

Identifying the Significant Public Facilities for Income Poverty Reduction in Nepal

(The Case of High and Low Caste Households in the Bidur Municipality)¹⁾

Ranamagar Udaya Bahadur²⁾

Key Words : Poverty, Public facility, High and Low Caste Households and Bidur Municipality

Abstract

Poverty is one of the most significant problems in the Bidur Municipality of Bagmati Zone in Nepal. This Municipality has a higher rate of poverty compared to the other municipalities in the Bagmati Zone. On the other hand, this Municipality suffers from poor conditions of public facilities, ultimately occurs income poverty among the poor households of both of the high and low caste households. This study identifies the significant aspects of public facilities that affect in income poverty for both of high and low caste households in the Bidur Municipality of Nepal.

Since the concept of poverty has diverse aspects which can be discussed from many angles, the per capita income has been considered for identification of the poverty conditions in the present study. Similarly, descriptive, correlation and multiple regression analysis methods have been used to identify the significant public facilities impacting on income poverty. The result of the data analysis showed that 24% and 36% of the high and low caste people are under the poverty line respectively, which is higher than the national average urban poverty of 10%. On the one hand, among the different facilities, irrigation, vocational training and working on agriculture have been found to be significant public facilities for high caste households. On the other hand, vocational training paved road, good health and education have been found to be significant facilities for the low caste. It means that among different public facilities, such as irrigation, education, vocational training, public health and paved roads are significant facilities for both of high and low caste households through which it may be able to reduce the poverty in this community. It indicates that policy guidelines targeting investment in irrigation, paved roads and vocational training could enhance access to the economic opportunities among poor people in the society.

-
- 1) This paper is one part of research paper, which has great contribution of Professors Kawamura and Obayashi from Ryukoku University, Japan ; so I would like to sincere thanks for their great full reviewers and meaningful responses on previous drafts of this paper.
 - 2) Udaya Bahadur Ranamagar is a Member of Government Service of Nepal, working as Section officer, Local Development Ministry of Nepal after graduating from the Graduate School of Economics, Ryukoku University, Kyoto, Japan.

1. Introduction

The primary goal of this study is to examine the poverty conditions related to public facilities. Specifically, this study identifies the most significant public facilities impacting on poverty reduction for high and low caste in the Bidur Municipality of Nepal. The study consists of introduction, background, research methodology, results of data analysis and finally conclusion. In order to achieve the objective, we have proceeded to carry out quantitative as well as qualitative analysis.

Nepal has faced more than a decade-long conflict until November, 2006. Despite of this, economic growth in the Fiscal Year 2010 is expected to be 3.5%. Agricultural growth has been lower than anticipated due to two major factors : low manufacturing as a result of long power outages of household's level, frequent strikes and highway blockades) and government expenditure. This is still an improvement compared to the years during conflict. Over the last decade Nepal has made considerable progress toward reducing poverty, with the headcount poverty rate falling dramatically from 42% to 31% between financial year 95/96 and 03/04. However, it has been difficult to sustain poverty reduction, because political conditions have not entirely been resolved.

The Caste System is a social division of people based on their occupation and access to power. The caste system in Nepal, with its origin in Hindu philosophy, has always prescribed then social status based on birth with Brahmin and Chettri considered as high and Shudra as low caste (highly discriminated). The higher caste representation in Bureaucracy is 83.9% and 0.3% of low caste which is a case of with higher poverty gap between the two castes, the poverty class occupies 15% for the high caste and 61% for the low caste (Lawati, 2001). It seems that the caste system is one of the causal factors for poverty and social disparity in Nepal. However the situation is not so simple as we will observe in the following survey results, there are not so small proportion of poor households in the high caste too.

Poverty is defined as lack of basic human needs, adequate and nutritious food, clothing, housing, clean water, and health services. However, this definition of poverty should include two important aspects- i) low income, which is insufficient to maintain a dignified life ; ii) low level of human capabilities, which restricts a citizen's options to lead a life of his or her choosing (NHDP, 2002). This study deals with only monetary aspects of poverty considering that non-monetary aspect is difficult to measure and demand further elaboration. Monetary poverty is measured by income, and income below the poverty line

is called income poverty.

Public facility is defined as those services provided by public as well as private sectors, which are commonly constructed for the purpose of the public use or to enhance people's well-being in the community. Fox (1994) also defines public facilities as "those services derived from the set of public works traditionally supported by the public facility to enhance private sector production and to allow for households consumption". Here, we have selected the irrigation, drinking water and sanitation, road and energy as the basic public facilities. Intensive observation shows that there are large numbers of poor households, due to limited access to public facilities such as roads, utility supply, irrigation, and water and waste disposal, transport, energy and so on.

The purpose of this research is to measure income poverty and identify the significant public facilities for reducing income poverty, in Bidur Municipality of Nepal. There are poor public facilities and higher poverty condition compared to other Municipalities of Bagmati Zone. This research hypothesizes that poor public facilities are primary causes for income poverty in the society and should be considered for analysis.

In order to achieve the objective, we use descriptive statistical methods for poverty analysis and correlation and multiple regression analyses to identify the significant public facilities causing income poverty.

Finally, this study identifies the impact of public facilities on income within the high and low caste groups and concludes with possibilities for increasing investment for public facilities and suggestions for policy in Bidur Municipality of Nepal.

2. The General Backgrounds of the Study

The caste division of people in traditional Hindu society of Nepal as Brahmins or high castes at the top as head, brain and authority of education and knowledge and Shudras or low castes at the bottom as servants or workers the toiling group of society is discriminators. The high caste people have better economic as well as social condition compared to the low caste (Including the untouchable Group) community (Lawati, 2001). The high caste groups are leading the community as well as overall nation.³⁾ The present

3) The elite Hindu caste *Bahun* and *Chhetri* and elite *Newar* (5.6% of pop.) are enjoying better access to resources. The former two groups are ruling groups whereas *Newar* community has done well in accessing resources despite facing cultural discrimination. Jointly these communities were holding more than 81.7% leadership positions in important areas of governance such as judiciary, executive, legislature, and public administration etc. in 1999 but indigenous and low caste people have limited access to these fields.

situation is going to be changed, following the advent of democracy in 1950 ; social discriminations started breaking down not because of any legal provisions but because of the high caste people's own initiatives. It seems that caste system discrimination is the root cause of poverty and social disparity in Nepal, especially, given the higher gap between the high and low caste people in the society.

