



Formalizing the informal settlements in Kathmandu valley: A case of Bansighat along Bagmati river corridor

Bibek Karki^{a,*}, Sangeeta Singh^{a,*}

^a Department of Architecture, IOE, Pulchowk Campus

ARTICLE INFO

Article history:

Received 17 Nov 2021
Received in revised form
13 April 2022
Accepted 20 Nov 2022

Keywords:

Informal settlements
infrastructure
infrastructure gaps
policies
upgradation

Abstract

Informal settlements are residential areas where housing is developed without land title and tenure. Housing developed with land tenure within the realms of rules and regulations are formal housing. As some settlements are termed informal, there are no formal programs from the concerned government agencies to develop infrastructure. This does not limit the settlers to develop the basic infrastructures they essentially need. Policies in the recent years have tried to address the issues of informal settlers. There is a gap between activities and policies of the government which is identified by policy review. This research is a study of the assessment of infrastructure and services in informal settlements and how the gap in infrastructure can be addressed. Based on observation, key informant interview and questionnaire survey, this research assesses the existing scenario of infrastructure reach and attempts to address the infrastructure gap through physical intervention and policy intervention in Bansighat informal settlement along Bagmati River Corridor. The research thus uses mixed methods to frame the current scenario and propose recommendations suitable to the place. The gaps are seen majorly in water supply, drainage, housing, roads and educational, general awareness sectors. Alternatives for addressing the gaps is through co-ordination among different levels of government with implementation of plans by local government which are prepared by line agencies from federal and provincial governments. Physical interventions are needed in basic infrastructures: drinking water, storm water drainage, road width and density of housing in Bansighat. Awareness of social infrastructure like education is also needed in the area. These interventions should be guided and supported by policy measures and participative implementation to provide infrastructure in Bansighat and similar informal settlements along Bagmati corridor in Kathmandu valley.

©JIEE Thapathali Campus, IOE, TU. All rights reserved


1. Introduction

Settlements can be briefly categorized into formal and informal settlements on the basis of formality. Those settlements where housing regulations are less utilized and the occupants or informally employed builders have built the housing are informal settlements [1]. This part of population is usually deprived of basic amenities and services in a city. The inability of urban areas to sustain growth within formal urban framework due to absence of affordable land plots and housing, and no consideration of low income groups in formal urbanization helps to create informal urbanization [2]. Governments do not

recognize informal settlements, excluding them from formal market inducing poverty in informality [3]. Informal settlements have started in urban areas of Nepal in 1951 after democracy [4]. There were 12,726 people living in forty informal settlements in Kathmandu valley according to a survey conducted in 2007 [5]. These settlements were highly vulnerable to multiple risks of environmental pollution and flooding.

Formal settlements are those settlements that are recognized by the government and the government provides administration of municipal services and management of various infrastructures [6]. Such settlements are expected to provide shelter over a long period of time. To legally recognize informal settlements and provide them with necessary services, formalization is necessary. Formalization is the process by which activities,

*Corresponding author:

 075msurp007.bibek@pcampus.edu.np, (B. Karki);
sangeeta@ioe.edu.np, (S. Singh)

methods and situations that are not recognized by law or formal channels, obtain such recognition. There are various models of formalization such as urban regeneration, urban renewal and resettlement [7].

1.1. Rationale of research

Studies conducted on the context of squatter settlements hint toward a study on formalization of informal settlements [1]. People in informal settlements do not opt for relocation. Relocation maybe relevant in settlements which are established in the recent past. People, who have inhabited the settlements from decades, have mended their ways and developed a network to configure and resolve the issues in their communities. Eviction and its attempts have faced criticism in the past. The residents have not taken relocation and its attempts positively. A solution to this could be updating the cadastral map and allowing the existing squatters to upgrade on their own land [8]. Sharma's work in 2010 has emphasized the failure of land sharing experience in Shankhamul informal settlement and it had opened the discourse to on-site upgradation. It had also focused for provision of infrastructure to informal settlements parallel to surrounding development on the basis of development of community and longer length of duration spent on the place. It provides us with the idea that infrastructure is necessary for residents irrespective of other aspects.

1.2. Problem statement

In the past, out of 863 households in squatter settlements of Bagmati River Corridor, 182 households used safe toilet and did not pollute the river and surrounding environment while other households were compelled to use either unmanaged pits or defecate openly increasing exposure of people to health hazards [5]. As a result of inadequate water and sanitation facilities, waterborne diseases are recurring, affecting poor and marginalized the most. Among them, poor children and women are specifically vulnerable [9]. In informal settlements, women are more vulnerable as husband takes hard earned money to spend on alcohol. There was physical violence, exploitation, random fights and discrimination within the community because of poor plight of family and less support to women, children and marginalized families of the community. The families are economically weak and not providing them with basic infrastructure has multiplied effect of problems they face on a daily basis. Hari Kumari Jimba, a resident from Sindhuli, who lives in extreme poverty in a tent like shelter made of temporary materials like wood, bamboo on the bank of Bagmati in Paurakhi Basti, Thapathali was quoted as saying, "*I fear that my children will lose this shelter. Any day, the government authorities*

may tell us to leave, or worse, the river Bagmati may flood into the tent" [10]. Fear from multiple sources has deteriorated physical and mental being of the residents. This has helped in amplifying the problems faced while the initiatives in tackling the situation from government and non-governmental organizations have been in vain.

1.3. Limitations

To avoid encroachment of the river while provisioning for providing infrastructure, the settlements which are established at a setback of 20m are only considered for upgradation. It complies with the requirement of setback for rivers and tributaries inside Kathmandu valley [11]. The effects of flood risk could not be considered as recently updated flood maps were not found. The author had taken appointments to meet the key informants but it was unable to meet some of them in person due to Covid risks at the time of research and unwillingness from the informants.

1.4. Objectives

The main objective of the research is to explore how the informal settlements can be formalized for better provision of infrastructure facilities. The specific objectives of the research are:

- To explore the current situation with regards to the access to services in the informal settlement at Bagmati corridor
- To explore the possibilities of better provision of services in informal settlements

2. Methodology and Research Framework

Ontological assumptions are social realities developed based on what we believe [12]. Questions about informal settlements arise when the government attempts eviction. Community organizations and NGOs show concern when there are health problems due to outbreak of disease caused by factors like drinking water, sanitation. Eviction and health problems are two individual scenarios, both negatively affecting the inhabitants of informal settlements. In the study, the question arises, "In regard to the context of informal settlements, can people living in informal settlements along Bagmati not access basic infrastructures and services?" The ontological assumption is that "By viewing the informal settlements from the perspective of provision of services reduces the gap created by the issue of land title."

