06 Detailed proposals
Detailed proposals

In this part of the project, we have individually developed detailed proposals for the project area. Two proposals constitute our individual parts of the diploma work. The two proposals are based on the overall proposal with focus on cooperative housing. A third proposal has been drawn jointly with improvements of the existing plan.

The first individual part is done by Ida Hansson. The proposal treats general aspects of how to develop spatial plans for cooperative housing areas and spatial arrangements that can be useful in a cooperative housing area. The intention is to be guideline for future developments of cooperative housing areas.

The second individual part is drawn by Anna Olausson and consists of a new spatial plan for María Auxiliadora. The intention with this proposal is to be an inspiration material for further development of cooperative housing areas in steep terrain. The proposal for the new plan does not consider buildings and roads that exist in the area today.

The third part is drawn jointly and consists of some improvements of the existing plan. The existing buildings and roads have been taken into consideration, to make it possible for the community María Auxiliadora to be able to use the improvements.
Detailed proposal No 1
- designed by Ida Hansson

The first individual part treats general aspects of how to plan areas for cooperative housing and spatial arrangements that can be useful in a cooperative housing area with the intention to act as a guideline when planning cooperative housing areas in the future. The chapter is divided into five parts, the first is dealing with how to plan a cooperative housing area, the second about different house types, the third deals with how to build in steep terrain, the fourth how to group houses and the last part is about spatial arrangements of various functions that can be useful in a cooperative housing area.

How to plan a cooperative housing area

In the project area, Maria Auxiliadora, a cooperative has been formed of a group of people that collaborate to obtain houses at reduced cost. The cooperative and the spatial plan for the area was formed after the group of people got together. Only cooperatives that is built up from scratch is considered in this diploma work about spatial planning for cooperative housing. It is essential to mention that people can form cooperatives in an already built up area or apartment block.

This part of the diploma work is going to treat different ways of how to create a spatial plan to obtain a functional cooperative housing area and various ways of how to collaborate as a cooperative in the future. When creating a cooperative it is important to consider local traditions, one example is that the cooperative can own the land together but the families own their houses. They can still get together and buy material and build as a cooperative with help from each other. It is important that the people want to live in a cooperative to give the area good conditions from the beginning. When moving in to an already built up cooperative the family has to accept conditions that are established in the cooperative.

A cooperative is a democratic form of housing where all members take part in the decision making process. The cooperative is a juridical person with its own economy. It consists of the members who chooses its board to care for and manage the property and economic issues of the cooperative. It is essential that the members are involved in their living and their cooperative to make the cooperative a functioning organization. To keep down the cost they can for example take care of the public space by themselves. One difficulty is that juridical, technical
and economical knowledge is a requirement to create a well functioning cooperative and it is essential that the people are engaged in these questions or that they are willing to find experts to take care of this need. Experiences from Swedish cooperatives shows that people living in a cooperative take good care of buildings, the outdoor environment and equipment in the area.

There is not an ideal number of inhabitants living in a cooperative, it is important to have not a too small number of inhabitant or too large number in the cooperative. A guideline is that 80 – 100 families in a cooperative is a maximum and 15 – 20 is a minimum. PROCASHA has an recommended number of 50 families living in a cooperative. The number of inhabitants can differ a lot depending on the number of people living in each family. Too many inhabitants can make people feel that they are not important for the cooperative and it can be difficult to get the members engaged and hard to get valuable social contact between neighbours. A cooperative with a small number of inhabitants is more vulnerable than those with many inhabitants because the small cooperatives are more depending on that all inhabitants are involved in the communal work. If the area is divided into small cooperative units people are more quick and effective in organizing themselves for group activities and to solve common problems.

When planning a new cooperative housing area it is important to consider public space and the life between buildings. It is important to let the intended inhabitants be a part of the planning process in an early stage. A collaboration between future inhabitants and urban planners or architects can together work out an desired structure to achieve the communal goal of cooperative housing and living. The planning stage takes a lot of time and maybe not all of the people involved in the project are able to move in to the new housing area. The collaboration between architects and the people in the cooperative can sometimes be difficult in Bolivia when people do have little or no trust for architects, it is essential to work this out to get a solid collaboration.