On the other hand, public facility is an important tool to people's well-being and economic development. Public facilities have been found to be a major determinant of economic growth and productivity convergence across regions.⁴⁾ Public facilities are significant for poverty reduction in developing countries (Seetanah, & et.al, 2009). Several previous studies show that public facilities and poverty have a causal relationship. A number of studies point to a significant impact of public facilities on poverty reduction through economic growth.

Jacoby (1998) studies Nepal's case and discovered that extensive rural road networks resulted in substantial benefits with the poor capturing an appreciable share of benefit. However, the poor's share was often not large enough to significantly reducing income inequality as the benefits from road extension could be greater for landholders among the rich. Thus, the distribution of benefits from road extension appeared to be ambiguous. The relevant question to ask is whether the benefits of a hypothetical road project are sufficiently large and distributed to reduce overall income inequality with benefits accruing more to the poor than the non-poor. Regarding to the cost benefit ratio of road construction, the cost side is heavier than the benefit as making benefit is not financially viable in short time. However road is necessary for economic development in every country. The government should take responsibility for road construction because of the large cost involved makes it not affordable for poor people.

The research is assessing the impact of transport and energy public facilities on poverty reduction (ADB, 2004) in India and results electrification and its effects to increase farm productivity non-farm activities (this needs to be simplified). Electrification increases the flow of information to the poor in that popular participation and awareness increased due to, for instance, lighting night meetings, watching TV and soon.

According to the World Bank evaluation of rural electrification project in India and

4) According to the World Bank, the studies of the developing countries further confirm infrastructure's role in promoting growth and productivity and reducing disparities between rich and poor regions. These results suggest that the returns to infrastructure investment are probably higher during the early stages of development, in which infrastructure is scarce and basic networks are not completed. Returns on infrastructure investment tend to fall sharply sometime as the economy reaches maturity.

Bangladesh, rural electrification raises the use of irrigation, thereby significantly reducing poverty incidence (Songco, 2002). The beneficiaries were also shown by an improvement in their lives and productivity activities by lessening their vulnerability to shocks. However, the problems are not only availability, but equally distribution, as we can see this type of public facilities often more support to the elite people who are leading the society. Poor people could not benefit from those facilities due to less power. Majority of poor people still had poor housing and living conditions. According to Nepal Electricity Authority rules the poor type of house could not get electricity facility because of safety net. This shows that poor people did not get benefit from electricity due to capacity inadequacy. The electricity is important and useful for economic development and employment generation. However, poor people could not afford the facility. Hence, we concluded that electricity facility is significant to poverty reduction, but it should be supported by the social policies also.

Similarly, access to irrigation Public facilities is also an important tool for poverty reduction in the society. Irrigation facility plays a vital role for crops production and household income. In case of Janakalyan, Kalleritar and Yampaphat Villages of Nepal, after irrigation public facilities crops production suddenly increased in these villages and a better economic situation in their houses was observed (Angood & et.al, 2002). It implies that irrigation facility is one of the important tools for poverty reduction. However, the facility would be beneficial for the higher class caste of land holders, and the re-distributing of land, i.e., land reform, would be another need policy for the social fairness to the facility access.

The sanitation and drinking water are also important sectors of public facilities the World Bank's, four-country study conducted in Cambodia, Indonesia and others -2007 found the need for universal implementation of improved sanitation and hygiene as its impacts were mitigated except health service for where 45% of the losses were mitigated. The sanitation sector was contributing to generally 2% of GDP which was not small contribution in economic sector. About 80% of the population had access to safe drinking water, 39% have access to sanitation (CBS, 2003) which shows that drinking water and sanitation had poor distribution in Nepal. On the other hand, impact of sanitation in health, water resources, environment and other welfare also had strong relation with each other.

The previous study of (World Bank, 1998) in Nepal shows that poverty is one of the critical issues and it is affected from various factors. Some of the studies are focusing on the different aspects for analyzing the poverty. However, there is no any research on the

role of public facilities on poverty reduction in Bidur Municipality of Nepal and this present study will be one of the significant contributions to the community of Nepal.

3. The Statement of the Problems

At present, both developed and developing countries have given a priority to poverty alleviation and social inclusion. The difference is that developing countries have a higher degree of poverty than developed countries. Nepal, as one of the developing countries, has 31% of the population under the poverty line which is an obstacle to alleviate the poverty and social exclusion for its development endeavor.

The question is the method of distribution of public facilities in the society. Since, providing better public facilities is one of the aims of economic development. According to the Local Self Governance Act—1999 of Nepal⁵⁾; every Municipality should have essential services of public facilities such as drinking water, roads, educational institute and health facility.

Bidur is an urban city of Nepal, established in 1986. The city has 21,770 populations and has a high potential for economic growth due to the close distance to capital city, Kathmandu. Moreover, Bidur has productive land, high industrial potential growth, enough labor availability, motivated local government and private sector. In addition, it has higher potentialities for tourism industry due to historical heritage places such as Nuwakot Darabar, Vhairabi Temple, Ganesh Himalaya as well as famous worship place of Gosaikunda. In spite of the above facts, this Municipality is one of the poorest cities in the Bagmati Zone of Nepal. 15% of the population is under the poverty line and it is larger than 10% of national urban poverty. (District Profile, 2008)

This Municipality has four major castes and most of the so-called higher caste householdholds are in higher socio- economic condition than so-called lower caste people. From the general observation, it can be noticed that people in this society have been facing severe socio-economic condition than other places. The limited access to public facilities is one of the causes for income poverty in both, high and low caste households. They have small numbers of the basic public facilities, and those facilities are not enough and only a few elite people can benefit from those facilities and the rest of people are suffering from income poverty. The previous data of this Municipality show that there are numerous problems. However, the following problems have been identified as manifestation of

5) In Nepal has formulated local self governance act 1999 for mobilizing and handling the lower government of Nepal.

poverty in the Municipality.

