

Integrated Upgrading of a Semi-urban Village

A Case Study in Putuwar Village, Halchowk, Nepal



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Abstract

Integrated Upgrading of a Semi-urban Village – A Case Study in Putuwar Village, Halchowk, Nepal

The world has witnessed a remarkable growth over the last 50 years and the urbanisation is becoming a growing problem in many countries. In 1950 29 % of the world's population lived in urban areas, in 2003 the urban population had grown to 48 %.

In order to create a healthy environment in the fast growing cities it is important to have an infrastructure that works. Creating such a city is something that can be hard without a functioning city plan and long term visions. In Nepal city planning is a big problem. The political situation is very unstable and has been for decades. The different governments have had their own plans and priorities and because of this the development has come to a standstill. Still the cities in the country grow in an unplanned way and the government cannot provide for the inhabitants' needs.

Nepal is a country in the beginning of its urbanisation, 80 % of the inhabitants live in rural areas. Much of the foreign aid donors and the focus of the government are therefore in the rural areas and in the larger cities. Some areas just outside the cities have therefore been neglected for many years and are in need of upgrading.

This thesis study is done in Putuwar village, a village just outside the capital city Kathmandu in a semi-urban area. The aim of the study is to help Department of Urban Development and Building Construction in the upgrading project of this village. The department has criteria on what is to be upgraded in the village and we are the first ones to face the problems and investigate if the department's requirements are equal to the real problems in the village.

The study has resulted in a proposal, consisting of 5 different plans suggesting how to solve the problems with:

- Drinking water
- Toilet and drainage
- Roads
- Public spaces
- Rainwater harvesting

A master plan is also created that did not exist before and can be used in future development of the village.

Keywords: City planning, Nepal, upgrading project, low-cost housing

Sammanfattning

Integrerad uppgradering av en by i ett semiurbant område – En fallstudie i Putuwar village, Halchowk, Nepal

Världens befolkning har under de senaste 50 åren växt anmärkningsvärt och urbaniseringen har blivit ett växande problem i många länder. 1950 levde 29 % av världens människor i urbana områden. Denna siffra hade till 2003 vuxit till 48 %.

För att skapa en hälsosam miljö i dessa snabbt växande städer är det viktigt att man har en fungerande infrastruktur. Att uppnå detta kan vara svårt i en stad om det inte finns någon fungerande stadsplan och långsiktiga visioner.

I Nepal är stadsplaneringen ett stort problem. Den politiska situationen är väldigt instabil och har varit det de senaste decennierna. De olika regeringarna har haft sina egna planer och prioriteringar och på grund av detta har utvecklingen avstannat. Städerna har ändå växt men på ett oplanerat sätt och staten kan inte tillgodose invånarnas behov.

Nepal är i början av sin urbanisering, 80 % av invånarna bor fortfarande på landsbygden. Mycket av utländska biståndsarbeten och statens fokus riktar sig därför till landsbygden och till de större städerna. Många områden som ligger just utanför städerna som inte klassas som landsbygd har därför blivit försummade i många år och behovet av uppgradering är stort.

Detta examensarbete är utfört i Putuwar village, en by i området runt huvudstaden Kathmandu som inte klassas som landsbygd. Målet med arbetet är hjälpa Department of Urban Development and Building Construction i detta uppgraderingsprojekt. Departementet har krav på vad som ska uppgraderas i byn men vi är de första som ska hitta lösningar på problemen och undersöka om departementet uppnår de problem vi funnit i byn.

Undersökningen har resulterat i ett förslag som består av 5 planer som föreslår lösningar på problemen med:

- Dricksvatten
- Toalett och avlopp
- Vägar
- Offentliga miljöer
- Regnvatten insamling

En master plan har också upprättats vilket tidigare inte funnits som kan användas i fortsatta arbeten i byn.

Nyckelord: Stadsplanering, Nepal, uppgraderings projekt, låg kostnads hus

Foreword

This thesis was conducted in Nepal during the summer of 2008. Two months of fieldwork was carried out in Nepal with help from Housing Development and Management (HDM), Lund University, in Sweden and Department of Urban Development and Building Construction (DUDBC) in Nepal.

This report is the final assignment for a Bachelor of Science degree in Engineering at Lund University, Faculty of Engineering.

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1 Introduction

We always had an interest for housing development and infrastructure in developing countries during our three years of study. After coming in contact with Housing Development and Management (HDM) at Lund University, we got a chance to carry out our thesis within this topic. With the help of HDM we came in contact with our local tutor in Nepal. She helped us to find an interesting project to write about when we had arrived in to the country. Two months of field study in Nepal took place during the summer of 2008, and the thesis was completed in Sweden.

1.1 Background

Nepal is one of the poorest countries in the world with over 24% of the population living under the World Bank's definition of poverty "a dollar a day". The problem with poverty is much due to the political instability of the last decades. Government after government has replaced each other and this has resulted in there not having been any long lasting economic or development plans in Nepal.

Putuwar village is located in the outskirts of Kathmandu, the capital of Nepal. The people in the village have been victims of the political instability in the country during the last decades. The living conditions in the village are very poor. Currently they have no drinking water, half the population do not have toilets and the only access to the village is via stairs, which makes the village isolated from the rest of the city.

Department of Urban Development and Building Construction (DUDBC) in Nepal has decided to start an upgrading project in Putuwar village and they have criteria in what they think is in need to be upgraded in the village. This fieldwork compares the department's criteria with the people's opinion in what they believe are the problems and shows different design proposals on how this upgrading can be done to solve the problems.

The thesis aims to a compliment for the government in this upgrading project. The proposals are made after listening to the people and facing the problems from another point of view. Hopefully this will assist in the department's continued work to upgrade this village so the result will be as good as possible for the people in the village.

1.2 Study structure

The preparations for the field study that was going to take place in Nepal started during the spring of 2008. We attended a course by HDM at Lund University, Faculty of Engineering, which discussed urban poor and housing in developing countries. Literature about the global urbanisation problems and the living condition in Nepal was read so that we could be well prepared before starting our field study.

After arriving to Nepal we continued our research about the living conditions in the country. We booked meetings with local professors and organisations that are working with improvements of the living conditions in Nepal. They were interviewed in hope to gain more knowledge about the country and how to face the problems they are dealing with. We visited different ongoing projects for the purpose to finding a project that suited our vision and that matched our goals regarding what we wanted our thesis to be about. The two criteria for our project were that it should be something that involved the poorer people and that could improve their living conditions. Also something that was of a reasonable size and could be done within our time limit was a necessity.

After a couple of weeks we came in contact with DUDBC. They were about to start an upgrading project in a village called Putuwar and needed some assistance in the starting process. At this time they had limited knowledge about the village and the existing problems and our task was to investigate these questions.

This project suited all our criteria regarding what we wanted our thesis to be about. Field studies were made during our two months of stay in Nepal. The village was visited 3-4 times a week and we made interviews and observations to understand the living conditions in the village.

The thesis work was continued in Sweden where we compiled all the fieldwork materials and finished the design solutions. After the literature review was done the thesis was completed.