The process of seeking answers to these questions involves literature review of existing and past contexts,

selection of stakeholders involved for and against informal settlements and their role. Key Informant Interview was conducted with the stakeholders, observation of informal settlements, and questionnaire survey with households to get an overview of the existing scenario. The stakeholders include locals, non-governmental officials and concerned governmental officials. It involves open ended questions to capture insights from the informants. The insights are useful to get details about the case study area and squatting population of Kathmandu valley. The existing scenario is known through field observation. Questionnaire survey in households is another method of data collection used. Household survey is done in one of the informal settlements, Bansighat, which has high potential for on-site upgradation.

Based on these methods, existing situation of infrastructure like drinking water supply, waste water management, road condition, solid waste management and built structure among the physical infrastructures and income, health, education, security among the social infrastructures are studied. Key Informant Interview is conducted with 10 persons in total : 6 persons from government agencies with expertise on informal settlements and 4 persons from non-governmental, community based organizations and locals with experience of working in informal settlements. Questionnaire survey is conducted by calculating the number of households to be surveyed out of 190 households (HHs). With the use of surveymonkey.com at 95 percentage confidence level and 5 percentage margin of error, the number of households is calculated at 128 [13].

In the methods employed, the following framework of matrix is developed to study the access of infrastructure [14] :

Based on this matrix, data is collected through a mix of methods based on which results and analysis are carried out. The existing scenario is compared with the desirable condition of infrastructure and based on the analysis of infrastructure gaps, the interventions for better provision of services is recommended.

3. Literature review

3.1. Models of formalization of informal settlements

Formality is a representation of planned settlements which encompasses basic infrastructure and facilities. Housing developed with land tenure within the realms of rules and regulations are formal housing. In an economy of free market, there is access to land rights and property possession for all of the population, tenure security, access to primary banking services like credit and mortgage, and fair property tax to all [15]. The

book “Housing by People” by John FC Turner (1973) provides glimpses on how networks of people can take hold of their surroundings and order them intelligently even without experts’ advice on what they need. The following three programs can be categorized for formalization of informal settlements:

3.1.1. On-site upgradation for infrastructure and facilities

Infrastructure facilities are setup to make a developed land before the process of land documenting. This provision is meant for physical infrastructures: drinking water, energy, sewers, roads, solid waste management and social infrastructures: schools, hospitals and police. Contrary to formal development of land plots and distribution by selling, informal settlements are built in open land prior to infrastructure provision. Post habitation supply of infrastructures increase the cost to the government than pre-habitation although most government interventions usually involve no cost for beneficiaries [16].

3.1.2. Relocation

Relocation to accessible location which lie at a close distance from the city center can be beneficial in diverse ways. It would cover safe drinking water and sanitarly safe toilets along with provision of storm drainages. Social housing in relocation sites could help in providing housing to the people of informal settlements. Housing can be provided on subsidized payments in schemes based on the economic status of people.

3.1.3. Resettlement

Resettlement can include settlements provided by governments, private settlements by companies or social or religious groups and regularization of and support for spontaneous settlements or land invasions [17]. The idea of resettlement originates with the idea of populating land by providing it to the inhabitants or inviting new people to join as first described by Hulme (1988), who identified agriculture, economics, geography and public administration as the principal areas of research and utilization.

3.2. Cases with similarity

ifferent cases which are successful in formalization of informal settlements by providing infrastructure like Talab Camp, Dhaka and Kampung Penas Tanggul, Jakarta are provided below:

3.2.1. Case study 1: Building resilience in Talab Camp, Dhaka [18]

In coordination with Habitat for Humanity Bangladesh, the major risks highlighted to be addressed were: poor sanitation, inadequate drainage and inadequate disposal

Table 1: Framework Matrix

Dimension	Parameter	Indicator
Physical Infrastructure	Drinking Water	<ul style="list-style-type: none"> • Source of drinking water • Tap water available repeating in how many days • Sources of water for purposes other than drinking. • Quality of drinking water
	Electricity	<ul style="list-style-type: none"> • Source of electricity • Average unit usage per month
	Sewers	<ul style="list-style-type: none"> • Connection to toilets • Performance in monsoon
	Solid Waste Management	<ul style="list-style-type: none"> • Waste collection period • Expense on waste
	Built Structure	<ul style="list-style-type: none"> • Structure type • Wall material • Type of roof • Number of rooms • Natural light sufficiency inside house
	Roads	<ul style="list-style-type: none"> • Width of road attached to house • Road material
Social Infrastructure	Education	<ul style="list-style-type: none"> • Percentage of literate in a household • Highest education in a household
	Health	<ul style="list-style-type: none"> • Types of hospital visited
	Employment	<ul style="list-style-type: none"> • Sector of employment • Commuting time to work
	Security	<ul style="list-style-type: none"> • Nearest police station • Its type

of waste. Pilot activities were developed and the project focused on drainage, water supply and purification of water, community toilets, solid waste management at household and community level for waste collection and disposal, housing improvement which is raising plinth level above water level in monsoon and raising awareness through cleanliness events and posting billboards.

There were a bunch of challenges while undergoing the project. Working in a megacity like Dhaka, it was not easy to meet the local expectations while supporting capacity building. It was an outcome of extensive participation of the community with problems looking for solution. They participated as the process involved participation of the locals from the very beginning to the phase of action and implementation. The locals could foresee the changes that were about to take place after conducting the pilot activities. Extensive training and capacity building activities were also a part of the pi-

lot activities. It included wide engagement of locals and helping hands. The project team also developed a long-term Community Development Plan so that a sustainable solution to the context can be reached.

3.2.2. Case study 2 : *Kampung Penas Tanggul, Jakarta [19]*

Kampungs are urban poor who are present in large numbers and occupy undeveloped open land. They have evolved under changing conditions of Jakarta although they are scattered in settlements. Still 60% of land in Jakarta is not registered in the National Land Board and obtain a quasi-legal status called Girik or Garapan. . The unoccupied land is usually targeted by poor Kampungs. Former State Ministry of Housing defined Kampung, Kumuh or slums as unplanned settlements lacking basic infrastructure, small land area for individual housing unit, substandard quality of building materials and structure which are constructed without

legal permission.

All of these settlements do not have administrative status because of legitimacy, illegal occupancy not allowed by zoning and government's idea of demolition of the settlement. But, NGO Institute Sosial Jakarta (ISJ) played a vital role for the formalization of these settlements when the residents demonstrated with support of the NGO and left a positive impact. There was less coordination between local government and state government with local government evicting the Kampung and the state government supporting the programs of NGOs and Kampung.