The education standard of Bidur Municipality is lower than the national average. It has 64.9% of the population literate and the literacy level of male are 77% and female are 53% (Bidur Bulletins, 2006). It is lower than national urban literacy rate whereas total urban literacy rate is 70.2% : and out of them 80.7% are male and 59.8% female (NLSS, 2003/04). School drop out rate is also higher and it seems that education is one of the causes of poverty in this community.

28% of Bidur's land is suitable for cultivation (Bidur first period plan, 2006) however, hardly only 10% agriculture land has irrigation facility based on my observation. As lack of the irrigation facility results in insufficient productivity, large numbers of the local population have been suffering from malnutrition.

The next problem is access to energy. Only 83% of the populations have electricity facility (Bidur Bulletins, 2006). However, 38 megawatt electric power, generated inside the Municipality,⁶⁾ is not available for more than 17% of the populations. In this sense, access to electricity seems to be a problem in this community.

Similarly, there is only 18% blacktopped road out of 101 kilo meters⁷⁾ in the society (Bidur Bulletins, 2006). It is less than 30% average level of national blacktopped roads. The blacktopped road is essential for maintaining regular transportation. However, this Municipality has not enough blacktopped roads and it is one of the causes for income poverty.

The condition of health sector is also weaker in this community. There is only one district hospital and 25 other health institutes. In addition, there are only six doctors for the population of 23,000. The medical doctor/population ratio is 1 : 3833 (Bidur Bulletins, 2006) and we cannot expect good health facility in this condition. It seems that there is a great problem of health facility.

According to the above facts, people of the society seem to be suffering from serious poverty under the poor condition of public facilities. Especially people in the low caste society are badly affected due to the prevalence of poor condition.⁸⁾ Therefore, this study aims at investigating significant public facilities for poverty reduction for high and low caste households in Bidur Municipality, Nuwakot, Nepal.

6) This Municipality has two medium size hydro powers is this name of company as Trishuli Hydro Power which is generating 24 Megawatts power and Devighat Hydro Power, which is generating 14 Megawatt power.

7) Out of total length of roads, 21km blacktop, 25 semi-blacktop and 55 km earthen roads.

8) 36% of low caste people are under the poverty line which is greater than high caste poor people of 24% in Bidur Municipality. (Field Survey, 2009)

4. Objectives of the Study

The public facilities are affecting people's well-being and happiness. People's income is affected by different factors such as economic opportunity, wealth distribution, social conflict, government policy, and feudalistic land distribution. Hence, we are concerned with only public facilities as one of the explanatory variables and household income as dependent variable. So, this study is focused to analyze the impact of public facilities on poverty reduction within the high and low caste households. Identification of public facility on income poverty is the main purpose of this study.

The specific objectives of this study, basically depends on access to public facilities between the high and low caste households and to identify impact of facilities on income poverty. The public facilities have multidimensional impact on the economic condition of people ; however, specific objectives of this research are as follows :

- i. To identify those households whose income falls below the poverty line and describe their poor situation.
- ii. To identify the significant facilities with income poverty of the high and low caste households.

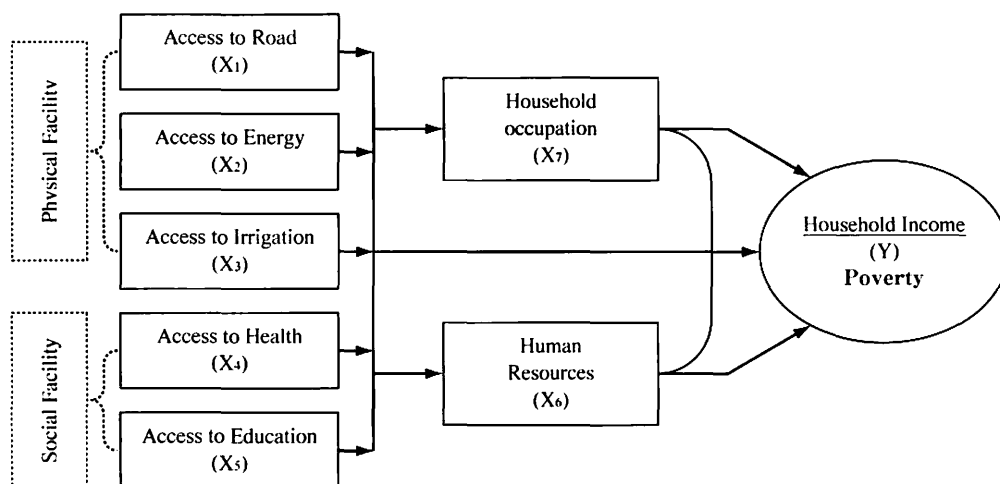
5. Theoretical Framework

As we already mentioned above, poverty is a multiple dimension issues. However, based on previous studies and observed problems in Bidur Municipality ; we have identified main problems for poverty such as road, energy, irrigation, education and health facilities. Therefore, we have divided those problems into two parts as the social public facilities as Health (X_4) and education (X_5) and physical facilities such as Road(X_1), energy (X_2) and irrigation (X_3). The household income (Y) has taken as the dependent variable. In addition, we hypothesizes that those explanatory variables create the opportunity and human resource which influences on household income and poverty. Taking those independent, intermediate and dependent variables, we have constructed the hypothetical framework, which is shown in Figure 1.

The conceptual framework considered the constraints to the household's accessibility of public facilities and to identify the impacts of those facilities on income poverty. This cause-and-effect framework has going from the left to the right of the Figure. So, the Figure is designed to be read from left to right and poverty is measured by income as a

dependent variable and other causes like physical and social facilities are independent and occupation and human resources as intermediate variables. To the left of the box Figure, causes are listed as access to irrigation (AI), energy (AE), road (AR) have taken as physical facilities for analysis.

Figure 1 Hypothetical Relationship among Independent Variables (X_{1-5}), Intermediate Variables ($X_{6\&7}$) and the Dependent Variable on Income Poverty (Y)



Our concept is that public facilities are one of the influencing factors for people's income⁹⁾ which is supported by previous research also. Down to the left of the two boxes are listed as access to education (EDU) and access to health as the social facilities. The education facility is significant for poverty reductions.¹⁰⁾ The health facility is also significant influence on income poverty.¹¹⁾ The middle of the two boxes (Human resources and occupation) is considered the intermediate variables of this framework and it is influenced by independent variables (physical and social facilities) in this model. There are two main types of causal-impact relationships (direct and indirect) to income poverty (Y).

