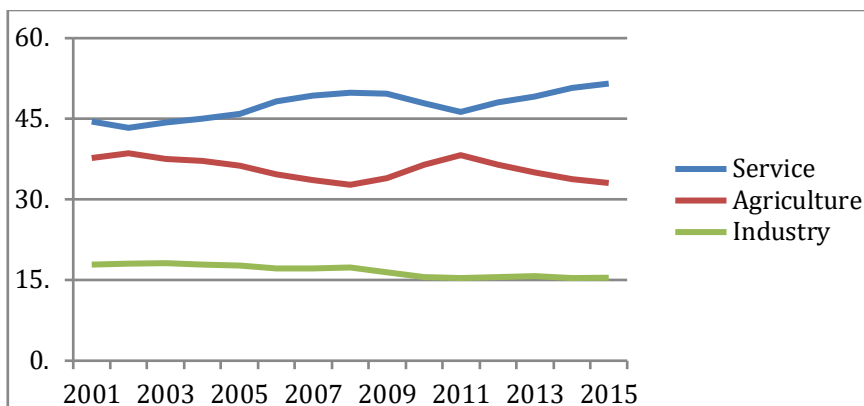
Figure 6: Contribution to Nepalese GDP by Sector
Source: World Bank Country Data

Slower growth in industrial sector reduces the local production at the same it also reduces the job availability. Even though most of the researcher comes to conclusion that there is increasing influence of the inward remittance in Nepalese economy, it's really difficult to calculate the exact remittance inflow to Nepal. It's because of the large portion of remittance being sent by informal channel, if we include inflow of funds to Nepal through informal channel also then its importance is even higher for the economy. On the basis of research carried out in more than 20 Asian countries on impact of remittance on economic growth, (Vargas-Silva, Jha, & Sugiyarto, 2009) conclude that remittances do have positive impact on GDP growth. Same research further concludes that 10% increase in remittance can lead 0.9%-1.2% increase in GDP growth.

Similarly most research suggests that it helped to reduce people below poverty line. Similarly, Sharma (2017) explains that there is substantial influence of remittance in increasing consumption and contributing to GDP growth. Moreover, he also argues that remittance is also creating moral hazard and Dutch disease phenomenon.

The debate between positive and negative impact of increasing labor migration and remittance on economy is still going on. The most important issue to remember before entering to debate is how recipient use the remittance income and either there is any policy intervention or not from the government to increase the positive aspect remittance on overall development. Remittance in the household sector found to have positive impacts by increasing the standard of living.

At the same time impact of remittance on overall long run national economy such as GDP, international trade, foreign exchange, liquidity etc also demands equal importance from researcher. Lartey (2017) concludes that there is chance of higher economic growth under floating exchange rate system with an increase in remittance than

that of fixed exchange rate. Furthermore, using panel data of 66 countries, Bettin and Zazzaro (2012) concludes that remittance have positive impact on the economy as it relax the liquidity constraints, increases access to credit with the help of efficient banking system.

Similarly, De Haas (2009) came up with the conclusion that remittance is financial resources to recipient household to invest in micro level and to national account its importance is growing as it became comparatively constant source of foreign currency. Moreover in the research on contribution of remittance on Nepal's economy, B. Shrestha (2008) explains that most of the Nepalese migrant worker are employed in low paying job as a result they have very lower saving rate with relatively higher marginal propensity to consume.

Remittance contributing 32% of GDP in Nepal in fiscal year 2015-16 and it's even in increasing trend. Increasing pattern in inward remittance has gained a lot of interest among researcher, academicians, and policy makers since last decades. Policy makers want to best utilize remittance in order to contribute for overall development of the country. Many scholars are worried about what will be the consequences if same pattern remains unchanged and economy heavily depends on remittance income. At the same time how remittance receiver person/family spend remittance have different influence to the economy. Recent data shows that most of the remittance income is being used for consumption purpose.

RESEARCH METHODOLOGY

System Dynamic Approach

The system dynamic approach starts with identification of dynamic problem, mapping and modeling to build confidence in the model and its policy implication.[5] System dynamic follows P'HAPI outline which is used by most of the researchers which are as follows.

P - Problem Identification

H - Hypothesis development

A – Analysis of structure and behavior

P – Policy option

I – Implémentation

Using system dynamic to address any issue starts with problem identifications. Identification of the problem allows us to know the severity of the problem, why it is important to address the problem and what might be the consequences if problem remains unresolved. The second stage is the development of hypothesis based on the identified problem and represents the existing structure of the system in computer simulating model representing the hypothesis developed. Next step is to analyze the simulation results by looking at the behavior of the system produced by computer simulation. After we analyze the problem by testing the behavior of the system with different values and identify underlying causes that produces the result, we test different policy option to alleviate the existing problem in the system. Similarly, probable implementation challenges will be discussed to make the policy option workable to address the problem.

Hence, working on this thesis started with first step of problem identification which is increasing labor migration, increasing remittance income in national economy and influence of labor emigration and remittance in production and consumption patterns of the Nepalese economy. Once problem is identified and hypothesis is developed model is developed with developing relationship between variables. The relationship between

---

5

System dynamic society defines system approach begins with defining problems dynamically, proceeds through mapping and modeling stages, to steps for building confidence in the model and its policy implications. More can be learned at http://www.systemdynamics.org/what-is-s/

variable are studied to develop the equations. Needed data are identified based on developed model and relationship with variables. Different secondary sources of data are used in this model to give the values to model since starting year 2001. Once model is verified and validated with unit and equation check, different behavior of the variable under different scenario is analyzed based on the simulation result. Finally, based on the behavior of the model, some policy option is suggested to address the problem of increasing flow of labor migration and inward remittance in the Nepalese economy with discussion of the implementation challenges.

Among various available computer simulation softwares to build the model this study uses Stella Architect.

The basic idea to build the computer model is around stock and flow diagram, which enables to understand different variables of the system in stock and flow concept. Stock accumulates or depletes depending on the flows (both inflow and outflow).
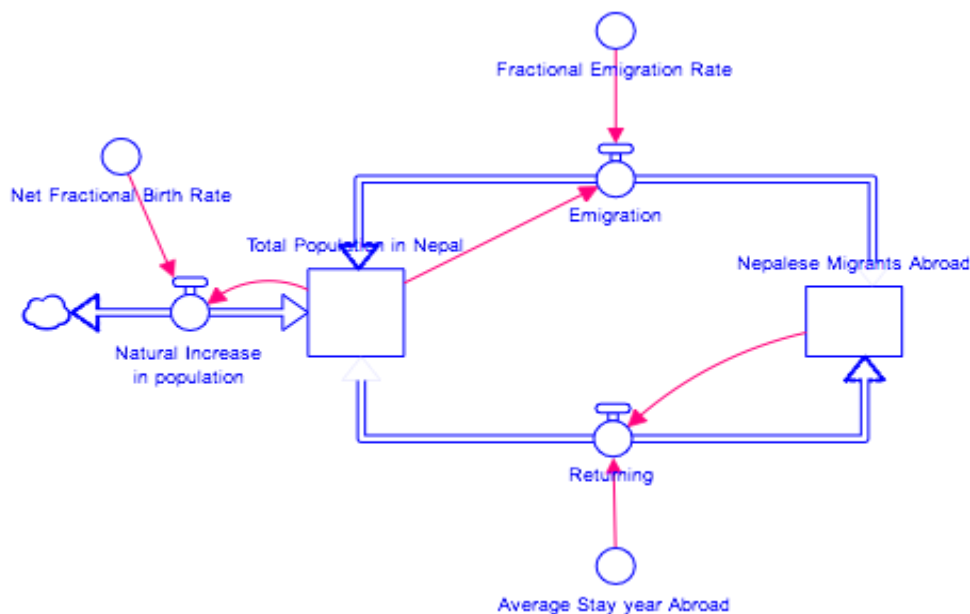

Figure 7: Simplified Migration Model

In the figure 2 above variables which are in box are stocks, variables connecting stocks are flows (either inflow or outflow). Similarly, variables on small circle are exogenous which influences the inflow/outflow of the system. If two inflows (Natural Increase in Population and Returning) for the first stock (Total population) are higher than outflow (emigration), then stock of population accumulates over time. Similarly, if migration outflow for stock of population (emigration) is higher than total inflow, stock of population depletes. Figure 3 only consist of few variables, in real scenario there are a lot of

variables that influences inflow/ outflow for the stocks. Similarly, exogenous variable used above can also made endogenous if it is really important for the identified problem. It depends on the scope and limitation of the research being carried out.
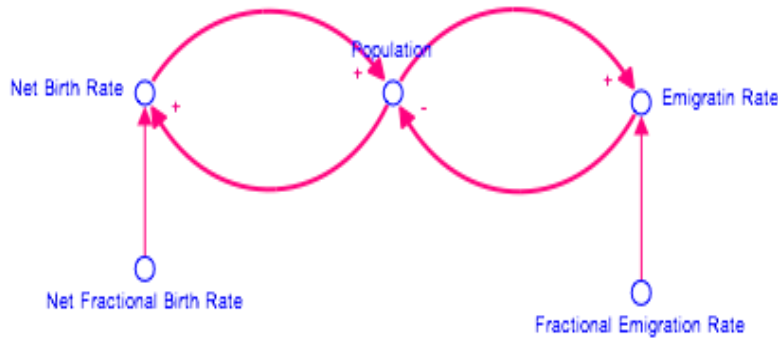

Figure 8: CLD of Population, Net Birth Rate and Net Emigration Rate

Casual Loop Diagram helps us to understand the relationship between different variables in the system through feedback loop. Positive (reinforcing) feedback makes the stock to rise, at the same time existence of negative (balancing) feedback loop in the same system acts to stop unlimited growth balancing the influence of reinforcing loop. Figure 3 helps us to understand those two loops with an example of casual loop diagram of population, net birth rate and emigration rate. Increase in net birth rate makes stock of population to increase, at the same time increasing population leads to increase in birth rate which again makes population to grow faster and faster.

