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Urban Externalities in the Small Developing Countries of Asia and Latin America: A Comparative Case Study Analysis of Squatter Settlements in Nepal (Kathmandu) and Ecuador (Quito)

Shiva Raj Adhikari
Institute for Nepal Environment and Health System, Nepal
Damodar Regmi
Government of Nepal
Vanessa Pinto
CIUDAD, Ecuador

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ABSTRACT

Rapid urbanization has led to a spurt in the number of squatter settlements. Though squatter settlements contribute to a city's economy, these unorganized settlements produce negative externalities. Addressing this situation is a conundrum for policy makers - they aim for developing their cities with minimizing the negative externalities. The study provides a fresh look at negative externalities of squatter settlements in the process of urbanization. The proposed study is undergone in Kathmandu, Nepal and the similar city of Quito, Ecuador; the study focuses on obtaining cross cutting comparative insights on their squatter settlements. The study seeks to measure the incidence and intensity of externalities, and willingness to pay to avoid the negative externalities by utilizing recently collecting data from primary sources in Kathmandu and Quito. Incidence and intensity of externalities are found higher in Kathmandu than Quito. The household will gain the net benefits of an average of $41.29 per year in Kathmandu and of an average of $255 per year in Quito. Similarly, total societal benefits will be $16.41 million for Kathmandu and $1,409 million in Quito. The intervention related to education, awareness and counseling can significantly reduce the possible negative externalities in the squatter settlements.

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Acronyms

BG	Bidding Game
CBS	Central Bureau of Statistics
CV	Contingent Valuation
DC	Discrete Choice
FC	Not Sufficient Food Consumption
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GNI	Gross National Income
HE	Highest Education In The Household
HH	Household
HI	Household Income
NGO	Non - Government Organization
NSS	Non- Squatter Settlements
OLS	Ordinary Least Square
PPP	Purchasing Power Parity
SD	Standard Deviation
SS	Squatter Settlements
TC	Total Cost
WTP	Willingness To Pay

1. Introduction

1.1 Background and motivation:

Economic growth is both a cause and consequence of urbanization. Urbanization is considered as an engine of growth and development. The high population and population densities of the cities may reduce the transaction costs of doing business. Public services are cheaper when compared to the same in rural areas because infrastructure is less costly due to economies of scale. The higher aggregate demand and supplies of public services in the urban areas usually makes for lower prices. On the other hand, the cost of living is higher in urban areas because of availability of higher levels of facilities and opportunities. The cost of living includes the price of development as well.

A number of studies have ascertained that externalities created by urbanization contribute to economic development of the cities and their peripheral areas. Recent evidences showed the significant contribution of the slums to city's economy (Sridhar and Reddy, 2012; 2013). Urbanization is generally associated with higher income and productivity levels. Higher urban population shares are associated in most cases with higher per capita gross domestic product (GDP) than their national average. There are possibilities of a higher GDP per capita, a higher labour productivity and higher employment levels than their national average. The productive capacity and their competitiveness may vary due to degree of quality of the urbanization.

The quality of urbanization is linked with the existence of negative externalities. The negative externalities such as high transportation costs and loss of productivity due to long commuting times, higher health costs, environmental degradation and unorganized squatter settlements, are associated with urbanization. Unorganized squatter settlements provide the negative attributes of urbanization process. They may create negative externalities such as the despoilment of natural environment, the devaluation of property, the increasing incidence of disease outbreak and occurrence of crimes; this situation is magnified by inadequate supply of public services and the behavioral pattern of the individual squatters. These squatters have also served as a

breeding ground for crime, juvenile delinquency, prostitution along with violent and destructive activities**.** The attitude of the government is apathetic and also considers squatters as illegal encroachers; this is reflected in ignoring the provision of basic facilities like health and sanitation services. The cumulative externalities of squatter settlements have created enormous challenges towards making cities environmentally healthy, socially inclusive and sustainable. The solution is not straightforward and many conflicting statements about the squatter settlements are the results of lack of detailed micro-level analysis. To improve understanding of the issue with urban externalities further research is necessary.

There are some studies which have examined negative externalities with urbanization. For example, studies have analyzed the linkages between urban environmental degradation and squatter settlements (Perlmanet al, 1998; Sengupta, 2006). Likewise some studies have examined the economic issue of transfer of land ownership to squatter residents (Hoy and Jimenez, 1991).Some studies have also examined the relationship between contagious diseases and squatter settlements (Imparato and Ruster, 2003; staff 2001), while other studies have examined the relationship between crimes and squatter settlements (Cullen and Levitt, 1999). A number of studies conducted in Africa have examined the relationship between squatter settlements and political rent seeking (Nathan and Spindler, 2001). The current and mostly non-economic literature has mixed views regarding whether squatting is a problem or a solution to efficient urbanization. The conflicting literature consequently has not provided a useful conceptual framework to guide government policy.

Urbanization is a complex process and has multiple dimensions. The study on multiple cities from different countries can provide better understanding and experiences of the externalities. Interactions of different issues and experiences of different cities can produce an innovative idea for the policy makers. For example, as squatter settlements in Quito are a chronic problem, the researchers have conducted in-depth studies of its evolution pattern and have rich research literature on the issue to develop policies. In case of Kathmandu, as the phenomena is comparatively new, the available information

is limited and there is a clear need for solid research on this issue to form and support contextual policies and actions.

The primary issue of this study is to quantify the negative externalities in terms of incidence, intensity and cost of the households. The study seeks to address: What is the willingness to pay on the part of the residents of the squatters and the neighborhood community affected by the squatters for internalizing of the externalities; what are the societal benefits after reducing negative externalities through introducing an intervention?

This research provides the information to the policy makers, local government, local community and civil societies regarding the benefits to the society after improvement in positive externalities in the squatter settlements. This study provides insight on the cost of the externalities which squatters have been bearing that may convince them to get resettled.

1.2 Goal and objectives:

The goal of the study is to quantify the possible negative externalities of squatter settlements and investigate the responsibilities of the residents of the squatter settlements themselves to reduce the negative externalities.

The objectives of the study are to:

1. Measure incidence and intensity of externalities of residents in and around the squatter settlements
2. Measure the willingness to pay on the part of the residents of the squatters and the neighborhood community affected by the squatters, for internalizing of the externalities
3. Identify the factors that determine their willingness to pay and their decision to continue living in the squatters
4. Analyze the squatters' sense of their responsibilities in solving these problems

1.3 Organization of the study

The structure of the study is as follows: the introduction section describes the background, goal and objectives of the study. The second section briefly provides the introduction of study areas, their similarities and differences. The third section discusses the conceptual framework, sources of information, data collection methods, data management and analysis. The fourth and fifth sections produce the empirical results and policy discussion of Kathmandu and Quito respectively. The final section provides the discussions and conclusions of the study.

2. Introduction of study areas

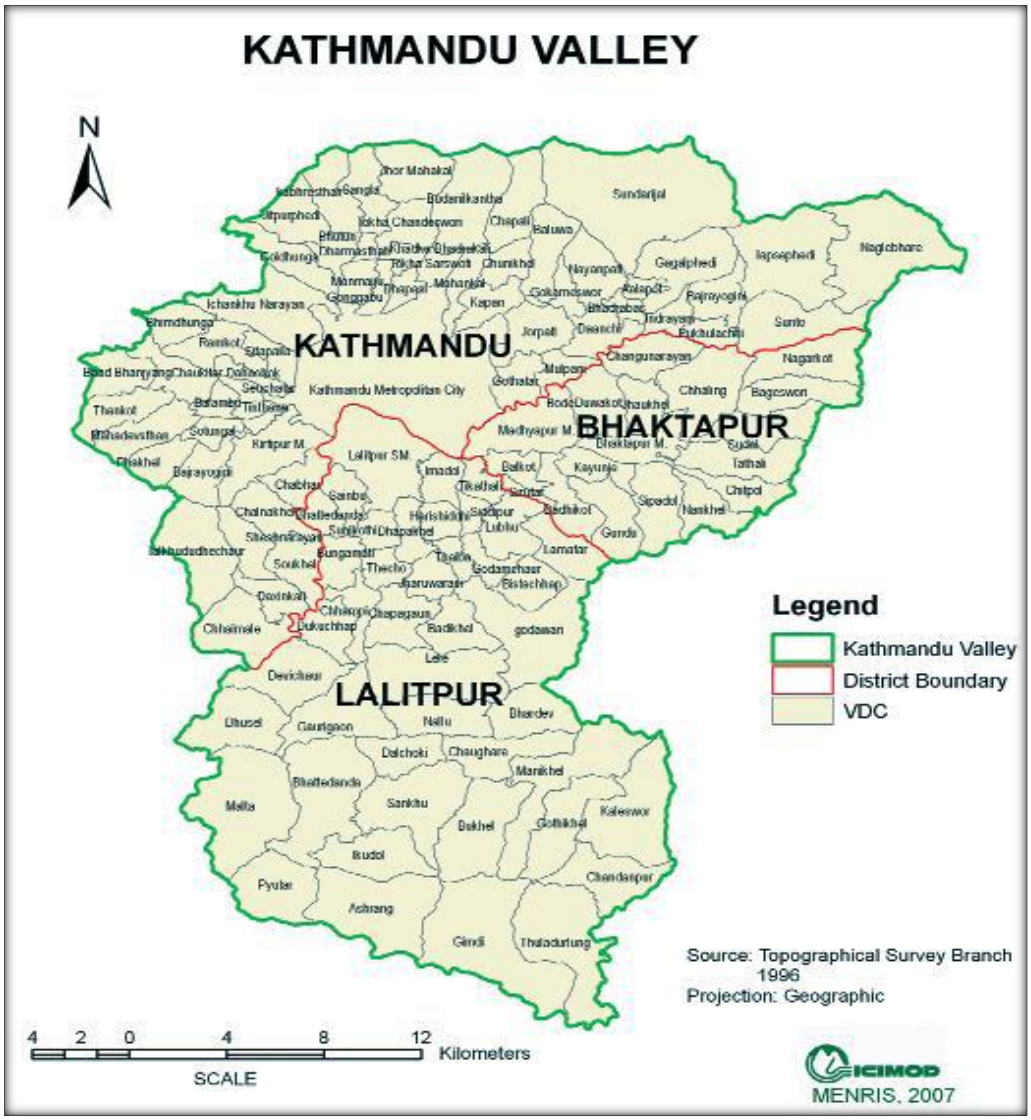
The definition of a squatter settlement varies widely from country to country and depends on a variety of defining parameters. Generally, squatter settlements are known as informal and unorganized settlements with the lack of a minimum level of physical (housing, open space, drain, road, tape, telephone etc.) and social (literacy, health, participation and organization among others) human requirements. Squatter settlements are an urban phenomenon. The formation of squatters is closely associated with rural-urban migration. There are a number of names by which squatter settlements are described by various authors, which highlight the attitudes and approaches towards them, ranging from a positive to neutral to negative outlook; such as informal settlements, unauthorized settlements, unplanned settlements or uncontrolled settlements. The official local name for squatter settlements in Nepal is Sukumbasi Basti (the settlement without their land and house) and Ecuador is barrios ilegales (illegal settlements).

2.1 Kathmandu

The valley witnessed major population explosion and dramatic physical, economical, and socio-cultural changes in the last four decades. A massive increase in population (from 500,000 in 1970 to above 3 million in 2010) and uncontrolled urbanization before development have reduced the open spaces and stressed the carrying capacity of the place. The Kathmandu Valley, nation's political and economic center, with three major cities: Kathmandu, Lalitpur, and Bhaktapur were the major reasons of the population boom, which attracted influx of migrant workers seeking better life and opportunities. However, it received massive influx of migrants in the insurgency period (1996-2006), who were internally displaced and in search of security of their life, employment, government shelter. After the end of insurgency period, the

growth rate of population is still tenacious with the rate of 6.6 per cent per year, which is one of the highest in the Asia and the Pacific Region (Shrestha, 2010).

Map 1.Map of Kathmandu



Source: ICIMOD, 2007

With the boom of urban population, the valley also witnessed growth of squatter settlements. These squatter settlements are termed as Sukumbasi basti and the people are called Sukumbasi, which describes a landless persons or family who is illegally occupying land and living on it or in some context making livelihood out of the land. The majority of these settlements are established along the riverbanks, traditional natural

borders between the cities. In 2010, Lumanti (a NGO) estimated that 7-10 per cent of the urban population lives in slums or squatter settlements in Nepal. The Kathmandu valley, for example, has seen its squatter settlements more than double in less than 30 years: there were 17 in 1985, but in 2010, that number grew to 40. The growth of urban Nepal and of its squatter settlements highlights the country's burgeoning urban housing challenge. Rural-to-urban migration is obviously another key reason behind the surge in urban statistics. There is also a backup support by the political parties, who seek the population living in these settlements as potential voters and manpower for political demonstrations. So, addressing the issue of eviction and relocation has been a complicated social, financial and political issue.

Kathmandu is now the premier cultural and economic hub of Nepal and is considered to have the most advanced infrastructure among urban areas in Nepal. Kathmandu's economy is tourism centric accounting for about 3.8 per cent of the GDP. The city has a population of about one million inhabitants as given in population census 2011. Urban poor are assets of urban economy and are mostly involved in informal sector of urban economy. Large numbers of poor families are living in the squatter and slum area, they are not only poor and unemployed but some of the economically well-off people are also living in these areas (Dahal, 2011). The squatter population comprises a large number of unemployed persons that is 41.9 per cent (Lumanti, 2005) and more than 50 per cent depend on their daily wages, with hand to mouth life style. Though the percentage of true Sukumbasi living in the squatters might be unknown, they are generally perceived as a threat by the people, and are socially and economically marginalized groups. The external society views them as a source of negative social and environmental externality.

Unplanned development and political instability have already intensified the challenges faced by urban Nepal. Like other South Asian cities, urban Nepal's infrastructure is stressed and unable to meet the demand for basic services (e.g. poor water supply, inadequate sanitation and lack of waste collection, unsafe road conditions) and housing.

According to Toffin (2010), only a third of the population has private latrines, which is drained to the river nearby and there is no solid waste management system, which has led to environmental degradation of the area. Besides this degradation, living on the riverbanks, they are constantly under threat of multiple disasters such as lands slides, flooding and communicable diseases. Squatters pile up sandbags and plant trees as a protection measure from the rising level of the river, however during monsoon season they are frequently flooded and in dry season the smell from river is intolerable. So, the stability of their settlement is not only legally uncertain but they are physically vulnerable and at risk population.

2.2 Quito

Ecuador is one of the smallest countries in South America, with a total land area of approximately 250,000 square kilometers and a population of about 15 million. The metropolitan district of Quito is located in the Pichincha province, and is the capital of Ecuador. The city is geographically located in the mountain range of the Andes surrounded by several active volcanoes such as the Pichincha, and the Guayllabamba and Esmeraldas rivers. The city is politically divided into nine administrative zones and two metropolitan delegations that are further divided into 65 subdivisions, 31 encompass the urban metropolitan area and the remainders are located in suburban zones. Quito has experienced rapid and unplanned development. This rapid population growth has resulted in the construction and establishment of many informal (squatter) settlements, often located in hazardous areas such as steep slopes and in flood zones (UNEP et al 2011). This high rate of urbanization has resulted in high levels of informal settlements, occupation in vulnerable areas and protected lands. The poorest segment of the population is located in the periphery of the city. Inequality in the city is high with 20 per cent of the poorest accounting for 5.62 per cent of the income and the 20 per cent of the richest accumulating more than 50 per cent of the wealth (UNEP et al 2011).

Quito, which used to be a city for elite people with political power and government bureaucracy, underwent exponential population growth due to migration

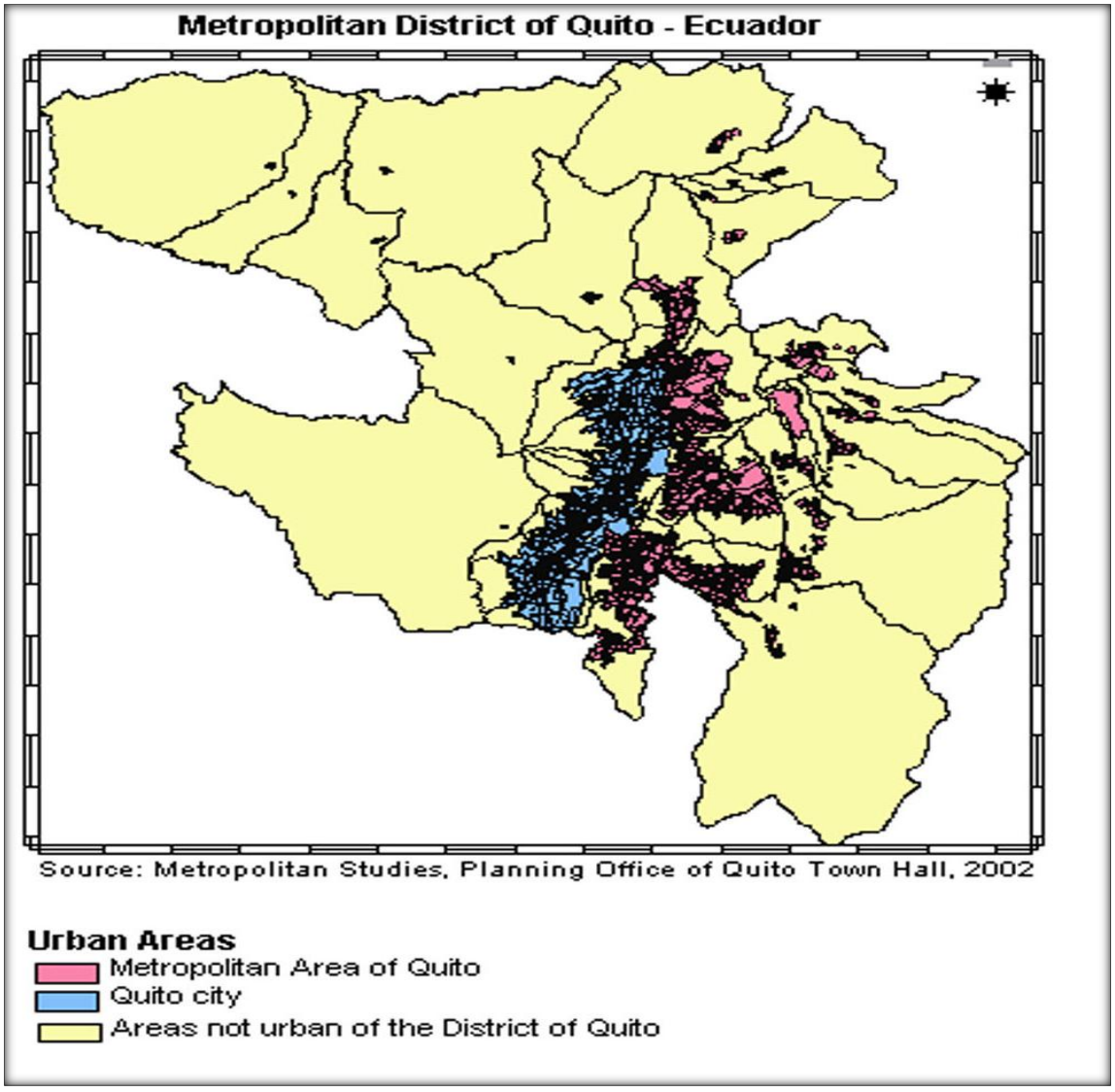
of low-income rural population from different parts of the country. So, the characteristics of urbanization were defined by the growth of low-income settlements around the city. High income poverty, low levels of education, high unemployment rates and unsatisfactory basic services affect a massive 82 per cent of slum dwellers in the city (UN-HABITAT, 2003).

Migrants settled at the edge of the city driving peripheral growth with large-scale squatting (*invasiones*), particularly in the northwest (Calderon) and south of the city, where agricultural lands were illegally sold and houses were constructed spontaneously (WB, 2008). The external debt crisis in 1980s also accelerated the illegal and unplanned occupation of the mountainside, mainly in the state-owned forests (Monero, 1999). These shanty places are termed as *barrios ilegales* – illegal settlements, meaning that these neighbourhoods don't possess an official approval and an urbanization license.

Similarly, residents in these barrios also held formal title of their land, but lacked legal permission on how they were using it, which is determined by its allowance for subdivisions, building laws and land-use regulations. According to the Municipal Government, there are 400 illegal settlements in Quito, which houses about 80,000 household that represents 16 per cent of Quito's population. According to Riano (2001), this widespread status of illegality takes on many degrees and forms, but a pattern of evolution is evident.