Then ISJ lobbied and Kampung received RT (Rukun Tetangga) neighbourhood community legal status when Minister of Human Settlements and Regional Development visited in 2000. This brought major changes to people in Kampung. The legitimacy helped the community's goal of achieving security of tenure. In the process, they received the rights to banking and had their names entry in the national database. The inhabitants were less concerned about land ownership title, but they wanted to be acknowledged as rightful citizen and receive the privileges to physical and social infrastructures as a citizen.

After receiving legal status of a community, they were able to confidently invest in development. Change of status from being evicted settlement by the central government and local government to a recognized neighborhood had helped to boost development. They upgraded their homes from temporary made of wood, metal and scraps to a house of brick wall after being formalized. They had built private toilet under the so called MCK facilities which were: bath; washroom; toilets in public places and some instances in individual houses too. The process of development and formalization was gradually upgraded in Kampung Penas Tanggul through investment in housing improvements and infrastructure after RT status.

3.3. Laws and Policies under Nepal Government

There are separate provisions in different acts and policies regarding what is considered right to housing and what is considered illegal housing. Article 37 of Constitution of Nepal states that every citizen has right to proper housing. It guarantees the public right to housing and enjoying the benefits that are inseparable from housing. The Right to Housing Act, 2075 has been enacted in 2018 to implement the Article. 8th Amendment of Land Act, 2021 in Article 52 "KHA" proposes for formation of Land Commission for distribution of land to landless and unmanaged by recommending to the local government. Working Policy 4.7.1 of National Shelter

Policy 2012 under strategy for disaster mitigation proposes for upgradation of unhealthy settlements in the same place, resettlement if upgradation is not possible and land holding to be collective, in any case, with family identification document provided to those migrating before a certain number of years. Policy 4.7.2 seeks to provide small land plots for low cost housing construction along with basic physical infrastructure for the poor and underprivileged living in riverside settlements and encroached land. Strategies on Housing promotes participatory approach of all groups including private sector housing development, peoples' housing through cooperative development and public-private/community partnership on squatter settlements. On the contrary, discouraging encroachment of public land is included in the strategies of National Urban Development Strategy 2017. Article 4 "YA" of HPCIDBC Formation Order states that any structure built in river corridor without prior approval and permission from authority are prohibited and subject to demolition.

4. Case area

Bansighat being one of the oldest informal settlements is recognized as a settlement which has the will but lacks direct and assisted support for on-site upgradation. It is said that the settlement began back in 1972 [20]. The settlement is situated beyond a setback of 20metres from Bagmati River and there are embankments in Bagmati River as high as 1.5metres from the ground level of the settlement. This is supposed to avoid flooding in the area to a higher extent. Bansighat settlement consists of 190 households [21] in a stretch of about 300metres along the river and about 60metres perpendicular to the river. The ethnic groups present in Bansighat are: Dalits, Tamangs, Chhetris, Brahmins and Newars [20].



Figure 1: Case Area [22]

5. Stakeholder analysis

The following table shows the different stakeholders who have a direct and indirect involvement in informal settlements in Kathmandu valley:

Table 2: Identifying stakeholders

Beneficiaries	Possible supporters	Possible opponents	Implementing agencies	Decision makers
i. People of informal settlements	i. Action Aid Nepal, GTZ ii. Lumanti iii. Nepal Basobas Basti Samrakchyan Samaj (NBBSS), Nepal Mahila Ekata Samaj (NMES)	i. Locals of new area if resettled or relocated	i. Ward office and municipality ii. NGOs, CBOs iii. Ministry: MoUD, MoLCPA iv. Concerned agencies: DUDBC, KVDA, HPCIDBC, RACL, LIRC	i. Dissolved Land Issue Resolving Commission (LIRC) ii. MoUD, MoCLPA
ii. People of other neighbouring settlements	iv. Human Rights Commission Nepal			

The role of concerned government agencies are important in all aspects of informal settlements and so is the co-ordination. The co-operation between Ministry of Urban Development (MoUD) and Ministry of Land Management, Cooperatives and Poverty Alleviation (MoLCPA) will be crucial since the issue of land is inherent along with development. Co-ordination of different agencies under MoUD like Department of Urban Development and Building Construction (DUDBC), Kathmandu Valley Development Authority (KVDA), High Powered Committee for Integrated Development of the Bagmati Civilization (HPCIDBC) is important for actions to take effect in the informal settlements. Rastriya Aawas Company Limited (RACL) is a company under Nepal Government which is responsible for providing housing and land to poor throughout the country. The above figures show Ministries and concerned agen-

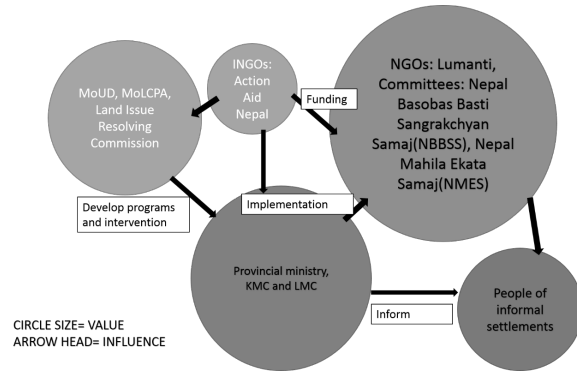


Figure 3: Prioritizing stakeholders

and proposed suggestions.

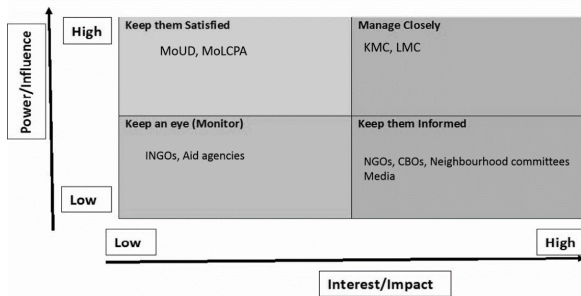


Figure 2: Stakeholder Mapping

cies of Government of Nepal, which have influence and expertise, are responsible for initial planning and programs while local governments are the ones responsible for implementation of programs. In this context, the role of community based organizations is crucial because they have been working in the informal settlements and in many cases, the inhabitants of informal settlements are a part of these groups. They have willingness to work with concerned agencies and also trust over people of the informal settlements which makes them a good intermediary in implementation of intervention

6. Findings

The findings contain the results obtained from mix of methods including field observation, key informant interview and questionnaire survey. The graphs represent the data collected from questionnaire which is prepared based on relevance and objective of research. For multiple choice closed ended questions, the vertical hatches in the bar graph represent multiple answers selection for a question and the solid hatches represent answers of single selection for a question.