*Life between buildings* written by Jan Gehl have been used as inspiration for this part about public life and social contact at different levels. The examples and experiences are from conditions common in countries like Sweden and Denmark and thus different from these in Bolivia the thoughts can be useful when planning a cooperative housing area in a developing country like Bolivia. It is important to consider differences in for example culture and climate. Physical design from Swedish and Danish cooperatives can be used as inspiration but changed to fit the Bolivian climate and culture, for example use of local materials (*see page 48*), location
of the house to use the passive heat from the sun (see page 57), roof overhang to create shadow (see page 71). According to Jan Gehl, the more time people spend outdoors the more often they meet. Common interests, problems or needs are important measures to facilitate for the people to live together in a cooperative and the design of outdoor space is thus especially important. The physical structure can be designed so physical contacts are increased and give a broader spectrum of available possibilities. It is however important to consider that outdoor space is used in different ways in Sweden and Bolivia. It depends on differences in culture but also the different climates. The climate in Bolivia is more pleasant all over the year than in Sweden, because of this the Bolivians are not depending that much on indoor space like in Sweden where the winter is cold and dark and people spend less time outdoors. This together with local traditions shows that Bolivians generally spend more time outdoors all over the year. It is important to plan the outdoor space to fit different purposes and for different people and ages.

Space in a housing area has different degrees of privacy (see Fig.2). The ultimate private space is inside the house which can have a private outdoor space, a garden or a balcony. Next step is semi-private space which is the space between the houses in a group, it has public accessibility and connection to the closest neighbours. The communal spaces are public space for all the residents in the area. A social structure with a matching physical structure with communal spaces, from public to private spaces gives the possibility to move from private rooms to gradually more public space. This directs to give a greater feeling of security and a sense of belonging. A greater use of public space can also be achieved, for example parents can permit young children to play outdoors in an early age.
Some of the cooperative thoughts can be showed with an illustration from Jan Gehls’ *Life between buildings – Using public space*. The pictures demonstrates that physical arrangement can promote or prevent visual and auditory contact.\textsuperscript{14}

1.) The first picture deals with contact between private and public space. If high walls surround the plot contact between private and public space is more difficult to establish than if the walls are kept low. Low walls promote spontaneously meetings between the neighbours.

2.) If there is too far distance between people moving in the area, spontaneous meetings will be less. Good social contact is promoted through short distances.

3.) High speed is negative in public space in a cooperative housing area. Low speeds increase possibilities for meetings between people and it is important to create an environment that promotes low speed. Low speed can be strengthened by creating a pleasant environment that promotes spaces for meeting, for example tree plantings to give shadow and benches to give a good area for rest.

4.) Living at different levels like in apartment blocks prevents spontaneously meetings with neighbours. Living at one level makes it easier to establish a good contact with neighbours.

5.) The orientation of houses is important for promoting good social contact. It is to prefer to orient buildings with doors face to face to obtain a feeling of solidarity.
The temperate climate in Bolivia provides good opportunity for outdoor activities and the fact that the houses often are small brings that people spend much time outdoors both for taking a rest or for working. Due to the warm sunny days in Bolivia it is important to provide space in the shadow, both for work and for rest. According to Jan Gehl the opportunity of places for meeting are supported by communal space both indoors, for example a community hall, and outdoors, for example a community centre or recreational areas, at different levels in the area. The communal spaces provide room for life between buildings; daily unplanned activities, walking, shorter stops, play and social activities. It is desired with a hierarchy from ultimate private space as the apartment, semi-private space as a group of houses and public space in shape of communal spaces. The family meets in the living room, the inhabitants of the cooperative meets in the nearby community hall and communal garden, the people living in the whole community meet in the main street or in the community centre. Comfortable resting areas are important for outdoor activities. Stationary activities like resting, doing something or play activities are long-lasting activities meanwhile ”coming and going” have just a brief duration. Important factors for long-lasting activities is easy access to in and outdoor spaces. Good staying areas in front of the houses and something to do or work with are also factors that can increase the will to stay outdoors. The design of the house and the outdoor space in the area is important in use of outdoor space. The house needs to be designed so that activities can change easily between outdoor and indoor activities. It is important that it is easy to go out and just see what is going on.\textsuperscript{12}

Life between buildings can be supported if semi-private areas in front of the house are offered. A garden with both a private part in the back of the house and a semi-private area in the front yard provides freedom of choice between staying on the private side of the house or be on the more public side of the house. A semi-private outdoor space in front of the house increases the opportunity for activities in the street, outdoor activities and conversations between neighbours. These semi-private areas can be designed for creating further opportunities for staying outdoors. They can be arranged with permanent resting areas with for

\textsuperscript{12}
example roof overhang for shadow, windbreaks, comfortable chairs, lighting etc. It is also important that the semi-private garden has a size and design suitable for a good resting space.