- 9) Mr. Louis is a one of the researchers of the World Bank and according to his results ; Infrastructure facility is a key element of poverty alleviation. Its impact is felt both on the economic and social sectors. Without roads, the poor are not able to sell their output on the market. In India, roads alone account for seven percent of the growth in aggregate output of the rural areas.
- 10) The research of the world bank 1995 : 1 has shown the result of Education—especially basic (primary and lower-secondary) education—helps reduce poverty by increasing the productivity of the poor, by reducing fertility and improving health, and by equipping people with the skills they need to participate fully in economy and society.
- 11) The paper of Phipps is concluding that *reverse causation* is not a serious problem and that the main direction of influence is *from* poverty to poor(er) health. His conclusions from this body of work include the following : i) the relationship between individual income and health is non-linear. ii) Longer-term measures of average income have larger associations with health than measures of current income, which can be highly volatile.

The first one is direct causal-impact relationship between the independent and dependent variables. This direct relationship is characterized by the presence of a significant regressive correlation between the independent variables and the income poverty. The second relationship is an indirect relationship, due to the presence of what is called intermediate variables. If there is significant association between independent and intermediate variables, then indirect relationships will be observable ; which is shown in the Figure 1.

6. Research Methodology

Nepal has 58 total Municipalities and those Municipalities are representing the urban cities. However, in overall cities are not like urban cities ; they have not enough basic public facility and seem as remote village. Out of total 58 Municipalities, Bidur Municipality is one of the poor Municipalities which have 15% poverty rate (CBS, 2001) ; it has the highest poverty rate among the 9 Municipalities of Bagmati Zone of Nepal. For this reason, the Bidur Municipality has been selected for study.

Out of 11 wards, only 5 wards have been selected as sample area and 66 sample households selected for desired information from the five wards. For fulfilling the objectives of study, an intensive observation was conducted in the study area using the pre-structured questionnaire. The major part the survey (baseline survey) consisted of personal interviews from sample households. In addition, group discussions and field visits have been done to cover some qualitative data which are useful for this search.

Basically, this study has used descriptive statistics analysis ; poverty head count index, correlation and multiple regressions for the appropriate results. The Foster—Greer—Thorbecke poverty index is used to identify the poverty situation based on income. The poverty headcount index (HCI) is defined a proportion of the households are living below the poverty line it is calculated by using following formula :

$$HCI = \frac{A}{N},$$

Whereas : A=Numbers of people are below the poverty line.

N=Number of total households.

The index above was used in measuring the proportion of households whose incomes are below the \$ 1 per capita or equivalent as 70 Rupees of Nepali currency used for calculation as of poverty threshold¹²⁾ for this study.

12) A poverty threshold has been taken from the Nepal Human Development Report 2002 Published ✓

Pearson Correlation Analysis Methods have used for knowing significant with dependent variables as well as result interpretation. Basically, this method is measuring the association between two variables that estimated the direction and strength of linear relationship.

Multiple regression analysis method is constructed by a dependent variable and a set of explanatory variables to represent reality or phenomenon which can be formulated based on both theoretical framework and empirical evidence. The SMRA is used to identify the impact on poverty. So, we will use followings equation of SMRA assumption.

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu \dots\dots\dots (1.1)$$

$$X_6 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu \dots\dots\dots (1.2)$$

$$X_7 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu \dots\dots\dots (1.3)$$

Where :

Y = Predictor variables X_7 = Occupation X_6 = Skills
 β = beta coefficient μ = Error term, and $X_1, X_2, X_3, X_4,$
 & X_5 = (Road, Energy, Irrigation and Health and Education respectively)

In order to examine the hypothetical model, we have to calculate the casual relationship, hypothesis test and direct as well as indirect effects of different public facility on poverty.

7. Results and Discussions

7.1. Socio-economic Conditions of HCH and LCH

This section will be divided who two sub-sections, first we will discuss about the social conditions of high and low caste households in this Municipality. Basically this section deals with religion, demographic distribution and gender conditions between the high and low caste households.

In the second section, sources of income and the conditions of income distribution between the high and low caste household in this Municipality have discussed. For those discussions, we have used Box plot and independent sample T-test.

Bidur Municipality is an urban city but most of its economic and social characteristics are similar to the rural village. According to the survey result, we have found four major castes groups, and within four castes, more than 42 sub-caste groups. The survey area has found only two religion people. It indicates that there is short of difference of social and economic situation between the high and low castes.

by United National Development Program.

About 97% households follow the Hindu religion and the rest follow other religions. It implies that this society is not so diversified in terms of religion. Both high as well as low caste people are following same funeral culture in this society.

The average family members in the low caste household are 5.78. It is greater than national figure¹³⁾ and most of the households have 4 to 8 average family members which seem to be big family size. This is unusual condition because Nepalese government always focuses to control the population, while the result comes out as reverse. In this survey area, we have found that population is increasing until now. One interesting finding is that the average family of the high caste household is larger than low caste. Average family size of high caste has 6; it is greater than the low caste of 5.57. Generally, our assumption is that low caste people are uneducated and due to low education, they have big family size, but the result found in a reverse way.

Families of both types of castes have higher number of economically active populations¹⁴⁾ and the sex ratio is almost similar. The majority of the high caste people's age group is between 16 to 40 years and similarly in the low caste people too. One of the important messages is that both caste households have smaller numbers of youth. It means that both societies have decreasing trend of youth population. This society is dominated by male such as 51% male and 49% female which is smaller than the national figure¹⁵⁾.

Characterized by higher number of male population and patrimonial rules, this society is dominated by male whereas only 21% and 18% households are led by female in the high caste and low caste respectively. This Figure does not show a big difference but the trend of social structure seems different. The high caste females have higher education than low caste females and they have more freedom for working in different kinds of social sectors which makes it easy to become household head. However, the low caste households have difficulties to change the position of household heads due to less education as well as limited social power. The low caste female are more discriminated than the high caste female. They are bounded by two social chains with traditional caste system and gender discrimination. It is a serious and chronic problem in the low caste.