6.0.1. Physical infrastructures

Drinking Water : Kathmandu Upatyaka Khanepani Limited (KUKL) provided one tanker 6000 litres 2-3 times a week in Bansighat. This water is distributed as 40 litres of drinking water per family to 25-40 families evenly at one time of supply based on the quantity of available water. A tanker from KUKL Low Income Consumer Support Unit (LICSU) supplies drinking water to a storage tank of 5000 litres which is provided by KUKL in Bansighat and it is distributed to the households which is used primarily for drinking and cooking purpose as in Figure 4. Second source of drinking water is 20 litres sealed jar bottles which is used for drinking. Tanker water is also used for drinking. Since one source is not

enough to meet the drinking needs, households need to rely on multiple sources at the same time as shown in the bar chart below in Figure 5. Among the 128 households surveyed, all households considered drinking water safe in terms of colour, taste and odour. All among surveyed used tube well source for purposes other than drinking but there is scarcity of water in dry seasons when the tube well sources shrink and water level is reduced.

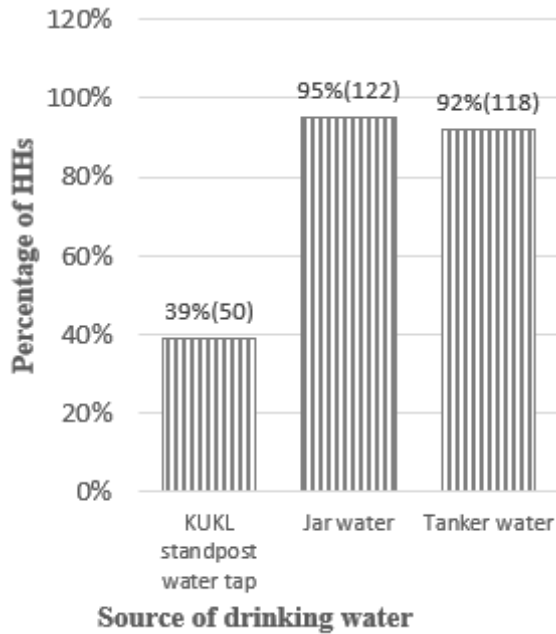


Figure 4: Percentage of HHs vs Source of drinking water

Electricity : All houses among 190 are connected by electricity lines from Nepal Electricity Authority (NEA). Among the surveyed 128 households, all of the households said that they paid for electricity on a monthly basis for the units of electricity consumed. People actively used electricity as they had individual meter connection to each household. Electricity consumption is above the minimum threshold of lowest fare electricity of 20 Units as specified by NEA for 98 percentage of the surveyed as shown in figure 6

Sewers : Toilets of all houses are connected through sewer lines to Dhobighat Waste Water Treatment Plant which is under construction. However, there were no drains to be seen in roads and alleys of Bansighat. Riverside had embankments to prevent water from entering inside settlements in flooding. Most of the households said that the pathway to their house flooded during monsoon. Among the households surveyed, 75 percent said that they had faced minor problems like flooding of the

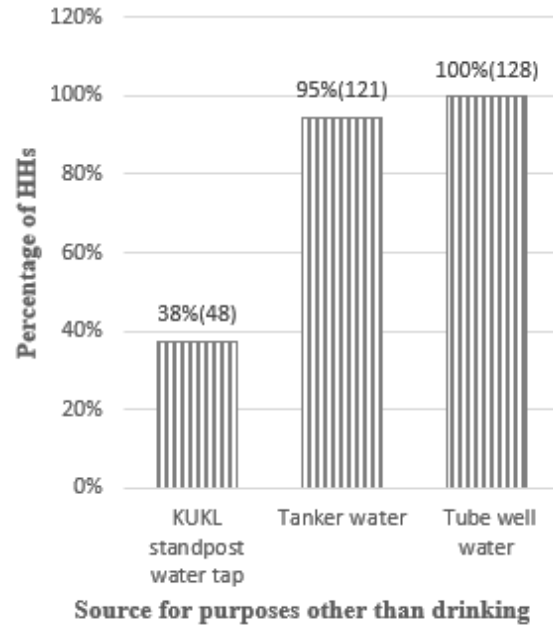


Figure 5: Percentage of HHs vs Source for purposes other than drinking

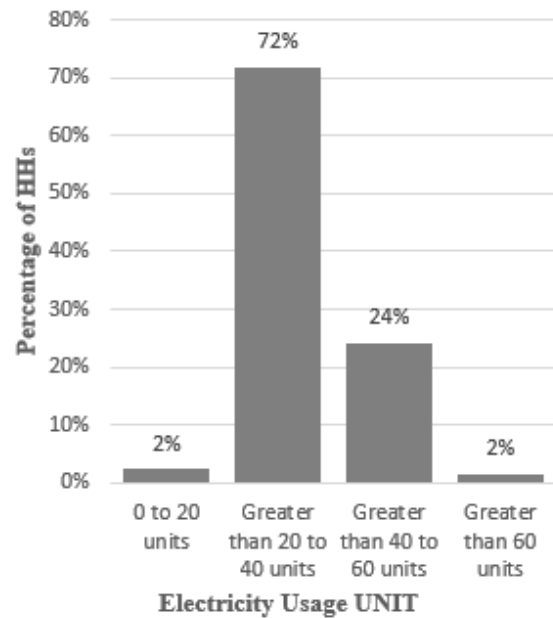


Figure 6: Percentage of HHs vs Electricity Usage UNIT

pathway in front of house while 5 percent said that there were severe problems like flood entering inside house and destroying all of the property inside as shown in figure 7.

Solid Waste Management : There needed less intervention for solid waste management as the same trucks and manpower used for collecting waste in surrounding

areas could collect waste for the settlement. So solid waste collection was done in an interval of 1 to 2 weeks' time as shown in Figure 8 and payment for solid waste by the households was done on a monthly basis.