Now, existence of negative feedback loop, i.e. when there is increase in population, it increases emigration but when there is higher emigration rate it reduces the stock of population balances the increasing population. There is negative relation between emigration rate and population which makes increasing population to balance and adjust within the system. It depends, which loop is more dominants, for increase and decrease in the value of stock. Dominance of reinforcing loop increases the population whereas dominance of balancing loop reduces the population.

Any system contains many variables which are directly or indirectly influencing each other in nonlinear way. The behavior of those systems is complex to understand, and there is why system dynamic is. System dynamic approach differs from other approach as it uses computer simulation model to deal with complexity, it turns the mental model into a computer model. Based on computer simulation result of the behavior generated by the interaction of different variables in the system, it is easier to make comparisons of the decisions made in various set of assumptions. It enables decision makers to play

with variables to choose best decisions out of available alternatives. Similarly, once model is developed, all important variables are visible in the model which makes understanding about the structure of the system even simple.

Based on the identification of important variables, relevant data are gathered, and mathematical equations are developed according to relationship between variables. When model validation is done and model is finalized values to the variables can be changed to see the results in different scenarios.

MODEL DESCRIPTION AND SIMULATION

Model Overview

Based on the review of different books, already carried out research on topic, articles, journals etc. model and relationship with different variables is developed with mathematical formulations. First sector of the model describes population dynamics; second sector describes migration dynamics, third sector is about policy option. First of all first three sectors are connected to each other to see the simulation result to see how the system is working as a whole and then analyzed based on the literature, data and educated guess. Simulation results of different important variables allow us to analyze the current structure of the system, how important variables are behaving in different parameters values. Simulation results make the comparison between values of variables and its influence in the behavior is more understandable. All those sectors are related to each other and change in any variable within any sector can changes the behavior of the system as whole. Last but not the least when behavior of the system requires some changes to achieve more favorable result, we add some policy option with discussion of implementation challenges.

CASUAL LOOP DIAGRAM

Figure 9 below is causal loop diagram of the built model. There are 4 important loops interacting to each other, among them three are balancing (B1, B2, B3) and four are reinforcing (R1, R2, R3 and R4) in nature.
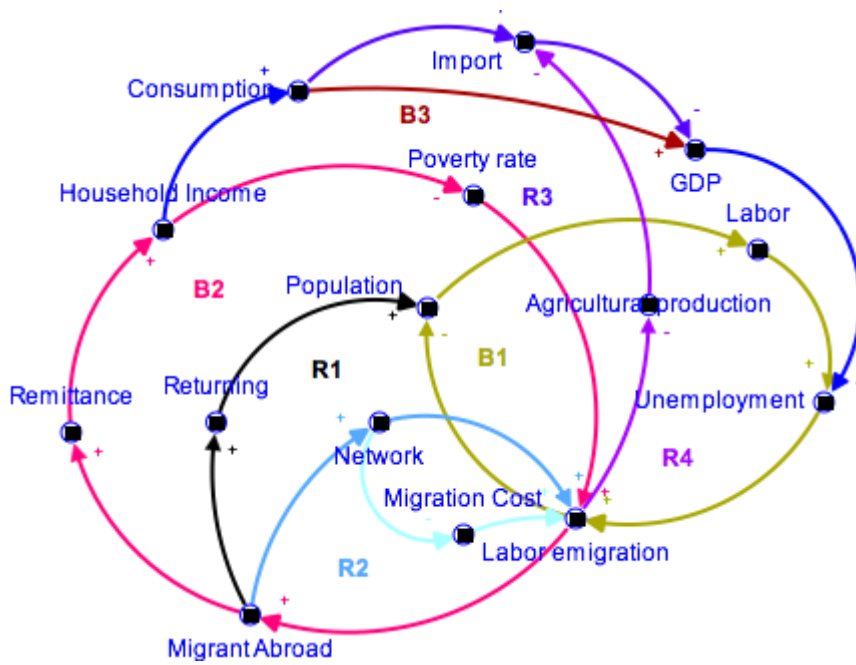
Figure 9: Causal loop diagram for migration

First of all B1 is the unemployment balancing loop, where increase in population leads to increase in total available labor due to natural growth. Increased available labor force reduces the employment opportunities when there is slower growth in employment in comparison natural growth in labor force. Increasing unemployment in Nepal then motivates people to migrate abroad in search for employment opportunities.

Second balancing loop above B2 balances the emigration through people below poverty. Higher rate of people below poverty line means there are more people who are willing to migrate abroad to make their life better. Increased emigration leads to increase in remittance through increased migrants abroad which ultimately increases household income. Increased household income makes people able to fulfill their different needs, which means it reduces the number of people below poverty line which again reduces the number of people who are willing to migrate because of poverty. Another balancing loop B3 is also balancing unemployment rate in Nepal by increasing consumption through increased household income because of remittance. Total consumer consumption expenditure is also one of the key elements in GDP calculation expenditure method and labor migration is helping to boost it through remittance. Higher consumption increases GDP and creates more job reducing unemployment which again reduces the labor emigration because of loops balancing nature.

26

On the other side, R1 is another loop but which is reinforcing in nature. Increasing labor emigration increases the Nepalese migrants abroad which increases the returnee also as ultimately they are going to return back. Increasing returnee increases the population in Nepal resulting in the total labor availability, which again leads to increase in unemployment. Finally, increase in unemployment means there are more people who are willing to migrate to get employed.

Similarly, another reinforcing loop R2 is network effect loop. Increased Nepalese migrants abroad means there are more available network to get help in obtaining information about different aspect of destination countries, migration investment etc. This makes more people to take decisions to migrate if there is higher gap in expected earning between Nepal and destination country making labor migration easier than before. Similarly, increased network helps to reduce migration cost making it more affordable. Moreover, another positive feedback loop R3 works as follows. Increasing consumption increases the import which reduces the GDP. Slower growth in GDP slower the employment creation rate which again leads to increase in emigration as migrant worker. Similarly, R4 also ultimately leads to increase in emigration by reducing agriculture production which is one of the important parts of Nepalese economy. Reduction in agricultural production due to labor emigration ultimately leads to increase in emigration again by reducing GDP and employment opportunity.

MODEL STRUCTURE

The structure of the model are divided into population sector, labor migration sector and policy sector which are explained in detail as follows with and stock and flow diagram of each sector.

1. POPULATION SECTOR

In population sector, total population is divided into three different stocks; young population, working age populations and elder population. For the stock of young population birth rate is inflow, which is determined by total population and fractional population growth rate. When young people dies or become working age population after maturation time it is outflow for the stock. It reduces the stock of young population. At the

same time becoming working age is inflow for another stock (Working age population). Death and becoming old is outflow for the stock of working age population. Here, another most important outflow for the stock of working age population in developed model is emigration which is growing year by year in context of Nepal. Similarly, when people who are working aboard as migrant worker returns to Nepal it is another inflow to stock which again increases stock of working age population. In this population sector people who emigrate and returns are determined by migration sector. Sum of young population, working age population and elder population gives us total population. As this thesis work is about labor migration total working age population who are willing to emigrate to work abroad are only considered as potential migrants.

Here, all the values for initial stocks are taken from World Bank country data for the year 2001. The mathematical equations are developed according to relationship between variables. Following are the few example of how these equations are developed in population sector of the model.[6]

- *Birth Rate = Total Population * Fractional population growth rate*

- *Young population mortality rate = Young population * Fractional death rate*

- *Becoming working age population = Young population / Time to become working age population*

- *Becoming Old =Working age population/ Time to become old*

- *Total population= Young population + Working age population + Elder population*
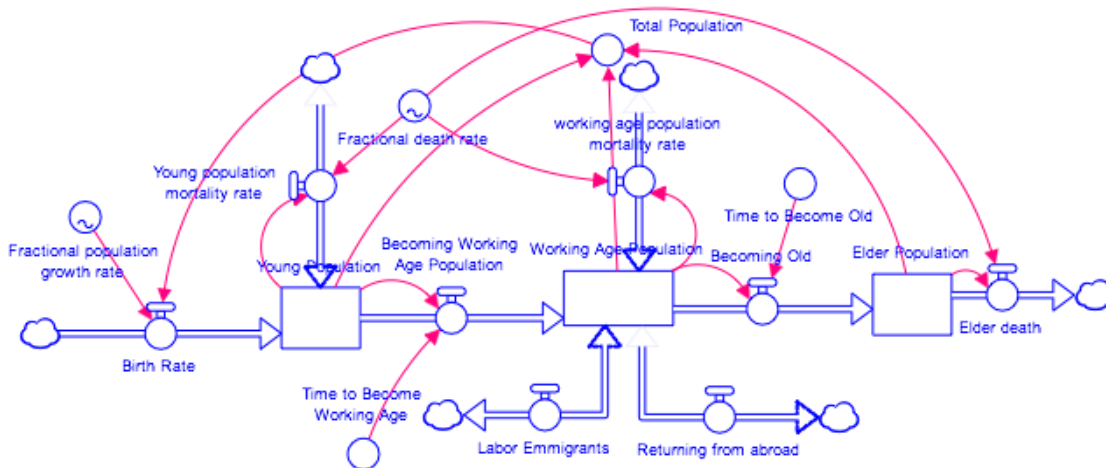
Figure 10: Stock and Flow Diagram of Population Growth Model

Figure 10 above is the stock and flow diagram of population growth. Initial values of stocks and values for exogenous variables (fractional population growth rate, fractional death rate) are taken from the data from World Bank. Ages from birth to 15 years are considered as young population, 16 years old to 65 years are working age population and elder then 65 years are elder population in the model. The reason behind considering population till 15 years as young population is in case of Nepal age requirement for citizenship card and passport is 16 years.