Large numbers of the economic activities are occupied by the agriculture sector. This Municipality has only small numbers of traditional handicraft industries and small scale enterprises. Therefore, there are no more employment opportunities in the society. The

13) According to Central Statistical Bureau of Nepal, 2002, National family size is only 5.5.

14) Economically active population is defined as the number of people in "active age" as 16-60 years.

15) (CBS, 2001) the proportion of Male and Female of Nepal is 0.499 : 0.501 and 2008. (Male : Female = 50 : 50)

Table 1 : Sources of Income of High and Low Caste Households in Bidur Municipality

Houshold Annual Income		High Caste		Low Caste	
		Income Rs.	Percent	Income Rs.	Percent
Agriculture	Crops	1,010,000	17	599,000	13
	Livestock	276,000	4	219,000	5
	Paid Work	50,000	2	47,000	1
Non-Agriculture	Self-Employment	1,863,000	30	1,741,000	36
	Wage Employment	2,623,000	42	858,000	20
	Remittance	120,000	2	885,000	19
	Other	255,000	3	304,000	6
Total		Rs. 6,197,000	100	Rs. 4,653,000	100
Average Annual Household Income		Rs. 179,060.61		Rs. 134,188.36	
National Annual Household Income		Rs. 328,692			
Sample size		33		33	

Note : Currency exchange rate, \$1=Rs.70 Source : Household Survey, 2009

survey result shows that 67% populations are economically active. It implies that there is labor surplus condition and they can use those surplus labor to labor markets. However ; there is no space for using those human resources properly and it is a huge burden for this Municipality because of lack of proper labor absorption. On the other hand, sources of income structure are somehow different which has shown in the Table 1.

Both caste households are deriving much of their household income from non-agricultural as well as agricultural income. The agricultural income is more common for the high caste households compared to low caste households. The income from agriculture including the crops, livestock and paid work together contribute 23% in the high caste and 18% in the low caste households. The next important income sources are non-agriculture which includes self-employment, wage employment, remittance and others. These all contribute 77% in the high and 82% in the low caste households. Overall contribution of income sources of high caste, wage employment (government and non-government job) is higher than other sources. The low caste households are relying more on self-employment and remittance is a common source of income in this community. Only 2% of income source come from remittance in the high caste which is smaller than that of the low caste (19%). The result shows that those households with members, who migrated outside the country for works, had higher income from remittance and better economic situation. However, this is a temporary source of income. It is common characteristics of Nepal that remittance contributed the huge proportion to reduce the poverty in Nepal.¹⁶⁾ The income

16) Lokshin M. and others have done the research on Work-Related Migration and Poverty Reduction in Nepal and they found that almost 20% of the decline in poverty in Nepal between 1995 and 2007

from crops production of low caste household is smaller than high caste and they depend on only temporary income sources such as remittances and others like daily wages. The average household annual income of high and low caste is Rs.179,060 and Rs.134,188 respectively. It is quite low compared to national annual average household income (Rs.328,692).¹⁷⁾ It shows that high as well as low caste societies have lower income than national average income.

The annual average household income is found Rs.30,000 and maximum Rs.492,000 overall in this society. If we observe the caste system distribution, it is slightly different between the high and low caste households. The minimum income of high caste household's have Rs 30,000 and maximum Rs 495,000, and whereas it is Rs.33,000 and Rs.322,000 in the low caste households.

Table 2 : Independent-Sample T-test of Household Income between the HCH and LCH

Descriptions	High Caste	Low Caste
Minimum	30,000	33,000
Maximum	495,000	322,000
Mean	179,060.61	134,188.79
Standard Deviation	92,032.922	71,373.79
Mean Difference	44,872.20	
t	2.21	
p-value	0.03	

*Note : N=HCH=33, LCH=33

Table 2 shows the result of independent sample T-test. The annual average income of HCH is slightly larger (Rs.179,060) than LCH (Rs.140,727) and total mean differences of income is Rs.44872.2 ; which is significantly different ($t=2.21$) ($p=0.030$) between HCH and LCH. In addition, the result shows that the income variance of HCH is higher than LCH ; which is already shown in box plot also. It means that HCH and LCH have significant different conditions of income distributions in this Municipality. Therefore, we are interested to compare between the HCH and LCH and identify the most important public facilities on income poverty within HCH and LCH in Bidur Municipality of Nepal.

7.2. The Analysis of Income Poverty between the HCH and LCH

The computation of the index incorporates that 24% of the high caste households are

↘ 2004 can be attributed to increased migration and remittances. Two-thirds of this decline can be explained by the higher number of the would-be poor among the households with international migrants.

17) The household annual income collected from the sample household survey undertaken by Nepal Rastra Bank (the central Bank of Nepal) during the (2005-2006) and based on that they have calculated the average household average income of Nepal.

poor. The Table 3 : shows that even high caste households also have higher poverty than national Figure.¹⁸⁾ It implied that even high caste households also suffered from poverty compared to national poverty. It indicates that even high caste people are not economically secured and they are also deprived of poverty even proportion of the poor are smaller than low caste households.

Table 3 : Poverty Condition in the High and Low Caste

Caste	Poor	Non-poor	Poverty Gap
High People	0.24	0.76	0.07
Low People	0.36	0.64	0.14

Secondly, 36% of low caste households are under the poverty line, which is higher than national urban poverty (Urban poverty rate of 10%) of low caste and the national poverty head count index of low caste is 65% to 68%. It means that, HCI of low caste of this Municipality had a little better situation than national low caste people. Compared to high caste as well as overall poverty head count index of Nepal, it is much greater than the national level.

The high caste people had better economic situations compared to the low caste households even though high caste economic situation is not better than the national poverty situation. It means that, the high caste people also have been suffered from poverty even though the proportions of poverty are different. Low caste people are highly suffered than the high caste people of this community.

The poverty gap indices of high caste poor households have only 0.078 whereas national poverty gap is 0.12 (Economic Survey, 2008/09). The income is more evenly distributed than the mean. The poor households are very close to the poverty line. This is a useful tool for knowing the gap among the poor and what volume of resource is needed to bring these household closer to the poverty line or above it. The results for the incidence of poor income are close to poverty line in the high caste people.