Built Structure : Construction of buildings inside the settlement was of varied nature with either of the materials: bricks, blocks, pre-fab, other materials like wood, bamboo, Corrugated Galvanized Iron (CGI) sheet used for walls as shown in Figure 9. Most of the roofs were of CGI sheets but people in recent times had started permanent construction with RCC frame and brick infill in new buildings. In number of rooms per household, most of the families had two bedroom and a kitchen (2BK) or more but the lighting and ventilation were not satisfactorily enough. Most of the houses had sufficient

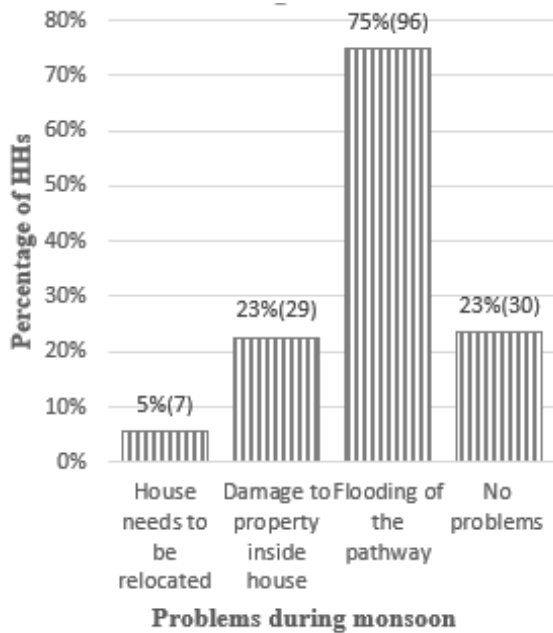


Figure 7: Percentage of HHs vs Problems during monsoon

light in the largest room but with only 1 window or less as depicted in Figure 10. Lighting and ventilation in houses in inner parts of the settlement is not sufficient enough.

Roads : The houses facing the river have connection to the widest road facing the Bagmati riverfront. The houses on the branch road through the centre of the settlement and adjacent to the school in east have 10 feet or wider road. All other pathways are narrow and do not have access to 4 wheelers as shown in Figure 11. They face problem during emergency and escape in disasters. The roads on the outskirts of the settlement

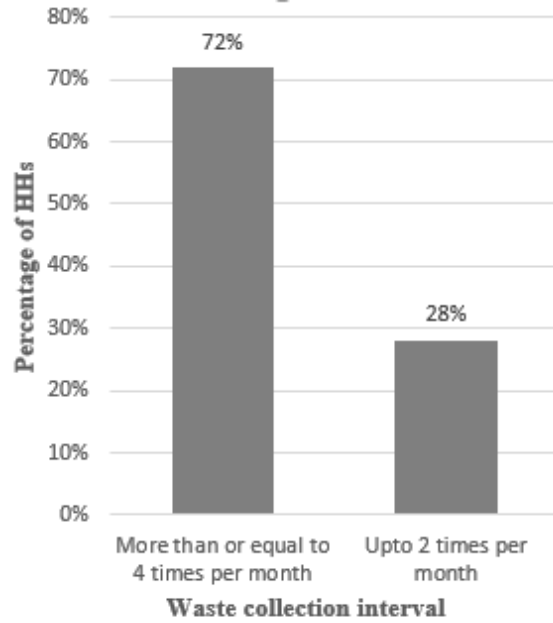


Figure 8: Percentage of HHs vs Waste collection interval

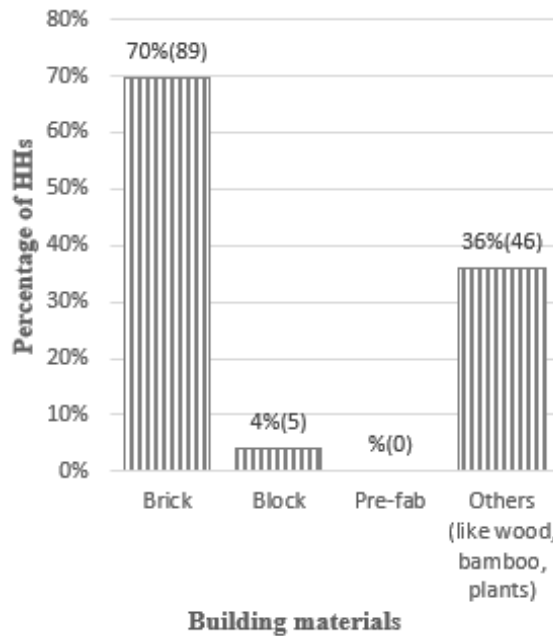


Figure 9: Percentage of HHs vs Building materials

are either bitumen or stone paved while narrow alleys on the inside are unpaved as shown in Figure 12.

6.1. Social infrastructures

Education : Although Bansighat is located at centre of the city, the level of educational awareness is low with more than fifty percentage of households saying they