2. LABOR MIGRATION

Another important stock of the model is Total available labor. The main inflow for this stock is natural growth in population i.e. when young population becomes mature; they become working age population after maturation.

One of the outflows for the stock of young population (being working age population) is inflow for another stock (working age population). It is also the inflow for another stock total available workforce; as when young population matures, it automatically increases the total available workforce.

Hence,

Natural growth in labor force = Becoming working age population

Equation 1

Where, *Becoming working age population = Young population / Time to become working age population*

Equation 2

Increase in population leads to increase in total workforce. In case of Nepal job creation rate (addition in number of available job per year) is far below than increase in workforce due to population growth. When there are less available job, people tend to migrate.. In the model equation for change in unemployment rate is;

Change in unemployment rate = (Total available labor-(Employed people + Employed in subsistence farming + Unemployed people)/ Employment adjustment time

Equation 3

In Nepal, majority of the populations are engaged in agriculture, to be more specific in traditional subsistence farming. Hence, out of total working age population, most of

them follow the traditional way of employment getting engaged in agriculture. The fractional growth in people engaged in agriculture times working age population gives yearly labor inflow to agriculture, which is another stock of the model.

Similarly, portion of working age population are employed (here employed means employed in other than agriculture/subsistence farming). The growth rate in employment is determined by job creation rate due to economic growth. Furthermore, working age population who are not engaged in agriculture/subsistence farming nor employed are considered as unemployed people stock.
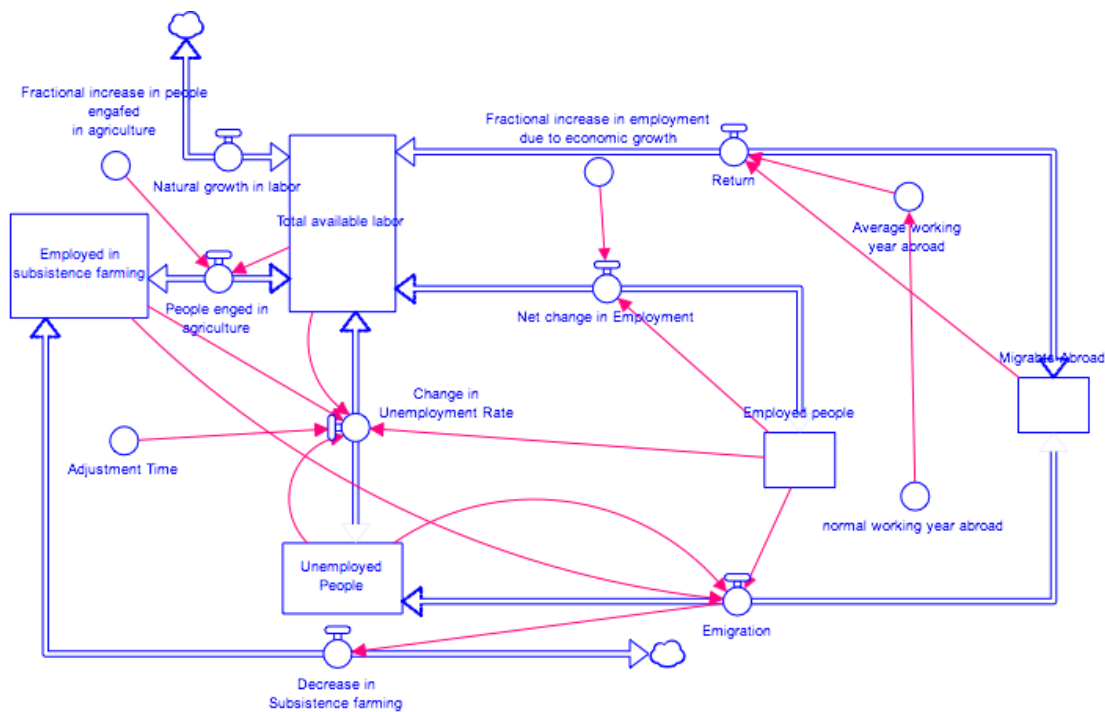

Figure 11: Stock and Flow Diagram of Labor Migration

Last but not the least Migrant abroad is another stock in this sector, which increases with emigration (inflow to stock) and decreases with returning (outflow to stock). Here most important thing to keep in mind is that, not only unemployed people are motivated to migrate but also people engaged in agriculture also. As most of the people engaged in agriculture in Nepal follow traditional way of farming and they earn even less then what they can earn if they get employed in other sectors of Nepal.

Hence,

Emigration= (People employed in subsistence farming + Employed People + Unemployed People) *Fractional emigration rate

Equation 4

30

When people emigrate from Nepal it reduces the stock of people engaged in agriculture also, as the portion of people engaged in agriculture in total potential migrant consist more than one third in case of Nepal.

3. FACTORS INFLUENCING LABOR MIGRATION DECISION

This part of the model explains factors influencing migration decisions and how it works to influence the fractional emigration rate. For this, whole sector of the model has been divided into four different sub sectors which are as follows.

Network effect

This part of the model shows how network effect is influencing Nepalese workforce to go abroad as migrant workers. Where, higher the value of Nepalese network capacity working abroad higher will be the effect on emigration decisions. Here, people need time to perceive the information they get from network. In this part, two of the variables (size of useful social network -150, and time to change perception - 1 year) used are exogenous which is totally an educated guess. Important equations in network effect part of the models are;

Nepalese network capacity working abroad / INIT Nepalese network capacity working abroad)) ^ 0.05
Equation 5

Perceived effect of social network on fractional emigration rate =SMTH1 (Effect of social network on emigration decision, Time to change perception, 1)
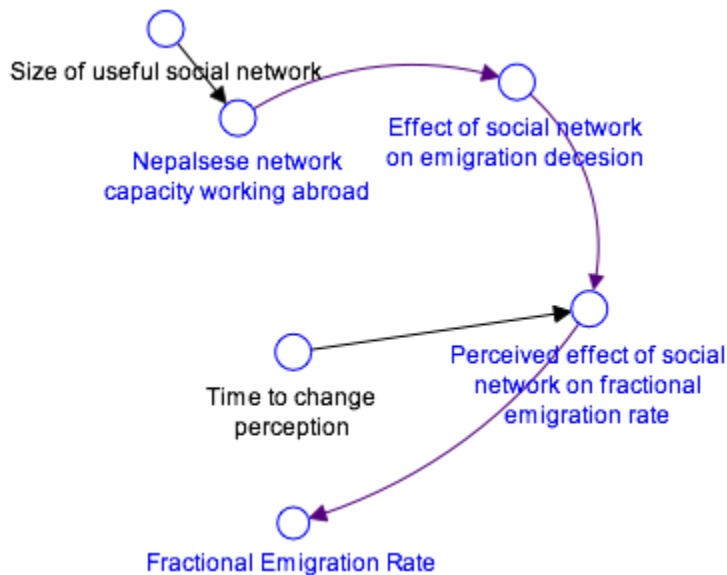*Equation 5*

Figure 12: Network effect on fractional emigration rate

Migration cost

There is always cost associated with the migration that the migrant has to bear. Here migration cost means total amount of money one spends to be a migrant worker in destination countries. Recent data shows that it cost between 1000 to 1500 USD in total for South Asian migrants worker as a migration expenses. According to report presented to annual seminar on Labor Migration, Employment and Poverty Alleviation in South Asia shows cost for migrating from Nepal is 1500 USD (Khatri, 2010).

Figure 13 explains how migration cost is influenced by social network people have in destination countries and how it influences fractional emigration rate.

More Nepalese migrant worker results in more network for Nepalese people. This helps to reduce migration cost as they receive help in migrating to destination countries.

Nepalese network capacity working abroad = Nepalese migrants worker abroad/size of useful social network

Equation 6

Higher Nepalese migrant worker working abroad means higher the social network people will have which will help to reduce the coast associated with migration. In the above equation the effect of network on migration cost is limited to the elasticity of 0.1 as social network have limited influence on migration cost.

Hence,

Effect of social network on emigration cost = (Nepalese network capacity working abroad/INIT (Nepalese network capacity working abroad)) ^0.1

Equation 7

From the average reference cost of migration and effect of social network on emigration cost, cost of migration is calculated.

Cost of emigration = Effect of social network on emigration cost*Average reference cost of Migration

Equation 8

Similarly, ratio of actual cost and average reference cost of migration is taken as relative cost of migration. If calculated cost of migration (with an effect of social network effect) is less than average cost of migration, migration cost will be lower to people which motivates people to emigrate.

Relative cost of migration = Average Reference cost of Migration /cost of Migration

Equation 9

Similarly, cost of migration is not necessarily be very important factors to all of the people who wish to emigrate abroad as migrant worker. In the model value for importance of migration cost in emigration decisions is considered as 0.2 (exogenous) which means 20% of the total migration is influenced by cost of migration.