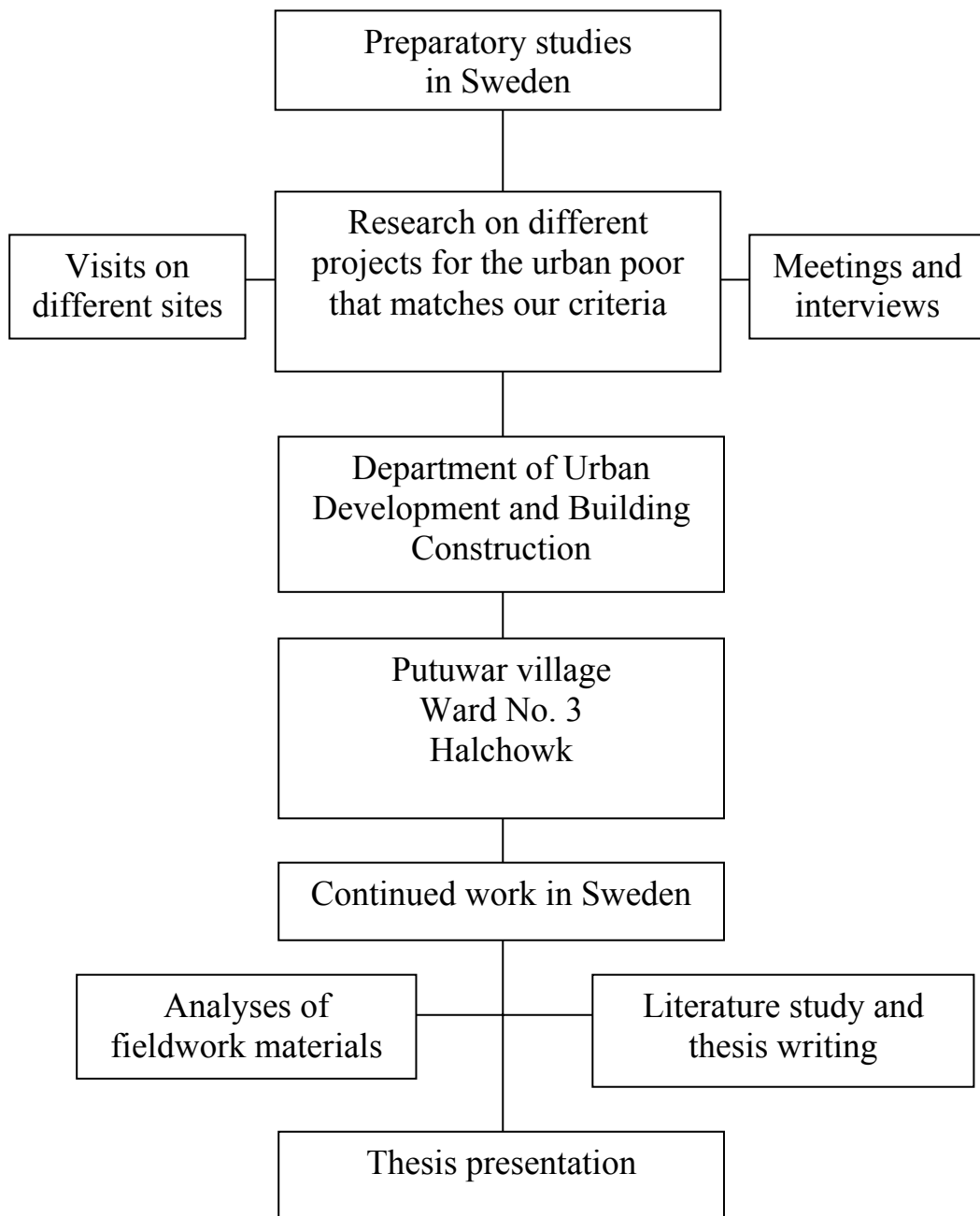


Fig. 1.1 Our study structure during the thesis work.

1.3 Problem

Putuwar village is located in the outskirts of Kathmandu. The living conditions in the village are very poor. At present time there is no running drinking water in the village. Half the population do not have a toilet and the roads are made of mud, which during rain makes the walking almost impossible and very dangerous.

The poor living conditions result from the country's economic issues during the history. The village is located on one of the hills that are surrounding Kathmandu and the limited access is another reason for the problem of poverty. The limited access has caused the village to stay undeveloped and forgotten when the rest of the city has grown and continued its development. Because of the isolated location of the village, there is no map over the area and this being yet another reason for why the development has come to a standstill.

1.4 Aim of the study

The aim of the study is to present different proposals on how to upgrade Putuwar village. During this work we will evaluate the upgrading criteria from DUDBC and compare them to the villagers' concerns.

The design proposals on how to upgrade the village will be handed in to the DUDBC in hope to give ideas and good solutions on how to upgrade Putuwar village and to help the department proceed with a successful project.

1.5 Method

The project could begin when we knew what requirements the government had for upgrading the village. Field studies were made regularly to the village during our stay in Nepal. Observations and interviews, with the help of an interpreter, were made 3-4 times a week on the site. It was necessary to face the problems in the village and to understand the peoples' needs before any design proposals could be made.

During the stay in Nepal we visited the libraries at DUDBC and Tribhuvan University, Institute of Engineering, where we could do literature studies. At the university we had a chance to talk to architects, professors and teachers who helped us with our thesis.

1.6 Limitations

The limitations were set based on the requirements from the department. Because of the limited time only a smaller area of Putuwar village could be

investigated. Material use and cost are not considered in this thesis. We are only dealing with the design to improve the living conditions in the village.

2 Literature review on housing and urban development

2.1 Urbanisation

The world's urban population is rapidly growing. In the developing world almost all future population growth will be in cities and towns. (G Tannerfeldt, P Ljung 2006) The world has witnessed a remarkable growth over the last 50 years. In 1950, 29 % of the world's population lived in urban areas, in 2003 the urban population was 48 %. A United Nations projection expects that the world's urban population will rise to 61 % by 2030 and will grow at an average annual rate of 1.8 % from 2000 to 2030.

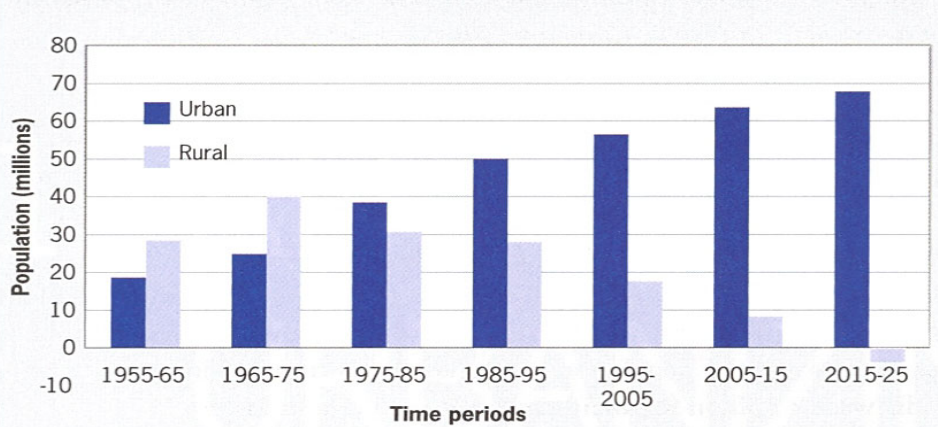


Table. 2.1 Shows the average annual increase of urban and rural populations globally. (G Tannerfeldt, P Ljung 2006)

The definitions of urban area vary in time and place. Each country has adopted their own definitions on what can be called an urban area. The definitions are based on criteria that usually are the same in every country: the size of the population in a locality, population density, distance between built-up areas, predominant type of economic activity, legal or administrative boundaries and urban characteristics for example specific services and facilities. In general the basic distinction between urban and rural areas is that the urban area usually provides a higher standard of life than the rural areas.

Urbanisation first started to become significant after the industrial revolution, mainly in Western Europe and the United States. The industrialisation and the development of modern transport contributed to the urbanisation as people could move easier with the help of for example the railways. The urban population continued to grow rapidly in the twentieth century. The world's total population increased from 2.52 billion to 6.3 billion, between 1950 and

2003 and the world's urban population increased from 0.73 billion to 3.04 during the same period.

The growth of urban population has two main components: migration and natural growth. The economical opportunities are the primary reason that motivates people to move in to urban areas. Other factors such as better education and higher standard of healthcare can also be reasons for people to move into urban areas. Disasters and famine can be factors that force people to move. Although migration is the biggest component that increases the urban population, the natural growth is also an important factor that contributes to the population growth. The urban areas can offer a healthier living with better education and better healthcare which causes a sustained high fertility and declining mortality. These combined creates a higher natural growth for the urban population compared to the rural population. (P Jenkins et al 2007)

It is in the developing countries that the urbanisation has caused the most problems. The lack of occidental science and medical care has made the population increase very heavy. This heavy population growth has caused the economy in these countries to suffer. The urban explosion in the Third world is remarkable. In South America the population of Sao Paulo, Lima and Mexico City has tripled since the start of the urbanisation. The total population of Algiers and Teheran has grown three fold respectively four fold over the last 20 years. The cities in the Third world have not been able to handle this increase in urban population and this has resulted in big slum areas. People are moving in to the city in hope for work and income but are instead forced to live in poor conditions, sometimes without sewerage and functioning waste disposal system. The death-rates are increasing due to the spreading diseases and striving towards a healthier life is impossible. (J-L Harouel 1993)

Some urbanisation prospects over the next 30 years:

- The world's urban population is projected to grow at an average annual rate of 1.8 %, which is nearly double the rate expected for the total population of the world.
- Africa and Asia are expecting a rapid rate of urbanisation. In 2030, 54 % and 55 % of their inhabitants will live in urban areas, compared to 39 % 2003. Africa and Asia will each have more urban dwellers than any other large area in the world. Asia alone will account for over half of the urban population in the world.
- In developed countries 75 % of the population was living in urban areas 2003. By 2030 this is projected to be 82 %.
(P Jenkins et al 2007)

2.2 Low-cost housing in Nepal

The concept with low-cost housing is to use cheap materials in the construction of houses. Because of that the materials that should be used are specific for a country or even for different parts of it. Materials that are considered low-cost in Africa can be the totally opposite in Asia. The price of material is not the only thing that is taken into consideration, with low-cost housing is also the quality of the house and the durability is of great importance.

It is not only in the choice of material that the cost can be reduced. According to Prof. Bhubaneswar Lal Shrestha it is possible to cut down the costs by good planning as well. “For instance we can reduce 10% in cost by proper planning of land, 10% in cost by efficient planning and design of individual building, 15% in cost by the use of alternative building material and construction technology”. The easiest way to reduce the costs is by using local materials and simple solutions so the owners can construct by themselves.