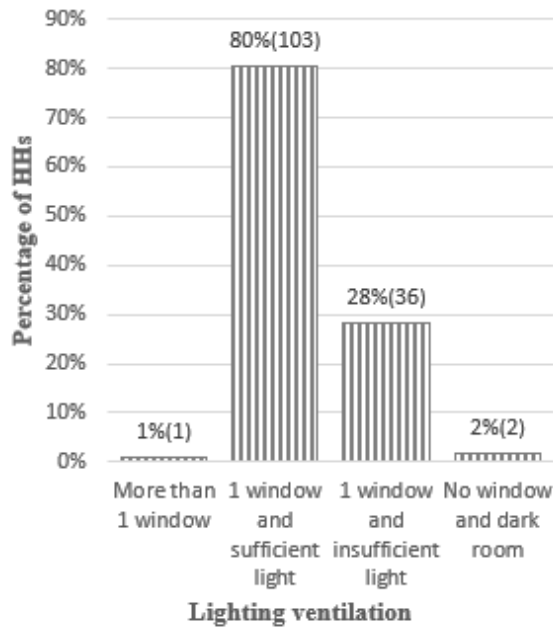


Figure 10: Percentage of HHs vs Lighting ventilation

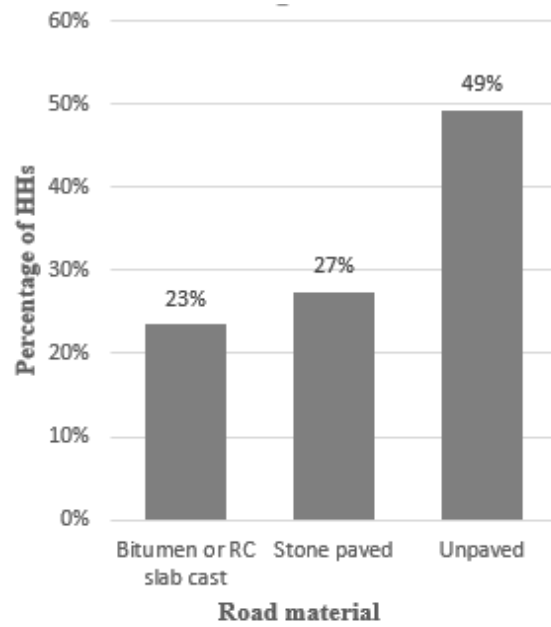


Figure 12: Percentage of HHs vs Road material

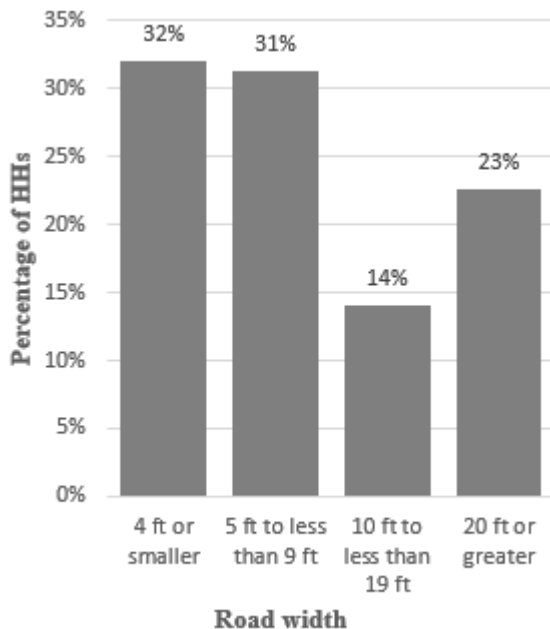


Figure 11: Percentage of HHs vs Road width

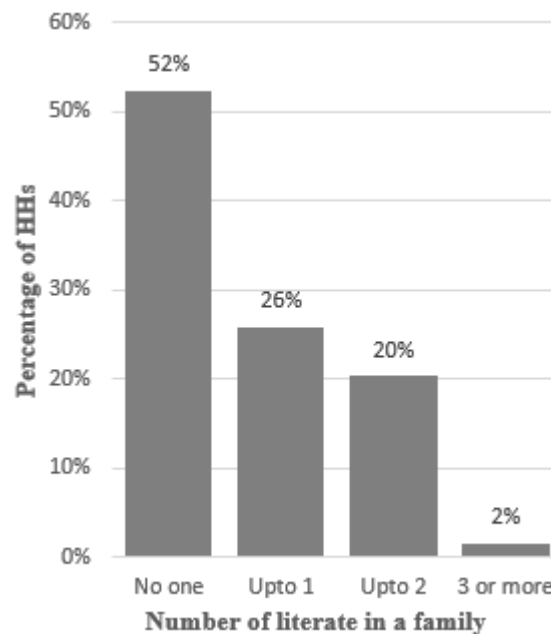


Figure 13: Percentage of HHs vs Number of literate in a family

had zero literacy rate in the family as shown in Figure 13. Among the people who were educated, 46 percent of people had received education of class 12 or higher as shown in Figure 14. This shows that educational qualification is extremely low.

Health : Most of the people visited either sorts of hospitals including private, semi-public and public indicating

they had easy access to health facilities with all surveyed households saying to have visited public hospitals at least one time as shown in Figure 15.

Employment : Employment of people is diverse with one family member in each household working in either self-owned business or employed in private sector jobs.

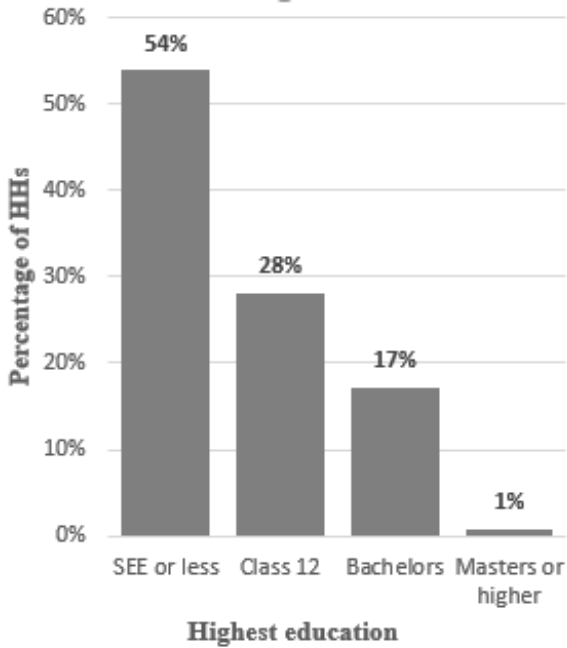


Figure 14: Percentage of HHs vs Highest education

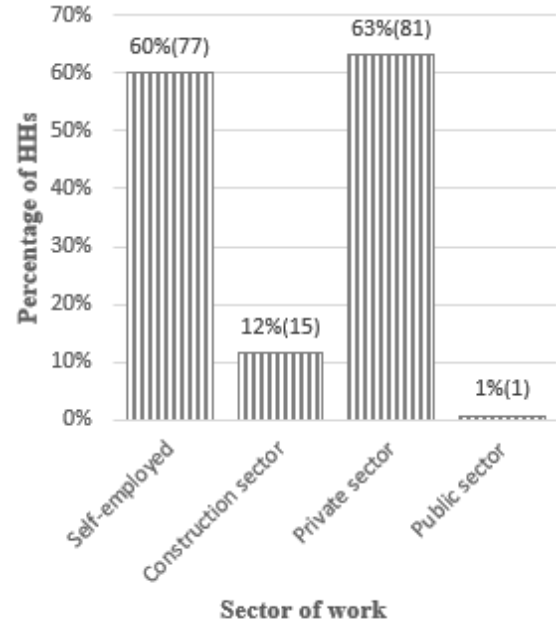


Figure 16: Percentage of HHs vs Sector of work

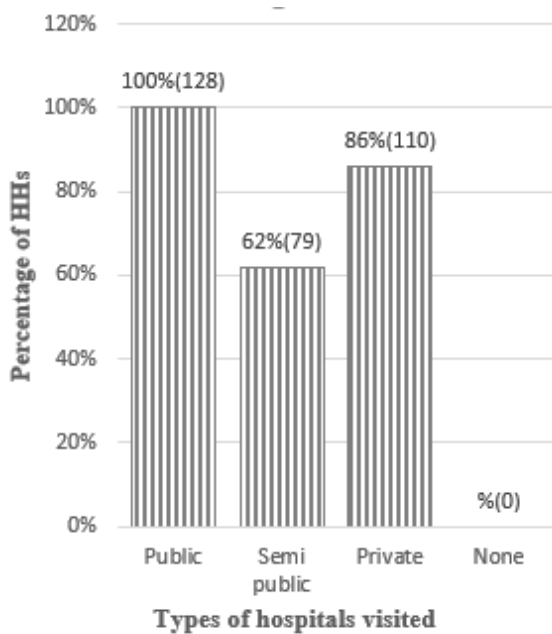


Figure 15: Percentage of HHs vs Types of hospitals visited

Very few people were found to be in governmental jobs as shown in Figure 16 and people commuted distances from short to long time as per requirement of their work which is shown in Figure 17. Security : In terms of security system in Bansighat, there are number of po-