The use of high walls to protect the private space is common in Bolivia because of tradition and to protect the property. This method is not supporting the cooperative form of living which is based on contact between the residents. It is important to pay a lot of attention on the design of space between houses and streets. Too high walls prevent contact between public and private space. Jan Gehl suggests to use low fences to define the space between the semi-private zone and the public zone. If high walls and fences are avoided it is easier to exercise natural surveillance and easier for the inhabitants to join public life which will increase the feeling of security in the area. It is possible to build a low wall or fence around the own plot or the group of houses, this could even increase the feeling of solidarity. This will increase potential for spontaneous meetings and greater contact between the neighbours and a feeling of security in the area.
House types

Most house types can be used in a cooperative housing area. I have chosen to consider three types that are suitable for a cooperative low-cost housing area; detached houses, semi-detached houses and terrace houses. Terrace houses and semi-detached houses use space more effectively than detached houses. A dense development means less cost for infrastructure such as to install water, telephone etc. at an affordable cost. Denser housing areas can provide the area with more recreational areas, playgrounds for the children and space for meeting. A denser housing structure also gives the possibility to avoid areas that is not suitable for housing because of for example steep terrain. New types of houses can strengthen the cooperative concept, but living close to neighbours is a new experience for the Bolivians and it is difficult to foresee the exact consequences of this.

To use space more effectively, apartment blocks can be used and thereby a denser housing area will be achieved. The apartment blocks can have different size, from small blocks with just a few dwellings to large apartment blocks with a lot of dwellings. In large apartment blocks private outdoor space is unusual, semi-private and public space is most frequently to be found. Apartment blocks with a lot of dwellings are not considered as an option in our diploma work but could be an option when planning for cooperative housing areas.
Detached houses
The detached house is the most common house type in most housing areas. Detached houses give possibilities to choose where on the plot the house is to be placed. Detached houses have a great opportunity to expand over time when the family needs more space either as a new part connected to the first part of the house or a new building on the plot. For example the family can choose to build just one or two rooms in the beginning and when the family can afford to build more rooms or need more space they can expand. The detached house can be placed on own plots or it can be placed in a group of houses with communal outdoor space.
Semi-detached houses

The semi-detached house use space more effectively than detached houses. It is possible to place the semi-detached house in a group with only communal outdoor space, with only private garden or both, for example communal garden in front of the house and a private garden in the backyard. There is also possible to expand the semi-detached house over time. It can be done in different ways such as with more rooms, with an extra floor or with a ”new” part.

Miraflores in Cochabamba, Bolivia. The first picture shows a semi-detached house. The second picture shows a semi-detached house that is expanded with an extra part where the blue mark shows one family’s part.

Example of how semi-detached houses with only private garden can be expanded with more rooms and new parts.
Terrace houses

The terrace house is the least space demanding of the three house types that are mentioned. In an area of terrace houses, it gives, as for the semi-detached house great possibility to have communal or private gardens or both. The terrace house has not the same possibility to expand over time as the other house types, all the rooms in the building are to be built in one stage. If necessary one possibility is to let the families expand the house with an extra floor, an extra part in the back of the house or an extra building. This solution needs that all the families in the block of terrace houses agree and special attention has to be taken to technical problems that can arise. Another topic that is important to consider is the design, the part that is going to expand needs to pay attention to the original design of the building. In a terrace house the neighbours live close to each other and social contact is important.
Building in steep terrain

The project area, Maria Auxiliadora, is situated on a hillside with a steep and rocky terrain. Building in this kind of terrain is more difficult than building on flat land. The technical part when building in steep terrain is important to consider and it can be necessary to contact experts to eliminate, for example, the risk of earth slides.

When building in steep terrain it is important to choose an appropriate solution of how to handle the differences in level. In this part I mention two different solutions, cut and fill and split level houses.