The following solutions are made of Prof. Bhubaneswar and are one type of solution for low-cost housing in Nepal. These solutions are best suited for the rural or semi-rural areas.

2.2.1 Floor

One of the main problems in current rural housing is dampness. Most of the damp comes through the flooring and it is necessary to stop it. The damp contributes to weaken the structure of the house and also to shorten the life expectancy of the building. It also leads to an unhealthy environment and causes many diseases.

Today the most common flooring in rural areas is a packed soil-floor. To upgrade this kind of flooring is easy; a cheap and good solution is to put a layer of stabilized soil bricks with a layer of cement mortar to prevent dampness. The price of this kind of soil brick is only 1/3 of the price for a regular brick.

2.2.2 Walls

Earthquakes are fairly common in Nepal and it is estimated that there is one huge earthquake every 100th year. The buildings are not constructed to stand a massive earthquake like that but with simple solutions the buildings can become strong enough so the inhabitants can evacuate. Using the same kind of stabilized soil bricks with a layer of cement mortar as on floor makes it possible to produce a wall that has a good durability and is cost effective. It is

easy to make the construction earthquake resistant by reinforcing the wall by having a bamboo construction on each side of the wall joined with a wire.



Fig. 2.1 Bamboo attached to a soil brick wall to make it earthquake resistant.

2.2.3 Roof

The most common type of roof in Nepal is a simple thatch roof. A more expensive type of roof but still common in Nepal is a tin roof. Another solution that is not as common but in many aspects much better than the others is a soil roof. The advantages with the soil roof are:

- It will not catch fire which is a big problem with a thatch roof.
- The insulating capacity is much better than that of a costly tin roof.
- It is built with environment friendly materials that are local.
- It is a simple solution and the family can do the labour them self. Even the poorest families can solve their roofing problem.
- Soil roof is a solution that in time can be improved with a cement plaster that will make the roof even better

The soil roof is constructed with a structure of treated bamboo with a polythene sheet, over this a structure bamboo and finally a layer of mud with a mixture of cement.



Fig. 2.2 A soil roof.

2.2.4 Other technical solutions

When building low-cost houses there are many challenging technical obstacles that have to be solved. In Nepal wood is a very costly material but is still often used for the frame around doors and windows. If the wood could be replaced it would lead to a much cheaper building component. Prof. Bhubaneswar has also found suggestions to these components. Instead of having the wooden frame it is possible to have special wall blocks with hinges moulded inside.

All of Prof. Bhubaneswar's components for a low-cost house are suited for rural and semi-rural areas in Nepal. The technologies are already existent but the problem is to spread that knowledge to the areas where it is needed and can be implemented. (B Lal Shrestha, 2007)

2.3 City planning

City planning is important in the development of a city. Without a city plan the city will grow uncontrolled and providing infrastructure to the citizens will be a problem.

2.3.1 History

Of the first known cities there is not much left to be seen and we do not know much about them. More famous is the major city of Babylon, called one of the seven wonders in the world. Babylon was established around 1900 BC and was at that time the largest city in the world, covering over 2500 acres. The reason why Babylon became such a big city and was so successful in its development was much due to the location on the river basis of the rivers Tigris and Euphrates, both major trade routes at the time. Other reasons were that Babylon was a planned city, with a system of canals so that farming could be developed after the demand of the growing population. They also managed

to enclose the city mainly for protection but that also led to a city separated from its surroundings with its own rules and regulations, like most of the present cities. (G Vickers 2008)

During the last century the city planning process has been developed in three stages. The **first** one that came short after the Second World War was called blueprint planning, and it was a design-based way using master plans as the key element. The **second** model came in the late 1960s using, instead of master plans, mainly lots of data and seeing urban areas as different systems. The **third** and final stage started in the 1990s with the acknowledgment of planning as a political decision-making process, with focus on negotiation. All of them are still existing but in different extensions. Which planning model is being used is of great importance, but also that there is a strong government for the creation of a sustainable city. (P Jenkins et al. 2007)

2.3.2 Definition

Today cities are much different from Babylon and also different from each other. Some have small narrow streets, some huge boulevards, some sprawl over huge areas and some are compact with skyscrapers. Some things that define a city no matter if they are old or new, big or small are:

- **City limits** – Not as obvious as in former times when big walls were built to protect the citizens but they are still an important part of a city. We do not have the same need of protection now and walls are not built but the limits are still there in form of mountains, rivers or just symbolic ones.
- **Population density** – There is no number on how many people have to live in a same place for it to be called a city, but the important thing is that the population density is higher than in the surrounding areas.
- **Social Structure** – Cities offer a variety of work and have place for both rich and poor people. The differences in the social structure can feel enormous and cities can be very segregated. All groups are however equally important for the city and without any of them the city would not function.
- **Monumental buildings** – Regardless of the city's background all have their own monumental buildings. They can be like Big Ben in London or Statue of Liberty in New York. These buildings have not much in common except that they are important for the people to be able to identify themselves with the city. They are also important as landmarks and make it easy to orient within the city. (G Vickers 2008)

The planning process in the developing countries can in many ways be compared with the process in the industrial countries. This is much because the funding and the technical support come from these countries, but the planning models implemented are often unsuccessful in the developing countries where the urbanisation is so fast. (P Jenkins et al. 2007)

2.4 Designing a housing project

There are a lot of aspects you need to look at when you start a new housing project. The new residential area is going to be inhabited by different people with different background and the goal is to get everyone to fit in. In developing countries it is even more important. The lack of money forces people to move to places where they can afford to live, whether they are good or bad. Therefore it is very important to build an area that is suitable for everyone. Feeling safe and satisfied in your neighbourhood is the key to development and healthy life. People in developing countries need a stable home community so they can continue their lives to a better living. (P Jenkins et al 2007)

2.4.1 Feasibility studies

Feasibility studies are needed as a preparation before starting a project. The purpose is to review if the project might be successful and helpful for the people. There are many questions that need to be answered before starting a project. What is to be achieved in the project, for whom it will be built, where it will be located and when it will be finished are some important questions. The economic aspect is also important; with what resources will the project be built. Once these questions are answered it is time to look at the site where the project is going to be built. What problems are the people facing and what are their social characteristics? The way the questions are answered will form the whole project and help the further work. The location of the site is something that needs to be decided early in the project. An analysis is made of the area to decide how many units will be built and for analysing the project feasibility. These studies enable understanding the needs and resources of the target population and the project can proceed.

2.4.2 Detailed studies

The detailed studies will form the main preparation for the project. Now it is necessary to look more in detail into the problems of the target population. Things like number of people in every household and detailed planning on the site are analysed. In this stage it is important to look into the economic characteristics and see the income of each household, the cost of any house

extensions and the maximum amount the households can afford each month for the upgrading. This will provide information of the economic status for the households and knowing their ability to participate can form the project.

Other detailed analyses of the project site are made in this stage. The location and existing transportation will effect the shaping of the upgrading and are important questions that need to be answered. Analyses of the topography, the ground condition and the climate are also important.

2.4.3 Developing project option

Developing project option is the key part of the project planning. Now the most important is to look if the proposals are appropriate to the people who will live in the project area. Can the new area fulfil the residents' needs and do they have sufficient resources? Combining elements in different ways and testing them against the object is necessary in order to create a well-function society. The houses and the area must be planned so they match the people and will be fully used. The recreation and public facilities are important in every residential area and this is something that might also need to be considered here. An area will not be functional if you do not have a well planned infrastructure and municipal services as water sanitation, energy and urban transport.

2.4.4 Detailed proposals

Once an approval from the authorities is established the work on detailed design can begin for the first time in the project. It is important to be aware that the earlier design can be changed later on in the project as long it is designed within the framework of likely final levels. This task prepares the detailed site development plan for the project which is based on the proposal from the earlier stage.

2.4.5 Project implementation

There are five main elements that a successful project requires:

- 1) Political will.
- 2) Adequate resources.
- 3) Well prepared plans that involve the political will and adequate resources.
- 4) Implementations that is effective and sensitive.
- 5) Maintenance and will to manage the operation.

(F Davidson, G Payne 2000)

3 Nepal

3.1 Geography and Climate

Nepal is a small country in southern Asia, about 145 000 km² and slightly smaller than 1/3 of Sweden. It is a totally landlocked country and does not have any coastline. In the south, east and west Nepal borders to India and in the north the mighty Himalayan mountains form the border to China. The Himalayan is the highest mountain range in the world and 6 of the 10 highest peaks of the world are located within the borders of Nepal. This makes it a well-visited land for mountaineers and trekkers.

Besides the Himalayan range the Nepali terrain can be divided into two more parts, Tarai (plains in the south), and the central hill region. The altitude reaches from 70 m above sea level to 8850 m, the highest point in the world.