Effect of migration cost = Relative cost of Migration / importance of cost on migration decision
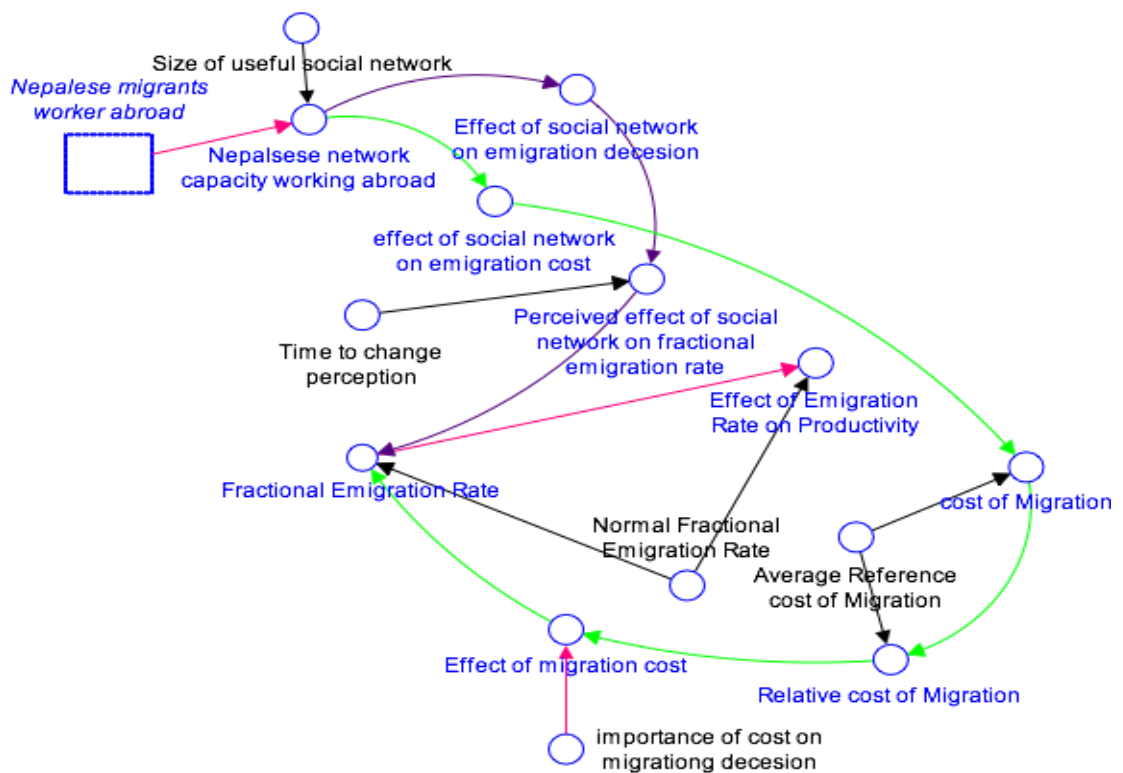
Equation 10

Figure 13: Stock and flow diagram of migration cost

In the end the effect of migration cost calculated above based on importance of cost on migration decision is multiplied with normal fractional emigration rate which influence the emigration decisions people make based on the cost.

Employment/Earning gap effect

This part of the model deals with unemployment rate in Nepal with the expected earning gap between Nepal and destination countries. Existing unemployment rate (unavailability of job) in Nepal is one of the major push factors for people to emigrate. Similarly, when people make comparison between what they exactly earning in Nepal and how much they can earn if they emigrate as migrate worker (expected earning gap) before taking migration decisions then pull factor dominates.

First of all ratios between employed and total labor gives the employment rate in Nepal. There is less chance of getting employed in Nepal due to poor availability of job hence the employment rate in Nepal is considered as expected employment probability on Nepal.

Employment rate in Nepal = Employed labor/Total available labor

Equation 11

Expected employment probability in Nepal and expected earning if employed in Nepal gives the expected earning in Nepal. Ratio between expected earning gap in Nepal and abroad and normal earning gap between Nepal and abroad gives the effect of earning gap in fractional emigration rate.

Effect of earning gap in fractional emigration rate = expected earning gap/normal earning

[7]

gap

Equation 12

---

[7]

See equations in appendix section for further details in calculation of expected earning gap and normal earning gap
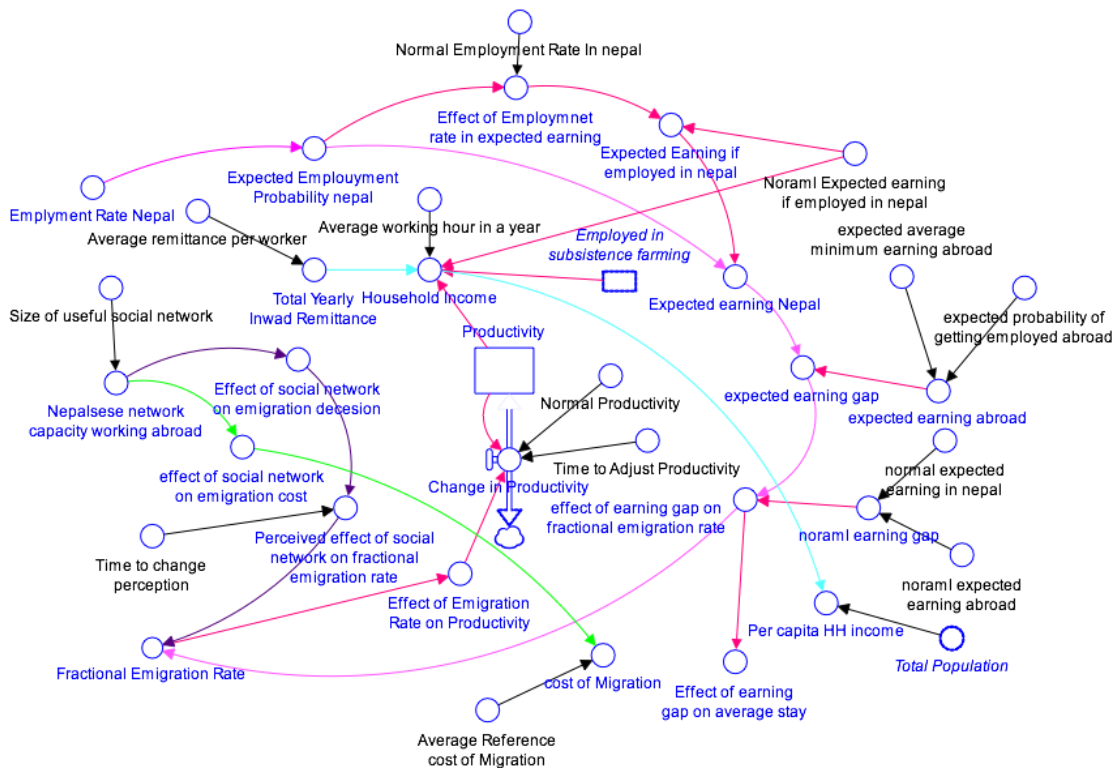
Figure 14: Stock and flow diagram for unemployment and earning gap effect

1. **Household income and poverty reduction**

This part of the model shows how remittance income is helping individual household to increase household income and the consumption pattern. Household income and consumption expenditure both are important components of the economy. Nowadays remittance income is influencing household income and expenditure in Nepal and gaining interest among policy makers. Higher the remittance income higher the household income and higher will be consumption expenditure as well.

Here,

Total household income = (Employed labor x Expected earning if employed in Nepal) + (labor productivity x labor in subsistence farming) + Total yearly inward remittance
Equation 13

Economically active Labor Marginal propensity to consume determines how much remittance income are used for consumption and saved. Similarly increased consumption leads to increase in aggregate demand, which increases investment to increase the production to support increased demand of goods and services. Higher investment leads to increase in output/production with delay. Existences of production delays obstruct the immediate increase in aggregate demand which leads to increase in import to satisfy

increased consumption. Similarly higher production requires higher workforce which ultimately increases household income and saving as well.

.

Figure 15: Stock and flow diagram of poverty and influence on emigration rate

Hence there is big reinforcing loop working to increase household income, consumption, demand, investment, output and again income. If we ignore the effect of other loop this reinforcing loop increases the economic activity and growth. We can name it as growth acceleration loop. Similarly, there is small balancing loop of depreciation which reduces the value of capital which reduces output. At the same time another reinforcing loop is working to increase the value of aggregate demand.

Similarly, cost of migration also influences the emigration decisions. When, expected earning difference between Nepal and abroad is higher it acts as one of the strong motivating factor for the people to take emigration decisions. This part of the model shows how these factors affects normal fractional emigration rate. As inward remittance is determined by number of people working abroad also along with how

2. Economic sector

Economic sector of the model starts with consumption expenditure and total production. Here, consumption expenditure is calculated on the basis of household income and marginal propensity to consume which is 0.5. Similarly, it also depends on minimum income per capita needed to fulfill basic needs which is taken USD 650 in base year. All data used in this sector for the base year 2001 is taken from World Bank country data.
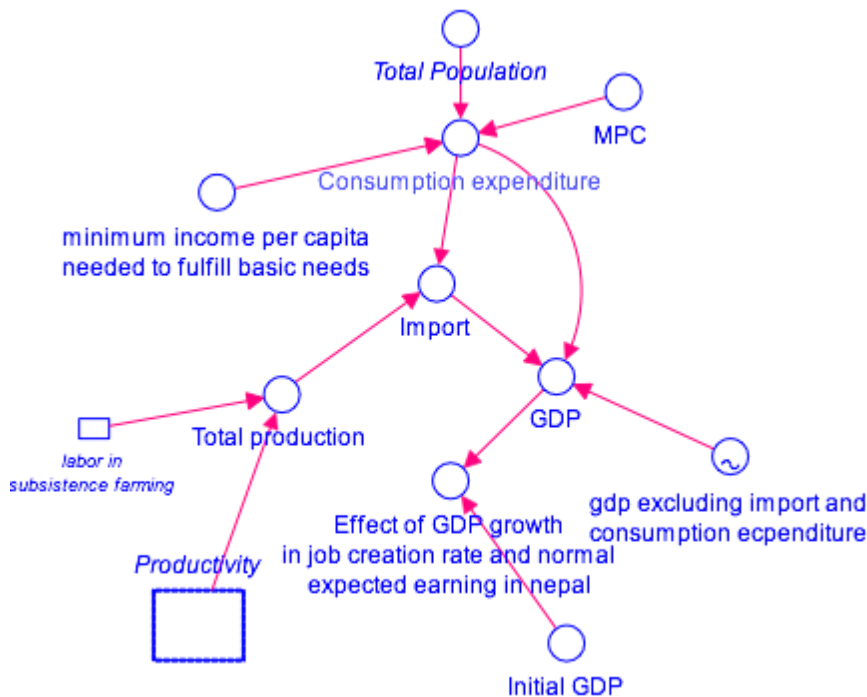

*Figure 16: Stock and flow diagram of selected economic indicator sector*

Model Behavior Analysis

Based on the developed model this part of the thesis deals with simulation result analysis of the model. However, it is very important to make sure that model is valid and runs in equilibrium. After model verification and validation simulation results of the developed model is presented in this section.