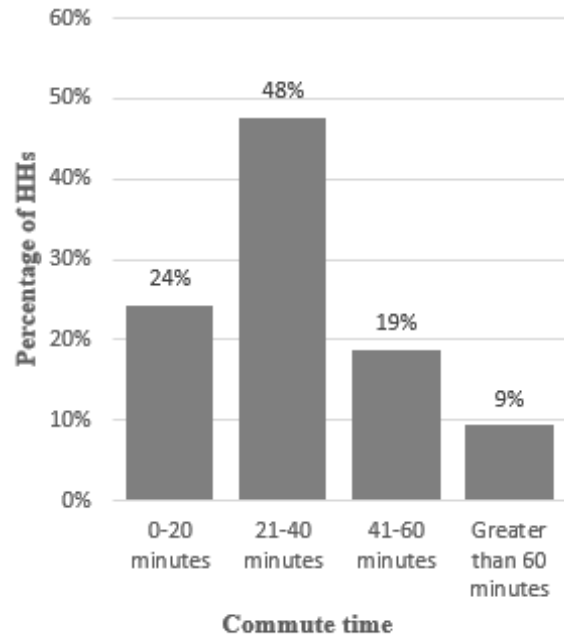


Figure 17: Percentage of HHs vs Commute time

lice offices within 2 kilometres reach so police security is easily accessible in Bansighat. Metropolitan Police Circle (Janasewa) branch of Nepal Police is located at Hanumana Dhoka and Valley Crime Division in Teku which are offices with greater authority and control. There is Metropolitan Riot Control Police Battalion in Tripureshwor. There are police beats in Bhotebahal and

Thapathali stationed for patrolling the community and providing safety.

7. Gaps and analysis

7.1. Gaps

Drinking water: Regarding physical infrastructures for water, 40 litres of water for 2-3 times per week for a family is insufficient for a family as minimum required use [23]. The desirable quantity of water is 100 litres per capita per day in urban areas according to National Urban Development Strategy (NUDS). Water for uses other than drinking is tube well water which is not safe for use [24]. There is problem of shortage of water in autumn and spring due to drying of the tube well source.

Electricity, solid waste management and sewers: Regarding electricity, all the households are connected to electricity and are paying for the electricity on a monthly basis. 98% of the houses are consuming more than the minimum 20 units of electricity. Solid waste is being collected from the trucks and manpower that collect the waste from the nearby areas at an interval of 1-2 weeks. Likewise, there are underground sewer lines but no storm water drains. Lack of storm water drains had caused flooding due to backflow of water from sewer and overflow from Bagmati River embankments. There are provisions for constructing drains and providing greenery to riverside in HPCIDBC Formation Order. Major causes of flooding are concerned with absence of storm water drainages and poor planning of embankments for prevention of overflow of water back to the settlements.

Roads and Built Structure: There are major gaps of infrastructure in Bansighat for housing construction. There is no building permit, no technical assistance and less people following byelaws for building construction in most cases in Bansighat. Ground floor is under threat of flooding in heavy rainfall every monsoon, so the houses with multiple stories are safe in many ways. They can even shift their belongings to upper floors. Human safety is guaranteed in upper floors in case of floods of low height. Inappropriate and inadequate planning, investment, materials selection in housing construction has created problems for housing management. Although many people had built houses of their own, it is uninhabitable because of low insulation of building materials, insufficient because of small size of room and inadequate ventilations. Although houses on the periphery of the Bansighat settlement were connected by roads, small alleys with a width of less than 4 feet led to houses on the inside. Houses on the inside of settlement were accessible only by two wheelers. The

requirements for road width are not met as all roads connected to households need to be minimum 20 feet wide [25]. Cul-de-sac of length not more than 50 metres need to be minimum 13 feet wide.

Health and education: Access to health institutions is abundant as there are many hospitals nearby including public, semi-public and private. However, less educational literacy and low financial capability has caused people to bypass education. Families in the community need educational awareness since there are many families which do not have even a single literate family member. There are less families with higher education also because of the inability to pay for quality higher education.

Employment and security: The types of work people are self-employed involve small scale businesses like vendor shops, grocery stores, hardware stores, motor-bike workshops which generates low income and it is not always sufficient for families to fulfill their all of their needs. Only in families where there are more than one family member employed in diverse sector of work, they are able to make good earnings which will help to lift their status and help them shift to a permanent location like rented apartments and housing in future. Security issues are overlooked by more than one police stations located in the surrounding. People in the community are united through NGOs and clubs like NMES, NBBSS helping create awareness and curb bad influences and there is less trouble from outsiders. There are a number of police offices in reach within 2 kilometres.

7.2. Analysis

Based on interview with key informants regarding why people are living in Bansighat despite the shortcomings they faced, informants believed that data collection is a must for keeping record of people in these settlements which will help in identifying problems and creating alternatives for people in the settlements. On the methods of basic data collection in the settlements, families can be categorized based on how long they have stayed in the informal settlements and their economic capability to afford housing so that the government can plan accordingly.

All informants believed different settlements required different intervention with relocation or on-site upgradation being the alternatives. Another viewpoint is settlers would not want to take a housing or apartment by relocation in Kathmandu since the price of housing decreases with time but the price of land increases. Land agents have speculated the price of land in Kathmandu and informal settlers demanding land in the same place has added complexity to the situation. On provision of infrastructure and facilities, providing infrastructure

by land development will be the best fit according to officials in the government agencies who had studied, worked and participated in various programs of the government for betterment of the informal settlements. The informal settlement will get a formal status in such a scenario since there will be less or no objection against the formal plans and actions of the government for overall benefit of the community.

National Shelter Policy focuses on providing land plots and services to the poor and underprivileged section of society including those living in squatter settlements. It promotes the idea of eradicating poverty and providing right to ownership of land. There is National Urban Development Strategy which provides alternatives for squatter settlements such as affordable rental housing with incentives and facilities. Implementation and coordination in implementation have been less applicable even when physical infrastructures have been created guided by policies of the government. Participation of beneficiaries in the process has been low in preparation of plans at all stages by the government so that the beneficiaries have low feeling of ownership upon implementation.

8. Conclusions

The research highlights the scenario that basic infrastructures like electricity, connection to sewer lines are provided in Bansighat but there are hardships regarding provision of infrastructures like drinking water supply, storm water drains. Provision of electricity to all households in Bansighat is possible by active efforts of the settlers and plans of the government to provide electricity to every citizen of the country. Reform in policies for providing infrastructure by ministries and departments of Nepal Government will enable line agencies to implement and support local government for action in the necessary area.