The climate is a two-season type with a dry season October – May and a rain season June – September. The temperature varies from cool summer and extreme winters in the north to sub-tropical summers and mild winters in the south. (www.cia.gov 2008)

Fig. 3.1 Geographic location of Nepal.(utrikesnyheter.se)
(cia.gov)



3.2 Population

Nepal has nearly 30 million inhabitants and the population is still increasing with an annual rate of 2.1 %. The official language is Nepali which half the population speaks. The social situation in the country is bad; the literacy in the country is 49 % (male 63 % and women 35 %) and the unemployment rate is 42 %. (www.cia.gov 2008).

Year	Total population in 1000	Urban population in 1000	% Urban population
1911	5,939	-	-
1952/54	8,256	0,239	2.8
1961	9,413	0,339	3.6
1971	11,558	0,462	4.0
1981	15,142	0,947	6.3
1991	18,600	1,745	9.6
2001	23,832	3,716	15.9
2011	29,543	6,884	23.3

Table. 3.1 Urban growth in Nepal. (T Pradhan 2000)

The most common way to live is in a joint family system where the different generations live together and take care of each other (ADB publication 2008). The average size of household is 5.45 persons. The most common kind of work is agriculture and tourism and most of the population (80 %) still lives in rural areas. (A Koirala 2006)

3.2.1 Housing situation

In Nepal there are about 3,000,000 dwellings. Of these dwellings 50.5% are of temporary type, 41.2% of semi-temporary type and only 8.3% are of permanent type.

- Temporary housing means houses with mud walls and a thatch roof, these houses are not very stable and the life expectancy is short. This type often lacks windows or other openings except the door, so the climate in a house can be very bad for the health and the risk of fire disasters is big.
- The semi-temporary is stronger than the first type. It has a better roof, often a tin roof or similar, and the walls are of bricks. The ventilation is better and there are some openings in addition to the door.
- The final type, the permanent house, is much like our western houses with concrete pillars and slabs, leading to a much more stable house.

Most of the dwelling units are 10 years or younger and only 7% is 50 years or older so the life expectancy of a building can be assumed to be short. An important and cultural part of a Nepali household is to be the owner of the house and the system of renting an apartment is very uncommon. It is easy to spot a difference between owning a house in urban and rural areas, and in pace with urbanisation the system of renting will probably be more normal.

House Ownership	National	Urban	Rural
Own	88.3	60.9	93.4
Rented	8.9	34.8	4.0
Institutes /Other	2.8	4.4	2.5

Table. 3.2 Percentage of household by ownership and types of house for urban/rural, 2001. (N Tuladhar 2008)

3.3 Religion

In Nepal religion is a part of the every day life. The main religion is Hinduism and Nepal is the only official Hindu state in the world. The Buddhist religion in Nepal goes back to its founder Siddhartha Gautam (Buddha) that was born in Lumbini, in southern Nepal (www.thamel.com 2008). Of the population 81% belongs to the Hindu religion. The Buddhists form 11 %, Muslim 4 %, Kirant 3 % and 1 % is of another religion. (www.cia.gov 2008) The religious climate in Nepal is very open and the religious tolerance is unique. It is not unusual to see people of Hindu and Buddhist belief pray at the same temples at the same time. (www.thamel.com 2008)

3.4 Economy

Nepal is, according to the Asian Development Bank (ADB), one of the poorest countries in the world. There is over 24 % of the population living under the world banks definition of poverty “a dollar a day”. The problem with poverty is much due to the political instability of the last decades. Government after government has replaced each other which has resulted in there not having been any long lasting economic or development plans in Nepal.

Nepal’s geographic nature is also a problem, with 66% of the area consisting of hills and mountains makes it both difficult and expensive to create a sustainable development of the rural areas (ADB fact sheet 2008).

3.5 Political situation

The political situation in Nepal has a history of instability and is full of dismissed governments and corruption. In 1990, after a non-violent rebellion and pressure from foreign-aid organisations, the king accepted the role as a

constitutional monarch and Nepal was proclaimed a democracy. One year later, 1991, the first democratic elections were held.

During the years 1995-2005 there have been nine different governments so it has been hard to create sustainable political environment in the country. Even if the political situation is unstable, Nepal has during the last five years joined the World Trade Organisation, and 2006 participated in the creation of the regional South Asia free trade agreement, and finally 2008 reformed into a republic. Many things are in movement and if this will lead to a calmer political situation is yet to see. (Lonely Planet Nepal)

3.6 Kathmandu Valley

Kathmandu Valley is the largest urban area in Nepal and is located in the central hill region of the country. The valley consists of the capital city Kathmandu, and two sub-metropolitan cities, Bakhtapur and Lalitpur. These three cities have almost grown together to one big metropolitan city. The valley with hills around a flat fertile land makes it unique and a suitable place for living.



Fig. 3.2 A view over Kathmandu Valley.

How many are living in the valley is not known, but it is estimated to about one million. Since three of Nepal's largest cities are located in the valley this is the place that is most exposed to the rapid urbanisation. With the urbanisation the planning and infrastructure problems occur and much of the construction becomes unplanned. Additional problem is that most of the land is owned by private owners, so when the government plans for the

construction of infrastructure they have to buy or compensate all landowners that will be affected. This is a process that takes very long time and is costly, so instead the roads are often built between and around plots making the city a labyrinth of small narrow roads. (Interview with A Koirala 2008)

4 Department of Urban Development and Building Construction

The department of Urban Development and Building Construction is a part of the Ministry of Physical Planning and Works and was first founded in 1963, under the name Department of Building. Since 1963 the department has been reformed three times. The first time was 1971 and the second time, in 1987, it was divided into two different departments. In 2000 the departments came together again and this time under its current name “Department of Urban Development and Building Construction” (DUDBC).

The department consists of

- 3 divisions and 16 sections
- 24 district level division offices
- Building Technology Research and Training Centre
- Building construction and maintenance division offices

There are 689 employees in total working in the department.

The three main objectives of DUDBC are

- **Urban development** – “Promote sustainable urban development and urban rural linkages through development of modern physical facilities and conservation of cultural, religious and historical heritage sites”.
- **Housing and Rural Settlement** – “Promote safe and affordable housing through development of planned settlements”.
- **Building** – “Promote construction and development of safer, economical, and environment-friendly buildings, which also foster local architecture”.

(An Y 2008)

5 Putuwar village

Putuwar village has a misfortunate location that has caused the village to stay undeveloped for a long time. The inhabitants have always been some the poorest people in Kathmandu and they now feel disregarded when the rest of the city expands.

5.1 Geography

Putuwar village is located in Halchowk community. The community is located in the northwest of Kathmandu. Kathmandu Valley is surrounded by hills and Putuwar village is located on one of these hills around 100–200 meters above the city. It is located with a distance of 1.5 kilometres to the outside the ring road that surrounds the capital. The only access between the ring road and the village is a steep and narrow road.

The topography around the village is mainly mountains on one side and agricultural land on the other. The fertile soil is beneficial for farming which surrounds the village in the west. The eastern side that is facing Kathmandu has steep falls of 20–30 metres down to the access road.

5.2 History

Putuwar village is one the oldest settlements in Nepal. In the village lives also one of the oldest religious castes in Nepal, Newar caste. The topography and the geographic location are one of the biggest reasons why this area became occupied by settlers. This was a good location to build a safe village protected from enemies. The limited accessibility to the village and the location on the hill created a safe place to live. (M Karki 2002)

5.3 Economy

The people in Putuwar village are from the lower rank in Newar hierarchy and have always been struggling with poverty. To find work and have an income has been something they had to fight for every day. The land around the village is privately owned and can not be used by the villagers. The most common income for the people in the past was to help farmers on their agricultural land around Kathmandu Valley. Occasional works such as building slabs in construction and selling local mud have also been a way to earn living.