Model validity

First of all unit consistency of the model has been checked manually for all variables used in the model. All set of secondary data uses for the model are from reliable source like government report and other international development organizations like World Bank. Similarly, labor migration sector has been run into equilibrium to test the reliability of the model. Moreover, simulation result of the model follows the trend of historical data sets (Reference mode), although it does not match close because of different limitation of the model.

- **Simulation result when in equilibrium**
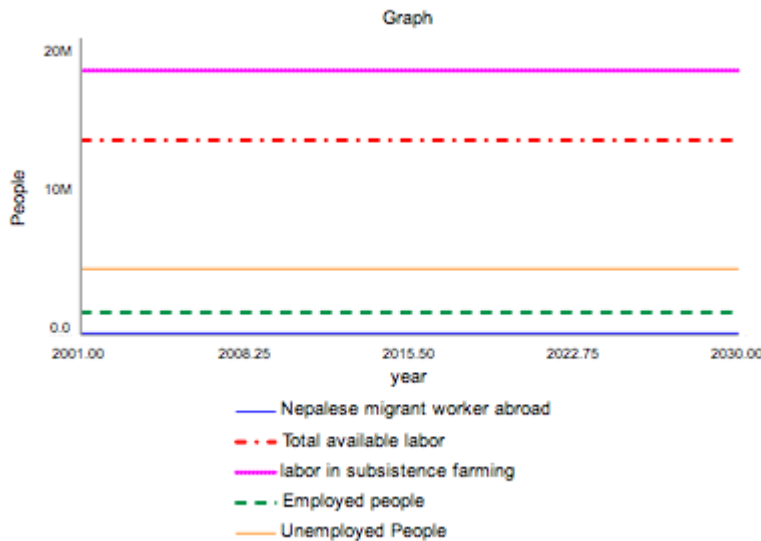
SIMULATION RESULTS, FINDINGS AND ANALYSIS

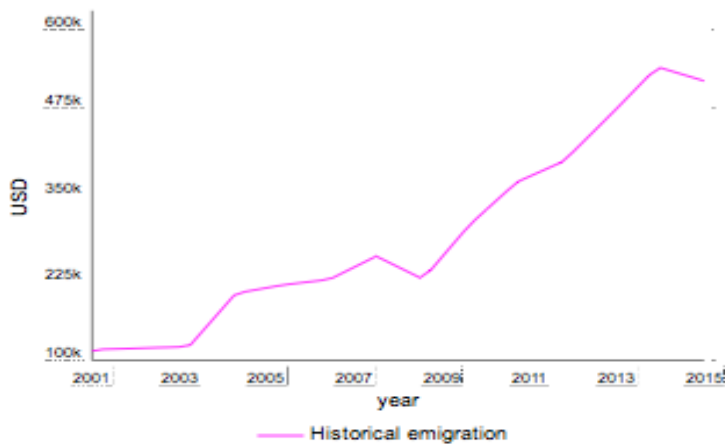### *LABOR AND POPULATION*

Labor emigration

Figure 17: Historical emigration

Figure 17 above below demonstrates the historical emigration from Nepal which is first reference mode. Recent data shows that there is increasing trend in labor emigration from Nepal. Emigration decreased couple of times during the period of 15 years, once in the year 2008 and again in 2015 which might be because of global recession in 2008 and earthquake in Nepal in 2015. In this present era of globalization economic problem faced by one part of the world defiantly affects rest of the parts. This shows that policymakers should start to think what if there is ban in labor movement from labor welcoming countries. Hence, it is very important to generate employment opportunity within the country that can reduce growing labor movement which might help the economy for sustainable development in the long run.

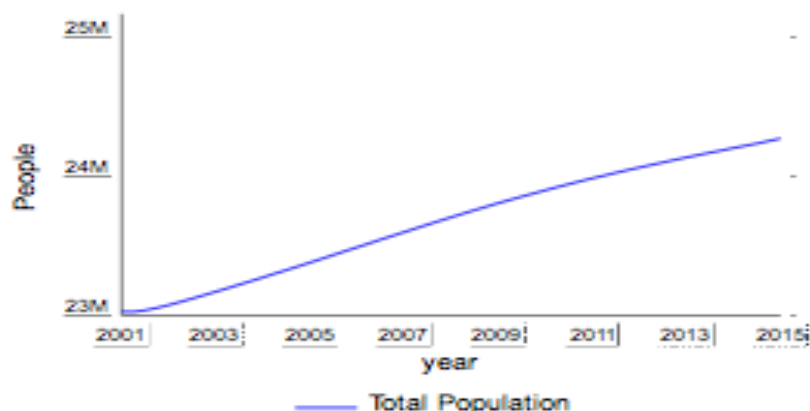**Total population and structure of population**

Figure 18: Total Population

Figure 18 shows increasing trend in total population of Nepal. Similarly figure 19 below display the different age mix on total population which reveals that the growth in elder population is higher in comparison with working age population growth. It also reveals decreasing number of young population in Nepal. Increasing migration of working age population (fertile population), enhanced knowledge and education, awareness and easy availability of contraception tools etc seems to be factor behind decreasing young age population in Nepal.
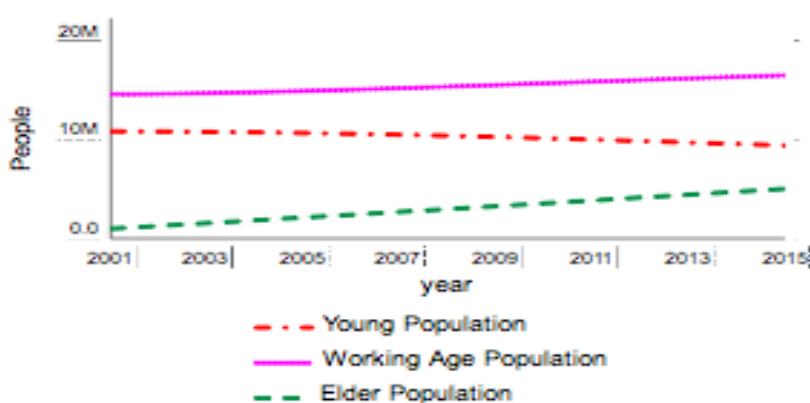

Figure 19: Structure of Population

Moreover, working age population is dominants in current population mix in Nepal, which means more available workforce in job market. If current situations of unsatisfactory economic growth, political instability, and poor job availability remain in the future too, it seems that there will be even more increasing trend in labor migration.

Comparison with reference mode

Figure 20: Comparison emigration with historical emigration (reference mode)

Similarly, figure 20 helps to make comparison of historical emigration with emigration from the simulation result generated from the developed model. Figure 17 below shows that historical emigration and emigration both are in increasing trend starting from the year 2001. However, historical emigration dropped twice throughout the period of time 2001 to 2015, in year 2009 and 2015. As discussed earlier probable reason for decreased emigration might be global economic recession and earthquake in Nepal which are both external forces and are not considered while developing the model. Increasing labor emigration from Nepal shows that, there is reinforcing loop dominating the emigration. Similarly, increasing trend in workforce entering to job market, comparatively slow growth job creation rate, higher expected earning gapare some of the major reasons for increasing labor emigration from Nepal as a migrant worker.