Quito's population growth rate has decreased due to reduction of in-migration from rural areas and increased migration to other countries. However, migration from rural areas to work in the informal sector is still an issue as these people locate themselves in the peri-urban shanty towns, which are identified by Griffin and Ford (1980) as the "Zone of peripheral squatter settlements" with the main characteristics of bad quality of housing and lack of basic public services. A similar scenario was portrayed in the study conducted by the UN-HABITAT (2003). According to the study, recent settlements located in areas of irregular topography, in the northern and southern peripheries of the city, are composed of dwellings such as huts, hovels and small houses, built with inadequate materials.

Map 2.Map of Quito



Source: Carrión et al 2003

The Municipal Government has applied both preventive and inclusive approaches to address the critical issue of illegal settlement. In the peak time of population boom, the government tried to contain sprawl of squatter settlements in the mountains west to the city by strictly limiting the provision of water above certain altitude (Hanratty, 1989). By an Ecuadorian decree in 1969, all land parcels should be fully serviced to be legally occupied (Godard, 1988). The government also attempted to protect encroachment of private and public lands. However, not being able to discourage *barrios ilegales,* the government has been trying to regularize the informal settlements.

The government is thus trying to encouraging developers to provide low cost housing units (US$20,000 or less), other programs attempted to construct basic infrastructure (site and services) ahead of squatter settlement. Consequently, new ordinance was issued in 1993 to regulate occupation and use of land which complemented previous ordinance of 1989 that permitted the titling of urban land through organized neighbourhood communities.

From a different perspective it is blamed that even the political parties represented by city government councillors favoured land invasions (Monero, 1999). The inhabitants of informal barrios represent a large voting potential. Local parties are willing to grant them favours (e.g. legalisation, infrastructure) in exchange for votes in the elections for city administrators (Riano, 2001). Thus, despite the illegal beginnings of informal barrios, the majority of them are eventually legalised and officially incorporated in the city. Throughout Latin America this political mechanism, known as *clientelismo*, is a main means by which informal urbanization becomes legalized. However, the slum dwellers' perception of their status is one of forthcoming integration through strategies for the progressive upgrading of living conditions and social inclusion (UN-HABITAT, 2003).

Beginning from 2001, the municipality of Quito showed increased interest in formalizing property rights by streamlining the titling process and unifying the land and housing titling departments into one. After this change twenty-three neighborhoods were legalized in only eight months, whereas before, an average of only two neighborhoods per year were regularized (Frank, 2003). As of 2006, 140 neighborhoods amounting to 40,000 households have been legalized; however, there are still more than 250 neighborhoods that are still illegal – some are in process and others have been deemed as unable to be legalized (WB, 2008). Increasingly informal settlements in Quito are being regularized. Squatter settlements have a slower rate of growth than in the 1980s and 1990s. Illegal settlements and squatting are increasingly rare. They are no longer supported by the community (World Bank, 2008). Residential development and agricultural activities are prohibited in the protected areas or open space.

2.3 Differences and similarities between Kathmandu and Quito

Squatter settlements in Quito are a chronic problem, which constitutes 16 per cent of the total population of the city. According to the Municipal data, there are recorded 400 illegal settlements with a total population of 80,000 households. As people migrated from the rural area settled in the periphery of the city, the urban area evolved from a "centrally-oriented city" towards the formation of a disperse agglomeration that developed in the adjacent valleys (Carrion, 2005). However, though the population of squatter settlements is a major concern for the city, currently it has a decreasing trend. Decrease in in-migration is the main reason; however various inclusive and preventive actions taken by the government together with involvement of local people to address the chronic issue of illegal settlement is the major reason for its decrease.

In case of Kathmandu, there are about 40 settlements in the valley with the total population of 15,000 in 2005 (Lumanti, 2005). Majority of them are situated along the banks of Bagmati and Vishnnumati rivers, with few located inland. As compared to Quito, the growth of squatter settlements is quite a new phenomenon and it is not a chronic problem as it occupies only a small percentage of the total population of this growing city. However, looking at the records of squatter population, there were 2,134 people in the municipality of Kathmandu, which reached 4,295 in 1990, to 11,862 in 2000 (Lumanti, 2005). Data show the increasing trend of growth of the squatter settlement population in the Kathmandu Valley, which is eventually showing symptoms of becoming a chronic problem.

So this study has been essential to identify various measures taken by both cities in dealing with similar issues of illegal settlement. The comparison has helped in identifying common issues of squatter settlements in two different contexts and analyzing various policies and actions taken to address them. The comparison with Quito, which has decreasing trend of squatter settlement, has helped in recognizing various preventive and inclusive measures taken to reduce the trend. The study gave an opportunity to learn multiple approaches for Kathmandu, with increasing population of

squatter settlements, from a context which has undergone similar process of urban growth and has tested various measures to address the issue.

A contrast between the squatter settlements in Quito and Kathmandu is that, in Kathmandu the squatters have mushroomed inside of the city and mostly along the river banks (where they have easy access to jobs and other opportunities). In Quito, these informal settlements are present in the periphery of the city with dispersed agglomeration in the Northwest and Southern parts of the city.

In the case of Quito, the government has used both preventive and inclusive measures to address this complex issue by limiting provision of facilities, protecting private and public land and even introducing policies and mobilizing other community groups as watchdogs to prevent from encroachment. On the softer side, later they started to formalize or legalize these settlements to incorporate them into the city system. Whereas in case of Kathmandu, due to multiple factors like economic and political instability, the government has not been able to focus on this critical issue or to protect encroachment of public lands. It has used direct and hard preventive method of eviction than other indirect and multiple ways to discourage development of these settlements.

Table 1 compares the socio-economic situation of the study areas. The indicators suggest that the economy of Ecuador in terms of Gross national income (GNI) per capita PPP$ is higher than Nepal; however, the income inequality in Gini index of Nepal is lower by 16.5 percentage point. Poverty incidences in both multidimensional and PPP$ 1.25 a day are higher in Nepal; however, the poverty using national poverty line income is higher in Ecuador. Poverty incidences using national poverty line income in Kathmandu and in Quito are 11.47 per cent and 17 percent.

Table 1.Summary of socio-economic indicators

SN	Indicators	Nepal	Ecuador	Sources
1	Human Development Index (value)	0.463	0.724	UNDP, 2013
2	GNI Per capita PPP$ 2005	1137	7471	UNDP, 2013
3	Income inequality (Gini Index) %	32.8	49.3	UNDP, 2013
4	Gender inequality index (value)	0.485	0.442	UNDP, 2013
	Multidimensional Poverty index			
5	Head count %	44.2	2.2	UNDP, 2013
6	Intensity of deprivation %	49.0	41.6	UNDP, 2013
7	Population Vulnerable to poverty %	17.4	2.1	UNDP, 2013
8	Severe poverty %	0.6	20.8	UNDP, 2013
	Population below income poverty line			
9	PPP$ 1.25 a day	24.8	4.6	UNDP, 2013
10	National Poverty line	25.2	32.8	UNDP, 2013
11	Total Population of the country (million)	31.0	14.9	UNDP, 2013
12	Total urban population %	17.3	68.0	UNDP, 2013
13	Total population Kathmandu metropolitan city (million)	0.975	-	CBS, 2012
14	Poverty in Kathmandu (based on national poverty line) head count %	11.47	-	CBS, 2012
15	Total population Quito metropolitan city (million)	-	1.607	GoE, 2011
16	Poverty in Quito (based on national poverty line) head count %	-	17.00	GoE, 2012

Sources: CBS, 2012;GoE, 2011 and UNDP, 2013

3. Research methodology

It is arguable whether squatter settlements contribute to making a more productive and sustainable city. On the one hand, squatter settlements can potentially create positive externalities and being an engine of urban economic growth (Sridhar and Reddy, 2012 and 2013); on the other hand it can produce negative externalities. The specific characteristics or activities of squatter households, such as poverty, insufficient information, hygiene and sanitation behavior, relationship with neighbors may have greater effects on squatters themselves, particularly as they relate to negative externalities, such as diseases and other socio-economic problems (poverty, insecurity, violence and crimes etc.) with the squatters and those in proximity to squatter settlements.

3.1 Theoretical Framework

When there are externalities, there is the potential for policy intervention. An externality includes two aspects: (a) the impact of an action on others and (b) that those others are not compensated for or do not pay for this impact. Negative externalities occur when the action imposes costs on others, such as increasing incidence diseases, violent and destructive activities. Positive externalities occur when the action provides benefits for others, such as reduced air pollution, improved space and greenery of the cities. Negative externalities impose direct costs on society. Solutions to a negative externality focus on ways to force the producer to internalize the costs it imposes on others, through decreasing the activity or forcing the producer to pay for it inflicting burdens on the producer. Negative externalities, therefore, are generally public issues.

Contingent valuation (CV) is a method developed to provide monetary valuation of these externalities. As many low income countries have less-developed market structures and prices for goods and services, the use of a technique such as CV in these countries may lead to less robust estimates of benefit than other methods. On the other hand, however, CV may be a more acceptable technique to provide monetary valuation of the externality. CV studies in developing countries are increasingly being used to

value health and environment related goods and services since more than three decades, for example, Gertler and Glewwe, (1992); Altaf, Jamal, and Whittington, (1992); Foreit and Foreit, (2003); Shrestha et al (2004); Bhatia,(2005); McNamee et al (2010) few of them. Willingness to pay (WTP) reflects the price that someone who does not have a good would be willing to pay to buy it.

Different CV elicitation methods are found in the literatures, for example, Open-ended WTP method, Closed-ended iterative bidding method, Contingent ranking method (Ordinal ranking), Dichotomous-choice Method ("Take it or leave it" choices). Each method has its strength and weakness. The bidding game (BG) method of CV is one way to increase the precision of willingness to pay (WTP) estimates relative to other methods such as the single dichotomous choice approach (Bhatia, 2005; McNamee et al, 2010). BG provides "thinking time" to elicit maximum WTP, as desired.

The prices of many goods and services in Kathmandu similar to other cities of developing countries are not fixed. This suggests that iterative BG method of obtaining WTP estimates may be better than non-iterative methods. The feasibility and validity of the method is partly determined by the extent to which respondents are familiar with paying for good or services. Most of the studies, therefore, are based on iterative bidding game methods.

In a bidding format, respondents are exposed to a starting bid and further bidding depending upon their response (yes/no). BG begins with an interviewer positing an initial bid to a respondent. Further bidding depends upon their response "Yes" or "No". If the respondent is willing to pay the initial bid, the interviewer revises the bid upward until a negative response is obtained. A negative response to the initial bid results in the interviewer revising the bid downward until an acceptable amount is found. The final bid is a measure of the respondents Hicksian compensating or equivalent surplus for the item being valued (Boyle et al., 1985). BG is sensitive to the starting value, which is one of the major weaknesses of the method. The starting point bias arises when the initial starting bid influences the respondent's final valuation.

Initiating the bidding process should not affect the respondent's final bids (Boyle et al. 1985) while conducting a study on WTP.

The empirical evidence produced conflicting results on starting-point bias. Some of the studies, for example, (Ternent et al, 2010, Bhatia, 2005; Frew et al., 2004; Phillips et al., 1997; Stalhammer, 1996), found starting point bias; however, other studies for example (O'Brien and Viramontes, 1994; O'Brien et al., 1998; Onwujekwe and Nwagbo, 2002) did not find starting point bias. However, the possibility of a starting point bias has been a concern of researchers.

A possible solution to the starting point bias has been mentioned in Boyle et al. (1985). Respondents are allowed to state their initial bid without prompting any amount. This type of modified game can reduce the starting point bias (Ternent et al, 2010). A few studies suggest developing closed-ended questions because closed-ended BG questions may have a very small starting point bias (Gunatilake et al 2007). A positive relationship between final bids and starting values was found, therefore, some of the studies encouraged the use of a range of starting values within a single survey (Samples, 1985; Ternent et al, 2010). Some of the studies based on their findings suggested that such biases may not be a major problem for applications of the CV method (Onwujekwe and Nwagbo, 2002; Brookshire et al, 1981).

The WTP responses are determined by the variety of considerations, particularly, the respondents construct their values at the time they are asked, rather than reporting a more well-defined value (Schkade and Payne, 1994). Alternative techniques such as verbal-protocol analysis (a psychological technique in which respondents are given time to think during their responses to surveys) might well be explored (Smith, 2000). A systematic review of qualitative evidence on WTP suggested that the use of qualitative techniques improves the validity and reliability in WTP studies. It is clear that WTP questions must be properly piloted, the contingent market adequately set up by the researcher and understood by the respondent. Proper study design will necessarily be able to overcome problems including starting point bias inherent in WTP studies (Baker et al, 2008).

3.2 Research Design

The extensive search of the literature suggested that externalities created by the individual/household/community, particularly negative externalities, have not been systematically measured. In economics, measurement of externalities is a challenging task and demands innovative research design. We found that previous research has been limited in its ability to capture these (negative) externalities. The technique in this study is carefully designed to measure (negative) externalities of various activities and several actors. The study focuses on the squatter settlements, particularly related to their negative externalities that are largely ignored by the literature on urbanization. Some of the studies explore the right of squatter settlements; however, they ignore responsibilities to make a healthy and sustainable city. This study has an innovative method that promotes self-evaluation. In addition to this, the study explores innovative ideas as to how the policy makers can solve the problem of squatter settlements through the involvement of squatter themselves, community and cities. The coverage, research design, measurement techniques, comparison of case studies from Nepal and Ecuador, confirm the originality of the study.

The innovative idea is to measure the incidence and intensity of externalities of various components of individual, household and community activities and to estimate their costs to the society. The data collected from Kathmandu and Quito were analyzed separately and compared in the interpretation where possible. The incidence of externalities was measured in percentage and intensity of externalities was given in the degree of feeling or risk. The intensity of externalities is presented in radar charts indicating degree of very high, high, moderate, low and very low intensity. In addition to this, WTP indicates the incidence and intensity of externalities.

The innovative idea in this study is to measure the incidence and intensity of externalities of various components of individual, household and community activities and to estimate their costs to the society. The WTP concept generally refers to the economic value of a good to a person (or a household) under given conditions. Net economic benefits of reducing the negative externalities, in simple terms, are estimated

as the difference between the consumers' maximum WTP for better situation or reduction of negative externalities and the actual cost paid due to negative externalities. Usually, the WTP of the squatter settlements to avoid the negative externalities produced by them will be higher than the willingness to pay of the non-squatter settlements; however, if the opposite is found there will be negative impact on urbanization since such a response would imply that the costs of urbanization (squatter settlements) would be greater than their benefits. This will be supported by further analysis of underlying factors determining the squatters' choices and responsibilities of squatters for better life. This approach used for the study is standard practice for analysis in health economics. Primary surveys ware used to measure the WTP to reduce the possible negative externalities in Kathmandu and in Quito. A mix of qualitative and quantitative approaches was used to increase the validity and reliability of this research; however, quantitative methods have ensured to fulfill the objectives.

Research began using exploratory qualitative methods through key informant interviews and focus group discussions. The findings fed into the design of the questionnaire, description of the scenario, the choice of elicitation mechanism, bid vectors, etc. For example, the decision to use a bidding format was guided by the outcome of the qualitative work, which showed that the respondents were familiar with bargaining as it was commonly used in the marketplace.

3.3 Qualitative study/Pre-test/Pilot

As discussed above, a qualitative survey prior to the main survey eliciting WTP helps to improve the validity and reliability of the study. The team composition for study design, pre-testing the questionnaires, piloting the survey, revised the questionnaires and CV survey tools based on feedback from pre-testing and piloting among others are some additional criteria to improve the validity of WTP study in developing countries (Gunatilake et al 2007).

A multidisciplinary research team including economists, social scientist, sociologist, and urban engineer from Nepal and collaborator Ecuador, were involved in interaction through emails through each and every stage of the study. Examples include review of available literature; develop sampling procedures and deciding sample size, qualitative study before designing questionnaires, conceptualizing the bidding process, questionnaire design, pretesting etc.

In-depth interviews and Focus Group Discussions (FGD) in Kathmandu were conducted to identify vexing issues due to behavioral impacts of both settlements and to provide the advice on the framing of the scenario and administration of survey. The FGD guidelines were prepared as suggested by Stewart and Shatmdasani (1990) and Ritchie and Lewis (2003). The research teams emphasized gender inclusion in every step of qualitative study, so attempts were made to include the perception of women, often the marginalized groups, living in the SS. Three FGDs, two with mixed groups of men and women, and another with women's groups, were conducted in Pativara SS, Kathmandu. As the initial part of the fieldwork, community liaisons were identified and a good relationship was established with the community. Similar study locations were selected in and rapport was established with the community.

In each FGD, 10 to 13 participants were there. Three in-depth interviews were also conducted. Open-ended questions and story-telling techniques were used to collect personal experiences and both positive and negative externalities of living in and from the SS. The information collected from the qualitative study was the base to design survey questionnaires. We discussed about the bidding format and judging a suitable range of values for the offer bids. We selected NRs 2000, NRs 3000 and NRs 4000 as starting bids and NRs 1000, NRs 3000, NRs 5000 and NRs 8000 as additional follow up bids during the focus group discussion. At this time, we tried to find out minimal "yes" responses. It was expected to get top value.

Based on the qualitative study, a conceptual framework of the bidding process and attribute selection was designed to guide development of the questionnaire. The findings from the qualitative study supported us to design the questionnaire for the

household survey and to capture issues related to individual, household and community characteristics. The questionnaire was drafted to capture all possible externalities. These externalities were identified and kept in the logical order. Questionnaires related to incidences and intensities of externalities were developed based on individual/household/community activities. This was followed by cost of externalities borne by households. Then the logical sequence linked to the hypothetical scenario developed for WTP. The questionnaire was developed in such a way that made a path of thinking about the negative externalities, feelings, cost of the externalities such as pain, suffering and monetary cost of externalities. People would be fully prepared psychologically to contribute some amount of money and their affordability determined magnitude of the amount of money.

Following the FGD, the pre-test and pilot phase examined the applicability of the questionnaire, including the hypothetical scenario and bid values used in the bidding game method. Small changes to the starting bids were made after the pre-test and were re-tested in the pilot. Initial versions of the questionnaires were pre-tested in a total of 10 households both in SS and NSS. A Pilot was undertaken for 60 households. The bidding game method was used to elicit WTP values. During the pilot, respondents were randomly assigned to one of the three starting bids NRs 1000; NRs 5000 and NRs 8000. The range was used to capture the lower, middle and upper values derived from the FGD. Based on the pilot for 60 HHs (36 HHs of SS and 24 HHs of NSS), common initial bids were used for SS and NSS. Common bids were used to minimize potential starting point bias as suggested in McNamee at al. (2010) and Ternent et al. (2010).

3.4 Sampling procedures

A multi-stage sampling procedure was used to select squatter communities and households; similar but separate procedures were adopted to randomly select the non-squatter communities and households. Lumanti (2010) has developed the list of the SS and total number of households (HH) for Kathmandu Valley. Shantinagar-Sinamangal (574 HHs), Pathivara (154 HHs) and Khadipakha-Maharajgunj (146 HHs) clusters are bigger SS in terms of number of households. We selected purposively these three bigger

SS for our study. As mentioned earlier, qualitative data were collected from Pathivara SS. Khadipakha Maharajgunj and Shanti Nagar- Sinamangal were selected for quantitative study. Of the two, Khadipakha, Maharajgunj is one of the oldest SS in Kathmandu, which has been in existence for more than 20 years, located in almost central part of Kathmandu while the one at Shanti Nagar, Sinamangal is relatively new, having been around for about 10 years and located in eastern part of Kathmandu. For the NSS cluster, we purposively selected adjoining of SS clusters because we aimed to measure the externalities of each clusters. The voter lists of the selected communities were collected from the local government offices. The names of the household heads, and household numbers were identified with the help of local residents. In Quito, Atucucho, Conocoto and Alto were purposively identified on the basis of adequate density, and bigger SS and NSS.