The first alternative is to create a flat space where the house is going to be situated. This alternative gives the possibility to build a house of the same type as on flat land. To make a flat area the ground has to be excavated and the mass has to be put in front of and in the back of the house. This means that the garden will have slopes on both sides of the house. This method is usually used for slopes of 1:20 to 1:8 and is called Cut and fill. When making the plateau it is important to dig into the slope, so the houses are founded on one single kind of ground material, if not the ground can after some time or in case of heavy rainfalls start to slide away. Houses built in slopes with an inclination steeper than 1:8 should be avoided if possible.
Another possibility is to build split level houses, which gives the possibility to have a flat terrain on both sides of the house. A split level house is using the steep terrain and is often built in two floors with doors on both sides of the house, one entrance in the front of the house and one door to the backyard. This alternative gives a flat garden on both sides of the house, but has the disadvantage that the garden is built in two different levels.

Both advantages and disadvantages can be found when building in steep terrain. The technical difficulties are many but where there is lack of land for housing, areas situated in steep terrain can be chosen as an alternative. One disadvantage is that it can be expensive to build in steep terrain because of the importance of good foundation of both houses and roads. It is also more difficult to place the houses in groups because the houses may be situated at different levels. This makes it important to create well functioning groups around a shared garden on the same level or just small differences in level. To plan a housing area in steep terrain gives the possibility to give the houses on the hill a great view over the valley.
How to group houses

The way houses are grouped is important for creating good public life in a cooperative housing area. It is essential to illustrate different structures and to show that it is possible to create variations like in an ordinary housing area. Houses can be placed in small groups or have individual gardens depending on the type of cooperative that is desired. To show some possibilities I have chosen to demonstrate three different alternatives, only private garden, private and shared garden and the last with only shared garden. Public space, for example, green areas and community centre, is not going to be considered in this part.

Own garden

The first proposal consists of houses with only own gardens. This is a common way to develop housing areas with detached houses and also most used in Bolivia. The garden is private space and streets, community halls and recreation areas are semi-private and public space located at a central space in the block or area. Both detached, semi-detached and terrace houses can be used.
**Private and shared garden**

The second proposal consists of a combination of private garden and communal space. In this proposal the families have one part of the outdoor space shared with a group of houses and a private garden. For example the backyard can be the private part and the front a semi-private space for the people living in the small cooperative. The shared part invites to social activities and spontaneously meetings between neighbours. The inhabitants have to share the care taking of the garden. There can be playgrounds for the children and places for take a rest or stop for a conversation. House types most suitable for this proposal are semi-detached and terrace houses but detached houses can also be used.

![Diagram of private and shared garden](image)

- A community hall is placed at a central place in the group of houses.
- Sanitation is provided in the backside of the community hall.
- A shared garden represents the semi-private space in the group of houses.
- The garden at the back of the house constitutes the private outdoor space.
- The street is public space.

*Houses in a group with private and shared garden situated to follow the contours of the slope.*
**Shared garden**

The last proposal is based on communal outdoor space only. Private space is achieved only inside the house, all outdoor space is semi-private. The alternative with only shared garden depends on the people living in the group of houses because they have to share and take care of the communal outdoor space together. The Danish *bofelleskaberna* has this principle, a group of houses with a community hall in the middle. This type of structure is easy to change with new parts and new houses. Both detached, semi-detached and terrace houses can be used.

*Houses in a group with shared garden situated to follow the contours of the slope.*
Spatial arrangements for various functions

This chapter is about spatial arrangements developed at different levels that can be used in a cooperative housing area to create a greater sense of community as well as give the area a pleasant environment.

Community activities

This part is going to discuss how to improve living in a cooperative housing area with help of spatial arrangements.

A cooperative can be good for a greater number of people, not only the ones that is members in the cooperative. A strong cooperative can push for important issues not only important for the cooperative but essential for the whole neighbourhood, like school, health centre and service close to the neighbourhood. The advantages of a cooperative collaboration is most obvious when there is problems considering housing that the family can not handle by themselves.

Communal space is important for a cooperative housing area and should be planned to please and consider the need of all the inhabitants in the cooperative. It is important to take care of the communal spaces, semi-private and public space, to achieve a good solidarity and a pleasant environment. It can be equipped with for example playgrounds for the children and benches for grownups to increase the use of the semi-private and public space. The families can take care of communal space together, in different groups or have a special day for cleaning and maintenance of the area. The everyday care taking can be shared by the people living in the cooperative or the cooperative can employ a person for this reason, if they can afford. If the community is divided into small cooperatives it is to prefer that the people are taking care of the shared garden together to increase the feeling of solidarity. It is also possible to have a piece of land set aside for cultivating vegetables. Each family that is having the interest of cultivating can get a piece of land to cultivate for the families need.