Nowadays the most common source of income is working in the near by stone mine where they hack stones that can be sold to the people in Kathmandu. (Interview in Putuwar Village 2008)

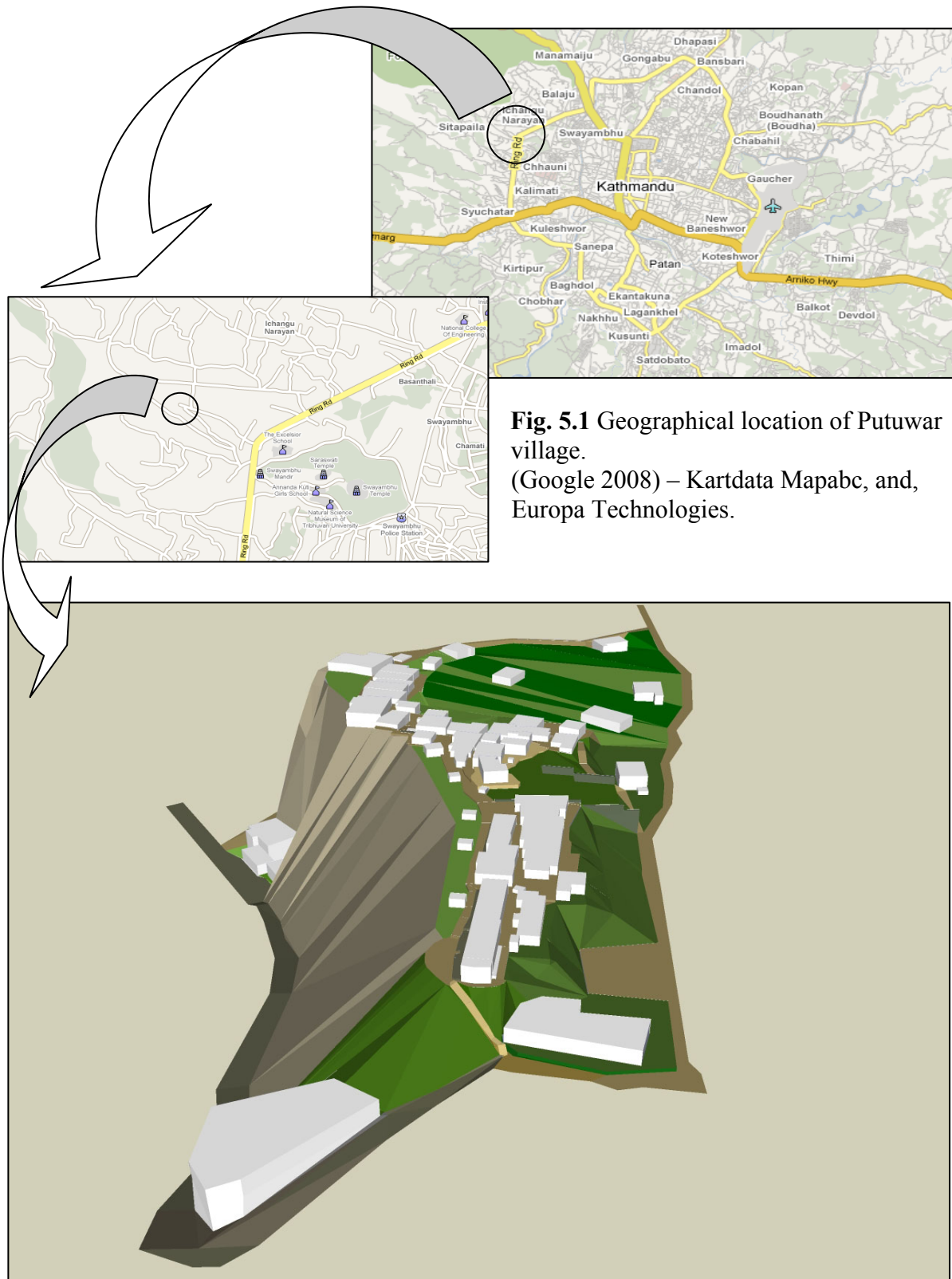


Fig. 5.1 Geographical location of Putuwar village.
 (Google 2008) – Kartdata Mapabc, and, Europa Technologies.

Fig. 5.2 Illustration of Putuwar village.

6 Analysis of the project site

6.1 The site

The site that is included in the project is a part of the Putuwar village. The whole village has around 1000 inhabitants located on different hills that are connected to each other. This project involves one of these hills with 76 houses and around 300 inhabitants.

The living conditions in the village are very poor. Lately there has been no running drinking water in the village. The three public water taps in the village are out of water. Almost half the population do not have a toilet which results in that the riverbank, public land or roads are used as toilets instead. The existing toilets are connected to individual septic tanks that will be full in a near future.

The mainly narrow and uneven roads in the village are made of mud, which during rain makes the walking almost impossible and very dangerous. There is no car access to the site. The only way to access the village is by two stairs that are located on both ends of the village. Many of the houses are from 15th-century and in poor condition. The houses are mostly over crowded and many of them are lacking electricity.

The plots that the villagers own are small and only fit their houses, so there is no land for agricultural or other use. There are limited spaces for public use, such as space for social interaction and economic purposes. Other than privately owned houses a school is located in the village with 500 students from different parts of Kathmandu. A smaller shop and a religious house can also be found in the village.

6.1.1 Requirements of the government

DUDBC have some requirements for things that they think need to be upgraded in the village.

These are:

- Drinking water
- Toilets and sanitation
- Road upgrading
- Public spaces
- Rainwater harvesting

6.1.2 Requirements of the inhabitants

In order to see if the government requirements were equivalent with the people's needs we made a study in the village where 31 households with

around 150 persons were involved, which is nearly half the population. With help from an interpreter we formulated a question sheet with questions on:

- Size of family
- No. of households
- No. of males/females in the household

The households also had to prioritise, from 1-4, what they most wanted to be upgraded in the village choosing between drinking water, toilets and sanitation, road upgrading and buildings. This study was made to increase our knowledge about the problems they are facing so that this could be taken into account in our design proposals.

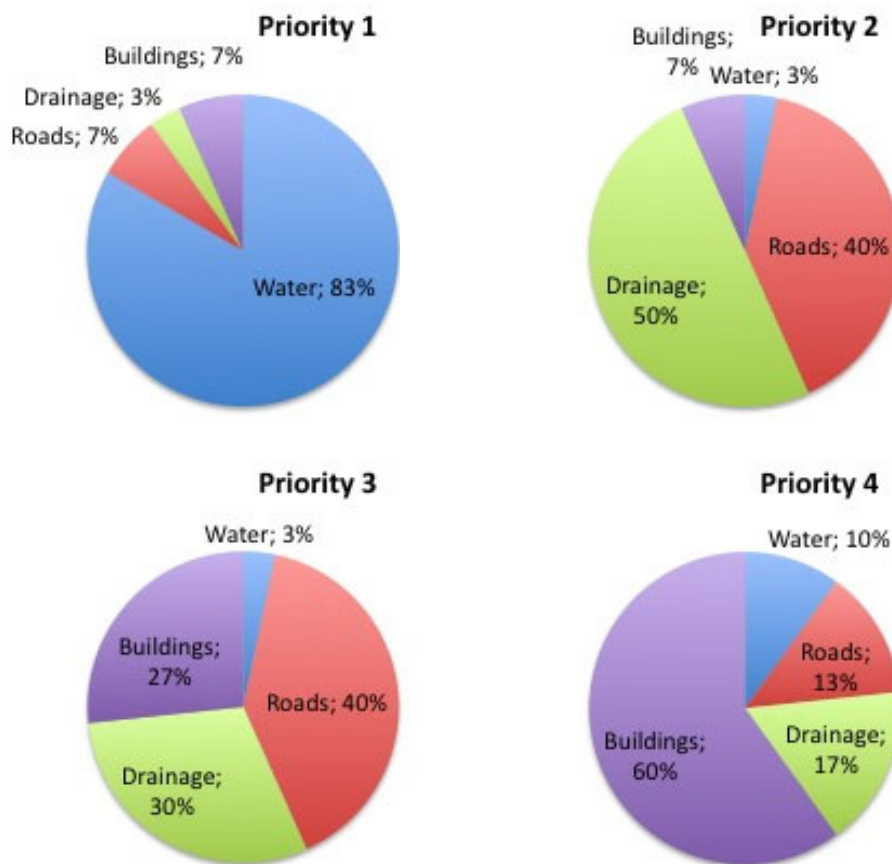


Table. 6.1 Showing the inhabitants, upgrading priorite.

Inhabitants requirements, in order of priority, were:

- Drinking water
- Toilets and sanitation
- Road upgrading
- Buildings

The study showed that the government requirements matched with what the people thought was needed to be upgraded in the village. Things like public spaces and rainwater harvesting were not questioned because we wanted the

people to tell about the problems they are facing daily. These two things are important for a village to be well functioning but are not as crucial for healthy living conditions.

6.2 Data collection and problem identification

One of the first things we had to do was to measure the houses and the surroundings in the village. No map was to be found over this village so in order to create a design proposal it was necessary to make a map. Each house and households was counted and a site plan was made to make it possible for our work to continue.

6.2.1 SWOT-analysis

By observation, a SWOT-analysis was made. Which strengths, weaknesses, opportunities and threats did this upgrading project have? This was made to create an overall look of the project and to try to understand what difficulties we could run into during our research and how to prevent them.

<p>Strengths</p> <ul style="list-style-type: none"> • Economic support from the department. • Willingness from the target population to participate in the upgrading. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Ignorance of the target population. • Privately owned land surrounding the village.
<p>Opportunities</p> <ul style="list-style-type: none"> • Economic support from aid organisations. • More people take notice of the problem and become involved in the project. 	<p>Threats</p> <ul style="list-style-type: none"> • Not enough education in how to prevent the same problems to re-emerge. • No long-term thinking. • Limited financial support.

Table. 6.2 Showing a SWOT-analys over the project.

Financial support from the government is the key for this project to be successful. The village has been promised to have an improved lifestyle in a near future with help from the government for funding of the upgrading project. The people in the village are willing to help with any work that needs to be done to reduce the costs. These two are the projects *strengths* and are helpful for this project to be successful.