The sample size for the households was calculated based on Paffenberger and Patterson 1987 (p. 389).

$$N = [Z_{\frac{\alpha}{2}}\,\sigma/E]^2; N = desired\ sample\ size, \sigma = standard\ deviation\ of\ income$$

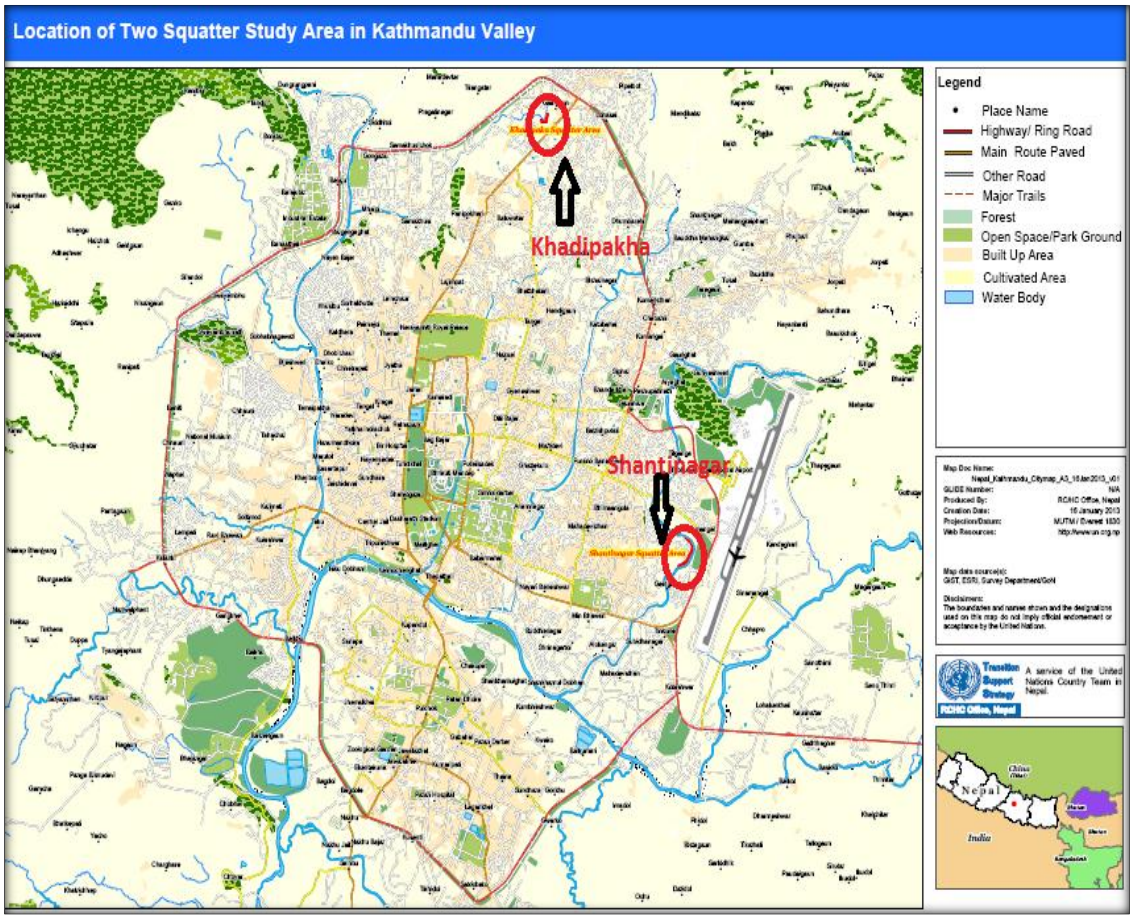
$$Z_{\frac{\alpha}{2}} = the\ 95\%\ confidence\ interval\ statistic\ (1.96) at\ 5\%\ significant\ level$$

$$E = acceptance\ error\ in\ the\ sample\ estimate\ of\ the\ population\ mean\ WTP$$

Lumanti (2010) suggested based on the survey on 2,691 households in 40 squatter settlements of Kathmandu that, the average monthly income of a household seems was NRs. 4,173 with 2678 standard deviation. We assumed acceptance error (NRs 417.3) in the sample estimate of the population mean WTP obtained as one-tenth of census estimate of average household income of NRs 4173 (i.e. a 10 per cent error). Very little similar information is reported for Quito. Therefore, the minimum sample for the households is 159 from each side. We made more than double the sample size to increase the degree of precision. As proposed, the research team in both countries interviewed a total of 750 HH each, which includes both SS (550 HHs) and NSS (200 HHs).

Squatter Settlements (SS): The total HH population was based on voter list and the list of HHs was enlisted with the help of community liaisons. A mini-census was conducted, wherever the voter list did not capture the HHs in SS to produce the HH list that served as the sampling frame. Each HH was assigned a number, and was selected through a lottery process or random number process to meet the required sample size of 550 HHs from SS. A total of 518 and 358 households from SS were surveyed in Kathmandu and Quito respectively. The response rates were 94 percent and 65 percent in Kathmandu and in Quito respectively.

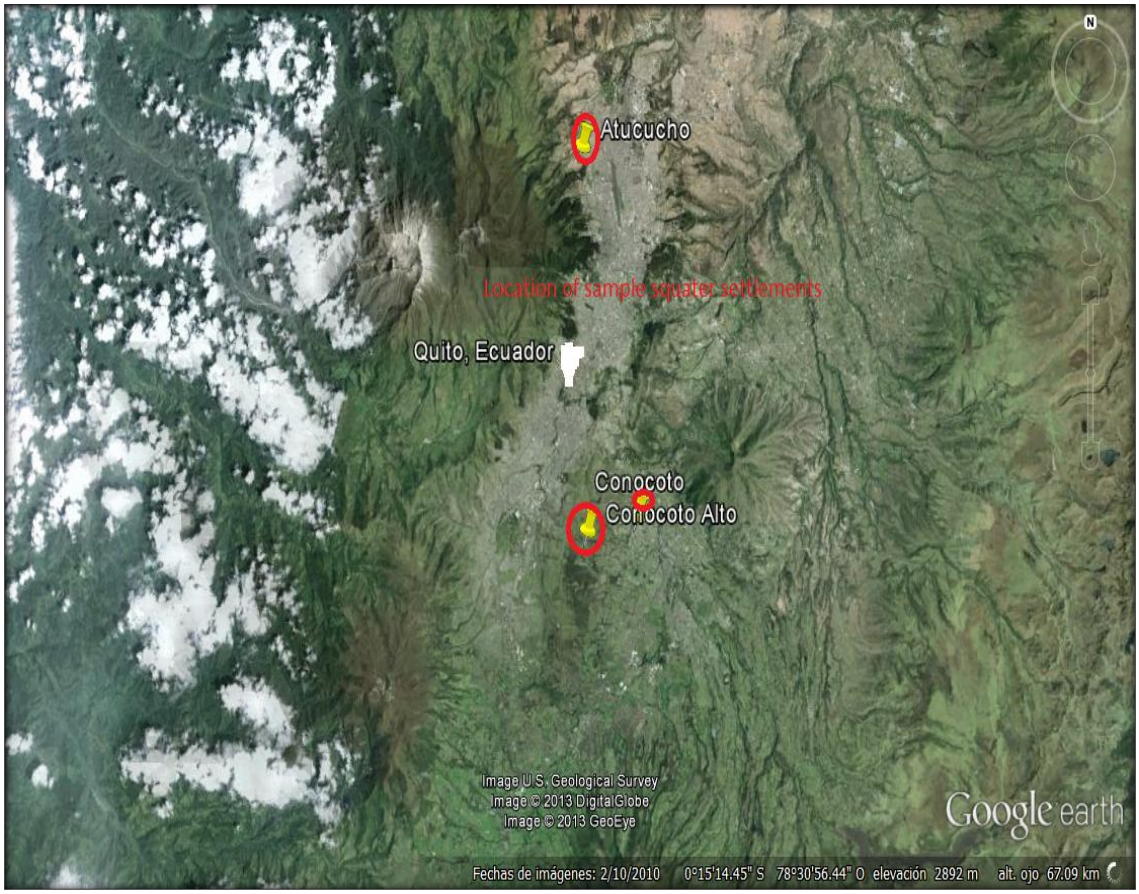
Map 3.Location of sampled Squatter Settlements in Kathmandu



Source: UN, Nepal

Non-Squatter Settlements (NSS): The adjoining NSS of the selected SS were purposively selected for NSS household survey. The selection of the required sample size HHs was based on an on-site systematic random selection method. The direction and starting point of interview was determined randomly, then every 4th HH, in axis perpendicular to squatter and every 5th HH aligned along the SS was selected for consecutive interviews. The same procedure was repeated throughout the process. The sample size of NSS was smaller than SS therefore we used 'with replacement' method if the households were not able to provide information or not available. A total 233 households from NSS in Kathmandu was selected to conduct the survey. A similar sampling procedure was adopted in Quito and 200 households were selected as NSS to conduct the survey.

Map 4.Location of sampled Squatter Settlements in Quito



Source: Google search

After selecting the households through given random procedures, the main survey was conducted. The description of the study procedures was explained verbally. The CV survey was conducted during October- December, 2012. The questionnaire was translated into local languages. All interviewers received a three days training in survey design and questionnaire administration by the researchers.

The same questionnaires were discussed with the researcher from Ecuador. Separate questionnaires were prepared for SS and NSS.

3.5 WTP questions and the scenario for valuation

The key issue of WTP is the scenario for which respondents are asked to give a value. The following box gives the English translation of the hypothetical scenario used. As mentioned above, the logical order of the questionnaire, the intensity and incidence of the externalities faced, the cost borne by the respondents were developed and, then the logical sequence linked to the hypothetical scenario developed for WTP. The questionnaire was developed in such a way that made a path of thinking about the negative externalities, feelings, cost of the externalities such as pain, suffering and monetary cost of externalities. Therefore, the respondents could easily imagine the potential of negative externalities and benefits from the proposed intervention. In addition to this, a balance was ensured between the need of the relevant information and overload of the information to avoid confusion to respondents. This would reduce the potential problem such as strategic bias, anchoring bias and ensuring to estimate the true value of effects. The description of CV scenario for reduction in negative externalities is given in Box 1:

Box I: Description of CV scenario for reduction in negative externalities

You already shared with us the incidence and intensity of negative externalities that you are facing due to individual/household/community activities in the squatter settlements (questions 3 &4). As you said, you had borne some cost due to these (negative) externalities (Question 5) last year.

I'm going to do this by asking you to think about a hypothetical situation where these negative externalities are reduced. To give you a little background, local community or local Government aim to prevent these negative externalities through introducing an intervention such as providing awareness and community education, better management of water and sanitation, better quality of the society.

I'm going to describe the benefits, for example, reduction of disease incidence, verbal and physical violence, gang fighting, improve the individual/household/community behavior through above mentioned intervention. You will get long term benefits, for example, your children will get better society and gain better education from the society. Your family will enjoy in the secured and quality of society. You have known that reduction of negative externalities means to increase the positive externalities for the society.

You have better experiences about the trend of the externalities whether they are increasing or decreasing over the years. Imagine now, that if the behavior of the individual/ household/community will not change, the cost of negative externality will be increased successive years. May be you have to pay additional amount of money each year.

You are aware that without community participation to change the behavior of the people is difficult and takes longer time.

If enough individuals make a contribution, the local Government and other community based organization will also contribute. With enough funds from individuals, an effective intervention can take place, and the negative externalities will be reducing over the years and quality of life will be improved. Therefore, you are required to pay one time out of pocket payment within this year.

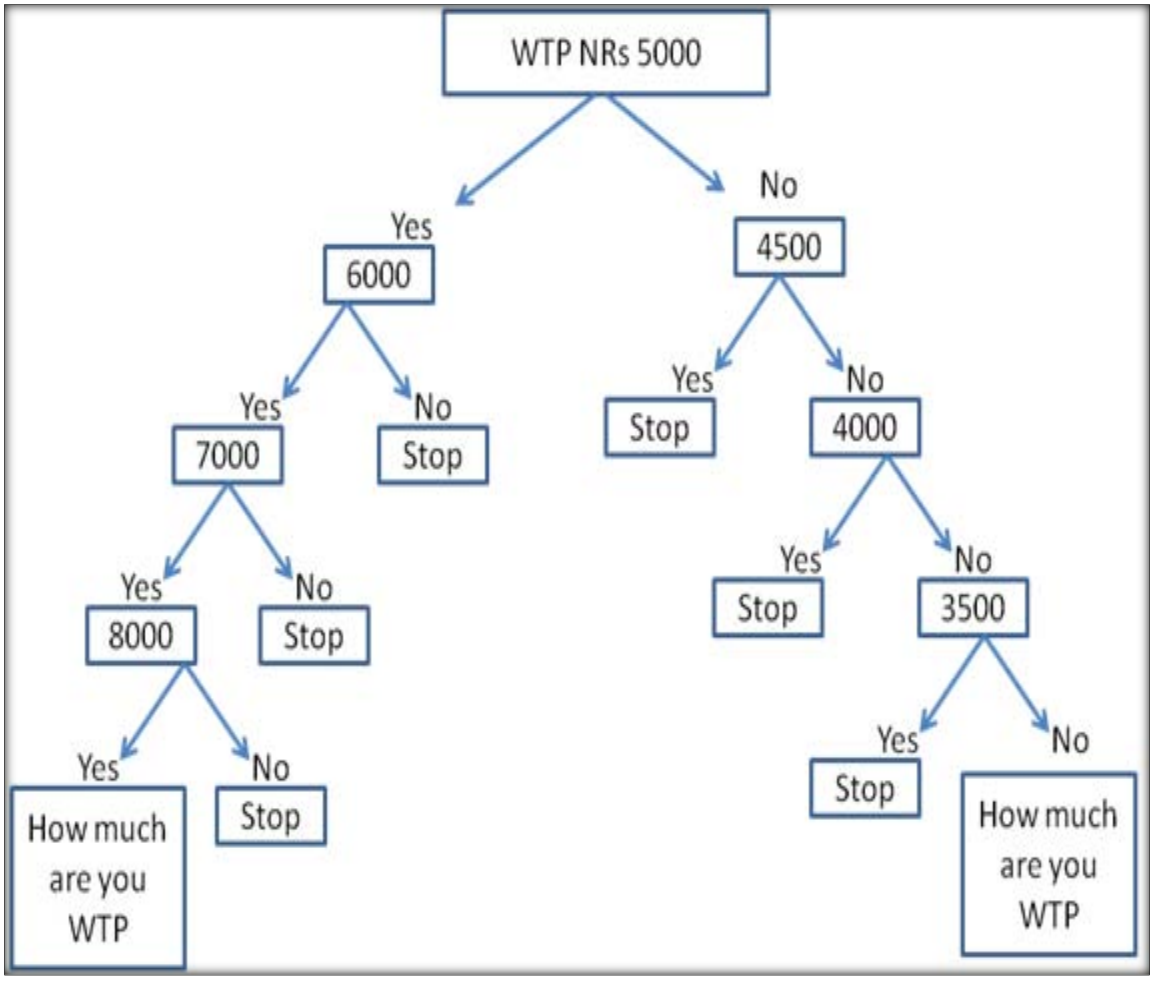
In answering these questions, please think about how much you can realistically afford to pay for this intervention one time within this year. Think about the things that would have to be given up if you were to pay that particular amount.

Source: Author, 2012

3.6 Elicitation method

The bidding game method, as discussed in theoretical framework, was used to elicit WTP values; the example of the bidding game algorithm is given in the following figure 3.1. Bidding game requires only yes/no responses to each bid that is an advantage of the bidding game. It has more market realism than single open-ended questions asking respondents for their maximum WTPs (O'Brien and Viramontes, 1994). The algorithm for the NRs 5000 starting bid is shown in figure. If the first response was "no", the interviewer decreased the bid amount by NRs 500 up to a maximum of four times until the respondent said "yes". At that point, WTP was estimated to be equivalent to the amount at which they said "yes". If the respondent said "no" throughout, they were asked to state their maximum WTP in an open-ended question. If the first response was "yes", the interviewer increased the amount by NRs 1000 up to a maximum of four times until the respondent said "no". At that point, the WTP was estimated as equivalent to the previous bid amount. If the respondent said "yes" throughout, they were asked to report WTP in open-ended question.

Figure 1.Bidding format used for elicitation of WTP values



Source: Author, 2012

Similar procedures were applied for Quito; however, starting bid was 50 USD. If 'yes', 10 USD would increase until four times; however, if 'no', 5 USD would decrease until four times, then open ended questions were started.

3.7 Data management and data analysis

The surveys took more than a man month to conduct for eight trained researchers in Kathmandu and almost equal time in Quito; with frequent reviewing and sharing of experiences in-between to improve the quality of data. Then the collected data was entered into the pre-designed CS Pro programme format for further analysis.

Questionnaires were designed in a way so that all the questions are in a logical order, easy to understand and phrased in local language. Statistics/Data Analysis STATA software version 11.2 Stata Corp LP was used for data management and analysis. A household head was an individual from a household; therefore, household is the unit of analysis for this study.

Generally, the WTP of squatters as primary impact bearer, to avoid the negative externalities produced by them is higher than the willingness to pay of other than squatters; however, if the opposite is found there is negative impact on urbanization. This is supported by further analysis of factors determining the WTP.

The net economic benefits of reducing the negative externalities are estimated using the difference between the consumers' maximum WTP for reduction of negative externalities and the actual cost paid due to negative externalities.

Further, to determine the factors that affect the willingness of household to pay for reduction negative externalities, this study followed a multiple regression model. The ordinary least squares (OLS) method was used to estimate the parameters in multiple regression models. The significant relationships between dependent and independent variables was examined by the value of the correlation coefficient (R) in two variable cases and for the multivariate case, t-values, R^2, adjusted R^2 and F-values was estimated. As such, the model assesses the relationship between various factors and the households' WTP. Three regression models were specified all respondents from both SS and NSS and separate SS and NSS regression models to determine the factors of WTP.

The household WTP describes the value that the head of household is willing to pay for the reduction of negative externalities for his/her whole household. Mean WTP is estimated directly from the data provided. Multiple linear regressions are used to study the influence of individual and household variables on WTP because the WTP data are continuous. The empirical model is as follows:

$WTP = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots\ldots\ldots + \beta_{n-1} x_{n-1} + \beta_n x_{n-1}$ ……(1)

WTP = willingness to pay; α = intercept; β= coefficients of explanatory variables

x = explanatory variables. A Chow test was used to determine whether the independent variables have different impacts on different subgroups, such as SS and NSS, of the population.

A non-linear Logit regression model was also applied to the respondents' response to the principle WTP elicitation question.

A discrete choice (DC) method analyzed using random utility theory was used to determine factors influencing the WTP for reduction of negative externalities. By definition, random utility has two components: deterministic component V and a random component ε .The random utility function can be written as:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad \text{..... (3)}$$

In empirical estimation, assumptions regarding the distribution of the disturbances lead to various estimable discrete choice models like Probit and Logit. We have strictly followed the procedures as suggested in (Lancsar and Louviere, 2008) and (Hensher et al 2005). The method of calculating Hicksian compensating variation in discrete choice random utility model helps to calculate willingness to pay for reducing the negative externalities of activities.