One key element in a cooperative housing area is a community centre, an important space for social activities in the community. The community centre is equipped with a community hall with different size and function depending on the number of families that is included in the cooperative. The design of the community hall is important to manifest its importance and the placement of the building is essential to give all inhabitants access to the building. Except from...
functioning as a place for meetings the community centre can include, for example, health centre (posta sanitaria), school, day care centre for the children. It is also possible to create space for business activities like restaurants, workshops and small tiendas etc. Space for commerce, for example a market where the inhabitants can sell products that they have been producing. For example they can sell vegetables that the cooperative have been cultivating on their land. The market can serve the close neighbourhoods with essential products and the area can almost be self-supporting.

The community hall can be equipped with a big kitchen, dining room, rooms for guests, workshops, laundry and day care centres. Dustbins set out on strategically places, for example close to the community halls, keep the area clean. For garbage that can be composted is suggested to have a special dustbin, the compost can be used as fertiliser in the space for agriculture. The community hall can be equipped with toilet and shower, either in the building or in a separate building close to the community hall, as many of the people can not afford sanitation in the first stages of the building process of their own houses. To equip the community hall with sanitation could therefore be a short term solution until the families can afford own sanitation. It is important to situate the sanitation with good access but in an undisturbed place.

Communal space can compensate some of the private space if desired. This can be achieved by a communal kitchen where the families can take it in turn to cook food for the families in the cooperative. It saves time for the families and reduces the burden of work above all for the women. It can also be an advantage for single parents. Each family can if desired or when they can afford have own kitchen and sanitation but the space can be kept smaller when there are communal areas. The space can preferable be taken care of by the inhabitants. The community hall can also be equipped with extra rooms that the families can hire if they temporary need more space.

A community hall can have different size and function depending on the number of people living in the cooperative. A small cooperative can have just one community hall or if it is having a large number of inhabitants a community centre can be supplemented with several small community halls. A community centre can be the centre for a group of small cooperatives with important functions for the area meanwhile the small cooperatives can be equipped with a small community hall. The small community halls can have communal equipment for the small
cooperative and be used for meetings, day care centre where the parents can take in turn to take care of the children. It can be equipped with playgrounds for the young children meanwhile playgrounds and space for the older children can be provided in the public space close to the community centre. The small community hall can also be prepared with sanitation like toilet and shower for the inhabitants. It is possible with a small tienda, a kiosk, that is common in Bolivia which can support the small number of inhabitants with products like refreshments, sweets, soap etc.

**Rain water**

Lack of water is a common problem in poor housing areas and in Cochabamba the lack of water is a huge problem. To improve the situation for people in poor areas in the outskirts of the city it is suggested to take care of rain water. The houses can be equipped with drainpipes and water tanks to catch rainwater from the roofs leading the rainwater from the roof to a storage tank is a fairly simple solution. All that is needed are gutters and drainpipes, and a concrete tank with filters. If it rains 100 millimetres on a 50 m² roof, it will give 5000 litres of water, which can give enough water for a family of six persons to last for almost six months. The water is only for secondary proposes for example washing and for vegetables in the garden.

![Fig.5](image.png)

*Fig.5*

*Tank for storage of rainwater.*
Sanitation
The lack of appropriate sanitation is a large problem in poor housing areas. Many people cannot afford sanitation and are therefore forced to go "outdoors". Another problem is that the areas not often are connected to the sewerage system due to the distance from the city, high cost or that the areas are being built on formally illegal land. New developments can be equipped with on-site sanitation instead of waterborne sewerage for example a urine-diverting composting waterless toilet. It is appropriate for areas like Maria Auxiliadora that is situated in the outskirts of the cities and where there is no close connection point to the sewerage system in the city. It is possible to choose a system with no need to dig up the ground and lay down pipes. Liquid and solid waste are routed separately. Urine is led via a waste pipe into the domestic wastewater system, to a sand bed soakaway or a tank where it is collected and used later on as fertiliser. When keeping urine separate unpleasant odours can be avoided. The solid waste, faeces and toilet paper are routed into the container inside the toilet. A fan keeps the toilet area free from odours and moisture. The urine, which accounts for about 85 percent of the volume, is removed and faeces and toilet paper that is stored in the container is lifted out and composted. It is important that the people is willing to take care of the on-site sanitation and that they are getting instructions about management. If not managed in a right way, not wanted effects can approach like environmental effects both for the environment and people living in the area.
The intention with this proposal is to be an inspiration material for future development of cooperative housing areas in steep terrain. The proposal focuses on how to arrange group of houses in steep terrain to be appropriate for cooperative housing. The spatial plan proposal I suggest is in line with ideas developed in the previous chapter. I have chosen to arrange group of houses based on the concept *Private and shared garden (see page 80)*, because I think it is a suitable solution for a cooperative in Bolivia. The proposal does not take the existing plan or the existing built structure into consideration. A design proposal for the area has been worked out to achieve a coherent appearance of the area.
Proposed alternative layout for Maria Auxiliadora