The poverty gap indices of LCH people are 0.14 it is large than national poverty gap. It implies that low caste poor households are more severely affected compared to high caste poor. The distribution of income among the poor people is not even and the poor have higher gap from the poverty line. According to the result of poverty gap index, the low caste poor households are in more severe situation than HCH poor. Most of the poor households are involved in paid worker in agriculture sector and those works are

18) The national urban poverty head count index=10% in Nepal and this Bidur has 15%. (National Census, 2001)

temporary in nature. Therefore, they have to do more struggle for survival in the community than HCH people.

The result of those gaps is not so big ; however, the situation of the low caste poor community seems serious. They have not enough food production even for three months within a year. Majority of the family members are working in agriculture sector though most of the poor from LCH have not own agricultural land for farming. They depend on only in paid works in agriculture. Those works do not generate sufficient income so that the condition of these poor is yet to be uplifted. One of the salient features of the LCH people is that low castes are generally allowed to perform undesirable and low-paying jobs ; therefore they are living in serious condition.

7.3. Identifying Significant Public Facilities on Poverty Reduction in the High Caste HH (cf.p17)

Initially, we have collected 41 different explanatory variables and after, running the correlation, we have identified that 9 variables are significant with dependent variables. Accordance to Model equation (1.1) $Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu$ for identifying the impact of public facility on income poverty, we have used only 9 independent variable and one household income as dependent variable, which is associate each other. The result showed that, three variables are significant as namely working on agriculture (OCC-1), canal irrigation (AI-1), and vocational training (HR-1). It means that this model of null hypothesis (H_{01}) is rejected at the significance level of $p \leq 0.1$. In order to get the multiple regression results, $R^2 = 0.48$ or it can be explained 48% of poverty situations.

Based on the model equation (1.2), two variables are significant and Null Hypothesis is rejected or at least one variable had significant with poverty through the intermediate dimension. In order to see the model (1.2), access to canal (AI-1) and Household education (EDU-1) are significant with vocational training. This model could explain 33% of poverty situation however ; model equation (1.3) is not significant. According to two models, four variables had found to be significant as directly as indirectly which is discussed as follow :

Firstly, in order to use the model equation 1.1, vocational training had higher beta coefficient among the significant variables, it is giving direct positive impact on 'household income' in model Figure 5.1 with $\beta = 0.443$. Some possible interpretations could be drawn as households that had vocational training had 0.44% higher income and their situation has turned out to be better. If we observed the unstandardized data, which household had vocational training, had Rs.83,406 higher annual incomes than others. This is a natural

Table 4 : Structural Causal Relationship of the Intermediate and Independent Variables to the Poverty

Variables	Code	Dependent	Intermediate		Indirect Impact	Direct & Indirect Impact
		Income	(HR-1) ¹	(OCC1) ²		
Vocational training	HR-1	0.443				0.443
Working on Agricultural	OCC-1	-0.252				-0.252
Canal irrigation	AI-2	0.398	0.311	—	0.140	0.538
Household education	EDU-1	—	0.409	—	0.180	0.180
Significant Variables		3	2	—	—	—
R ²		48%	33%	—	—	—

Note : —1. $X_6 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$

2. $X_7 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$

3. Third column is significant ($\alpha=.10$) standardized linear regression coefficients (β) of all variables on Poverty.

4. R² means model explain the poverty situation in the community.

4. Indirect Effect is calculated based on $=\beta_{AI,HR} * \beta_{HR,Y}$ and $\beta_{AI,HR} * \beta_{HR,Y}$

phenomenon ; higher vocational training is producing higher income in this society. Most of the households that had vocational training ; had more work and better economic situations and could easily succeed to escape from the poverty.

The second important variable has been selected as access to canal irrigation system (AI-2). It had second higher beta coefficient than other variables. Based on these results, statistically we may say that agriculture lands having canal irrigation system have higher possibility of higher income than others. The result is telling us that access to canal irrigation system is giving positive impact as ($\beta=0.398$) on household income or which has access to canal irrigation, they have Rs.73,776 higher annual income compared to others. It implied that access to canal irrigation system is having positive impact on the household income. Therefore, we may argue that, access to canal irrigation system in these agriculture lands is considerably variable than the other variables for improving household incomes. It had higher possibility to reduce the poverty in the society.

The third important variable is working in agriculture (OCC-1), which had significant direct negative impact on household income with $\beta=-0.252$. Generally, these are not natural findings ; however this is a true phenomenon in terms of national trend of Nepal.¹⁹⁾ Those households ; which are employed in agriculture sector ; had less annual income than

19) See the report of World Bank, The poorest households in Nepal are those headed by agricultural wage laborers : The second poorest group comprises households headed by someone who is self-employed in agriculture sectors. Poverty in this group declined from 43 percent in 1995-96 to 33 percent in 2003-04. Poverty declined even more for households whose heads were self-employed in trade (a decline of 66 percent) or services (decline of 43 percent). The incidence of poverty was relatively low for these groups (11 percent in trade and 14 percent in services) in 2003-04. The lowest incidence of poverty in 2003-04 was in households headed by wage-earning professionals (2.1 percent) or by the unemployed (2.9 percent).

others. It means that there were negative impact of working on agriculture field on household income as ($\beta = -.252$) which suggest that working on agriculture sector is not efficient for poverty reduction in the society. This is happening in this society because they have average 8 Ropanee (1 Ropanee = 5476 Square foot) agricultural lands ; however, most of the households are not intensely devoted to agriculture sector due to the lack of modern irrigation system. Another cause is that most of young people do not like to work in the agriculture sector. Therefore, agricultural labor is not sufficient in the society. It means agriculture labor is costly and cost of agricultural production is increased and that costly agricultural products cannot compete with outsider agriculture products. Moreover, they do not have enough government subsidies in the agriculture so ; this is one reason for the low productivity.