In the Logit analysis with a dichotomous choice structure, the dependent variable can be formulated from the respondents' responses for the payment principle questions. In this process, the 'yes' responses are coded as 1 and 'no' responses as 0, so that the probability of a respondent saying 'yes' to the bid value offered from each WTP elicitation question can be found: $P_i = probability\ (yes) = Probability\ (WTP_i \geq Initial\ Bid\ value)$, the probability of obtaining a 'no' response is $(1 - P_i)$ where $0 < P_1 < 1$. Thus the dependent variable can be transformed by eliminating the upper and lower boundary problem by estimating $P_i|(1 - P_i)$. This ratio will be positive since$0 < P_1 < 1$. However, when PI approaches one, $P_i|(1 - P_i)$goes towards infinity which results in the lower boundary problem. This problem can be eliminated by estimating the natural logarithm, $\log[\, P_i|(1 - P_i)]$ the result of which can be any real number from negative to positive infinity. When y equals 0 or 1, the conditional

expectation of y is, $(y_i|x_i) = P(y_i = 1|x_i) = F(x_i)$. A latent variable interpretation for Logit model is, $y_i = 1 \quad iff\ y*_i > 0;\ y_i = 0 \quad otherwise$

Then, $P(y_i = 1|x_i) = P(y*_i > 0|x_i) = P(\varepsilon_i > -x_i\beta) = F(x_i\beta)$

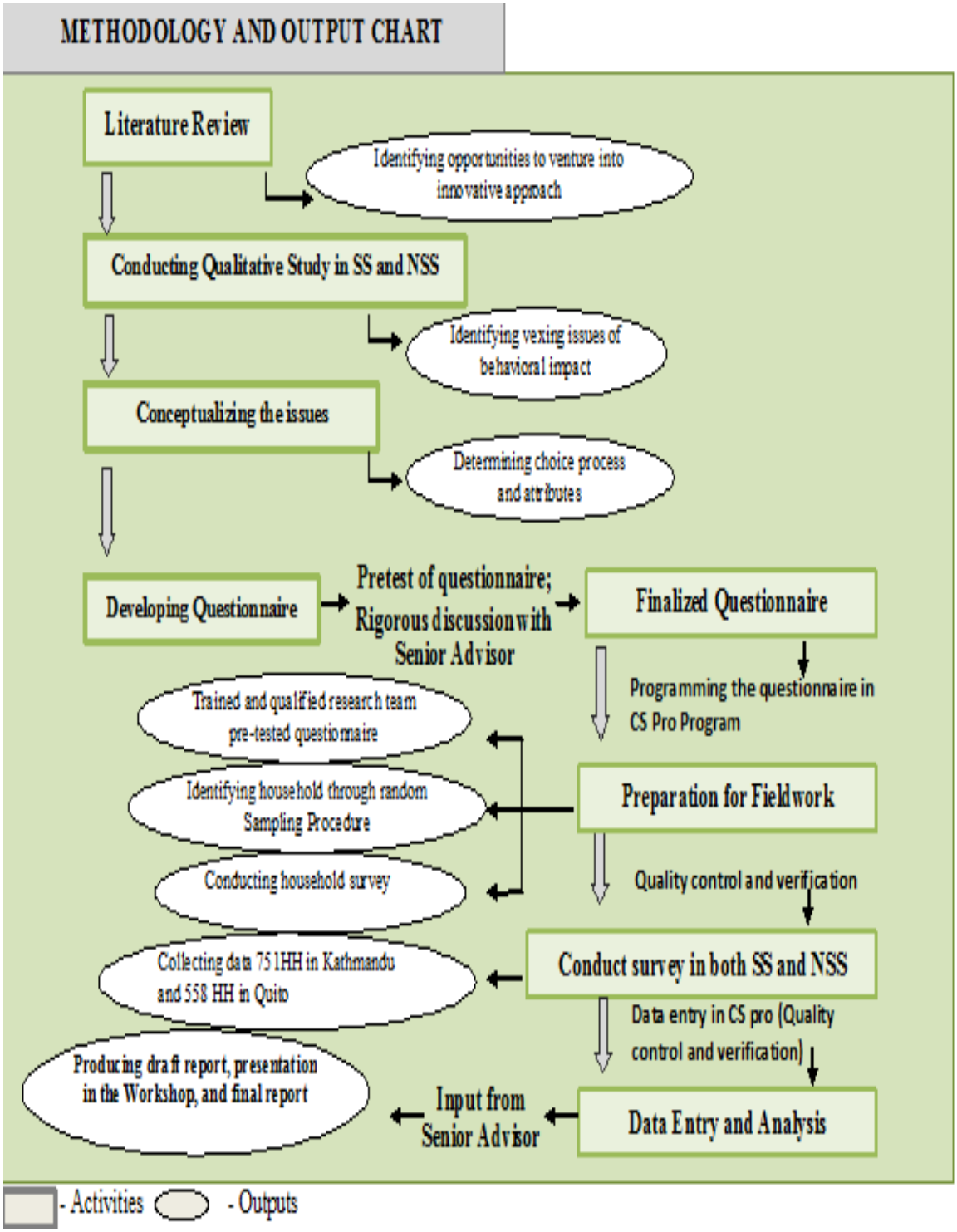
The log-likelihood for a sample of independent observations is,

$LogL = \sum_j\{(1 - y_i)\log(1 - \mathrm{F(x_i}\,\beta)) + y_i\log(\mathrm{F(x_i}\beta))\}$ ..... (3)

The iteration log shows the convergence of the model. A large number of iterations may signal a high degree of multicollinearity. A Logit model has a standard logistic distribution; therefore, for the interpretation of the coefficients, we used marginal effects. Sign of the coefficient is also the sign of marginal effects.

Figure 2 below describes the methodological flow and outputs and exhibits quality assurance steps that relate to this data flow, and the tasks that were performed during the study.

Figure 2.Methodological chart



Source: Author, 2012

4. Results and interpretation of Kathmandu

The intention is to measure the incidence and intensity of externalities of various components of individual, household and community activities. We measured incidence of externalities faced by the SS and NSS. The differences were statistically tested using t-test to confirm whether SS or NSS faced negative externalities from their activities. The intensity of the externalities is conditional upon incidence; therefore, to measure the distribution of intensity among the various degrees such as very high, high, moderate, low and very low, weightage of incidences were used. The intensity, i.e., depth of the externalities, along with the incidence level and their corresponding skewedness is shown in different charts.

4.1 Incidence of externalities

The results suggested that a greater number of participants from SS worked for political and social organization compared to NSS—refer to Table 2. This argument is confirmed by the statistical test in which p value is less than 5 per cent level of significance. Almost 9 per cent of respondents in NSS and 42.1 per cent in SS perceived negative externality when utilized by such organizations. The respondents in both settlements agreed that they gave time to such political/social organizations and some of them got paid for their involvement; however, the results were not significantly different across the SS and NSS.

Table 2.Individual/ Household Characteristics

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Member of political org	28.8%	0.450	36.6%	0.482	7.8%	0.037
2	Time given to political org	17.9%	0.386	18.3%	0.388	0.4%	0.939
3	Utilization of your time by political org	10.7%	0.310	68.5%	0.464	57.8%	0.000
4	Payment by political org	5.8%	0.235	2.6%	0.160	-3.2%	0.162
5	Negative externality when utilized by political org	8.7%	0.284	42.1%	0.494	33.4%	0.000

Note: SD =Standard deviation
Source: Field survey, 2012

Table 3.Community Characteristics

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Incidences of disease outbreaks	60.9%	0.49	67.5%	0.47	6.6%	0.081
2	Access to public facilities	99.1%	0.09	91.5%	0.28	-7.6%	0.000
3	Not enough food due to financial problem	1.3%	0.11	15.3%	0.36	14.0%	0.000

Source: Field survey, 2012

Respondents in both the SS and NSS settlements verified the outbreaks of communicable diseases in their communities. The answer is comparatively equal, where 60.9per cent in NSS and 67.5 per cent in SS agreed upon disease outbreaks, certainly higher in SS, as we would expect. This data has been helpful in verifying a major incidence that causes negative externality. However, the results are not significantly different across in SS and NSS. Almost all respondents in both types of settlements had access to public facilities such as water supply, road etc. Roughly 1.3 per cent of

respondents in NSS and a higher proportion, 15.3 per cent in SS reported “not having enough food due to financial problem”; in other words, expenditure is greater than income. Both these results are significant (table 3).

Table 4.Individual/ Households/Community behavior

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Inappropriate substance use in SS	56.9%	0.497	74.3%	0.437	17.4%	0.000
2	Substance abuse in NSS	65.8%	0.476	58.9%	0.492	-6.9%	0.120
3	Substance abuse in HH	0.0%	0.000	5.6%	0.230	5.6%	0.000
4	Gambling in SS	48.0%	0.501	74.5%	0.436	26.5%	0.000
5	Gambling in HH	6.0%	0.238	18.2%	0.386	12.1%	0.000
6	Alcohol drinking in SS	67.4%	0.470	87.8%	0.327	20.4%	0.000
7	Alcohol drinking in HH	12.4%	0.331	34.6%	0.476	22.1%	0.000
8	Gang fighting in SS	43.9%	0.497	49.1%	0.501	5.2%	0.198
9	Violence within HH in SS	24.2%	0.429	47.3%	0.500	23.0%	0.000
10	Violence in HH	11.6%	0.321	38.4%	0.487	26.8%	0.000
11	Criminal activities in SS	59.9%	0.491	25.7%	0.438	-34.2%	0.000
12	Criminal activities in HH	25.3%	0.436	9.9%	0.300	-15.4%	0.000
13	Criminal activities in NSS	41.2%	0.494	58.5%	0.493	17.4%	0.001
14	Prostitution in SS	16.0%	0.368	10.2%	0.303	-5.8%	0.050

Source: Field survey, 2012

Questions related to incidences due to individual/HH/communal behaviour were helpful in identifying key issues that cause negative externalities to the residents. Some key findings are that there is no record for incidence of substance abuse in HH for NSS, which for SS is 5.6 per cent. More than half, 59.9 per cent of respondents in NSS agreed

regarding the presence of criminal activities in SS, but only 25.7 per cent of respondents in SS were positive about such criminal activities. However, the differences of incidences of substance abusers and gang fights in community of NSS and SS are not statistically significant (table 4).

Table 5.Economic cost due to identified incidences

In NRs

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Total cost in one year	19334	53043	7514.3	16671	-11819.79	0.000

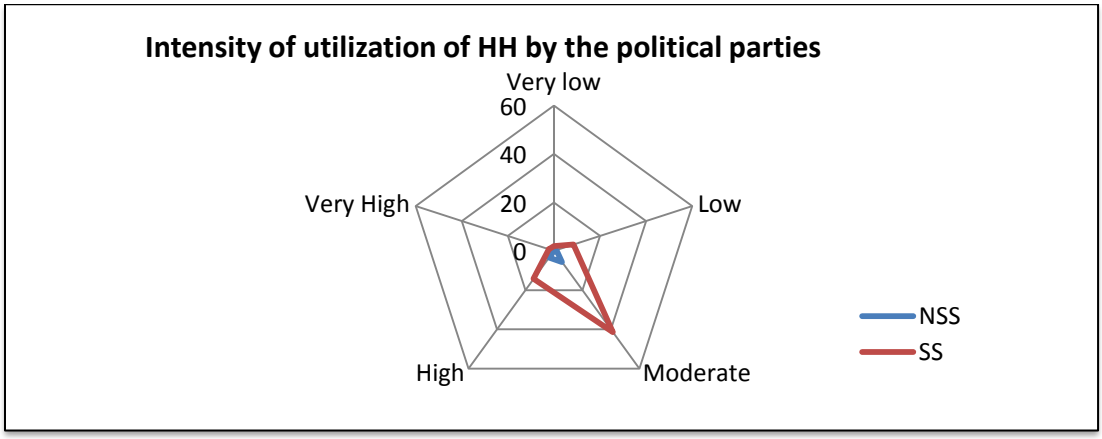
Source: Field survey, 2012

Table 5 shows the average economic cost in NSS and SS due to consequences of identified incidences of externalities. The costs includes the cost borne by the households due to negative externalities, for instance, cost of treatment due to gang fight or physical abuse, incidence of communicable diseases (if any), fines due to gambling, alcohol drinking (if any), cost of police case such as crime, domestic violence (if any) in last one year. This cost includes direct payment. Opportunity costs or time costs due to externalities are not estimated. The result statistically confirms that people in NSS pay almost two times more than those in SS.

4.2 Intensity of externalities

In Kathmandu, compared to 68.5 per cent of respondents in SS, only 10.7 per cent in NSS were of the view that they were being 'utilized' by political/social organizations. In Kathmandu, the SS graph is skewed towards moderate intensity, which means majority of respondents felt a moderate degree of utilization by political/social organizations (in Figure 3). The intensity of externalities over utilization by the political and social organization in NSS seems negligible.

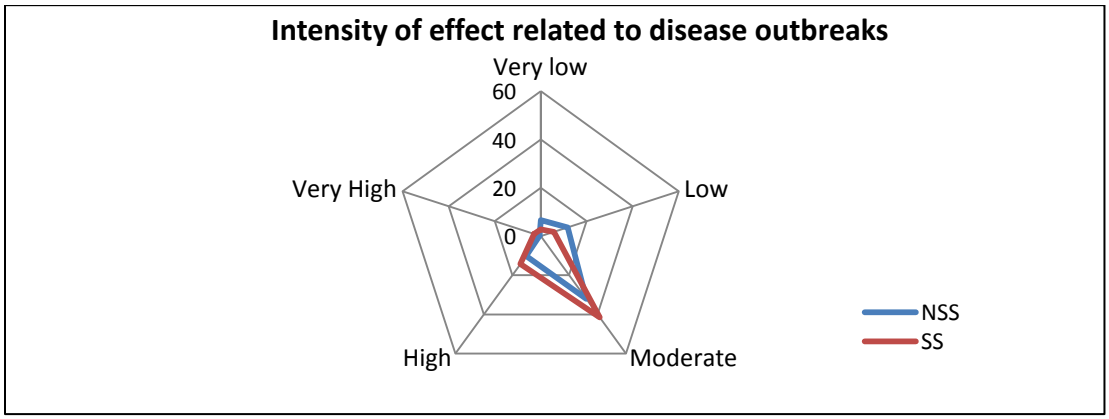
Figure 3.Intensity of utilization of HH by political and social organization



Source: Field survey, 2012

In Kathmandu, both NSS and SS residents perceived considerably higher incidence of disease outbreaks in their respective communities. Of those who were interviewed, 61 per cent in NSS and 67.5 per cent in SS experienced externalities due to communicable disease outbreak. In Kathmandu, the graph for both NSS and SS is skewed towards moderate (Figure 4). It means majority of people in both settlements perceived a moderate degree of impact due to communicable disease outbreaks.

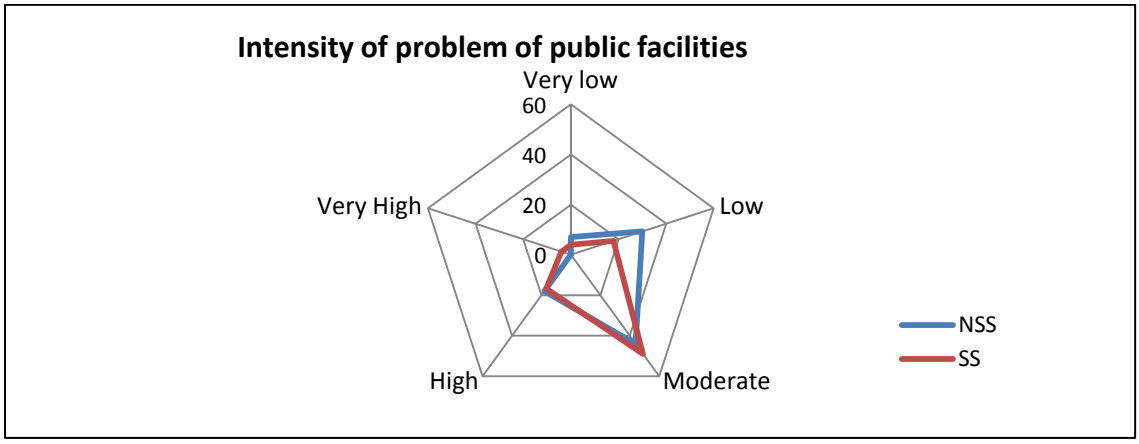
Figure 4.Intensity of effect related to disease outbreaks



Source: Field survey, 2012

In Kathmandu, a majority of respondents in both SS and NSS settlements perceived a moderate degree of impact due to problems related to public facilities (in Figure 5). The data distribution for NSS is towards low intensity as well, whereas for SS it is towards high intensity, to be expected.

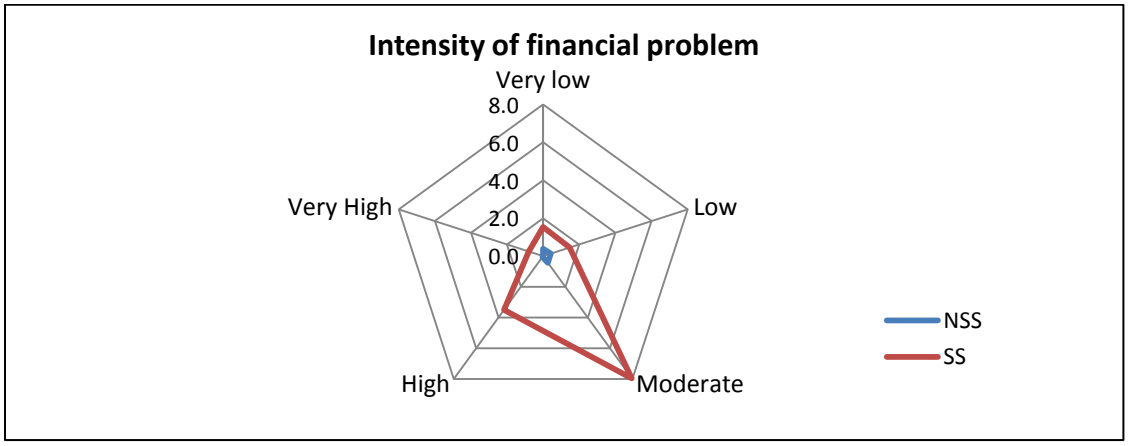
Figure 5. Intensity of effect (problem) of public facilities



Source: Field survey, 2012

In Kathmandu, compared to 15.25 per cent of respondents in SS, only 1.3per cent in NSS experienced financial problems, it means the expenditures are greater than current income. In Kathmandu, the SS graph is skewed towards moderate, where majority of those who have financial problem have experienced moderate degree of its impact (in Figure 6). Second to moderate, the SS data are distributed towards high degree of impact.

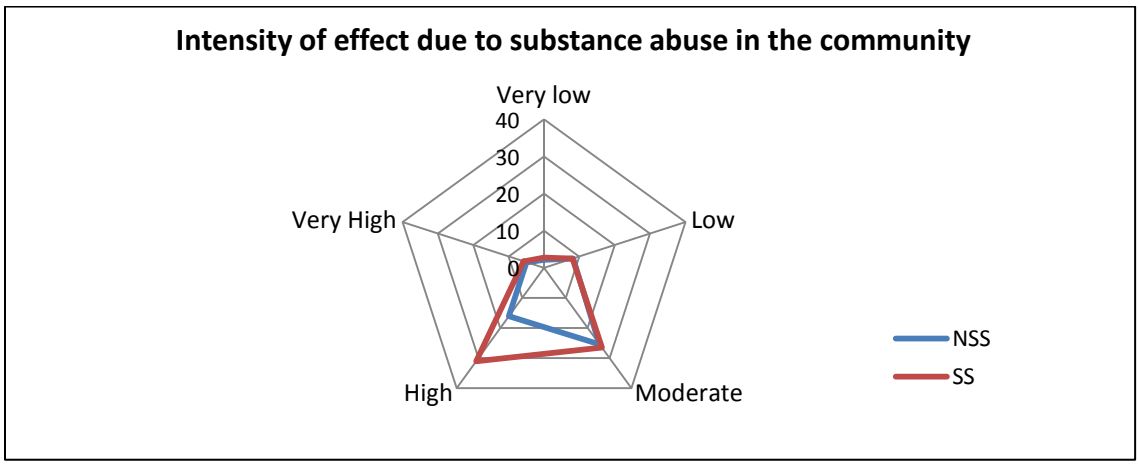
Figure 6.Intensity of effect of financial problem



Source: Field survey, 2012

While in Kathmandu, almost 75 per cent of respondents in SS and 57 per cent in NSS experienced incidence of substance abuse like drug use in their community. SS data is distributed towards high and moderate intensity, where majority of respondents in SS perceived high intensity of externality due to substance abuse in their community (in Figure 7). For NSS, a majority of respondents perceived moderate intensity of externality due to substance abuse in SS.

Figure 7.Intensity of effect related to substance abuse in the community

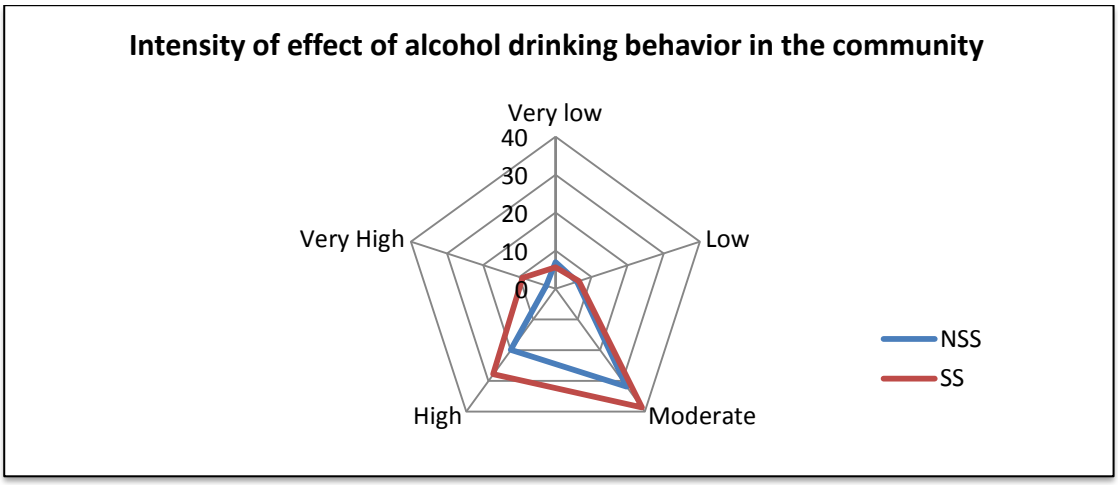


Source: Field survey, 2012

In Kathmandu, compared to 87.8 per cent of respondents in SS, 67.4 per cent in NSS experienced alcohol drinking behaviour in the community. In Kathmandu, SS and NSS graph is skewed towards moderate, which explains that majority of respondents in

both SS and NSS perceived moderate intensity of externality due to alcohol drinking behaviour in the SS (in Figure 8). Second to moderate, both settlements perceived high degree of impact due to this behaviour.