- Carretera Sivingani
- Private area
- Rio Sivingani
- Football field
- Market square
- Community centre
- Area for cultivation
- Path

Scale: 0 - 100 m
Housing

The spatial plan is divided into seven blocks for housing. Each block has a separate local street and can be identified as one cooperative unit with dwellings for about 50 families (PROCASHA has an ideal number of 50 families in a cooperative). Each cooperative has its own small community hall where the inhabitants can have meetings and other activities. During the days it can also be used as day care centre for the children. The community hall is suggested to be located in the middle of the neighbourhood and close to the community hall there is space set aside for a playground. The common parking lots are placed close to the houses, so that the inhabitants easily can overlook the cars. Grouping the houses into small villages makes technical development easier. It is easier to install for example water at an affordable cost if the houses are less scattered. The plan makes it possible to achieve totally 365 plots. The proposal consists of a mixture of semi-detached houses and terrace houses. These types of houses require smaller plots and are cheaper to build than detached houses. To strengthen the cooperative concept the houses are suggested to be placed in groups in line with the ideas developed in previous chapter.

Seven cooperative units.
The space in the front of the houses will be created as a communal garden with benches and trees for shadow. The entrances to the dwellings are suggested to be from the garden. The groups of houses have a small building for laundry facilities in the centre. About 10 families will share a place for laundry facilities. Each dwelling is provided with a small private plot at the back. The houses are suggested to be one family house of one or two floors. The proposal contains places for children and young people where they can play and meet. For the younger it is better with several small places near the houses instead of one big playground. The places have to be free from traffic and therefore many smaller places for meetings, recreation and play within the neighbourhood are suggested. The playgrounds will be situated at a safe distance from the roads and situated close to the houses so children can be under an eye of adults.

A cooperative unit of 49 houses.
A cooperative unit of 52 houses.
The entrance to each of the seven housing blocks is marked to show that the visitor is entering a semi-private zone and also to make the inhabitants in the cooperative feel that the area belongs to them. If the inhabitants feel this connection it is more likely that they look after and protect the area. The entrances are suggested to be marked with signs, welcoming people to the cooperative.

The slopes in some parts are too steep to be developed for housing. I have tried to keep the buildings in areas with an inclination of 1:8 or flatter, but many slopes have to be cut and filled in order to be developed. Only a few slopes steeper than 1:8 have been planned for housing to be able to form a full housing block.

I suggest that high walls or fences around the cooperatives or buildings will not be used. It is important for people to be able to fence their property, but these fences should not be higher than what is needed for having eye contact with the neighbours across the wall.
A cooperative unit of 49 houses.
Infrastructure

The proposal consists of one main road up the hill with secondary streets that follow the contours of the slopes as much as possible. To follow minimises the difficulties created by the steepness and facilitates the road construction. It is important that the roads have an inclination that is not more than 8 percent\(^1\). The main road is suggested to be paved and of good standard. Hard surfaces prevent the road from being washed away during heavy rainfall. The secondary streets are covered by gravel to keep down the cost and facilitate the infiltration of rain water. The secondary streets are easy to connect the area to the surroundings in the future and to develop the area in stages. To make the main road safe separate sidewalks on both sides and street lighting are recommended. Along the main road an open drain system will separate the road and the sidewalk from each other. Storm water is suggested to be collected in open drains along the main road and led to Rio Sivingani.

Trees are suggested to be planted along the main road to offer a good environment with shadow over the sidewalks. Trees are also good because these absorb exhaust fumes from vehicles and will thereby contribute to a cleaner and healthier environment. In the area a well-connected path system is laid out, which can function as short cuts for pedestrians. The paths also allow the pedestrians to move within the area unhindered from vehicles. Benches are proposed to be placed along the paths to create places for resting and meetings.