Some *weaknesses* can be found especially if we look at the topography. The land surrounding the village is very hilly and any space to expand the village is hard to find. A lot of land in and around the village is privately owned and it will be expensive for the government to buy when it is needed. The lack of knowledge of the people in the village can result in bad maintenance and the same problems may appear again.

The *opportunities* can be found in aid organisations. With financial help and technical support to the department this upgrading can be done properly.

That there is no long-term thinking can be seen as a *threat*. People might not understand the magnitude of the problems and believe that quick and easy solutions are the most important. We believe that the problems need to be solved so that the solutions will be sustainable and last for a long period. It is also important to follow up the upgrading and educate the villagers about the problems and how to prevent them from appearing again. The financial support is limited and this will affect the upgrading result if the best solutions are not be implemented.

6.2.2 Drinking water

Currently there is no drinking water running in the village. The three public taps from where the people are getting the water are empty. The only place to collect water now is from a centre tank that is located around 10 metres below the village. This forces the villagers to climb stairs when they are in need of water. The natural source from where the drinking water is collected is blocked with mud and raffles and this causes the lack of water. The pressure in the pipe is not enough to force water up to the village into the three public taps. Even when the public taps have water running there is nowhere to store water in the village. The centre tank below the village is the only place where drinking water can be stored at the moment. During dry seasons or other misfortunes that cause lack of water people are forced to climb stairs when they are in need of water.



Fig. 6.1 Showing the stairs that the people need to climb while collecting water. This is also one of the two access point to the village.

6.2.3 Toilets and drainage

In the village 26 of 76 houses lack a toilet. People without a toilet are instead using their neighbour's toilet, the riverbank or the roads to do their needs. The existing toilets are placed outside the family houses, attached or not attached to the building. Each toilet is connected to a private septic tank that is located on the family's plot. These septic tanks will in a near future be full and the owners have no money to clean them nor more land to dig a new one.

Help organisations have earlier given some toilets to the village. They helped with materials and then the villagers built the toilets themselves. This caused an unfair distribution as some people have more money which allowed them to build bigger toilets closer to their house. The poorer families did not have the same possible options and the walking distance to the toilets can be long. Since the toilets location is based on individual families decisions attaching all toilets to communal pipes instead of using individual septic tanks might cause a problem. Height differences and the topography makes it also very hard to drag a pipe that connects all the toilets.

6.2.4 Roads

The roads in the village are in poor condition. The material of the road is mainly mud and the stairs are made of stone. The walkway is rough and hilly with a width of around 1-2 m and in some places it is even narrower. The rough surface on the roads makes the walking hard and to stumble is very easy. This causes a problem especially for the elderly and the disabled people. During rain the roads in the village gets very muddy and slippery. Walking is then almost impossible and gets even more dangerous. Some roads with less traffic are used as a toilet or a place to throw garbage which adds to the poor road conditions.



Fig. 6.2 and 6.3
Showing some of the poor roads.

The only access to the village is by two stairs that connect to both ends of the village. They are both steep and have a height difference of around 20-30 meters. This makes the village hard to reach and isolated from the rest of the city and that is also the cause of the unhealthy living conditions and why the village is undeveloped. The limited access to the village forces people away from the village in search of medical care. During the time it takes people might get worse or even die.



Fig. 6.4 Showing one of the other access point to the village.

6.2.5 Public spaces

The limited public land in the village is illustrated by the narrow roads and the fact that there are no public spaces to be found. Most of the land is privately owned and there are no areas that can be used by the community. People are using their own small land for social interaction. There are no open areas for the children to play on or to be used for a larger group of people to meet. They are now using the narrow roads for these kinds of purposes and this can create irritation among the people.



Fig. 6.5
The biggest public space in the village.

6.2.6 Rainwater harvesting

Right now there is no solution for collecting and storing rainwater. Once it rains the families put out barrels in the rain to collect the water. Compared to the drinking water this water is used for washing and cleaning. Every collection is now individual and not enough for the families to store. During dry seasons with less rain drinking water is wasted on these kinds of purposes. There is already a shortage of water and the village cannot afford wasting drinking water on cleaning and washing. The individual storage systems cause an unfair water supply among the people, families with more money can afford bigger barrels and can collect more rainwater. Cleaning and washing is today done outside each family house or on some open space on the roads. This adds more water to the already muddy roads and contributes to the road damage.

7 Proposal

All the proposals are based on studies of established research on how a well functioning city should be planned. With this knowledge we have been able to face the problems from a European point of view. It was necessary to compare and compromise our ideas with methods already used in Nepal. Considering cost and building techniques were important so that our solutions could be implemented in this village and create better living conditions for the inhabitants.

7.1 Drinking water

The natural water source is blocked and needs to be cleaned so the water can reach the village again. After the cleaning the department must secure the area and build some kind of protection around the source to prevent it from being blocked again. The inhabitants have to make sure that they will look after the water source so that they also will contribute to this protection. The now existing pipe is supposed to have water running 24 hours a day. Because of the amount of people that are in need of water a new pipe is planned to be connected to the village in the near future. This pipe will have water running for 3 hours per day and to take advantage of this, tanks should be built to store the water in the village. These tanks should be located above the three public taps and filled up during the 3 hours. This water can be stored and thus prevent the drinking water from running out again.

(See plan 121)



Fig. 6.6 Showing one of the three water taps in the village.

7.2 Toilets and drainage

The village has attempted to use public toilets before, but when nobody is in charge to take care of them they all end up dirty and non functional. In our proposal we have therefore suggested that everybody needs to have their own toilet. Instead of private septic tanks the toilets are going to be connected to five bigger communal septic tanks through sewerage pipes. These tanks are going to be located near the car road to make the emptying by a tank car easy. The connections between the toilets and the septic tanks are going to be constructed using the natural slope of the village. There are a couple of toilets that, because of the topography, are located so they cannot be connected to the sewerage pipe so they need to have their own septic tanks.

More public toilets are needed for the school; in total 6 new toilets, two for boys and 4 for girls. That will give the school a total of 9 toilets for 500 students. Before upgrading the toilets a standard toilet should be made. Everybody in the village will get this toilet, same size and same standard, and this will be fair among all the people.

(See plan 131)



Fig. 6.7 One of the toilets from an aid organisation in the village.

7.3 Roads

All public roads will be upgraded with a stone paving using local material from the stone quarry that is located near the village. The roads will be made plain for an easier walk and the stone will prevent the roads from being muddy and over flooded during the rain. All the roads will be made with a small slope towards an open drainage that will lead the water away from the walking paths. The stairs have to be remade plainer for an easier walk in the village. A car road will be connected to one of the public spaces for an easier access to the village. *(See plan 141)*

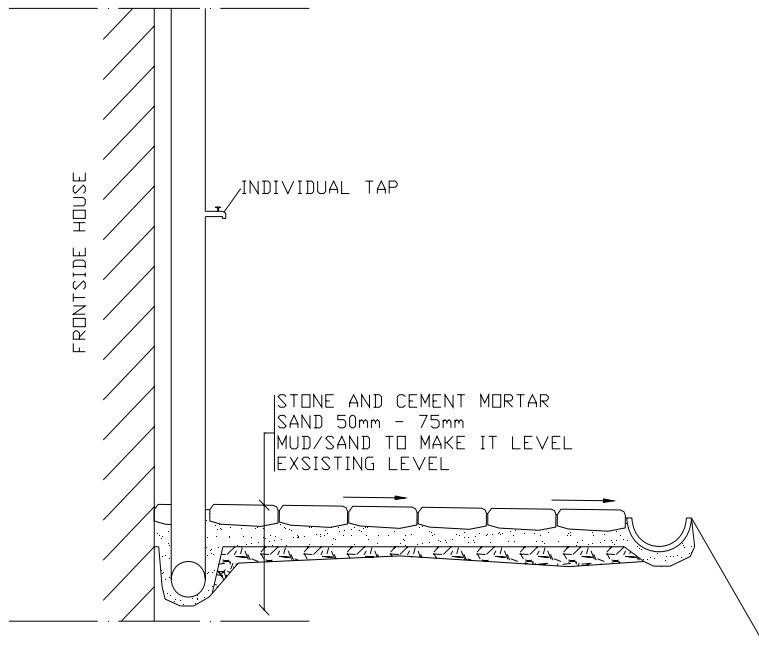


Fig. 6.8 Road section, towards an open area.