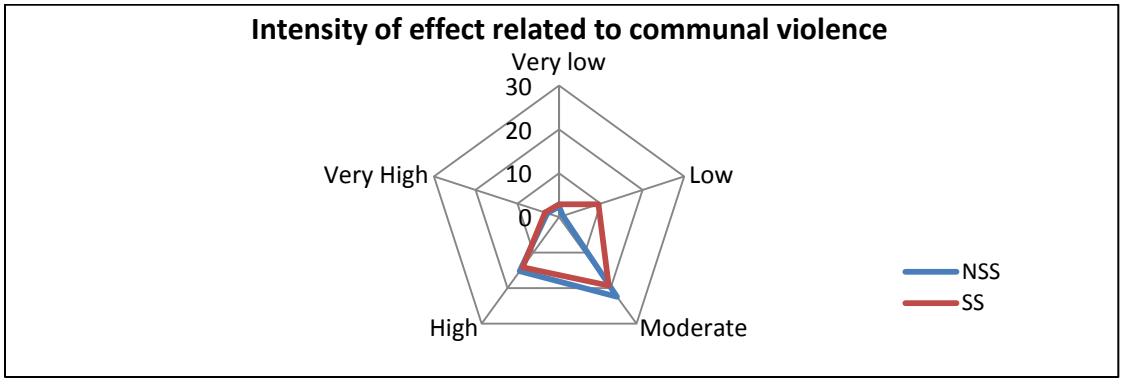
Figure 8.Intensity of effect due to alcohol drinking behavior in the community



Source: Field survey, 2012

In Kathmandu, both NSS and SS have a comparatively equal and positive response to the presence of communal violence in SS. Of those who were interviewed, 44 per cent in NSS and 49 per cent in SS experienced communal violence. In Kathmandu, a majority of respondents in both SS and NSS perceived moderate intensity of impact related to communal violence. Second to moderate, NSS and SS data is distributed towards high intensity (Figure 9).

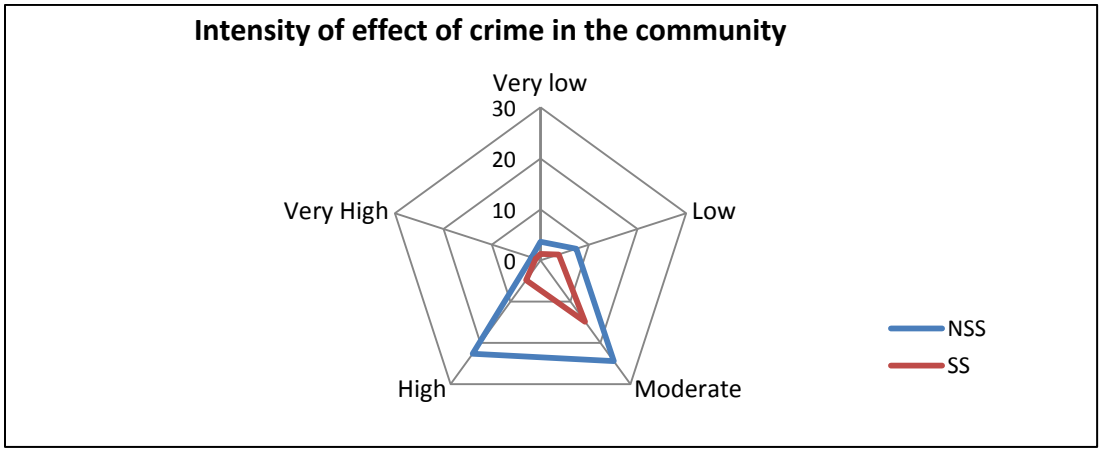
Figure 9. Intensity of effect related to communal violence



Source: Field survey, 2012

In Kathmandu, a majority of respondents in NSS perceived either high or moderate intensity of impact due to criminal activities in SS, where the data is distributed almost equally to moderate and high intensities. The SS graph is skewed towards moderate, so the majority of respondents in SS perceive moderate intensity of effect of crime in the SS (in Figure 10).

Figure 10.Intensity of effect of crime in the community



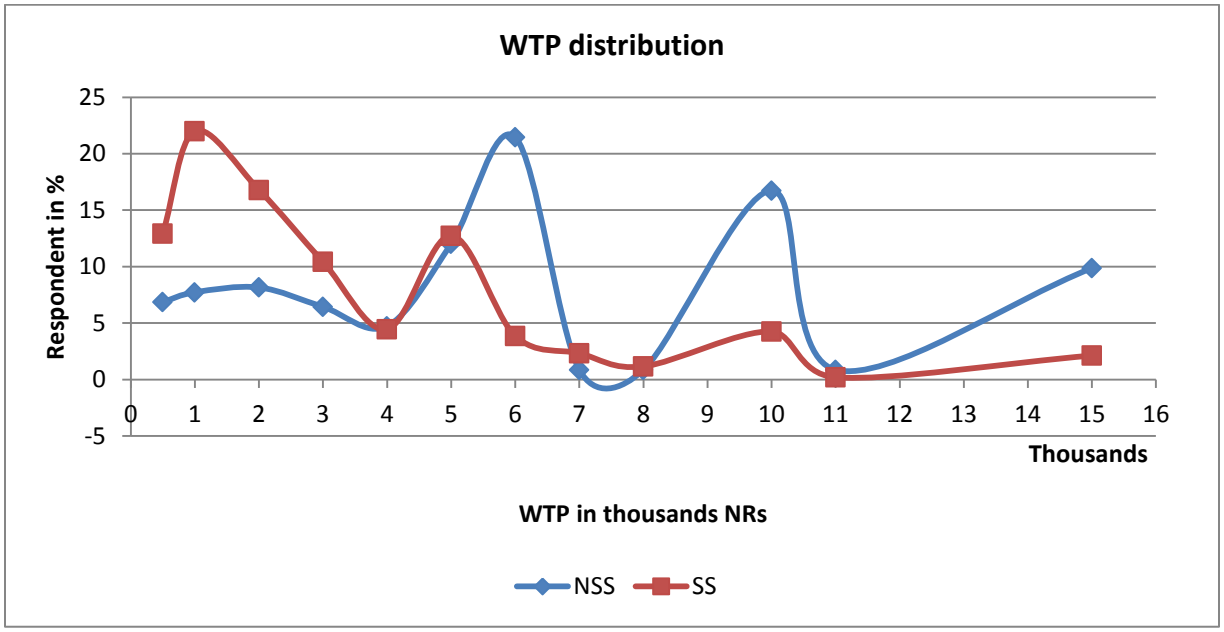
Source: Field survey, 2012

4.3 Measuring Willingness to pay

The questionnaire was developed in a logical way that explored various types of externalities produced by the various activities done by the individual, household and communities in the SS. We asked the respondent the total cost paid by the household as for alleviating negative externalities such as cost of police case, cost of hiring lawyer, fine to the community in the event of violence of community norms, and theft/robbery, among others. The costs of suffering, pain, discomfort, discrimination were not captured by the total amount they paid. Therefore, we asked willingness to pay to avoid the negative externalities produced by the various activities in the SS. If the SS respondents faced a higher degree of negative externalities, they would have liked to pay a higher amount of money to avoid such externalities. Here 'to avoid the negative externalities' is a composite commodity. A higher amount of WTP indicates a higher degree of negative externalities and vice versa. The amount of WTP quantifies negative externalities in monetary terms.

Figure 11 describes the background characteristics of the NSS and SS respondents. Thirteen per cent respondents from the SS, and 29 per cent respondents from NSS said 'yes' in the initial bid amount. Seventy three per cent respondents from SS and 37 per cent from NSS wanted to contribute less than NRs 5000. This means the initial bid amount was able to capture the maximum WTP as discussed in the methodology section. The figure compares the distribution patterns of WTP of NSS and SS.

Figure 11.WTP distribution



Source: Author, 2012

Table 6 provides the summary estimates of WTP in the SS and NSS of Kathmandu. The results confirm that the WTP of NSS is significantly higher than the WTP of SS. These WTPs of NSS is 6,597 NRs (76 USD) whereas it is 3, 141 NRs (36.19 USD) in SS. These WTPs suggest that the individual, household and community activities in the SS have produced negative externalities on themselves as well as NSS residents. They indicate that the NSS would like to pay significantly more than SS to reduce the negative externalities created by the SS.

Table 6.Statistical difference in willingness to pay in Kathmandu

Willingness to pay	Coeff.	Std. Err.	t	P>t	[95% Conf.	Interval]
Difference (SS-NSS)	**-3455.93**	**406.6809**	**-8.5**	**0.0000**	-4254.3	-2657.56
_cons	6596.996	337.7526	19.53	0.0000	5933.941	7260.05
observation	=	751				
F(1, 749)	=	72.21				
Probe > F	=	0.00				
R-squared	=	0.0879				
Adj R-squared	=	0.0867				
Root MSE	=	5155.6				

Source: Author, 2012

The results suggested that average total cost borne by the respondent, taking into account both the SS and NSS was NRs 663 (7.64 USD) due to negative externalities. The average cost paid by the residents from SS (NRS 673; 7.75USD) is higher than the average cost paid by the resident from NSS (NRs 662; 7.63USD); however the statistical test confirmed that there was no difference in cost across NSS and SS.

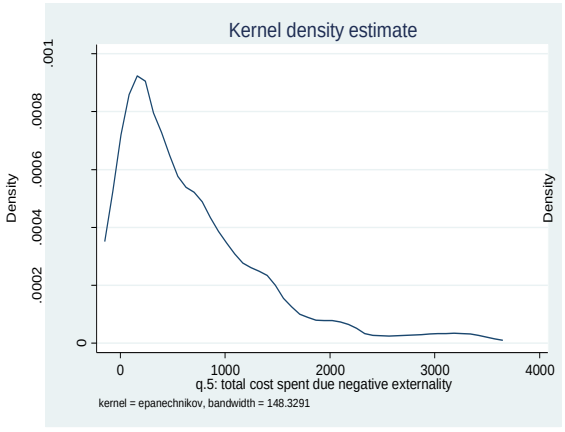
Table 7.Statistical difference in total cost in Kathmandu

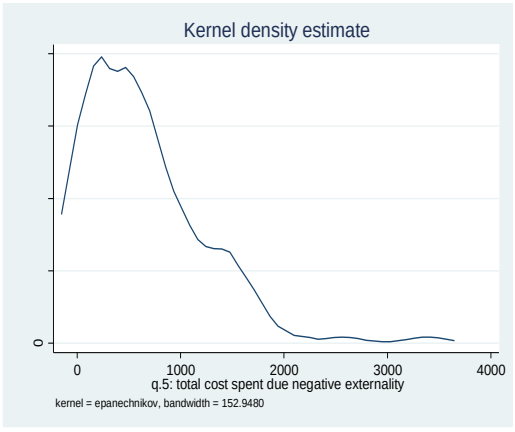
Total cost	Coeff.	Std. Err.	t	P>t	[95% Conf.	Interval]
Difference (SS-NSS)	**33.1756**	**52.46385**	**0.63**	**0.527**	**-69.81808**	**136.1693**
_cons	639.6738	43.57175	14.68	0.000	554.1365	725.2111
Number of observation	=	751				
F(1, 749)	=	0.40				
Probe > F	=	0.5274				
R-squared	=	0.0005				
Adj R-squared	=	-0.0008				
Root MSE	=	665.09				

Source: Author, 2012

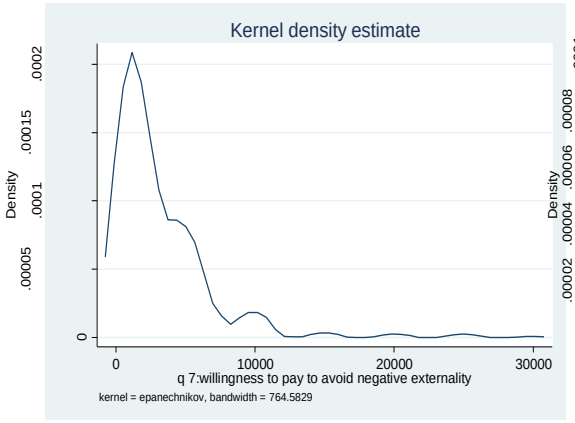
Figure 12 compares the level and distribution of total cost and WTP by NSS and SS. The distribution of total cost of SS has a long tail in the right side; however, the distribution of total cost of SS is fairly symmetric. The distributions of cost and WTP of SS are similar. The total cost and WTP of NSS have similar distribution patterns. However, the total cost and total WTP for all respondents have slightly different distributions.

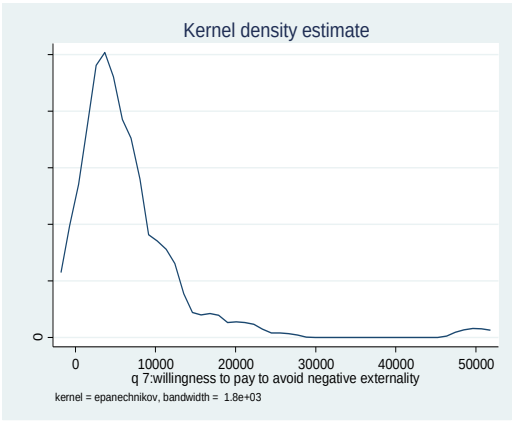
Figure 12.Comparisons of density of level of total cost and WTP (a, b, c and d)



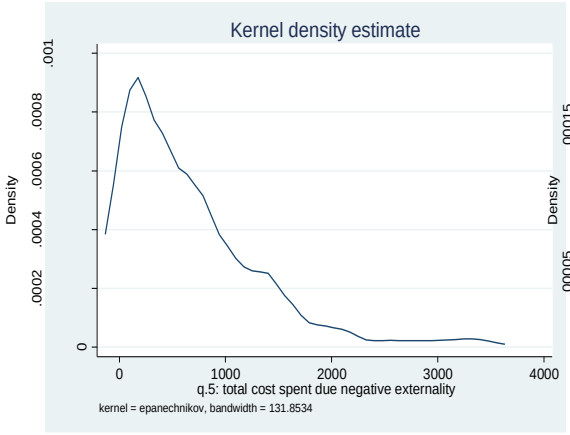


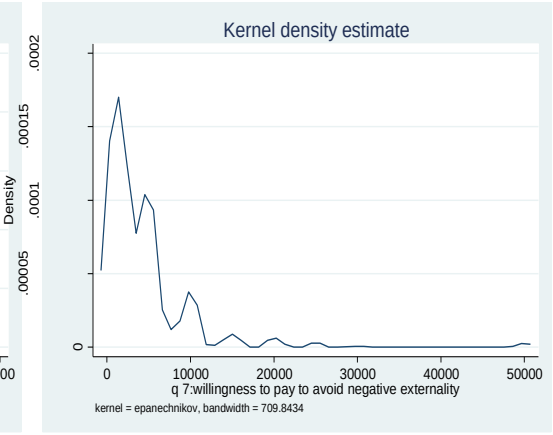
a. Distribution Total cost of SS b. Distribution of total cost of NSS





c. Distribution of WTP of SS d. Distribution of WTP of NSS





e. Distribution of Total cost of SS & NSS f. Distribution of Total WTP of SS &NSS

Source: Author, 2012

4.4 Factors determining Willingness to pay

Negative externalities imply external cost for the households. The households do not engage in consumption or production of the goods and services; however, they have to pay the cost of the process of consumption and production of the goods and services. This is not the cost of consumption or production activities that they have to pay for; however, this is the by-product of these activities. For example, individual, household and community activities in SS may require resources in terms of money or time. The study is not going to measure the value of inputs in monetary terms; however, it seeks to measure the effects of these activities in monetary terms. In general, the people who create the negative externalities through their activities do not compensate for the external cost. The incidence of negative externalities that was measured in the previous section suggests the headcount of those who were facing negative externalities from particular activities. The characteristics of the individuals, household and the community determine their activities that create the negative externalities. The people who bear the externalities were different and have had different characteristics from those who created the externalities. Therefore, an analysis of factors determining WTP is not straightforward. The individual, household or community characteristics may or may not have a direct impact on WTP or the influence can be seen in nonlinear way. To capture the nonlinearity among the variable is difficult, therefore, some of the variables can be seen to be statistically significant; but economically (i.e, in terms of their magnitude) may not be significant.

4.4.1 Multiple regression model

As mentioned above, there are various questions to capture externalities; however, all variables that are created from these questions may not be relevant to include into the WTP regression model. This may not be scientific too because there is a strong correlation among the variables. Therefore, we selected the list of variables that will capture the behaviour of the individual. The dependent and explanatory variables used in this analysis are described in Table 8 below. WTP was the dependent variable

that was elicited using an interviewer-administrated structured questionnaire. The explanatory variables include continuous variables such as household size, education; income and cost are continuous variables. Sufficiency of food consumption is described as dummy variable. Dummy variables have power to capture the non-linear relationship as well.

Table 8.Summary statistics of the dependent and independent variables

Variables	Data Unit	Obs.	Mean	Std. Dev.	Min	Max
WTP	Continuous	751	4213.276	5394.787	0	50000
Household size	Continuous	751	4.620506	1.850709	1	14
Highest education in the household	Continuous	750	10.57333	4.480408	0	20
Household last month income	Continuous	751	25236.95	29508.62	0	373000
Not sufficient for food consumption	Dummy	751	0.109188	0.312083	0	1
Total cost paid due to negative externalities	Continuous	751	662.5566	664.8278	0	3500

Source: Author, 2012

To facilitate interpretation of the factors which determine WTP, we discuss their expected signs, drawing upon economic theory and WTP studies. We expect that higher HH size imply higher level of externalities because sum of the externalities will be higher faced by the various members of the households. In order to mitigate negative externalities, higher income groups can be expected to pay more due to their affordable capacity. Similarly, we expect that educated families can reduce negative externalities more efficiently and they can predict the real cost of negative externalities that are produced by the various ways, such lack of public facilities in the community. Generally our hypothesis is that those who face a higher degree of negative externalities will pay more to avoid the negative externalities; however, tolerance capacity of the household may affect the signs of the coefficients. Therefore, in general, we expect positive sign of the coefficients of household or individual characteristics related variables such as

income of the household, cost paid due to negative externalities, household size, and education.

The assumption is that SS and NSS are both faced with negative externalities. Therefore, first, we run in a single model for the SS and NSS to examine the factors which determine their WTP; however, SS and NSS may have different regression with different intercept and slopes. We, therefore, used Chow test to determine whether the independent variables have different impacts on different subgroups (SS and NSS) of the population. For the independent cross-section data, we used the standard approach i.e., use robust standard errors. It gives the standard errors that are valid even if model errors are heteroskedasticity. Before running the regression, we estimated the pair wise correlation coefficients between independent variables. Income and not sufficient food consumption are negatively correlated; therefore, we dropped the not sufficient food consumption variable while running the OLS.

Table 9.Correlation matrix

Variables	WTP	Household size (HH size)	Highest education (HE) in household	Last month household income (HI)	Not sufficient food consumption (FC)	Total cost (TC)
WTP	1.0000					
HH size	0.1200	1.0000				
HE	0.2951	0.1931	1.0000			
HI	0.2805	0.2497	0.3631	1.0000		
FC	-0.1395	-0.0094	-0.2519	-0.1631	1.0000	
TC	0.0798	0.0426	0.0118	-0.0539	0.0274	1.0000

Source: Author, 2012

Table 10 exhibited that there were significant differences between SS and NSS respondents with respect to education, income, cost and sufficiency of consumption. All variables except household size were significant at 5 per cent level with expected sign in all models; however, magnitudes were different.