The width of the main road is 9.5 metres and the secondary streets are 5 metres.
Service

A community centre is suggested in north-east easily accessible next to Carretera Sivingani. The community centre is proposed to contain a community hall, health centre (*Posta Sanitaria*) and space for business activities, restaurant, workshops for repairs of all kinds. In the middle of the community centre a public open space is suggested. The open space has benches, and lighting to allow it to be used also in the evening. To protect from the sun the open space has tree planting. This open space can also be used as a market place. The community centre can also supply the surrounding areas with service. The community hall can function as a place for meetings, educations, celebrations, day care centre during the days and as a place for youths in the evenings.

A market place is suggested north of Carretera Sivingani, a place that we observed as a spontaneous meeting place. It can be used as a market place for agricultural products and handicrafts and also a natural place for meetings. The market place is designed as a square and will contain benches and lighting. The paving of the square is suggested to be made of stones from the area.

In the northern part of the area space for small plots for cultivation are suggested. The intention is that the cooperatives should have the possibility to use a plot to cultivate for their own needs.
Market square next to Rio Sivingani.

Stalls on the paved market square.
Parks and space for recreation

To increase access to parks and areas for recreation this kind of open spaces in different sizes are planned in the area. These green areas can be used as meeting places, playgrounds for children, for celebrations and ceremonies or just to relax in the shadow. The area is suggested to provide an open space structure. Paths have been planned to make the green areas more accessible.

Most of the vegetation are proposed to be saved and more trees and other types of vegetation are suggested for the neighbourhoods, in public spaces and along the streets. The provision of vegetation, lighting, benches and playgrounds are proposed to make the area attractive and useful for all inhabitants.

The area around Rio Sivingani is suggested to be a park for recreation. Today there are no walking paths and around the river there are lots of garbage which make the area dirty and unpleasant. Today there is already vegetation but this is thinned to make the area more accessible. I suggest a walking path in the area next to the river with benches and dustbins placed along the path. Trees are proposed to be planted along the path to achieve shadow and a pleasant and green environment. A market square for the area is proposed next to the river on an area that we observed as a spontaneous meeting place. I suggest a pedestrian bridge across Rio Sivingani to increase the access to the recreation area from the settlement.
Design proposal

The purpose of a design proposal is to suggest ideas to make the area beautiful and attractive, both for inhabitants and visitors. The design proposal has been created to get a coherent appearance of street furniture in the area.

Seating

The first type of seating suggested in the area is a simple kind of seating. Big stones are suggested to be placed along roads and paths for the people to take a rest. The other one is a bench of iron with seat and backrest made of wood. The benches can be placed in the parks as well as in the public spaces. The colour and pattern of the benches are proposed to be designed and created by the people in the cooperative.

Dustbin

Dustbins are proposed in the area to reduce litter on the ground. The dustbin has a rain protection on the top and inside used with a plastic bag for easy collection of refuse. The cooperative is suggested to collect the refuse from the dustbins.
Wall
Low walls can be used around the plot. The walls are made of concrete and have a pattern that is possible to see through to get as much contact with the street as possible. Too high walls should be avoided for getting a natural surveillance.

Stalls
Stalls are suggested for getting an attractive and organized market. The stall are suggested to be made of wood and get the same pattern as benches, walls and dustbins to get a coherent appearance in the area.
**Paving**
Small stones from the area are suggested as paving at semi-private and public places in the area. It is cheaper to use stones from the area and it helps to keep the identity in the area. Paving is also protecting the area from earth erosion.

**Lighting**
Lighting enhances the enjoyment of the area at night by providing comfort and safety. In the area streetlights and lights for pedestrians are suggested along the roads. In the parks some trees are suggested to be lighted from below. This can also be an attraction in the area.
Detailed proposal No 3
- designed by Ida Hansson and Anna Olausson

Improvements of the existing plan
Since the area is under development following the existing plan we have chosen to propose some improvements of the present plan (see page 35). This is also a requirement from PROCASHA. The proposal takes into consideration the existing built structure of streets and buildings in order to not affect people already living in the area in a negative way. There have been no planned stages in the building process which is the reason why houses are spread out all over the area and limits the conditions for improvements of the existing plan.
Suggested plot development

- Detached houses
- Semi-detached houses
- Terrace houses
- Area for commerce
- Community hall
- Existing buildings
Infrastructure
The existing road structure as a grid is not a desirable solution for an area in steep terrain like Maria Auxiliadora. The streets are in many parts too steep for vehicles and many of the plots are not suitable for buildings because of the steep and rocky terrain.