REMITTANCE AND ECONOMIC INDICATORS

Remittance comparison with reference mode

Figure 21: Historical personal remittance

It is well known that increasing labor migration increases the remittance they send back to their home country. Figure 21 is shows trend in historical total personal remittance received in Nepal starting from year 2001 to 2015. Trend in personal remittance matches close enough with the labor emigration in Nepal as there is linear relationship between those two. In this study average remittance per migrant worker is considered as exogenous variable as it is generated outside of Nepal.
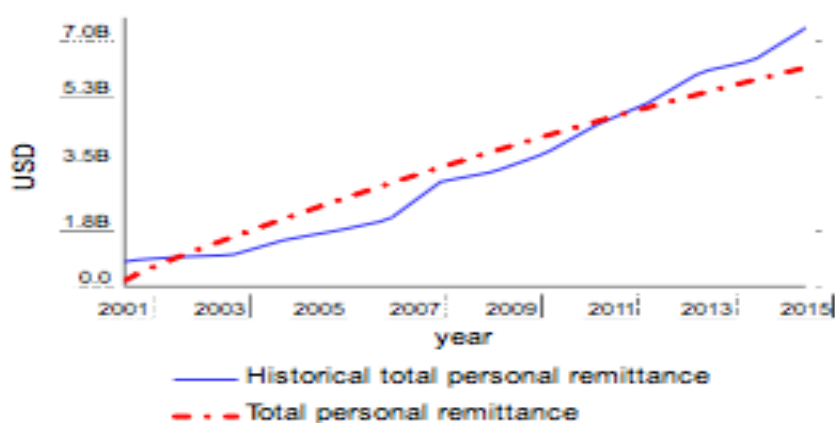

Figure 22: Comparison of total personal remittance with historical total personal (reference mode)

Similarly, figure 22 demonstrate simulation result of total personal remittance with historical time series data of total personal remittance. Historical data of the total personal remittance is the data obtained from World Bank country data and where as total per-

sonal remittance in the figure 19 is simulation result of the model. Simulation result from the model closely resembles historical data which suggest that variables taken into consideration while building model and data reflect the real world scenario. Similarly, close fit in the simulation result of labor emigration and personal remittance with that of historical data (reference mode).

Economic indicators with and without remittance

+ **Per capita household income**

Per capita household income denotes the total income earned by individual person within a year in specified place/country. In this study household income is calculated by separating it into three different aspects.

Where, total household income is sum of salary and wages, agricultural income and remittance income. After dividing total sum by total population we get per capita household income.
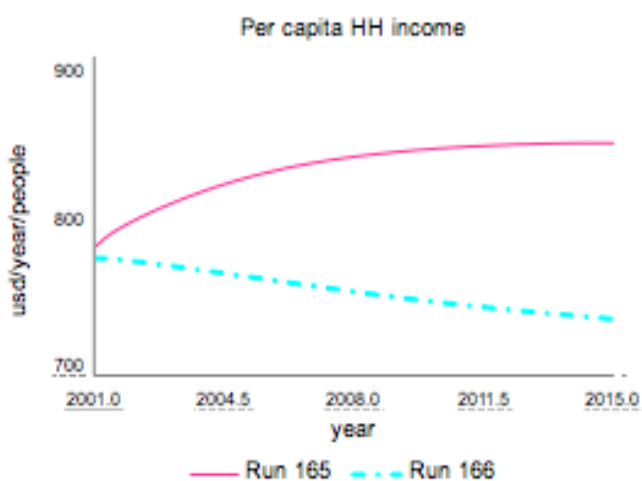

Figure 23: per capita HH income

Figure 23 above display how per capita HH income would changes over the period of time with and without remittance. Run 165 in figure 23 shows how per capita HH income actually changed over time and run 166 shows how it would changed if there were no remittance. For this, average remittance send per migrant worker abroad is set to be zero to see the result in household income. There are many other factors too influencing household income, however remittance being one of the important components of the household income helped a lot to increase household income in case of Nepal.

The results produced by the model agrees with the findings by B. Pant where he mentioned that remittances can generate a positive effect on the economy thorough various channels for example; savings, investment, consumption etc. (B. Pant, 2008). Many reports and literatures discuss that remittance affect the macro and microeconomic aspects of a country. The reports from world bank also suggests that, at household level, remittance has increased income and consumption level (Poverty Reduction and Economic Management Sector Unit, 2011).
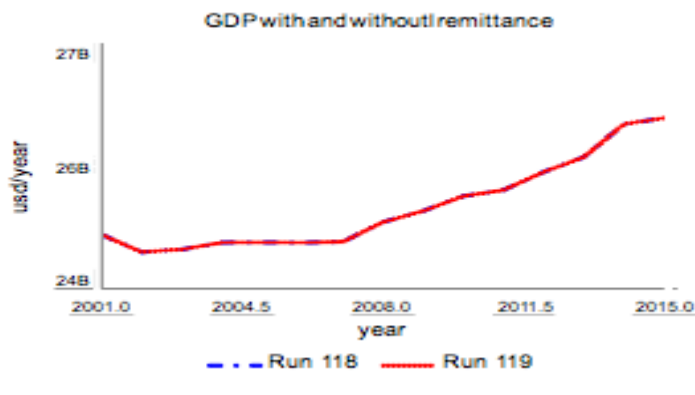
+ **Gross domestic product (GDP)**

Figure 24: GDP with and without remittance

Figure 24 shows the simulation result of the model for the variable GDP with (Run 118) and without remittance (Run 119), which indicate that there is no change in simulation result of GDP with or without remittance. In this study GDP is calculated using expenditure method of GDP calculation. For this purpose consumption expenditure and import is generated by the model indigenously and remains (government expenditure, investment and export) are taken as exogènes.

As remittance is generated outside the country and not included directly while calculating GDP might be the reason for seen no effect on simulation result. The findings from the model show that there is not effect of remittance on the GDP of Nepal. This however contradicts with some studies where studies have shown that there is influence of remittance on GDP growth as it affects consumption Sharma (2017).
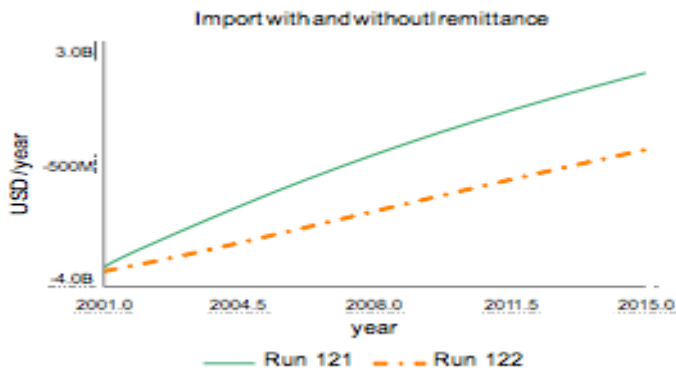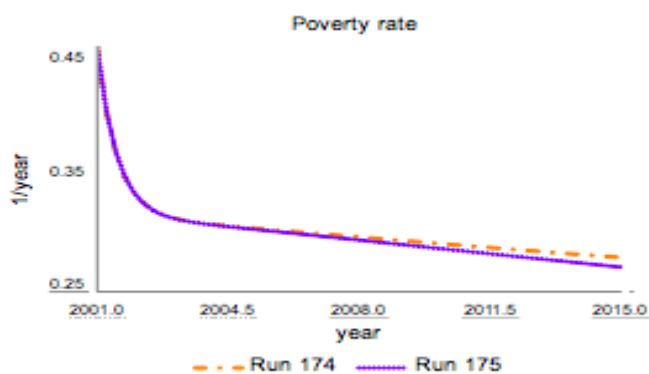
Import

Figure 25: Import with and without remittance

Figure 25 shows the simulation result of total import with (Run 121) and without remittance (Run122). Increasing household income because of remittance is increasing consumption expenditure which ultimately leads to increase import if production is lower than consumption. The simulation result suggest that remittance is key to increase the import in Nepal. It is because labor migration in one hand is reducing total agricultural production and at the same time there is increasing consumption expenditure due to remittance income.

Poverty Rate

Figure 26: poverty rate with and without remittance

Poverty reduction is still one of the important economic goals Nepal is chasing. Figure 26 shows the simulation result of poverty rate with (Run 175) and without remittance (Run 174), which demonstrate that remittance is helping to reduce the poverty rate. Simulation result shows that if there were no remittance poverty reduction rate would be slower. The findings in this section agree with studies discussed in the sections

45

above. Many studies show that one there are positive impacts of remittance on receiving countries as it helps to alleviate poverty. Ratha (2013) also argues that remittance is an anti-poverty force in countries like Nepal.

POLICY TESTING

Reference mode and simulation results of the developed model both demonstrate increasing labor emigration and increasing inward remittance inflow to Nepal. Although it seems it is helping to improve some of the economic indicators it is not helping to attain overall economic growth. To gain the more favorable effect from remittance which will also help to achieve economic growth there must be some policy intervenes to use the remittance in productive sectors. It's very important to realize that if existing structure of the labor emigration, remittance and economy continue to remain for long term the consequences might have more negative influence to the economy.

Policy option choice also depends on objective of the policy. After reviewing multiple literatures on use of remittance and its development impact Carling (2004), come up with tentative list of policy measure to enhance the development impacts of remittance.

Table 1:Alternative policy measures to enhance the development impact of remittances
Source: (Carling, 2004)

Objectives	*Measure*
Capturing a share of remittances for development purposes	➢ Taxation of emigrants ➢ Duties or levies on remittances transfers ➢ Voluntary check-off for charitable purposes (on transfer forms)
Stimulating transfers through formal channels and/or stimulating capita availability	➢ Remittance bonds ➢ Foreign currency accounts ➢ Premium interest rate accounts Promoting/enabling transfers through microfinance institutions (MFIs) ➢ Promoting financial literacy / banking the unbanked

Stimulating investment of remittances	➢ Outreach through MFI infrastructure
	➢ Outreach through migrants' service bureaus
	➢ Tax breaks on imported capital goods
	➢ SME schemes (financial, infrastructural, or innovative)
	➢ Training programmes
Outreach to migrant collectives/ Hometown associations (HTAs)1	➢ Matched funding
	➢ Public-private ventures
	➢ Competitive bidding for development projects
Influencing consumption patterns	➢ Promoting consumption of local goods and services
	➢ Enabling migrants to spend on their relatives' behalf
Securing future remittances	➢ Promoting continued migration
	➢ Promoting transnationalism / diaspora management

It is very important to know linkage between remittance use pattern and development impact to implement the best available policy to achieve the objective of the introduced policy. To test the policy option, first model is run long run till the year 2050 to check the behavior of variables taken as reference mode and key economic indicator used in the model.