There has been positive approach in viewing the informal settlements in recent years in Nepal by formulation of laws for creating a just and inclusive society. There are gaps in physical and social infrastructures which have been prevalent in informal settlements since a long time. Less awareness about benefits of education has compelled people to be left behind in terms of educational competency. Awareness and sectoral emphasis on providing solutions in informal settlements can help whole of the community. Role of local government is highly significant for implementing at community level as ward and municipal representatives are much aware of the scenario and can guarantee maximum participation in planning and implementation at local level through Tole Sudhar Samiti, clubs and community groups. Par-

ticipation also includes support from non-governmental and community based organizations.

There are no clear provision and detailing regarding informal settlements in any of the acts and policies. There are cases where policies and legislation are contrasting to one another. National Shelter Policy 2012, 8th Amendment of Land Act 2021, and National Urban Development Strategy 2017 speak for healthy urban practices and showed support for the people who were needy, genuinely squatters. But there are strict guidelines against encroachment of river in HPCIDBC Formation Order. The Order calls for demolition of any structure built by encroaching the river. It can be said that there are provisions protecting the rights of people regarding access to physical and social infrastructure as basic rights of citizens of the country. There are also provisions forbidding the encroachment of riverside and forest, and that structures build without maintaining the minimum setback as per building byelaws are subject to demolition. In such case, the government can guarantee the right to development of healthy settlement while uplifting the status of the needy through inclusive development.

9. Recommendations

Recommendations are of two types: short term and long-term. Short-term recommendations for provision of infrastructures can be implemented by direct physical intervention. The long term recommendations are reflection of what can be achieved for better condition of informal settlements. Long term interventions include physical planning, intervention and policy suggestions on meeting the objectives.

Short term recommendations are providing water supply consistently through Low Income Consumer Support Unit (LICSU) to all households. The government should also prepare transitional shelter for places with probability of flooding and other disasters. With coordination of local governments, community based and non-governmental organization, awareness programs about education to children and health care are to be provided. Local government should support and encourage initiatives for development of community based funds and programs. Community and non-governmental organizations should work with local government to provide validity and keep track of conducted works.

Long-term recommendations are linking permanent water pipeline in Bansighat like Melamchi Water supply. There shall be storm water drainages in all pathways and roads. Federal and provincial governments have to plan and implement the water supply network. In the due process, local government can act for co-

ordination. Increasing the height of embankments of Bagmati River nearby settlement will be crucial to mitigate flooding. Height of plinth level of house needs to be increased to avoid yearly low level floods wherever possible. The government shall encourage multi-storey development and alternative use for ground floor to increase safety.

In the long run, the government shall strive to create a balance by providing affordable rental housing with incentives like land consolidation, development and availability at low cost. The government shall provide these incentives to private sector to enhance the development of housing for the welfare of people living in squatter settlements and in temporary shelters. Co-operation and co-ordination between agencies of the government is a must where there are multiple agencies involved. The government shall assign one agency with the power of the co-ordination in effective implementation of plans. Although federal or provincial government is the planning agency, the power of implementation shall reside in the local government along with the beneficiaries and participation of all stakeholders in the process is a must for efficiency of plans and programs.

References

- [1] Willis K. Squatter settlements[M]. pp. 403-408: Elsevier, 2009.
- [2] Mohanty M. Squatter settlements and slums and sustainable development[M]. Encyclopedia of the UN Sustainable Development Goals: Sustainable Cities and Communities, 2020.
- [3] Soto H D. The other path: the invisible revolution in the third world, london: I[M]. B. Taurus, 1989.
- [4] Lumanti N, Aid W, Asia W S. The water supply and sanitation situation of the urban poor in the kathmandu valley[M]. WASP-South Asia, 2000.
- [5] Lumanti. in status of squatter communities along bagmati river and its tributaries in kathmandu valley[M]. Kathmandu, Lumanti, 2008: 29.
- [6] Nassar D M, Elsayed H G. From informal settlements to sustainable communities[M]. Alexandria Engineering Journal, 2018.
- [7] Richards R. Urban renewal[J]. in Encyclopedia of Quality of Life and WellBeing Research pp, 2014: 6867-6868.
- [8] Sharma Y. Land sharing experience in kathmandu, case of shankhamul squatter settlement[M]. Rotterdam: Erasmus University, 2010.
- [9] Subedi A. An assessment of the condition of squatter settlement in sankhamul, kathmandu, nepal[J]. International Journal of Scientific Engineering Research, Volume, 2018, 9(9): 465-483.
- [10] [EB/OL]. . http://www.guthi.net/web/index.php?option=com_content&view=article&id=175:on-the-quest-for-a-home&catid=94&Itemid=1202.
- [11] Kutde M. Kathmandu upatyaka bhitraka nagarpalika ra nagaronmukh ga. bi. sa. ma garine nirmaan sambandhi maadanda[M]. MOPPW, Kathmandu: KUTDC, 2008.
- [12] Blaikie N. Concepts, introduction: Foundational[M]// Designing Soical Research, , Polity Press p. 8. 2000.
- [13] [EB/OL]. . <https://www.surveymonkey.com/mp/sample-size-calculator/>.
- [14] Jeong K Y. Disaster vulnerability assessment in coastal areas of korea[J]. Journal of Coastal Research, pp, 2018: 885-860.
- [15] Potsiou C. Policies for formalization of informal development: Recent experience from southeastern europe[J]. Land Use Policy, 2014, 36: 33-46.
- [16] Guevara N K A. Informality and formalization of informal settlements at the turn of the third millennium: Practices and challenges in urban planning[J]. Journal of Studies in Social Sciences, ISSN, 2014, 4624(2): 247-299.
- [17] Kinsey B H, Binswanger H P. Characteristics and performance of resettlement programs: A review[J]. World Development, 1993, 21(9): 1477-1494.
- [18] Ahmed I. Building resilience of urban slums in dhaka, bangladesh[J]. Procedia - Social and Behavioral Sciences, 2016, 218: 202-213.
- [19] Winayanti L, Lang H C. Provision of urban services in an informal settlement: a case study of kampung penas tanggul, jakarta[J]. Habitat International, 2004, 28: 41-65.
- [20] Budhacharya B, Interviewee. Key informant interview. [interview][J]. 2021.
- [21] NMES. Landless and informal settlements within kathmandu metropolitan city 2020[M]. NMESNepal Mahila Ekata Samaj, Kathmandu, 2020.
- [22] Google Earth 7.3 K. [Z]. 2021.
- [23] Moud G. National urban development strategy 2017 part a main document[M]. Kathmandu: MOUD, 2017.
- [24] Phuyal R K, Maharjan R, Maharjan R, et al. Assessments of drinking water supply quality at squatter and indigenous settlements of bagmati river corridors in kathmandu[J]. Scientific Research and Essays, 2019, 14(8): 30.
- [25] MOUD. Settlement development and building construction byelaws[M]. Kathmandu: MOUD, 2015.