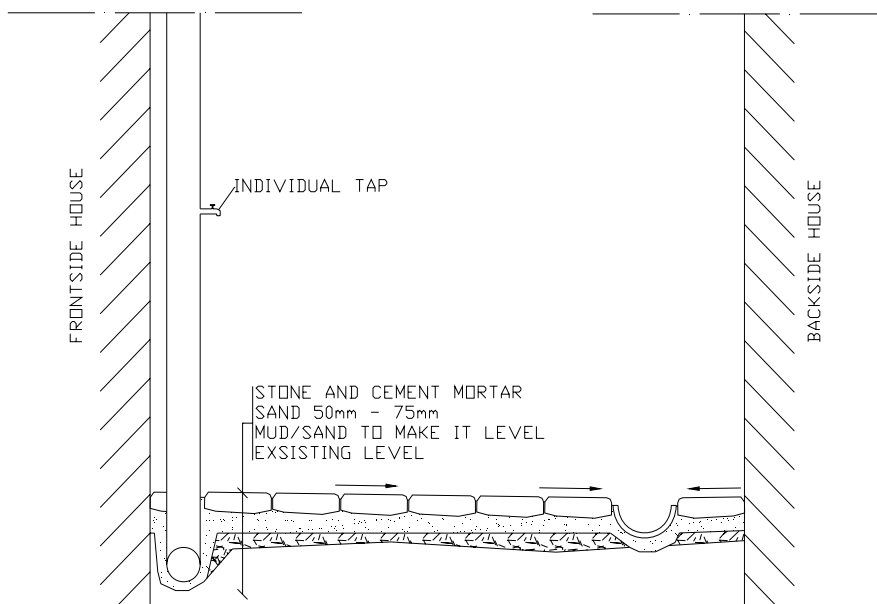


Fig. 6.9 Road section, between houses.

7.4 Public spaces

To have public spaces is significant for a well function urban area. The creation of meeting points and a place that can be used for economic purposes is important for a society to continue its development. This can improve the people's unity and increase the social security in the society.

In order to create public spaces in Putuwar village privately owned land needs to be bought. The open areas can be used as parking lots for the inhabitants and the visitors. To earn money to the community the parking lots can be rented out and the money can be used in the community to maintain the upgrading. The public area will also be a place for the people to use as a market where they can sell their agricultural products or handicrafts. A small health centre where infections and deceases can be treated must be located in the public space. Two options for an open space are suggested. Both of them will allow cars to have access to the village.

Alt.1: This is the best alternative for a public space. It is located in the middle of the village which makes it easy to access for all the villagers. The big area allows everything from car parks, market and health centre. A lot of privately owned land needs to be bought and that will make this alternative expensive.

Alt.2: The second option has a poorer location but will be much cheaper to create. Here an existing road can be used for the new car road and no land needs to be bought. The location and the size of the area is not as good as the first alternative, and older- and disabled people can face hard time in reaching the area.

Smaller public spaces for rainwater harvesting are suggested in different parts of the village. To build new toilets some small plots need to be bought. Near the school the public space will function as a playground for the children.

(See plan 151)

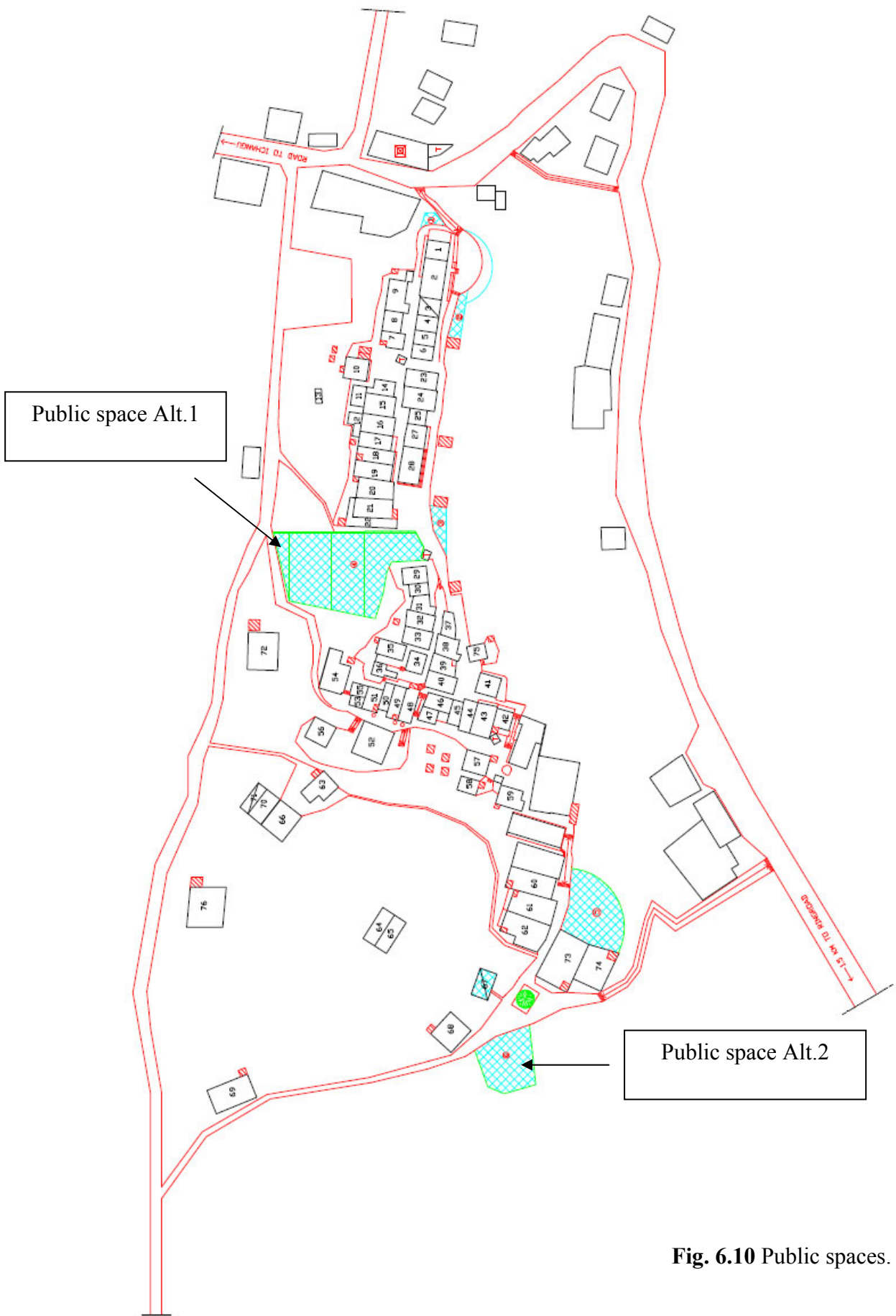


Fig. 6.10 Public spaces.

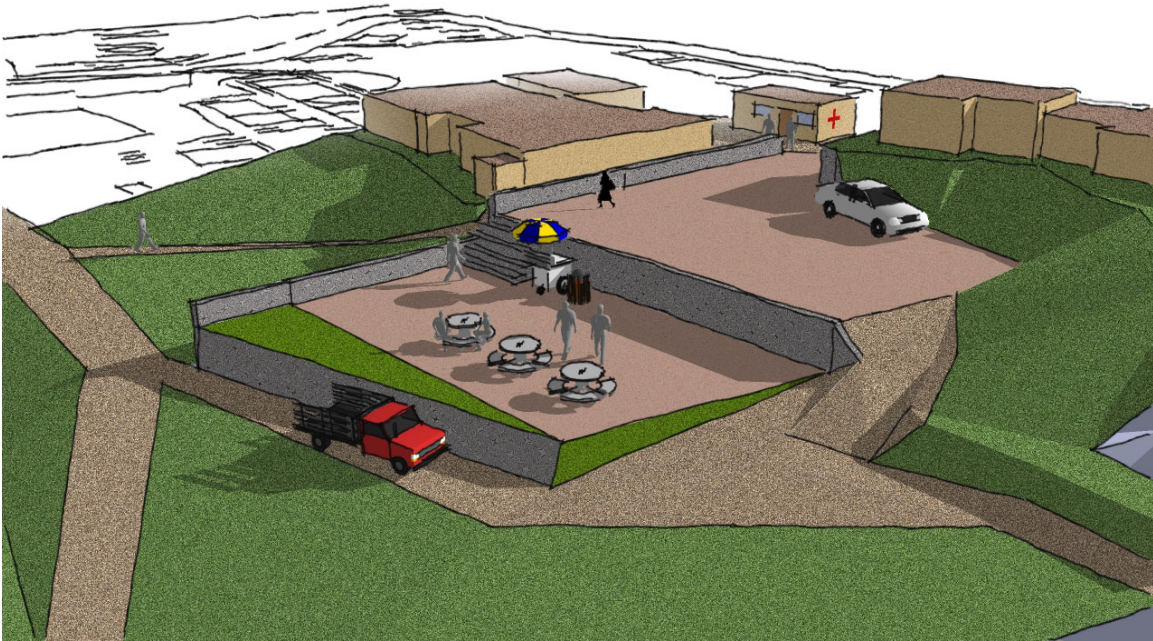


Fig. 6.11 Showing the first alternative for a public space.