Introduction of policy

To address the problem of increasing outward migration and dependency of economy on remittance policy option has been introduced here based on the developed model. Simulation behavior analysis of variables before and after introducing policy helps us

to know the effectiveness of the introduced policy to achieve desired goals. Multiplying total number of Nepalese worker working abroad and average remittance sent by individual in a year gives total inward remittance per year.
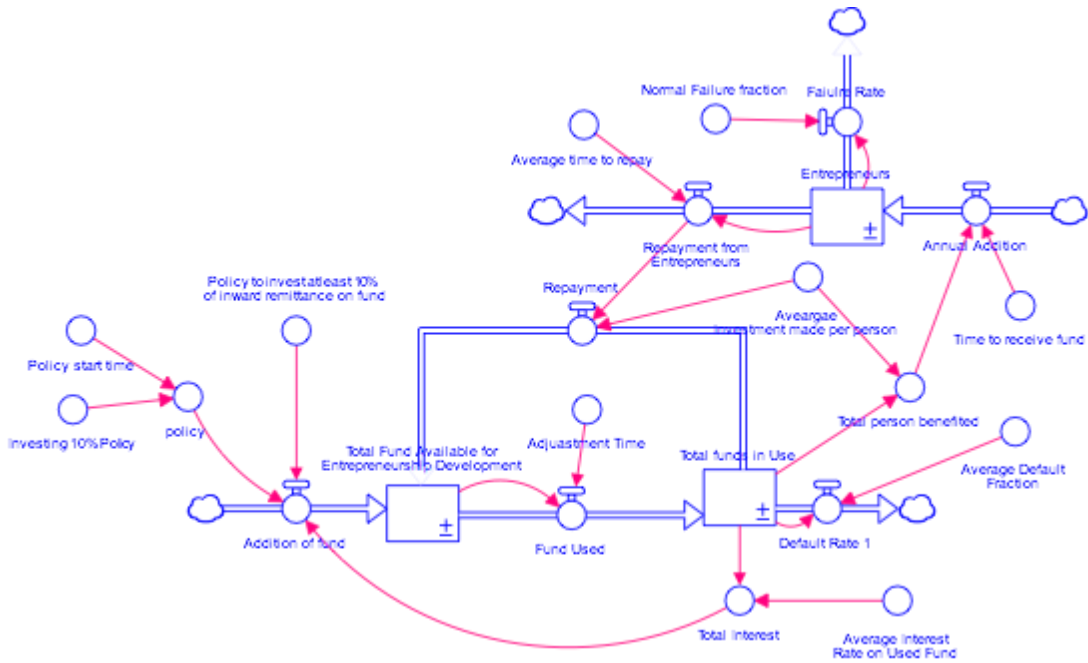

Figure 27: Stock and flow diagram of introduced policy

Total fund available for entrepreneurship development is another important stock in policy option. When government introduce the policy to invest 10% of inward remittance on government fund to promote entrepreneurship, 10 % of total inward remittance acts as one of the inflow for the stock of fund. Similarly, along with this fund collected through remittance, payback of the funds used by individuals with interest on this fund is inflow for the stock to have more coverage. Which will also added to addition of fund as an inflow, which increases the stock of fund with government.

When funds with government started to being used to promote entrepreneurship; total funds in use start to increase. So, fund being actually used from available funds is the inflow for total funds in use. At the same time, it reduced the available fund with government. Total funds used have two outflows; one of them is default rate. When people who used fund go bankrupt, they cannot pay it back. Similarly, when people using fund starts to pay it back with interest, it again accumulates available fund and reduces the funds in use.

Dividing total funds in use by average investment made per borrower/person/entrepreneur gives total number of person benefited by the funds.

49

Total number of person benefited by funds becomes entrepreneurs. Funds used by people yearly are considered as inflow for being an entrepreneur after time to receive funds. At the same time some of them might fail too, so there is failure rate as one of the outflow for stock of entrepreneurs. Similarly, after some defined time entrepreneurs who used fund to become entrepreneur starts to repay the funds used. It reduces the current number of entrepreneurs.

Analysis of behavior with and without policy option

Previous simulation results shows that remittance is helping Nepalese economy in different way. First of all 23 and figure 26 reveals it is helping to increase household income which is making people financially able to fulfill their basic needs and so reducing poverty. Similarly, figure 24 and figure 25 show that remittance is not helping GDP growth but it leads to increase in import (which might reduce GDP). To see the long term effect of remittance in the Nepalese economy developed model is run to simulation time till 2030. The simulation result till 2030 with or without policy on selected economic indicators in long is as follows;
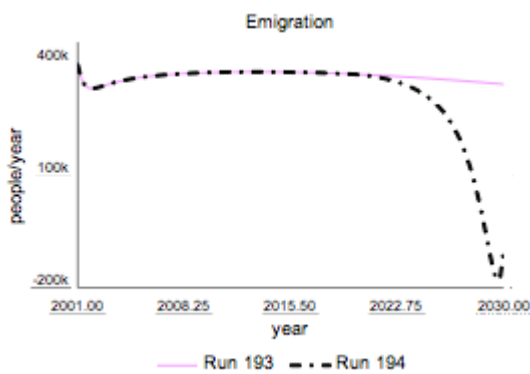

Figure 28: Emigration in long run with or without policy

Figure 28 above shows the simulation result of emigration without policy (Run193) and with policy (Run194) which reveals that introduced policy will reduce the emigration by creating more jobs in Nepal.
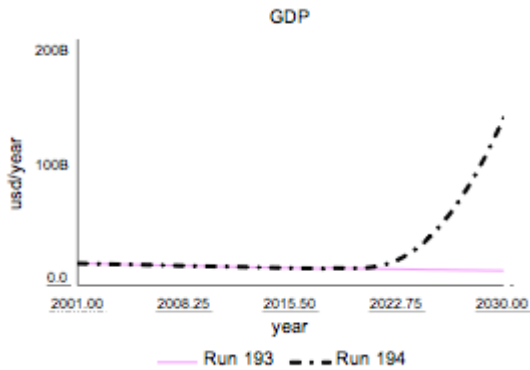
Figure 29: GDP in long run with or without policy

Figure 29 above is the simulation result of GDP without policy (Run193) and with policy (Run194) which shows GDP growth will be higher if introduced policy be implanted successfully. It's because increase in entrepreneurship have positive influence in the economy as it increases production and employment opportunity. There is reinforcing loop acting to increase the GDP, as increase in entrepreneurship increases employment opportunities and production which ultimately increases GDP in positive cycle.
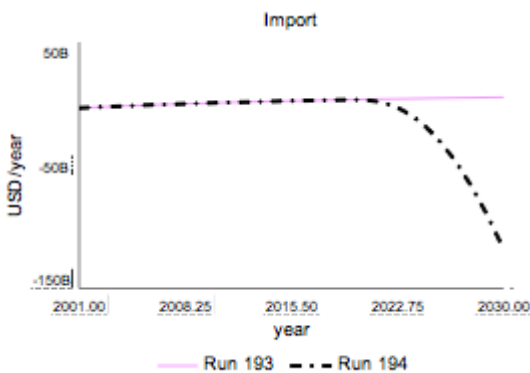

Figure 30: Import in long run with or without policy

Similarly, figure 30 above shows simulation result of import without policy (Run193) and with policy (Run194) which reveals with policy increasing import can be reduced which ultimately can increase in GDP with increasing production within country sufficient to satisfy domestic demand.
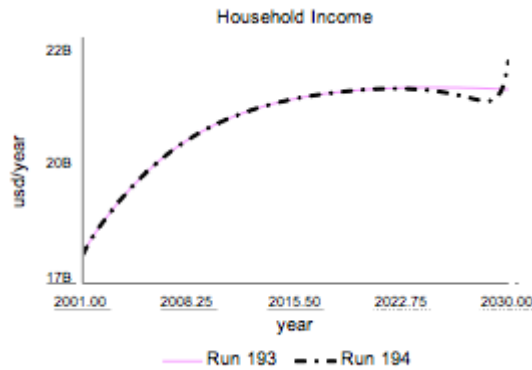
Figure 31: Household income in long run with or without policy

Figure 31 above demonstrate that there is less difference in household income without policy (Run194) and with policy (Run194) in comparison with other indicators. It's because average earning in destination countries is higher than in Nepal and it takes time to match up those earning. At the same time this figure also reveals that after year 2030 it will start to grow faster with policy.

Policy Implementation Challenges

To achieve the expected result from policy implementation in proper way plays key role. There are a lot of challenges to face while implementing policy. Following are the key implementation feasibility challenges;

Economic feasibility

In order to implement the policy, there are lots of costs associated starting with the cost of tax on the remittance as suggested by the model. Directing the fund away from current pool to a new pool for a new investment requires time and effort which affect the economic stability of the country.

Social acceptance

The policy suggested in the study might not be socially accepted in the initial implementation phase as people usually do not want to give away their hard earned earnings for government project or any other investments that they would not want. Thus, social and cultural barriers are high in Nepal, which could in turn affect the policy implementation process.

52

Opportunity cost

Implementing the policy will require a sum of capital to be invested and supported for a certain phase of time until it will turn into positively affecting the whole economy, as suggested by the study. The opportunity cost of withholding the capital could be overcomes its return if the policy does not produce results on time.

CONCLUSION AND RECOMMENDATION

There is no similarity in findings among researchers about how migration and remittance is influencing the labor sending countries. As per review of literature, what can be conclude is that international migration and remittance is influencing the structure and behavior of the economy although there is still debate on optimistic and pessimistic aspect. Based on simulation result analysis of developed system dynamics labor migration model, this study come up with the following conclusions.