Table 10.Regression analysis (dependent variable = willingness to pay)

	Regression model for SS			Regression model for NSS			Regression model for all respondents		
Variables	Coefficient	Robust Std. Err.	P Value	Coefficient	Robust Std. Err.	P Value	Coefficient	Robust Std. Err.	P Value
HH size	52.767	96.007	0.583	198.066	204.662	0.334	71.399	93.846	0.447
Education	99.025	37.051	0.008	400.886	127.336	0.002	260.858	48.472	0.000
Income	0.043	0.016	0.006	0.024	0.016	0.122	0.037	0.013	0.005
Total cost	0.615	0.221	0.004	1.19	0.787	0.130	0.706	0.252	0.005
Constant	825.340	440.699	0.062	-1848.375	1912.113	0.335	-262.625	533.302	0.623
	Number of obs	=	518	Number of obs	=	232	Number of obs	=	750
	F(4, 512)	=	9.79	F(4, 227)	=	6.46	F(4, 745)	=	19.98
	Prob > F	=	0.000	Prob > F	=	0.000	Prob > F	=	0.000
	R-squared	=	0.0773	R-squared	=	0.071	R-squared	=	0.1300
	Root MSE	=	3510.7	Root MSE	=	7289.700	Root MSE	=	5046.7

Source: Author, 2012

The regressors are jointly statistically significant, because the overall F statistics for all models have p values of 0.000. The model is significant in explaining changes in WTP. However, much of the variation is unexplained with R squared being only 0.08. We performed Chow test, F (2,738) = 1.02; Prob>F = 0.3606, it is not statistically significant at 5 per cent level, which means that there is no structural change.

4.4.2 Logit model

Under Logit models, all variables other than household size are statistically significantly different from zero at 5 per cent level with expected sign; however, income and cost are not economically significant as found in the previous model. One of the benefits of the Logit model is that it captures the nonlinearity nature of the variables.

Table 11.Results of logistic regression

Variables	Regression model for SS			Regression model for NSS			Regression model for all respondents		
	Coefficient	Marginal effects	P Value	Coefficient	Marginal effects	P Value	Coefficient	Marginal effects	P Value
HH size	0.0350 (0.0624)	0.0066	0.574	0.0209 (0.0775)	0.0048	0.788	0.017 (0.048)	0.0045	0.725
Education	0.1003 (0.0298)	0.0190	0.001	0.1260 (0.0445)	0.0287	0.005	0.150 (0.023)	0.0342	0.000
Income	0.0001 (0.0000)	0.0000	0.008	0.0001 (0.0000)	0.001	0.036	0.001 (0.000)	0.0001	0.000
Total cost	0.0002 (0.0001)	0.0000	0.095	0.0002 (0.0003)	0.0001	0.575	0.001 (0.000)	0.0001	0.130
Constant	-2.6743 (0.3589)		0.000	-1.9616 (0.7304)		0.007	-2.868 (0.320)		0.000

Log pseudolikelihood	-282.136	Log pseudolikelihood	-142.351	Log pseudolikelihood =	-430.991
Number of obs	518	Number of obs	232	Number of obs	750
Wald chi2(4)	33.46	Wald chi2(4)	17.02	Wald chi2(4)	91.63
Prob > chi2	0.000	Prob > chi2	0.0019	Prob > chi2	0.000
Pseudo R2	0.0604	Pseudo R2	0.0694	Pseudo R2	0.1338

Source: Author, 2012

The table 11 presents the marginal effects of the variables. Marginal effects suggest the impact of a small change in independent variables such as education, income and cost of externalities on the probability of a change in WTP more than 5000 Nepalese rupees. A one unit change in education leads to the probability of a change in WTP by more than 5000 NRs compared to a WTP less than 5000 NRs by 0.019, 0.0287 and 0.0342 for SS, NSS and all respondents respectively. A higher level of education is more likely to have positive effects on WTP. In other words, educated people want to reduce negative externalities. The iteration log shows fast convergence in four iterations in all models. Wald chi2 for all models is significant at 5 percent level.

4.4 Policy implications

As mentioned above, the net economic benefits of reducing the negative externalities can be estimated using the difference between the WTP for reduction of negative externalities and the actual cost paid due to negative externalities. The results suggested that average cost of negative externalities for per household was NRS 662.56 and average WTP per household was NRs 4213.28. An annual net economic benefit of reducing negative externalities for per household is NRS 3550.72. The annual social benefit for Kathmandu due to reducing negative externalities can be estimated by using following equation.

$WTP_{total} = netbenefit_{hh} * total\ HH * R_{wtp}$ … … … (4)

Where, WTP_{total} = total societal benefits; $netbenefit_{hh}$ = total net benefit per household (NRS 3550.72) R_{wtp} = average percentage rate of respondents who expressed WTP) to reduce the externalities and who have paid cost of externalities (91 percent household either paid cost of externalities or expressed interest to WTP. A recent census 2010 revealed that the total number of households in Kathmandu is 436 344 (CBS, 2011). Therefore, the annual total societal benefit of reducing externalities is 1409.895 million Nepalese rupees (16.39 million USD).

The allocation of resources for the intervention of reducing the negative externalities in the SS would improve the societal welfare. The ratio of any two parameters from the logistic regression shows marginal rates of substitution between attributes, for example, the ratio of the coefficient of education and income gives us the possible substitution effect to reduce the externalities (or to increase WTP). The results suggested that education is the most powerful instrument to improve societal benefit through reducing negative externalities.

Table 12.Elasticity of the variables with respect to WTP

variables	Elasticity	Std. Err.	P values
Education	1.0080	0.16639	0.000
Income	0.3323	0.08876	0.000

Source: Author, 2012

The elasticity of education is 1.01, so a 1 per cent increase in education level of the household is associated with a 1 per cent increase in societal welfare due to reduction in negative externalities. Similarly, a 10 per cent increase in income is associated with a 3.25 per cent increase in societal benefit. The policy that helps to increase education level including awareness with counseling program, access to information, campaign programs are needed in the SS.

5. Results and Interpretation of Quito

Similar to the analysis in Kathmandu, we measured the incidence of externalities faced by the SS and NSS for Quito. The differences were statistically tested by using t-test to confirm whether SS or NSS faced the negative externalities from their activities. The intensity of the externalities is conditional upon incidence; therefore, to measure the distribution of intensity among the various degrees such as very high, high, moderate, low and very low, weightage of incidences were used. The intensity, i.e., depth of the externalities, along with the incidence level and their corresponding skewedness is shown in the charts.

5.1 Incidence of externalities

A greater proportion of respondents, 14 per cent of respondents in NSS and 4.3per cent in SS are members of various political/social organizations and 25 per cent of respondents in NSS and 20.6 per cent in SS perceived negative externality when being 'utilized' by these political/social organizations. Respondents in both settlements agreed that they give some time to such political/social organization and some of them get paid for their involvement. Though these results are interesting and important, they are not statistically significant (Table 13).

Table 13.Individual/Household Characteristics

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Member of political org	14.0%	0.349	4.3%	0.204	-9.7%	0.000
2	Time given to political org	7.1%	0.267	6.3%	0.250	-0.9%	0.925
3	Utilization of your time by political org	6.0%	0.239	9.0%	0.286	3.0%	0.980
4	Payment by political org	25.0%	0.447	20.2%	0.404	-4.8%	0.669
5	Negative externality when utilized by political org	25.0%	0.447	20.6%	0.407	-4.4%	0.698

Source: Field survey, 2012

The results suggest that the respondents from SS in Quito perceived negative externalities when being utilized by the political parties. The respondents from NSS in Quito are the members of political organization (Table 14).

Table 14.Community Characteristics

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Incidences of disease outbreaks	0.0%	0.000	8.6%	0.281	8.6%	0.002
2	Access to public facilities	95.0%	0.219	97.5%	0.157	2.5%	0.172
3	Not enough food due to financial problem	39.0%	0.490	26.3%	0.441	-12.7%	0.009

Source: Field survey, 2012

Only the respondents in SS (8.6 per cent) identified the presence of communicable disease outbreak in their communities. This data has been helpful in verifying a major incidence that causes negative externality and the results are

significant as the P-value is less than 0.05. Almost all respondents in both settlements had access to public facilities, but the result is not significant as the P-value is more than 0.05. As an interesting finding, 39 per cent of respondents in NSS and 26.3 per cent in SS encountered incidence of "Not having enough food due to financial problem". Both results are significant (Table 15).

Table 15.Incidence due to Individual/Household/ Community behavior

SN	Variable	NSS		SS		Difference	P-Value
		MEAN	SD	MEAN	SD		
1	Inappropriate substance use in SS	15.0%	0.36	63.2%	0.483	48.2%	0.00
2	Substance abuse in NSS	22.3%	0.419	43.4%	0.496	21.1%	0.00
3	Substance abuse in HH	8.0%	0.273	12.8%	0.334	4.8%	0.18
4	Gambling in SS	11.2%	0.318	21.4%	0.411	10.2%	0.03
5	Gambling in HH	11.0%	0.315	10.1%	0.302	-0.9%	0.79
6	Alcohol drinking in SS	25.8%	0.44	69.1%	0.463	43.3%	0.00
7	Alcohol drinking in HH	10.1%	0.303	21.9%	0.413	11.8%	0.01
8	Gang fighting in SS	21.6%	0.414	52.9%	0.5	31.3%	0.00
9	Violence within HH in SS	17.6%	0.383	35.1%	0.478	17.5%	0.00
10	Violence in HH	11.0%	0.315	14.5%	0.352	3.5%	0.35
11	Criminal activities in SS	20.8%	0.408	65.4%	0.476	44.5%	0.00
12	Criminal activities in HH	20.5%	0.406	21.2%	0.409	0.8%	0.87
13	Criminal activities in NSS	25.0%	0.435	57.6%	0.495	32.6%	0.00
14	Prostitution in SS	3.0%	0.172	12.7%	0.333	9.6%	0.02

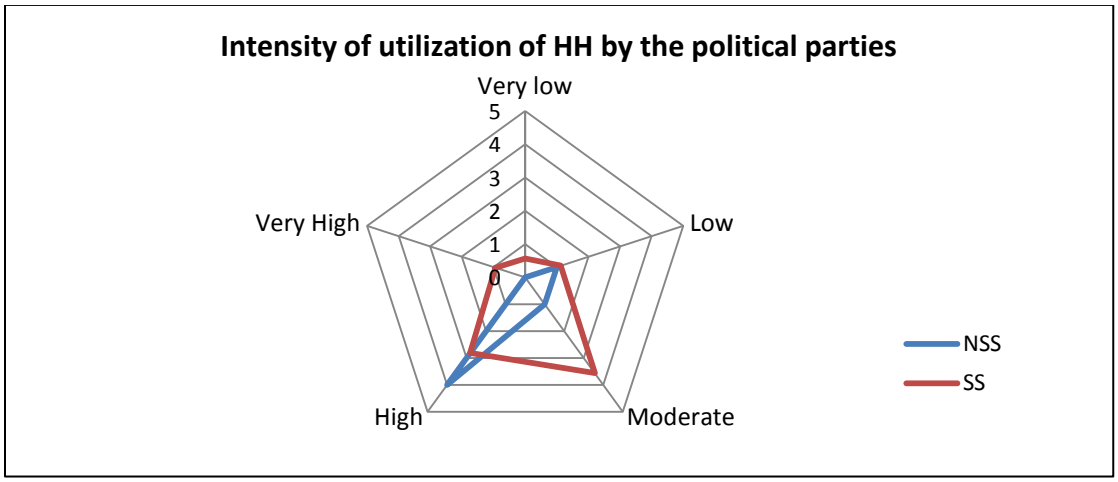
Source: Field survey, 2012

Questions related to incidences due to individual/HH/communal behaviour were helpful in identifying key issues causing negative externalities to the residents. The results have been helpful in identifying degree of impact of these incidences in both settlements. Some findings are: 15 per cent of respondents in NSS agreed to presence of substance abuse in SS, which for SS was significantly higher, at 63.2 per cent. About 20.8 per cent of respondents in NSS perceived presence of criminal activities within SS, which for SS are again significantly higher, 65.4 per cent. Only 3 per cent of respondents in NSS identified presence of prostitution in SS compared to 12.7 per cent of respondents in SS (Table 15).

5.2 Intensity of externalities

The results suggested that the involvement of the public in political/social organizations is relatively low in Quito. Of the respondents, only 6 per cent in NSS and 9 per cent in SS were of the view that they were being utilized by such organizations. SS data is distributed in moderate and high intensity, and most of the respondents perceived a moderate degree of utilization by such organizations. Interestingly, in Quito, the NSS graph is skewed towards high intensity, which is higher than that of SS, as a majority of respondents in NSS perceived a high degree of utilization by such organizations.

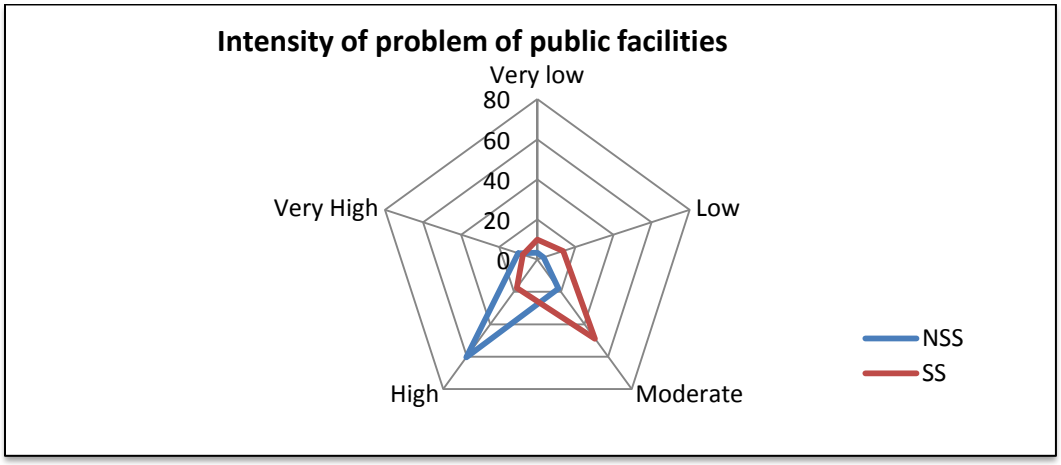
Figure 13. Intensity of utilization of HH by political and social organization



Source: Field survey, 2012

The data results in Quito show that the disease outbreak incidence is low, and intensity of externalities due to disease outbreak was distributed uniformly to five intensities, and majority of respondents perceived moderate degree of impact due to such incidence in SS; however, in NSS, no incidence and intensity were found. In Quito, the NSS graph is skewed towards high intensity such that a majority of respondents in NSS perceived a high degree and those in SS perceived a moderate degree of impact due to problems related to public facilities (figure 14).

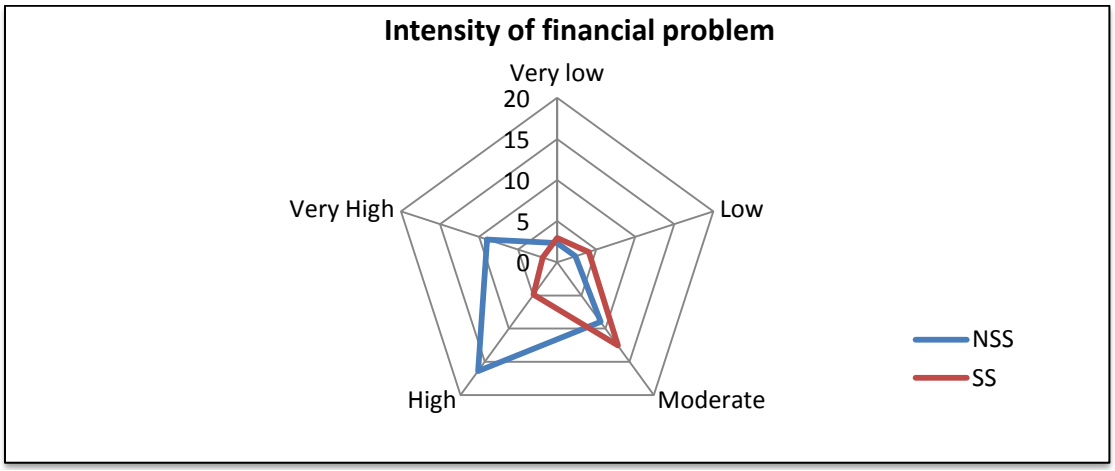
Figure 14.Intensity of effect (problem) of public facilities



Source: Field survey, 2012

The results surprisingly showed that 39 per cent of respondents in the NSS had financial problems as compared to 26.3 per cent in SS. A majority of respondents from NSS perceived a high degree of impact due to their financial problem than those in SS. Second to high, the NSS data in Quito are distributed to moderate and very high intensity. In the SS of Quito, a majority of respondents perceived moderate intensity of impact due to their financial problems (figure 15).

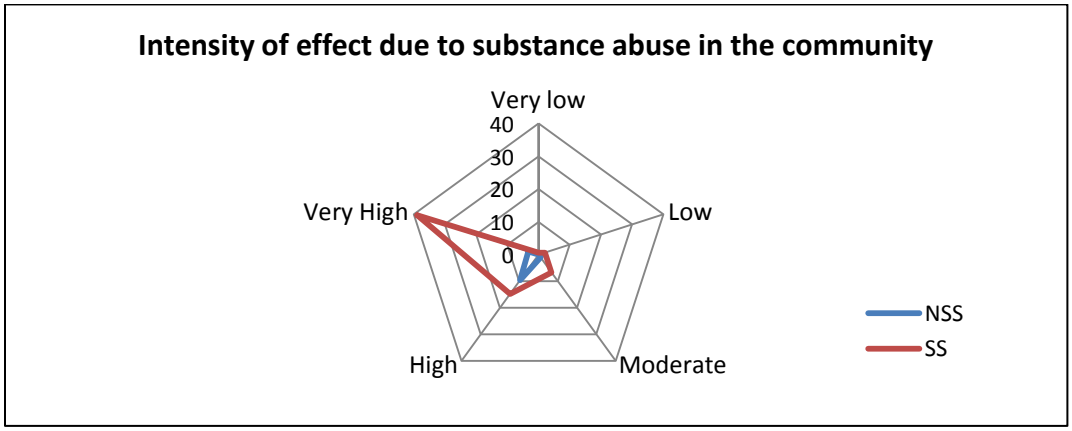
Figure 15.Intensity of effect of financial problem



Source: Field survey, 2012

The results showed that 53 per cent of respondents in SS and only 15 per cent in NSS experienced incidence substance abuse like drug use in their community to be expected. The SS graph is skewed towards very high intensity, which means majority of respondents in SS of Quito perceived a very high intensity of externality due to incidence of substance abuse in their community (figure 16).

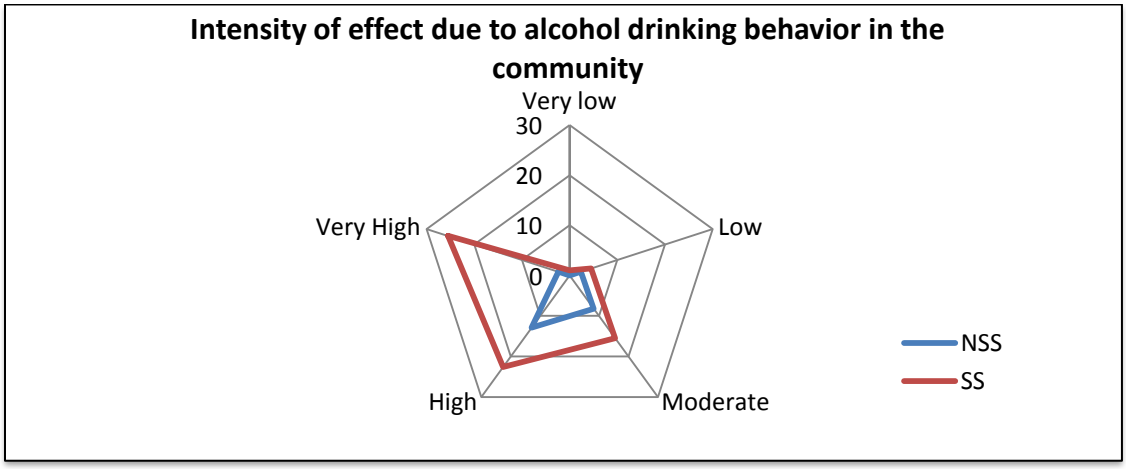
Figure 16.Intensity of effect related to substance abuse in the community



Source: Field survey, 2012

In Quito, compared to 69per cent of respondents in SS with 25.8 per cent in NSS have experienced alcohol drinking behaviour in the community. Data shows that incidence of alcohol consumption is relatively low in Quito (in both SS and NSS). A majority of respondents in SS perceived very high intensity of externality due to alcohol drinking behaviour in the SS. Second to very high, SS data is distributed to high and then to moderate intensity. For NSS, majority of respondents have perceived high degree of impact due to alcohol drinking behaviour in the SS (figure 17).