Table 5 : Economic Condition of Employed on Agriculture Sector Households

Economic Condition	Less than-50% FM	Over than 50% FM	Total
Non-poor Household	80%	20%	100%
Poor Household	36%	64%	100%

*. FM= Family Members *. Poor household Calculate based on \$1 per Capita

The Table 5 ; shows that, out of the poor households, 64% households are poor even though they have more than 50% family members employed in agriculture. On the other hand, there are 36% poor who have less than 50% family members employed in the agriculture sector. It is telling that higher numbers of family members working in agricultural sector has higher possibility of lower income and poverty. It proved that this finding is true and employed on agricultural sector is not attractive and who employed in agriculture, those houses are poor. We know that agriculture work is essential for poverty reduction ; however ; without irrigation and agro-technology, working in the agricultural sector is not effective for poverty reduction in this community.

According to the model equation 1.2 ; two independent variables are significant ; namely canal irrigation (A1) and household education (EDU) sent their significant indirect impact on dependent variable : “household income” through vocational training variables positively.

Household education (EDU-1) sends its significant indirect positive impact on the household income through vocational training. It is telling that household education is also significant for poverty reduction. Household education increased 18% of household through the vocational training. This is natural findings for this society, as most of educated family members have different types of vocational training which is creating the job opportunity and better economic situation.

Table 6 : Indirect Impact of Public Facilities on Household Income

Independent Variable	Intermediate	Dependent	Indirect Impact
	Vocational Training (HR-1)	Income(Y)	
Canal Irrigation (AI)	0.311	0.140	0.140
Household Education (EDU-1)	0.443	0.180	0.180

Note : —The significant level as ($\alpha=.10$) standardized linear regression coefficients (β)

—Indirect impact is calculated based on $=\beta_{AI,HR} * \beta_{HR,Y}$ and $\beta_{AI,HR} * \beta_{HR,Y}$

Those households which had canal irrigation facility had 14% higher income than those not having through the vocational training. It means those households with canal irrigation ; had 31% higher possibility of vocational training and increased 14% of household income and better economic situation in their household.

7.4. Identifying Significant public Facilities for Income poverty Reduction in the

Low Caste Households

Using the same consideration for low the caste groups also, we have found that three variables are significant based on the model equation (1.1), among the nine intermediate and independent variables, only 3 variables provide significant at the ($p \leq 0.1$), three variables have significant coefficients to the dependent variable. These three important variables are distance to Paved Road (AR-1), Vocational Training (HR-1) and Households Education (EDU-1).

According to the model equation-1.2, we have found two variables are significant with vocational trainings ; namely, household education (EDU-1) and health condition. This is giving positive impact on vocational trainings and this model can explain as 48% poverty conditions of the low caste in the Bidur Municipality. Similarly, occupation dimension had no variable significant with household's income ; so we have not used Model-equation (1.3) in this study.

According to two model equation, we have found four variables are significant on household income with direct as well as indirectly in low caste community. Those significant variables are discussed as follow :

First important variable is access to paved Road (AR-1) with beta coefficient as -0.471 . It has beta coefficient on poverty and is significant and fairly stable across specifications. It is giving negative direct impact on household income. To have an idea of the magnitude of these results, we note that distance to paved road is decreasing 0.471 of household income. If we look at the unstandardized data, one kilometer distance to paved road is Rs.104,666 differences of household income which is true in case of overall

Table 7 : Structural Causal Relationship of the Intermediate and Independent Variables to the Poverty

Significant Variables	Code	Dependent	Intermediate		Indirect	Direct & Indirect
		H. Income	(HR-1) ¹	(HR-2) ²		
Non-agriculture work	OCC-1	—				
Vocational training	HR-1	0.327				0.327
Distance to paved Road	AR-1	-0.471	—			-0.471
Health Condition	AH-1	—	0.315		0.102	0.102
Household education	EDI-1	0.249	0.373		0.120	0.390
Significant variables		3	2	—		
R ²		65%	46%	—		

Note : — 1 & 2. $X_6 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$

3. $X_7 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mu$

4. Third column is the significant ($\alpha=.10$) standardized linear regression coefficients (β) of all intermediate & independent on Poverty.

5. R² means model explain the poverty situation in the community.

7. Indirect Effect is calculated based on $=\beta_{AH,HR} * \beta_{HR,Y}$ and $\beta_{EDU,HR} * \beta_{HR,Y}$

condition of Nepal also.²⁰⁾ It implies that higher distance to paved road is one of the important causes of poverty in the low caste society.

The road is an important development tool, however ; only paved road has regular transportation service which is creating different economic opportunity in this community. There are almost 48% low caste households having access to paved road and out of them 63% households are succeeded to escape from the poverty. It also implies that, paved road is playing a vital role for poverty reduction. However, access to earth road is not significant for poverty reduction in the low caste groups.

The second important variable is vocational trainings in the household (HR-1), which has significant direct positive impact on household income with $\beta=0.327$ based on model Figure 5.2. Those households which have higher number of vocational training, they have 33% higher income as compared to those who do not have. The vocational training is essential factor to increase the household income which has beta coefficient as ($\beta=0.327$).

This is a common phenomenon and many previous researches proved that phenomena, this is common in this society too. Statistically, those households which have higher number of vocational training, they have better economic situation. Obviously, vocational

20) To see the report of world Bank : the regression results explaining the difference in travel time between 1995-96 and 2003-04 find that initial travel time is negative and statistically highly significant in determining where new roads and facilities are placed. In other words, facilities and infrastructure were targeted to areas that were underserved in 1995-96. To the extent that greater inaccessibility to these facilities reduces people's standard of living, this placement pattern suggests some pro-poor targeting.

training is important for skill development and skilled manpower is wealth of any origination. They can produce money using their capacity in their organization.

Third, important variable is household education (EDU-1). It has significant beta coefficient as ($\beta = 0.249$). It has positive impact toward the household income : and selected as important. It means that household education increases 25% of annual income in their households or one year household education is creating Rs.8115 different annual income in their households. However, education is not so much common in the low caste groups. Unfortunately, there are 42% people under the illiteracy level because of the reasons that most of the households are under the poverty level. Education is essential for income generating and poverty reduction especially for low caste household in this society.

Based on the model equation 1.2 : two variables have been found significant ; namely household education (EDU-1) and health condition (AH-1) sent their significant indirect impact on dependent variable : “household income— through vocational training variables positively. One year household education is increased 12% of household income through the vocational training. Those who had higher education receive higher vocational training and higher possibility of jobs or they have more potentiality to start their own business : and then they could easily escape from the income poverty in the society.