1. Simulation results of the developed model of labor migration and remittance trend closely matches with historical labor migration and remittance data trend which means system dynamics approach can be used in economic policy making and forecasting.

2. Increasing labor emigration is influencing Nepalese economy by reducing agricultural production as it reduces the number of people engaged in agriculture.

3. Similarly, increasing remittance income is one of the key elements in Nepalese household income which helped Nepal in reducing poverty otherwise poverty reduction rate would be slower than actual (Sensitivity test has been conducted to know the influence of remittance income to poverty reduction, and result shows that it helped for Nepal to reduce poverty rate).

4. With increase in remittance and household income, consumption expenditure is also in increasing trend due to remittance. Result shows that which increases import as well because of lower agricultural production due to labor migration and fewer workforce available to work in agriculture.

At the same time increase in household income because of remittance leads to increases the total household consumption. Data on sector wise contribution to Nepalese economy shows that the contribution of industry is going down sharply and

Simulation result analysis of developed model matches with the finding of other similar research that supports the idea; remittance does have positive impact on economy of receiving country. For example, (B. Pant, 2008) come up with the result that suggest remittances thorough various channels like savings, investment, growth, consumption, poverty and income distribution; can have positive impact on the economy. And the simulation result of this study partly supports with previous results.

REFERENCES

Acharya, C. P., & Leon-Gonzalez, R. (2013). The impact of remittance on poverty and inequality: A micro-simulation study for Nepal. *Asian Journal of Empirical Research, 3*(9), 1061-1080.

Adams Jr, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. *Journal of development studies, 47*(6), 809-828.

Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World development, 33*(10), 1645-1669.

Ahmed, M. S. (2010). Migrant workers remittance and economic growth: evidence from Bangladesh. *ASA University Review, 4*(1), 1-13.

Airola, J. (2007). The use of remittance income in Mexico. *International Migration Review, 41*(4), 850-859.

Arnold, D. (2017). Labor migration. *The International Encyclopedia of Geography*.

Bank, T. W. (2014). Agriculture, Value added (% of GDP). Retrieved from http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS

Bank, T. W. (2016). *Migration and Remittance Factbook 2016*. Retrieved from 818 H Street NW, Washington, DC 20433: https://openknowledge.worldbank.org/bitstream/handle/10986/23743/97814648031 92.pdf

Bank, W. (2018). How do you define remittances ? Retrieved from https://datahelpdesk.worldbank.org/knowledgebase/articles/114950-how-do-you-define-remittances

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel, P. J. (2009). Do workers' remittances promote economic growth?

Bettin, G., & Zazzaro, A. (2012). Remittances and financial development: substitutes or complements in economic growth? *Bulletin of Economic Research, 64*(4), 509-536.

Bhandari, P., & Chaudhary, I. (2017). A calendar method of collecting remittance use data in a remittance dependent setting of Nepal. *Migration and Development, 6*(2), 177-197.

Buch, C. M., & Kuckulenz, A. (2004). Worker remittances and capital flows to developing countries.

Carling, J. (2004). *Policy options for increasing the benefits of remittances* Paper presented at the Remittances and Development: beyond increasing incomes

at the Ninth International Metropolis Conference, Geneva, 27/09—01/10 2004 Geneva. http://www.gdrc.org/icm/remittance/carling_benefits-remittances.pdf

Connell, J., & Conway, D. (2000). Migration and remittances in island microstates: a comparative perspective on the South Pacific and the Caribbean. *International journal of urban and regional research, 24*(1), 52-78.

Cooray, A. (2012). The impact of migrant remittances on economic growth: evidence from South Asia. *Review of International Economics, 20*(5), 985-998.

De Haas, H. (2009). Remittances and social development. *Financing Social Policy: Mobilizing Resources for Social Development*, 293-318.

Fayissa, B., & Nsiah, C. (2010). The impact of remittances on economic growth and development in Africa. *The American Economist, 55*(2), 92-103.

Government of Nepal, M. o. F. (2015). *Economic Survey*. Nepal: Government of Nepal, Ministry of Finance.

Government of Nepal, M. o. L. a. E. (2016). Labour Migration for Employment, A Status Report for Nepal: 2014/2015.

IMF. (2006).

International Labour Office, G. (2016). Promoting fair migration. *International Labour Conference, 105th Session, 2016, Report III (Part 1B)*(2016), 4.

Jongwanich, J. (2007). *Workers' remittances, economic growth and poverty in developing Asia and the Pacific countries*: United Nations Publications.

Khatri, S. K. (2010). Labor migration, employment, and poverty alleviation in South Asia. *Promoting Economic Cooperation in South Asia: Beyond SAFTA*, 231-259.

Knerr, B. (2017). International Labour Migration and Remittances in Nepal: an Overview. *International Labor Migration and Livelihood Security in Nepal: Considering the Household Level, 22*, 63.

Lartey, E. K. (2017). Exchange rate flexibility and the effect of remittances on economic growth. *Review of Development Economics, 21*(1), 103-125.

Lokshin, M., Bontch-Osmolovski, M., & Glinskaya, E. E. (2007). *Work-related migration and poverty reduction in Nepal* (Vol. 4231): World Bank Publications.

Lokshin, M., Bontch-Osmolovski, M., & Glinskaya, E. (2010). Work-Related migration and poverty reduction in Nepal. *Review of Development Economics, 14*(2), 323-332.

Martin, P. L. (2006). The trade, migration, and development nexus. *Migration, Trade, and Development*, 11.

Meyer, D., & Shera, A. (2016). The impact of remittances on economic growth: An econometric model. *EconomiA*.

Nepal, I. C. O. f. (2017). *Nepal Labor Market Update*. Retrieved from Nepal:

Olusuyi, A. E., Adedayo, A. O., Agbolade, G. B., & Ebun, A. F. Dynamic Impact of Remittance on Economic Growth in Nigeria. *Journal of Accounting and Financial Management ISSN, 3*(3), 2017.

Pant, B. (2008). Mobilizing remittances for productive use: A policy-oriented approach. *Nepal Rastra Bank, Research Department Working Paper, 4*.

Pant, D. (2017). *An analysis of the determinants of remittances and effect of remittance on expenditure behaviour and child welfare in the households of Nepal.* University of Reading.

Poverty Reduction and Economic Management Sector Unit, S. A. R., World Bank. (2011). *LARGE-SCALE MIGRATION AND REMITTANCE IN NEPAL: ISSUES, CHALLENGES, AND OPPORTUNITIES* Retrieved from

Puri, S., & Ritzema, T. (1999). *Migrant worker remittances, micro-finance and the informal economy: prospects and issues*: International Labour Office.

Ratha, D. (2013). The Impact of Remittances on Economic Growth and Poverty Reduction. (8).

Sharma, B. (2017). Socio-economic Problems of Remittance Economy: The Case of Nepal. *Journal of Advanced Management Science Vol, 5*(4).

Shrestha, B. (2008). Contribution of foreign employment and remittances to Nepalese economy. *Economic Review, 20*(1).

Shrestha, M. (2017). *The impact of large-scale migration on poverty, expenditures, and labor market outcomes in Nepal*. Retrieved from

Siddique, A., Selvanathan, E. A., & Selvanathan, S. (2012). Remittances and economic growth: empirical evidence from Bangladesh, India and Sri Lanka. *Journal of development studies, 48*(8), 1045-1062.

Taylor, E. J. (1999). The new economics of labour migration and the role of remittances in the migration process. *International migration, 37*(1), 63-88.

Termos, G. N. a. A. (2010). Remittances from GCC Countries: A Brief Outlook. *Middle East Institute*.

Tuladhar, R., Sapkota, C., & Adhikari, N. (2014). Effects of migration and remittance income on Nepal's agriculture yield.

Vargas-Silva, C., Jha, S., & Sugiyarto, G. (2009). Remittances in Asia: Implications for the fight against poverty and the pursuit of economic growth.

Walmsley, T., Aguiar, A., & Ahmed, S. A. (2017). Labour Migration and Economic Growth in East and South-East Asia. *The World Economy, 40*(1), 116-139.

APPENDIX

Model Initialization values (Base year 2001)

Model Initialization values	Values	Units	Data source
Initial Employed People	1050000	people	World Bank country data
Initial Elder Population	895069	people	World Bank country data
Initial employed people	1500000	people	World Bank country data
Initial fund available with government	1000000	USD	World Bank country data
Initial GDP	1.14E+10	USD/year	World Bank country data
Initial Migrant Abroad	100000	people	World Bank country data
Initial people engaged in agriculture	17805683	people	World Bank country data
Initial population Under Poverty	10000000	people	World Bank country data
Initial poverty rate	0.67	1/year/year	World Bank country data
Initial remittance per worker	1500	USD/year/worker	World Bank country data
Initial Unemployed people	4435227	people	World Bank country data
Initial Working Age Population	13115019	People	World Bank country data
Initial Young Population	9730823	People	World Bank country data
MPC	0.8	dmnl	Economic survey in Nepal
Normal Productivity	1000	USD/year/worker	World Bank country data
Normal expected earning abroad	8	USD/hour	Average in major destination
Normal expected earning in Nepal	2	USD/hour	Average in low and high level
normal working year abroad	8	year	Average in major destination
Size of useful social network	150	people	Assumed value
Time to Become Old	50	year	
Time to Become Working Age	15	year	
Total available labor	13115019	people	World Bank country data
Total Entrepreneurs	25000	people	Assumed value