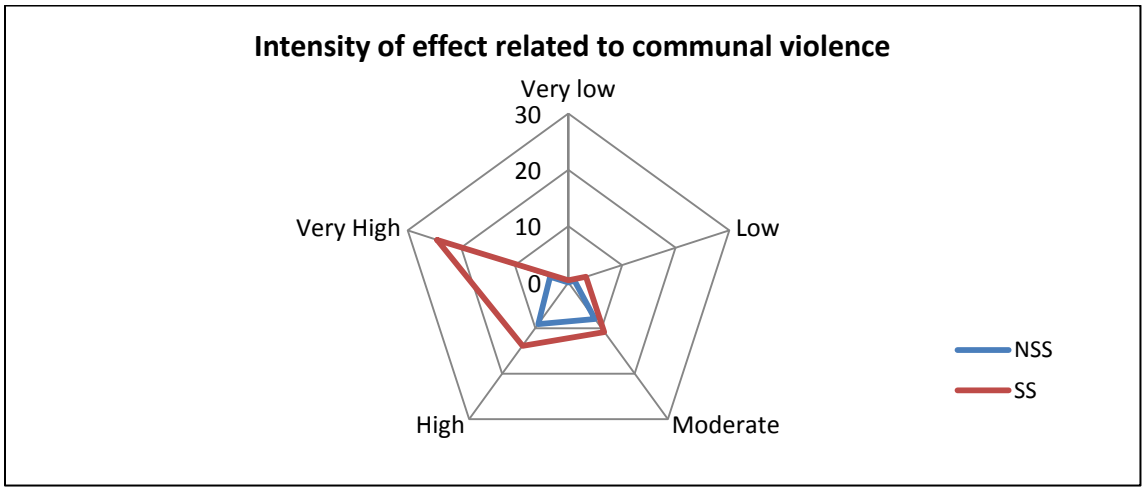
Figure 17.Intensity of effect due to alcohol drinking behavior in the community



Source: Field survey, 2012

The results showed that 53 per cent of respondents in SS and only 21.6 per cent in NSS experienced presence of communal violence. SS graph is skewed towards very high, which means majority of respondents in SS have perceived very high intensity of effect related to communal violence in SS (in Figure 18). Second to very high, SS data is distributed to high intensity. In case of NSS, a majority of respondents perceived a high degree of impact due to communal violence in SS.

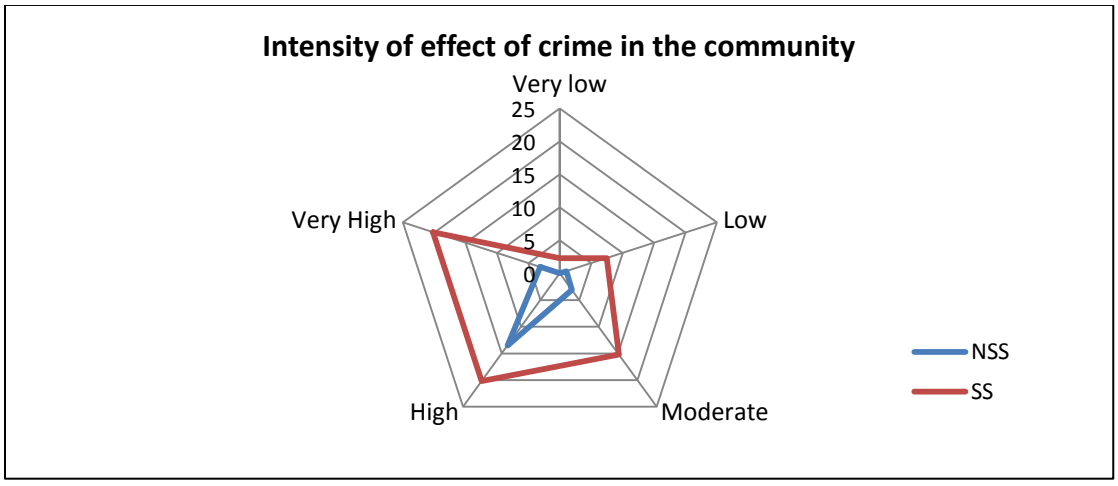
Figure 18.Intensity of effect related to communal violence



Source: Field survey, 2012

A majority of respondents in SS perceive to have very high and high intensity of impact due to presence of criminal activities in SS. For NSS, the graph is skewed towards high, which means majority of respondents in NSS perceived a high intensity effect due to crime in SS.

Figure 19.Intensity of effect of crime in the community



Source: Field survey, 2012

5.3 Measuring willingness to pay

The sample data showed that the WTP of SS is higher than WTP of NSS; however, it was not statistically significant. The average WTP is 680 USD for SS and 22 USD for NSS. This means that SS respondents faced more negative externalities than NSS. It confirms that SS will be more responsible to reduce the negative externalities created by them. The results suggested that there was a statistically significant difference between average WTP of SS and that of the NSS.

Table 16.Statistical difference in WTP

Willingness to pay	Coif.	Std. Err.	t	P>t	[95% Conf.	Interval]
Difference (SS-NSS)	657.9267	343.7435	1.91	0.056	-17.04346	1332.897
_cons	21.74	316.5473	0.07	0.945	-599.8281	643.3081
Number of obis	=	658				
F(1, 644)	=	3.66				
Probe > F	=	0.0561				
R-squared	=	0.0056				
Adj R-squared	=	0.0040				
Root MSE	=	3165.5				

Source: Author, 2012

Table 17 shows the average economic cost of due to consequences of identified incidence of the externalities. The cost exhibits the direct cost bored by the household due to negative externalities such as incidence of diseases, incidence of crime, incidence of police cases etc. Average cost due to externalities paid by NSS was 23USD; however, it was 379 USD for SS. The average cost is statistically significant at 10 per cent level.

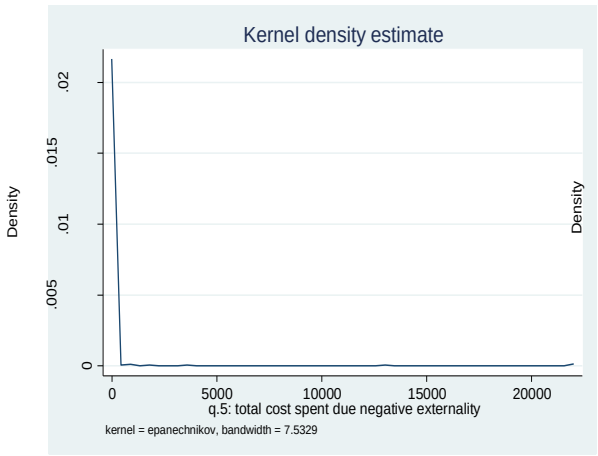
Table 17.Statistical difference in cost

Cost	Coif.	Std. Err.	t	P>t	[95% Conf.	Interval]
Difference (SS-NSS)	355.9981	216.2781	1.65	0.100	-68.68276	780.6789
_cons	22.66	199.1667	0.11	0.909	-368.4211	413.7411
Number of obis	=	658				
F(1, 644)	=	2.71				
Probe > F	=	0.1002				
R-squared	=	0.0041				
Adj R-squared	=	0.0026				
Root MSE	=	1991.7				

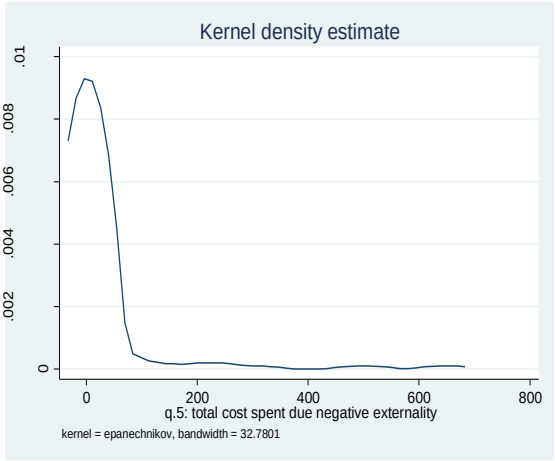
Source: Author, 2012

Figure 20 exhibits the distribution of cost and willingness to pay across the SS and NSS. Figure 20 (a) suggests that most of the respondents from SS paid zero cost and WTP is also almost zero. The distribution of cost determines the distribution of WTP.

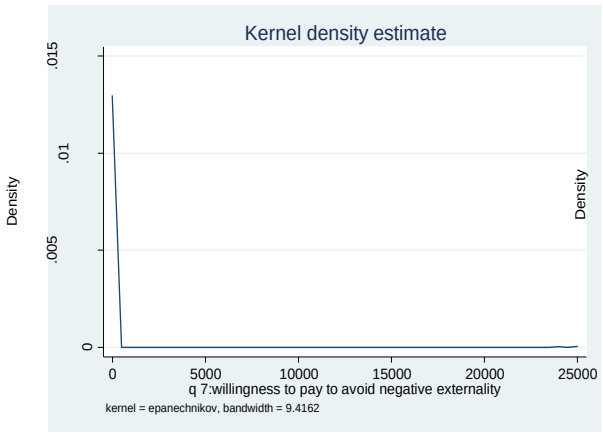
Figure 20.Comparisons of density of level of total cost and WTP(a, b, c and d)



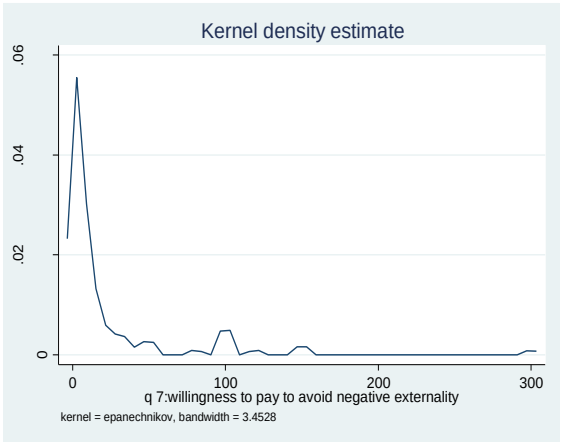
b.Distribution Total cost of SS



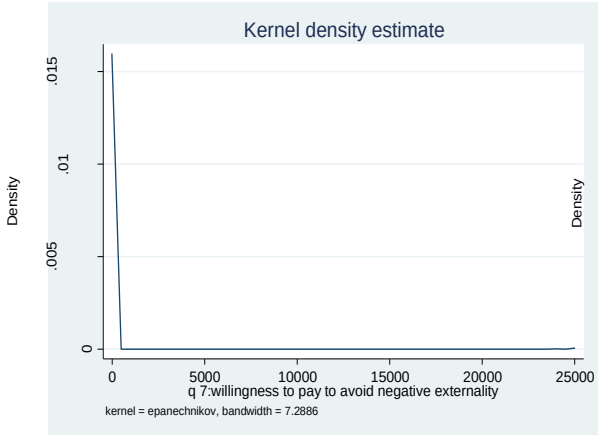
b. Distribution of total cost of NSS



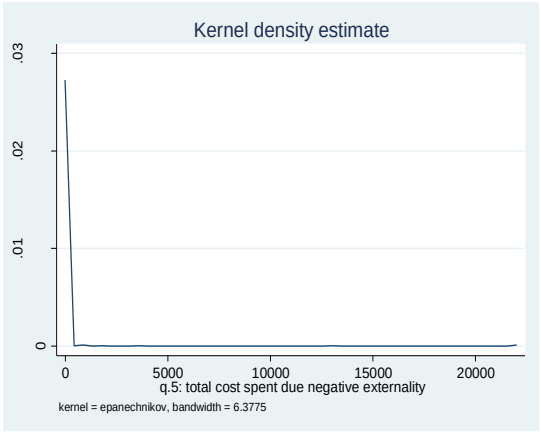
c. Distribution of WTP of SS



d. Distribution of WTP of NSS



e. Distribution of Total cost of SS & NSS



f. Distribution of Total WTP of SS & NSS

Source: Author, 2012

5.3.1 Multiple regression models

The table showed that average household size was 3.44 persons and on average, the highest education attained in the household was 12 years of education. The average last month income of the respondent was almost 751USD. The observation numbers indicated that there were some missing variables.

Table 18.Summary statistics

Variables	Data Unit	Obs.	Mean	Std. Dev.	Min	Max
WTP	Continuous	658	579.6778	3171.883	0	25000
Household size	Continuous	405	3.441975	1.295352	1	9
Highest education in the household	Continuous	646	11.63622	3.224305	0	22
Household last month income	Continuous	580	750.9826	597.0765	30	5000
Not sufficient for food consumption	Dummy	655	.2824427	.4505316	0	1
Total cost paid due to negative externalities	Continuous	658	324.555	1994.256	0	22000

Source: Author, 2012

The correlation matrix showed the household size and education had positive associations; however, all economic variables have negative associations with WTP. Income and not sufficient for food consumption are negatively associated and are statistically significant at 5 % level. Therefore, we dropped the not sufficient for food consumption variable while running the OLS.

Table 19.Correlation matrix

Variables	WTP	Household size (HH size)	Highest education (HE) in household	Last month household income (HI)	Not sufficient food consumption (FC)	Total cost (TC)
WTP	1.0000					
HH size	0.0411	1.0000				
HE	0.0377	-0.0253	1.0000			
HI	-0.0102	0.1645	0.4185	1.0000		
FC	-0.0033	-0.0919	-0.1135	-0.1132	1.0000	
TC	-0.0235	0.0451	-0.0197	0.0666	0.0083	1.0000

Source: Author, 2012

The results exhibited that there were significantly differences between SS and NSS respondents with respect to education, income, cost and sufficiency of consumption. All variables except household size were significant at 5 per cent level with expected sign in all models; however, magnitudes were different. The results of the three regression models suggested that none of the variables were statistically significant to determine the WTP because of nonlinearity. We, therefore, used log of WTP to estimate the models. The results suggested that income and education were statistically significant at 5 per cent level for SS model; however, only income was statistically significant at 5 per cent for NSS model. For combined model, education and household size are significant at 5 per cent level. The result suggests that household size has positive influence on WTP. Similarly, higher levels of education have positive impact on WTP of the household. Income has expected signs with statistically significant; however income is not economically significant (in terms of its magnitude).

Table 20.Regression analysis (dependent variable = log willingness to pay)

	Regression model for SS			**Regression model for NSS**			**Regression model for all respondents**		
Variables	Coefficient	Robust Std. Err.	P Value	Coefficient	Robust Std. Err.	P Value	Coefficient	Robust Std. Err.	P Value
HH size	0.120	0.080	0.142	-0.142	0.170	0.408	0.213	0.078	0.005
Education	0.074	0.031	0.018	0.072	0.058	0.211	0.088	0.027	0.001
Income	0.0002	0.000	0.080	0.0007	0.000	0.062	0.0001	0.000	0.286
Total cost	-0.0006	0.001	0.425	0.0004	0.001	0.632	0.000	0.001	0.916
Constant	2.032	0.450	0.000	0.872	0.776	0.265	1.219	0.402	0.004
	Observations = 199			Observations = 73			Observations = 272		
	F(4, 194) = 4.7			F(4, 73) = 5.71			F(5, 267) = 8.22		
	Prob > F = 0.0004			Prob > F = 0.0005			Prob > F = 0.000		
	R-squared = 0.0940			R-squared = 0.1824			R-squared = 0.087		
	Root MSE = 1.1945			Root MSE = 1.3306			Root MSE = 1.3971		

Source: Author, 2012

5.3.2 Logit model

Under Logit models, all variables other than household size are statistically significantly different from zero at 5 per cent level with expected sign; however, income and cost are not economically significant as found in the previous model. The table 5.10 presents the marginal effects of the variables. Marginal effects suggest the one unit change in dependent variable due to one unit change in independent variables. One unit of change in education leads to the probability of change in WTP by more than 50 USD compared to WTP less than 50USD by 0.0255, 0.00049 and 0.0217 for SS, NSS and all respondents respectively. A higher level of education is more likely to have positive effects on WTP. In other words, educated people want to reduce negative externalities with higher amount of money. The iteration log shows fast convergence in four iterations in all models. Wald chi2 for all models is significant at 5 per cent level.

Table 21.Results of logistic regression

	Regression model for SS			**Regression model for NSS**			**Regression model for all respondents**		
Variables	Coefficient	Marginal effects	P Value	Coefficient	Marginal effects	P Value	Coefficient	Marginal effects	P Value
HH size	0.074 (0.110)	0.0099	0.501	-0.390 (0.419)	-0.0327	0.352	0.125 (0.104)	0.0157	0.230
Education	0.213 (0.064)	0.0281	0.001	0.059 (0.108)	0.0049	0.586	0.178 (0.056)	0.0223	0.001
Income	0.0006 (0.0002)	0.0001	0.022	0.001 (0.001)	0.0001	0.401	0.0001 (0.0002)	0.0001	0.079
Total cost	-0.004 (0.003)	-0.0006	0.133	-2.301 (1.268)	-0.0327	0.070	-0.004 (0.002)	-0.0005	0.101
Constant	-4.740 (0.965)		0.000	-0.390 (0.419)		0.352	-4.521 (0.817)		0.000
Log pseudolikelihood	-122.990		Log pseudolikelihood	-27.2026		Log pseudolikelihood	-153.225		
Number of obs	279		Number of obs	85		Number of obs	364		
Wald chi2(4)	25.67		Wald chi2(4)	2.63		Wald chi2(4)	25.14		
Prob > chi2	0.0000		Prob > chi2	0.6211		Prob > chi2	0.0000		
Pseudo R2	0.1120		Pseudo R2	0.0527		Pseudo R2	0.082		

Source: Author, 2012

5.4 Policy implication

Similar to what has been done earlier, net economic benefits of reducing the negative externalities can be estimated using the difference between the WTP for reduction of negative externalities and the actual cost paid due to negative externalities. The results suggest that the average cost of negative externalities per household was USD 324.56 and average WTP per household was USD 579.68. An annual net economic benefit of reducing negative externalities for per household is USD 255.13. The annual social benefit for Quito due to reducing negative externalities can be estimated by using the following equation.

$WTP_{total} = netbenefit_{hh} * total\ HH * R_{wtp}$ … … … (6)

Where, WTP_{total} = total societal benefits; $netbenefit_{hh}$ = total net benefit per household (USD 255.13) R_{wtp} = average percentage rate of respondents who are WTP to reduce the externalities and who have paid cost of externalities (52 percent household either paid cost of externalities or showed interest to WTP. A recent census Ecuador 2010 revealed that the total number of households in Quito is 560,927 (Ecuador Government, 2010). Therefore, the annual total societal benefit of reducing externalities is 74.42 million USD.

The allocation of resources for the intervention of reducing the negative externalities in the SS would improve the societal welfare. The ratio of any two parameters from the logistic regression shows marginal rates of substitution between attributes, for example, the ratio of the coefficient of education and income gives us the possible substitution effect to reduce the externalities (or to increase WTP). The results suggested that education is the most powerful instrument to improve societal benefit through reducing negative externalities.

Table 22.Elasticity of the variables with respect to WTP

variables	Elasticity	Std. Err.	P values
Education	1.851	0.579	0.001
Income	0.268	0.154	0.081

Source: Author, 2012

A 10 per cent in education level of the household is associated with 18.51 per cent increase in societal welfare due to reduction in negative externalities. Similarly, a 10 per cent increase in income is associated with a 2.68 per cent increase in income. The policy that helps to increase education level including awareness with counseling program, access to information, campaign programs are needed in the SS.

6. Discussion and Conclusions

Rapid urbanization has led to a spurt in the number of squatter settlements. Though squatter settlements contribute to a city's economy (Sridhar and Reddy, 2012, 2013), studies suggest that these unorganized settlements produce negative externalities such as despoilment of the natural environment, devaluation of property and increase in the propensity of disease outbreak and crimes (Tabuchi and Thisse , 2002; Clark and Cosgrove, 1991; Habitat, 2007; Perlmanet al, 1998; Sengupta, 2006). The policy makers aim for developing their cities and minimizing the negative externalities. Unfortunately, there are not sufficient studies to guide them. To improve understanding of the urban externalities issues a credible study is necessary. The study addresses two interlinked questions: what intensity of negative externalities is experienced by the squatters from their behavior patterns and; what intensity of negative externalities are experienced by the neighbors from squatters. Data were collected through structured questionnaires administered to 751 randomly selected households in Kathmandu, Nepal and to 558 randomly selected households in Quito, Ecuador. There are some limitations in this study; for example, a qualitative study was conducted only in Kathmandu. Kathmandu based research design was implemented in

Quito, consequently some issues related to Quito were not captured. Differences in political, social, cultural and economic contexts between two countries and cities made the challenges for the researchers to design the research instruments. Concurrently, limited time and resources compromised the research study.