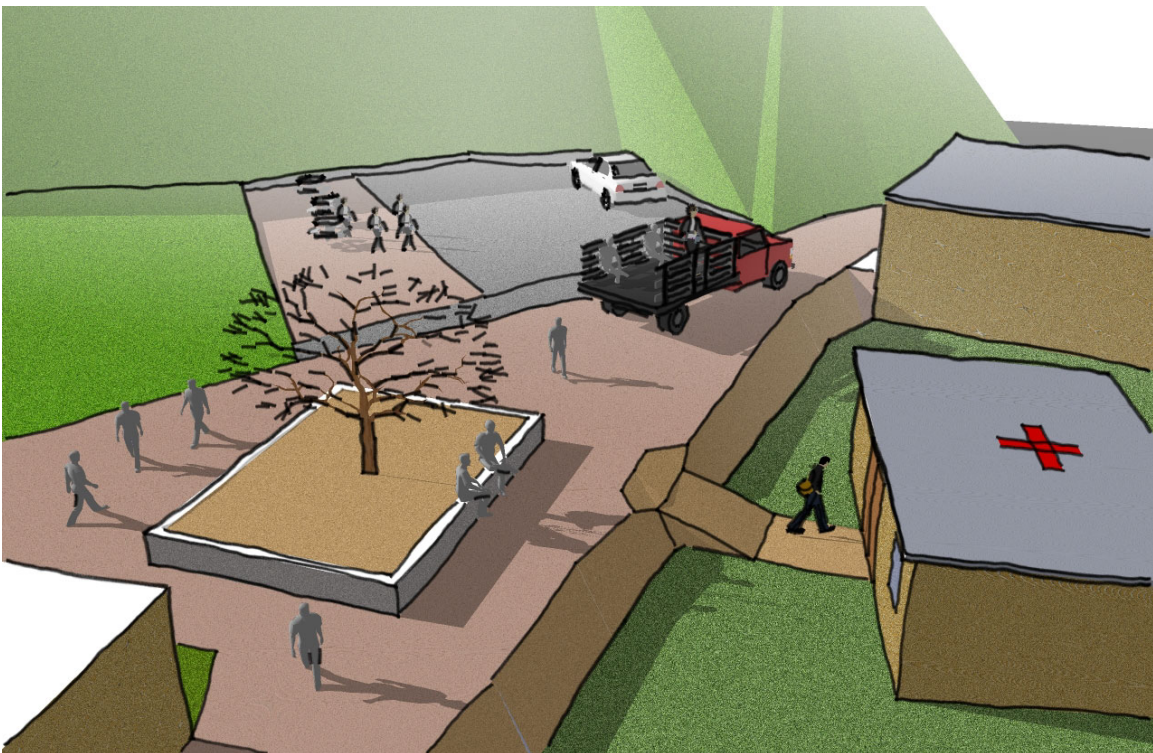


Fig. 6.12 Showing the second alternative for a public space.

7.5 Rainwater harvesting

The rainwater has to be more effectively collected because the lack of drinking water is very high. The villagers cannot afford to waste their drinking water on cleaning and washing. If the collection of rainwater can be improved the rain water will be used for these kinds of purposes instead and no drinking water will go to waste. To prevent the roads deteriorating when the people stand outside their houses washing and cleaning, a place above the water tank will be made for this purpose. Here everybody can wash and clean their clothes without adding more damage to the roads. This will also be a good spot for people to meet and talk, which hopefully can make the washing more fun. A hand pump makes a cheap and easy solution to lead water from the tank to the tap. The pipes that collect water from the rooftops will go underground

and follow the natural slope in the village. Four different places for water collection will be located around the village.

Each house will have an individual tap on the pipe that leads water from the roof into the ground. When it is raining there is no need to go outside to the different tanks to collect water. The taps can be opened any time and offers the people water in their houses.

(See fig. 6.8, 6.9 and plan 161)

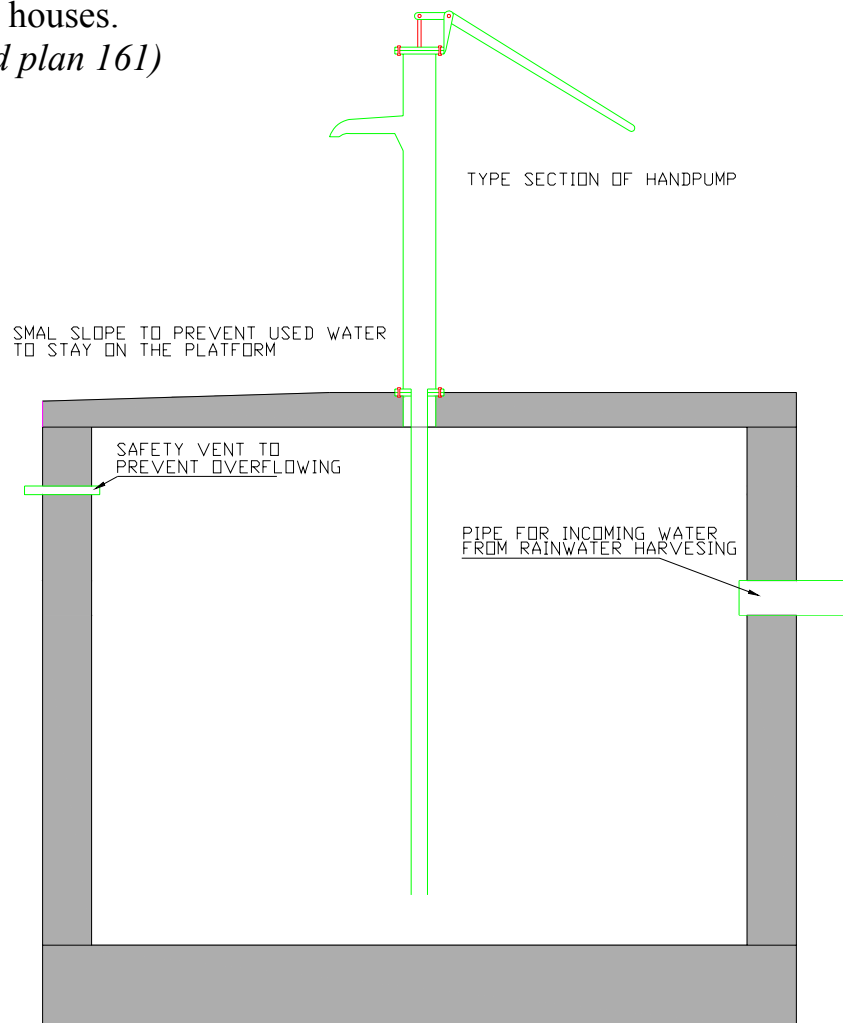


Fig. 6.13 Section of the watertank.

8 Our design proposal

Six plans and details in our design proposal are attached to this thesis on a CD. The plans are showing proposals that are described in the former text.

LIST OF DOCUMENTS				
000001	Ward No. 3	Putuwar village	Page 1 (1)	Rev:
			2008-12-10	

Doc-name	Contain	Date	Rev	Rev-date
111	Master plan	2008-07-20		
112	Height section	2008-11-10		
121	Proposal water distribution	2008-07-20		
131	Proposal toilets and drainage	2008-07-20		
141	Proposal roads	2008-07-20		
151	Proposal public spaces	2008-07-20		
161	Proposal rainwater harvesting	2008-07-20		

All measurements and facts of the site can not be 100 % reliable due to lack of information, proper tools and communication problems.

9 Reflection

There is no doubt that an upgrading project is needed in Putuwar village. The current living situation in the village is very poor and something has to be done to create the possibilities for a developing environment. With help from DUDBC the villagers have been given a chance to improve their lives in order to have healthier living conditions.

Our aim with this thesis is to offer a proposal that can provide decent living condition with possibilities for further development in the future. Now, for the first time the people in Putuwar village had the chance to describe the problems they are facing and the people's opinions have been one of the key elements when working with this thesis. With this we hope that the project will result in the solutions best fitted for the villagers.

The key to success is to implement this project in the right way. It is not acceptable to do the same mistake that has been made before. A good cooperation between the department and the villagers is needed to solve the problems. To involve the villagers in the project will reduce the cost of labour and also contribute to the people's awareness, which hopefully will prevent the same problems from appearing again in the future. All the upgrading in the village needs to have well designed technical solutions that should be sustainable for a long period. The department and the inhabitants in the village are responsible for this project to be successful and that the upgrading will last in the future.

All the people we met in Nepal have been so kind and very engaged in our project that it really has helped this project to be successful. Everyone has welcomed us to their homes and treated us as their family. The curiosity of the people in the village has helped us in our daily trips up the hills and the farewell ceremony given for us is something that we will never forget.

Before coming back to Sweden we had a big presentation for some people on DUDBC and other people that had been involved in our project. We talked about the project and our design proposals. The department was given a copy of the thesis so far and all the plans so that they could continue to work with them. Small road upgrading was just about to start in the village. We are keeping in touch with the people in Nepal to see how the progress with the upgrading is going.

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