Table 8 : Indirect Impact of Public Facilities on Dependent Variable (Household Income)

Independent Variable	Intermediate	Dependent	Indirect Impact
	Vocational Training (HR-1)	Income (Y)	
Health Condition (AH-1)	0.315	0.103	0.103
Household Education (EDU-1)	0.373	0.122	0.122

Note : —The significant level as ($\alpha = .10$) standardized linear regression coefficients (β),

—Indirect impact is calculated based on $= \beta_{AH,HR} * \beta_{HR,Y}$ and $\beta_{EDU,HR} * \beta_{HR,Y}$

Theoretically, good health is essential for poverty reduction. This study found that health is an important tool for poverty reduction in the households ; but not directly. The good health condition is significant selected for poverty reduction in this society through the vocational training. The result shows us that those houses who have good health condition possesses 37% higher possibility of increasing vocational training, and finally 12% possibility to reduce the poverty. This is a true phenomenon that, good health is generating higher income and better economic situation. Most of the low caste households are not considered enough to health and get affected by different disease. This ultimately impacts to the human resources manpower and they have to live under the poverty situation. Most of the households have no adequate sanitation and hygienic practices

among them which also leads to illness. Moreover, they have no adequate shelter and it creates them to be susceptible to disease. Without decent protection, many of the poor are exposed to severe and dangerous weather as well as to bacteria and viruses carried by other people and animals. In those conditions, they could not bear the costs of treatment and they are suffering from diseases.

8. Conclusion and Policy Recommendations

According to the statistical results, there are still 24 and 36 percent households under the poverty line in the high and low caste respectively. Similarly, the poverty gap for high caste poor people is 0.07 and 0.14 for low caste poor, which is showed the serious problems of poverty in high and low caste. However, the degree of prevailing in low caste is higher than high caste.

The result of multiple regression analysis showed that, canal irrigation and vocational training, education and working on agriculture variables are found the significant on household income in the high caste households. It means that those significant public facilities are playing the vital role for poverty reduction in the high caste family.

Similarly, the results of multiple regressions of low caste showed that based on two models, four variables are significant on household income, namely, distance to paved road, education, good health and vocational training. It means those variables are helpful for poverty reduction in low caste households.

Therefore, the distribution policy of public facilities should have equal between the high and low caste which can support to reduce income poverty in both caste households.

Hence, while making investment ; priority should be given to paved road, education, vocational training and health facility for poor households in low caste, and canal irrigation, vocational training, agriculture incentive and education for poor households in high caste which are significant for poverty reduction. This should be reflected in the annual plans and budgets of local governments.

Moreover, investment policy should support and encourage both domestic as well as foreign investments in community level road, education, vocational training, health and irrigation facilities which is helpful for income poverty reduction in the high as well low caste household in Bidur Municipality. Investment policy should be more flexible and favorable for investment in those public facilities, which is significant for poverty reduction. Land redistribution policy also should be necessary for poverty reduction in this municipality.

References

- Angood C. F. C., Hasnip N, Morrison, J. & HR, W. (2002). The Contribution of Irrigation to Sustaining Rural Livelihoods : Nepal Case study : DFID.
- Bennett, L. (2004). Poverty and Caste-based Social Exclusion in Nepal, paper presented in the international consultation on Caste based Discrimination in Kathmandu.
- Bhatta, S. D., & Sharma, S. K. (2006). Determinants and Consequences of Chronic and Transient Poverty in Nepal. [Working Paper 66].
- CBS. (2004). Nepal Living Standards Survey.
- CBS. (2008). Fourth Householdsholds Budget Survey of Nepal.
- CBS. (2009). District profile of Nepal.
- Census. (2002). National Census Figure of Nepal.
- Cook, C. C., Dunca, T. Jitsuchon, S., Sharma, A., & Guobao, W. (2005). Assessing the impact of transport and energy public facilities on poverty reduction published by ADB.
- Cook, C. C., Duncan, T., Jitsuchon, S., Sharma, A., & Guobao, W. (2004). Assessing the Impact of Transportation and Energy Public facilities on Poverty Reduction.
- Ifzal, A. & Ernesto, M. P. (2003). "Public facilities and Poverty Reduction" What is Connection? ERD Policy Brief Series, 13.
- Jacoby, H. G. (1998). Access to Markets and the Benefits of Rural Roads : A Nonparametric Approach.
- Kawamura, Y. (2002). Research paper of "Role of Social Statistic Analysis in Participatory Rural Community Development Programs for Poverty Alleviation", Case of a JICA Project in South Sulawesi, Indonesia.
- Municipality Bulletin. (2006). Published by Bidur Municipality of Nepal.
- Nepal, Act. (1999). Local Self Governance Act of Nepal.
- NPC, (2003). Joint Staff Assessment of the Poverty Reduction Strategy Paper of Nepal.
- NPC. (2007). Poverty Reduction Strategy Paper Progress Report of Nepal.
- NPC. (2001). Tenth National Plan of Nepal Published by National Planning Commission.
- Rajarshi, M. (2003). Infrastructural Facilities in India : District level Availability Index.
- Salim, A. & Others. (2007). Education and Poverty Reduction Strategies : Issues of Policy Coherence Research Council (HSRC), 5-No-2(June 2007).
- Sen, A. (1999). Development as Freedom : United States in Anchor Books, a division of Random Households, Inc., New York and Canada by Random households of Canada Limited, Toronto.
- Simth. L. E. D. (June 2004). Assessment of the Contribution of Irrigation to Poverty Reduction and Sustainable Livelihoods ; Water Resources Development, 20, No. 2, 243-257.
- Smith, E. D. (2004). Assessment of the Contribution of Irrigation to Poverty Reduction and Sustainable Livelihoods.
- Tadoro & Smith, (2007). Economics of Development (8 ed.).
- Tilak, P. & Jandhyala. (2005). Post-elementary Education, Poverty and Development in India ; National Institute of Educational Planning and Administration.
- Tiwari, B. N. (2009). Human Development Report by UNDP.
- Walle, D. (1996). Public facilities and Poverty in Viet Nam ; PTBL : LSMS working paper ; 121, PUB : Washington, D.C : World Bank.

(Received September 21, 2011)