The study seeks to measure the incidence and intensity of externalities of various components of individual, household and community activities and to estimate their costs to the society. As found other studies on negative externalities in urban setting, the results suggest that WTP of NSS is significantly higher than WTP of SS indicating negative externalities. Incidence and intensity of externalities are higher level in Kathmandu than Quito. Reduction of negative externalities in SS means creating positive externalities in the city. Education and income have a positive impact on WTP. Education has greater power to influence WTP; for example, a 10 per cent in education level of the household is associated with 18.72 per cent increase in societal welfare due to reduction in negative externalities in Quito and 10 per cent in Kathmandu.

Reduction of negative externalities through introduction of an intervention by the local government or local community ensures the societal welfare. The study found that almost 91 per cent residents from Kathmandu and 52 per cent residents from Quito are interested to contribute to reduce the negative externalities. After reduction of negative externalities, the household will gain the flow of benefits; for example, a household can get the benefits to the extent of an average of 41.29 USD per year in Kathmandu and on an average of 255 USD per year in Quito. Total societal benefits from improvement in positive externalities are 16.41 Million USD for Kathmandu and 1409.895 millions in Quito. This benefit encourages the government or other agencies to allocate the budget to reduce the negative externalities. The result suggests that the investment in reduction of negative externalities is beneficial for the society and this is a good opportunity for the government and international partners.

The study provides a fresh look at negative externalities of SS in the process of urbanization. The study provides valuable information to the policy makers through this comparative study, for example, negative externalities and problem SS can be solved

through internalization process. For example, Quito has a long experience in solving the issues of SS through local government. Quito has a chronic SS problem; however, it is reducing recent years. The problem is increasing in Kathmandu. Quito mobilized the NSS people through political and social organization. SS are no longer supported by the local community.

Quito has a success story in solving the problem. The instrument to success is the coupling of increasing shelter or enhancing supply policies in conjunction with tough sanctions against squatting. Increasingly informal settlements in Quito are being regularized. The metropolitan government is encouraging developers to provide low cost housing units ($20,000 USD or less while planning to construct basic infrastructure (site and services) ahead of squatter settlements (World Bank, 2008). A different story is found in Kathmandu, for example, where the residents from SS are members of political parties and social organization. The political parties or social organization in turn provided direct and indirect support to the SS.

In Quito, the government has taken both preventive and inclusive measure to decrease the population of squatter settlements. As a preventive measure, multiple active and passive approaches have been used to discourage people from squatting. As a passive approach, the Government of Ecuador is encouraging developers to provide low cost housing units for the migrant workers to the city. In case of Kathmandu, migrant workers have faced unaffordable rentable space that forced people to settle in the squatter settlements.

As an active measure to discourage people from squatting, the Quito Municipality tried to contain the sprawl of squatter settlements in the mountains by strictly limiting the provision of water above certain altitude (Hanratty, 1989) and according to an Ecuadorian decree in 1969, all land parcels needed to be fully serviced to be legally occupied (Godard, 1988). The policies were intended to discourage people to squatter by limiting provision of services and regularizing policies to support the action. However, Kathmandu does not have a clear action plan and active preventive policies to discourage new development of squatter in the city.

In both cities, political influence is an important key in supporting squatting as people living in these settlements are potential voters for the political parties. Taking advantage of their lower hand, the political parties give assurance of regularization or legalization of their land for voting. In Quito, the barrios (in their term) have been regularized and incorporated into the city, where the political parties have empowered organized neighborhood committee to identify genuine squatter settlements, who also take actions to prevent from further squatting. However in Kathmandu, even though people have been utilized by these political parties, and there is a strong representation of political parties within the settlements.

In Kathmandu, people living in squatter feel as second degree citizens (from the in-depth interview and focus group discussion) and are viewed as threat by the community. They are regarded as a source of negative externality by the society and the government, who have used forceful means to evict squatters. However in Quito, slum dwellers' perception of their status is one of forthcoming integration through strategies for the progressive upgrading of living conditions and social inclusion (UN-HABITAT, 2003). The use of the neighborhood community to help in regularization shows the acceptance of people living in squatter settlements by the external society, which is a key to build confidence of people to relocate independently. As people in squatter are the major source of informal workers in the city to maintain urban economy, there is a need to change the perception of people living in and around the squatter and also the government to design socially inclusive plans and policies regarding squatter settlements.

As the history of squatter settlements is relatively old in Quito, the government has developed and revised various policies to address the issue, which is in decreasing trend. In Nepal, the housing and urban development policies ignore the issue of urban poor, and national building codes and permits do not incorporate anything about slums and squatters (Shrestha, 2010). This policy vacuum has been a key issue in directing any actions or formulating visions to address the complex issues. So, the Government of

Nepal needs to formulate socially inclusive policies and regulations to take actions to legalize, upgrade, relocate, and evict the squatter settlements through a formal process.

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Appendix

Urban Externalities in the Small Developing Countries of Asia and Latin America:

A Comparative Case Study Analysis of Squatter Settlements in

Nepal (Kathmandu) and Ecuador (Quito)

My name is _____ and today I am here on behalf of INEHD to conduct an interview with you. As you know that the essential elements, which link urbanization with development, are: social connection (meaningful, positive interaction), social capital (networks, norms and co-operation); social trust (confidence according to social norms); social cohesion (common values and civic culture); and social inclusion (participation in all aspects of life). We acknowledge that the local knowledge of community is needed to better understand the process of urban development. Therefore, I would like to speak with you about community/households/individual behavior and their externalities in the community/households/individual.

The interview will take about 45 minutes. I will be taking some notes and writing down your answers during the session. Your responses will be combined with other responses for a report but your name and details will not be used or given to anybody. Your participation in this survey is completely voluntary and you can chose not to answer any individual questions or all of the questions. However, we hope that you will participate in this survey since your views are important to make inclusive and sustainable city.

Do you agree to participate in this survey? 1. Yes 2. No

At this time, do you want to ask me anything about the survey?

Signature of interviewee: _____

Date: ____/_____/_____
day/ month/ year

Name of the Interviewer:

Name of Supervisor:

Serial No. of Questionnaire:

Name of the Settlement:

Note for the researcher:

- Interview should begin by building rapport with your interviewee, to make them feel comfortable in sharing their personal information.
- If possible, interview should be of the HH head, where other HH members can participate.
- HH is defined by people sharing one kitchen for more than 6 months, where exceptional cases are when people have temporarily gone elsewhere for work or other purpose.

- At the times of conflict of answer between HH members, refer to the answer of HH head, who is the main decision maker.

- You should not try to influence any answers or use your assumption to answer the questions.

- You should not make personal interpretation of questions.

- For issues like income, use multiple and indirect ways to ask questions about occupation, expenditure, etc. than asking direct question.

- You should circle each and every answer, ticks or any other symbols will be invalid.
- You should not leave out any question unanswered.

- If there are some issues that are not captured by the questionnaires, please write a note in a separate copy

- Ask for apology in between interview, for any kind of pain or suffering caused while sharing their personal information.

- The proposed contingent valuation method creates the realistic price of given product or market scenario (experimental design) using willingness to pay (WTP). To elicit the WTP for the given scenarios, the researcher should provide the clear picture about the product to the respondent. Before having clear picture about the product, the respondent should not be asked the question about WTP. The researcher should remove pre-assumption if any about WTP of the respondent and should not impose anything to the respondent while asking the WTP. The given method tries to capture maximum amount of WTP for the product what they have chosen. The researcher should inform to the respondent about the bedding process to know realistic price of the product. The respondent should be happy to involve the bidding process and to inform the real price of the product from their perspective. The researcher should carefully start the bedding process.

Identification:
Date of interview:
Time interview started: Time interview concluded:
District: Municipality: Ward No:
Name of *Tole*:
Household (HH) Identification/Voter list No:

1. Category: 1) Squatter settlement (SS) 2) Non- squatter settlement (NSS)

2. Information on Individual and HH characteristics:

2.1 Name of the HH head (or respondent): ……..

2.2 Caste/Ethnic Group: ……

For Q. 2.2, please extract from full

2.3 Years of experience living in squatter: ……

2.4 Why did you choose to live in this community?

……

……

2.5 Size of HH (sharing one kitchen): ……..

2.6 Details of HH members:

For 2.6, HH members are defined by people sharing one kitchen for more than 6 months.

S.N	Name	Relation with HH head	Number of completed schooling years*	Sex	Age	Occupation	Work place (neighborhood/outside)
1							
2							
3							
4							
5							
6							
7							

8							

Code: * 0 for no education, numbers 1-12 for grades they have completed, and use ascending number for education beyond +12.

2.7 Main occupation in the HH: ……..

2.8 Gross HH income per month:

S.N.	Sources of income or expenditure	Last month income
1		
2		
3		
4		
5		
6		
7		
8		
9		
	Total HH Gross income	

For Q. 2.8, it is gross income rather than net income or saving. Please carefully ask multiple and indirect questions, based on their answer in occupation Q. 2.6, expenditures and consumption, to assure the amount of HH income

2.9 Membership in political/social organizations:

1) Yes 2) No **[If no, go to question number Q. 2.12]**

2.10 If yes, how are they using you?

1) To build new organization in your community 2) To gather people for demonstration

3) Both (1) and (2) 4) Passive member

2.11 If yes, how much time are you giving for those political/social organizations?

1) More than other community 2) Based on my choice or using my leisure time

3) Don't know 4) None

2.12 Do you think that the political parties or social organizations utilize your community people more than other communities?

1) Yes 2) No

[If yes in Q. 2.9 and no in Q. 2.12, go to question number Q. 2.14]

[If no in Q. 2.12, go to question number Q. 3.1]

2.13 If yes, how do you measure the intensity of utilization of the people from this community?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

2.14 The political parties or social organizations utilize your community people in their activities:

1) With payment 2) Without payment

2.15 Do you feel any effect from utilization of your community people by the political parties or social organizations?

1) Yes 2) No

2.16 If yes, how do you measure the intensity of this effect?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3. Information on the community characteristics:

3.1 Where is the SS located? Based on your observation

1) Near to the river 2) Near to the public field/or open area

3) Far from the city area 4) Others (specify)…….

3.2 What is the total number of HHs in this SS? …….

3.3 Is community behavior of SS different from NSS?

1) Yes 2) No

3.4 If yes, please share the intensity of this difference?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3.5 What is the common type of building structure in the SS?

1) Permanent 2) Temporary 3) Mixed

3.6 Has there been any incidences of water and air borne communicable disease outbreaks in the SS?

1) Yes 2) No

3.7 If yes, how will you measure the intensity of effects related to disease outbreaks?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3.8 Is your community connected with public facilities such as road, public transportation, school, health facility, etc.?

1) Yes 2) Partially yes 3) No

3.9 How do you measure the intensity of effect (problem) of public facility such as road, public transportation, school, health facility?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3.10 Did you face the issues of not having enough food or money to buy food during last 30 days?

1) Yes 2) No

3.11 How do you measure intensity of poverty in your community?

1) Very high (more than 50%) 2) High (30 to 50%) 3) Medium (15 to 30%) 4) Low (10 to 15%) 5) Very low (less than 10%)

3.12 How do you measure the intensity of effect (problem) of given level of poverty in your community?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3.13 Are there any issues related to natural environmental degradation in your community?

1) Yes 2) No **[If no, go to question number Q. 3.15]**

3.14 If yes, how will you measure the intensity of degradation of natural environment in your community?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

3.15 Is there any effect on land price due to SS?

1) Yes 2) No **[If no, go to question number Q. 4.1]**

3.16 If yes, how will you measure the intensity of the effect on land price due to SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4. Incidence and its intensity due to Individual/HH/Community/NSS behavior

4.1 Are there any incidences related to drug abusing behavior in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.3]**

4.2 If yes, how will you measure the intensity of effect related to drug abuse in the SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.3 Are there any incidences related to drug abuse by people from formal settlement?

1) Yes 2) No 2) Don't know **[If no, go to question number Q. 4.5]**

4.4 If yes, how will you measure the intensity of effect related to drug abuse from the formal settlement?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.5 Are there any issues, in your HH, due to indulgence of any one of your HH members into drugs due to external influences?

1) Yes 2) No **[If no, go to question number Q. 4.7]**

For Q. 4.5, Please do not make any interpretation or question that makes them uncomfortable. Please ask indirectly such as sue to others influence (*aru ko sarsangat le garda*)

4.6 If yes, how will you measure the intensity of effect due to this drug using behavior?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.7 Are there any incidences related to gambling in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.9]**

4.8 If yes, how will you measure the intensity of effect related to gambling in the SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.9 Are there any issues, in your HH, due to indulgence of any one of your HH members into gambling?

1) Yes 2) No **[If no, go to question number Q. 4.11]**

4.10 If yes, how will you measure the intensity of effect due to this gambling behavior?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.11 Are there any incidences related to alcohol drinking in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.13]**

4.12 If yes, how will you measure the intensity of effect due to alcohol drinking behavior in the SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.13 Are there any issues, in your HH, due to alcohol drinking behavior of any one of your HH members?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.15]**

4.14 If yes, how will you measure the intensity of effect due to alcohol drinking behavior?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.15 Are there any incidences of communal violence like gang fights, physical abuse in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.17]**

4.16 If yes, how will you measure the intensity of effect related to communal violence?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.17 Are there any incidences of domestic violence in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.19]**

4.18 If yes, how will you measure the intensity of effect due to domestic violence in the SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.19 Are there any problems, in your HH, related to domestic violence?

1) Yes 2) No **[If no, go to question number Q. 4.21]**

4.20 If yes, how will your measure the intensity of effect due to domestic violence?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.21 Are there any incidences of occurrence of crime like theft, robbery in the SS?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.23]**

4.22 If yes, how will you measure the intensity of effect related to crime occurrence?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.23 Are there any problems related to criminal activities like theft, robbery conducted outside of the SS or by people from formal settlement?

1) Yes 2) No 3) Don't know **[If no, go to question number Q. 4.25]**

4.24 If yes, how will you measure the intensity of effect related to criminal activities outside of the SS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

4.25 Are there any incidences of presence of sex work in the SS?

For Q. 4.25, sex may be one of the reasons to increase criminal activities

1) Yes 2) No 3) Don't know

[If no, go to question number Q. 5]

4.26 If yes, how will you measure the intensity of effect related to sex work?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

5. Please provide the cost (if any) due to consequences of above mentioned factors:

Events (based on above mentioned discussion)	**Cost in NRS or USD (Within past 1 year)**

6. What can be done to solve the identified problems? Or what are the coping strategies being used?

Coping strategies should be prioritized, if there is long coping strategy; it should be summarized and researcher should write key words/ points that can be interred into CS Pro.

……
……
……
…

7. Experimental designing to mitigate the externalities due to individual/HH/community activities or behavior (to solve above mentioned effect/problem, as you suggested): (the researcher can remind to the respondents about their bargaining behavior to buy the goods in the local market)

You already shared with us the incidence and intensity of negative externalities that you are facing due to individual/household/community activities in the squatter settlements (questions 3 &4). As you said, you had borne some cost due to these (negative) externalities (Question 5) last year.

I'm going to do this by asking you to think about a hypothetical situation where these negative externalities are reduced. To give you a little background, local community or local Government aim to prevent these negative externalities through introducing an intervention such as providing awareness and community education, better management of water and sanitation, better quality of the society.

I'm going to describe the benefits, for example, reduction of disease incidence, verbal and physical violence, gang fighting, improve the individual/household/community behavior through above mentioned intervention. You will get long term benefits, for example, your children will get better society and gain better education from the society. Your family will enjoy in the secured and quality of society. You have known that reduction of negative externalities means to increase the positive externalities for the society.

You have better experiences about the trend of the externalities whether they are increasing or decreasing over the years. Imagine now, that if the behavior of the individual/ household/community will not change, the cost of negative externality will be increased successive years. May be you have to pay additional amount of money each year.

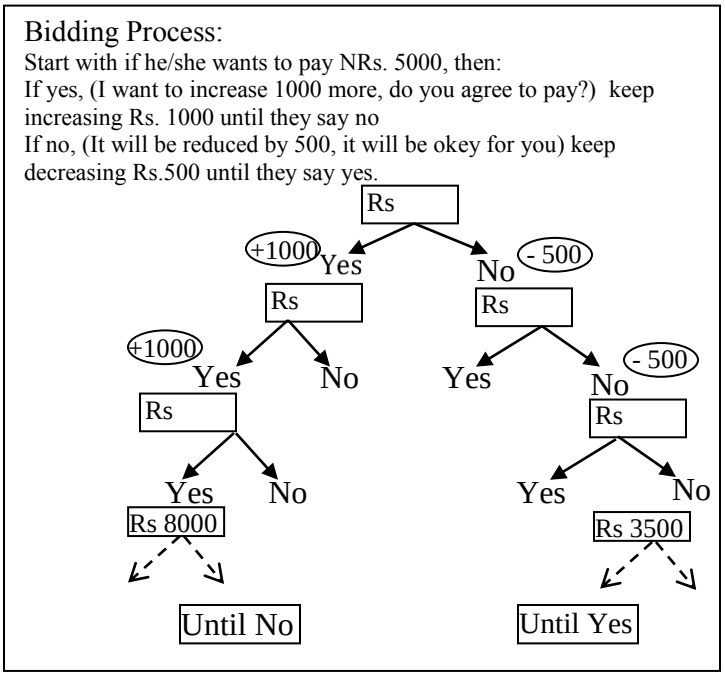
You are aware that without community participation to change the behavior of the people is difficult and takes longer time.

If enough individuals make a contribution, the local Government and other community based organization will also contribute. With enough funds from individuals, an effective intervention can take place, and the negative externalities will be reducing over the years and quality of life will be improved. Therefore, you are required to pay one time out of pocket payment within this year.

In answering these questions, please think about how much you can realistically afford to pay for this intervention one time within this year. Think about the things that would have to be given up if you were to pay that particular amount.

How much are you willing to pay if it solves all the identified problems in the SS at once?

…….



Similar procedures were applied for Quito; however, starting bid was 50 USD. If 'yes', 10 USD would increase until four times; however, if 'no', 5 USD would decrease until four times, then open ended questions were started.

8. Public Facilities in the community:

8.1 Does your community have facility for sewerage/waste disposal?

1) Yes 2) Partially yes 3) No

8.2 How do you measure the intensity of effect (problem) of sewerage/ waste disposal?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

8.3 Is your community connected with public utilities such as drinking water and sanitation?

1) Yes 2) Partially yes 3) No

8.4 How do you measure the intensity of effect (problem) of public utility such as drinking water and sanitation?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

8.5 Is your community connected with public utilities such as power supply system?

1) Yes 2) Partially yes 3) No

8.6 How do you measure the intensity of effect (problem) of public utility such as power supply system?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

8.7 Is there any difference in SS and NSS to provide the public facilities?

1) Yes 2) No **[If no, go to question number Q. 9.1]**

8.8 If yes, how do you measure the intensity of this discrimination?

1) Very high 2) High 3) Medium 5) Low 6) Very low 7) None

9. Belief/Perception/Attitude/Motives of living in the SS

9.1 Did you feel any discrimination within the SS on the basis of economic status?

1) Yes 2) No **[If no, go to question number Q. 9.3]**

9.2 If yes, how do you measure the intensity of this discrimination?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

9.3 Did you feel any discrimination within the SS on the basis of location?

1) Yes 2) No **[If no, go to question number Q. 9.5]**

9.4 If yes, how do you measure the intensity of this discrimination?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

9.5 Are there any incidences of discrimination, by people from NSS, on the basis of your squatter status?

1) Yes 2) No **[If no, go to question number Q. 9.7]**

9.6 If yes, how will you measure the degree of problem due to such discrimination by people from NSS?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

9.7 Do you feel uncomfortable living in your community?

1) Yes 2) No **[If no, go to question number Q. 9.9]**

9.8 If yes, how do you measure the degree of uncomfortable living in your community?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None

9.9 If you chose yourself, is this your right choice in living in your community?

1) Yes 2) No **[If no, go to question number Q. 10]**

9.10 Please rank your choice?

1) Very high 2) High 3) Moderate 4) Low 5) Very low 6) None