Some streets, particularly in the north part, have already been built, most of them in an east–western direction. These streets ends up at the border of Maria Auxiliadora and do not have any connection to the surrounding areas which are not yet developed. We suggest that the streets in an east–western direction are adjusted to follow the contours of the slopes as far as possible. These streets have sidewalks on both sides and car parking and tree planting on one side. Many of these streets have no connection with the streets in north–southern direction because of the steep terrain. This cause problems for vehicles as most of these roads are too steep and in too bad condition for an ordinary car. To improve the situation the streets in an east–western direction are proposed to be connected with the surroundings to make it possible to enter the area in different terraces. Some of the streets in north–southern direction are preserved as streets for vehicles, other streets will be only for pedestrians and have stairs to facilitate walking in north–southern direction. The streets for only pedestrians will be narrow and have trees planted along the street to offer shadow. Benches are proposed along the streets to create places for resting. Due to the lack of drainage many plots can get problems with storm water during the rain season. A drainage system will be lead along the streets in open drains to minimize the risk of being clogged. The main drainage will be presented in the main streets and the most important will be the main street in north–southern direction.

Housing
The existing structure of plots for detached houses in a grid-system and the steep terrain limits the choice of new house types. Our proposal contains detached, semi-detached and terrace houses. The houses are proposed to be in one or two floors. Some houses in extremely steep terrain are suggested to be split level houses. The placement of the houses on the plot is considering type of house, street and the steepness.
A more effective use of the streets is suggested with houses on both sides when possible. Some streets have been extended to improve the road connection with the surrounding areas and because some parts are more suitable for housing. Plots not suitable for housing are removed when possible and these areas are suggested to be green areas.

The proposal shows how the area can be built in stages to make it easier to achieve good standard of the infrastructure in stages. The existing number of 350 houses in the area is preserved.

**Service**
To allow the inhabitants to have small business for example a small neighbourhood store on the plot a mixed land use within the area is proposed to be allowed. There is also a central place set aside in the area for business activities and market place. Three community halls are proposed in the area, these will be centres for meetings and social services in the community. In the community halls there will be space for a day care centre for children and a place where youths and adults can meet. A local health centre, *Posta Sanitaria*, will also be placed in one of the community halls.

**Parks and areas for recreation**
The open spaces are divided into three big areas and a few small areas to give all inhabitants access to open spaces. There are variations of characters from natural open spaces to parks. The open spaces can be used as meeting places, playgrounds for children, for celebrations and ceremonies or just to relax in the shadow. Since it is important to create spaces with shadow tree planting is suggested. Most of the vegetation has been saved and more trees and other vegetation are planned in the blocks, in public spaces and in the streets. The existing football field is preserved as an area for play and recreation. To make the area around Rio Sivingani attractive and more useful, more trees, lighting, benches, paths and a playground are suggested. At the same time as the area is suggested for recreation it is a protection area for flooding.
07 Endnotes
Introduction

1 La Fundación de Promoción para en Cambio Socio Habitacional

Background

1 Swaney Deanna; 1996, p. 375
2 Fundacion Pro Habitat; 2003, p. 7
3 SIDA, (2004-02-24)
4 SIDA, (2004-02-24)
5 Equipo de PROCASHA; 2003, p. 6
6 Fohlin A, Johansson M; 2001, p.26 f
7 Interview with Mr Rubén Sanches Vargas and Mr Miguel Larrazábal Vallejos, University of San Simón
8 Plan municipal de desarollo, Distrito 9, 1997, p. 38
9 Bricks made of hay, clay and water
10 Fundacion Pro Habitat; 2003, p. 18 f
11 Equipo de PROCASHA; 2003, p 12 f
12 Equipo de PROCASHA; 2003, p 12 f
13 FUCVAM; 1998, p. 1
14 FUCVAM; 1998, p. 2
15 FUCVAM; 1998, p. 4 f
16 FUCVAM; 1998, p. 6
17 FUCVAM; 1998, p. 28 ff
18 FUCVAM; 1998, p. 28 ff
Maria Auxiliadora

1 Villca Córdova S, Salas Arteaga R; 2002, p 73

2 Interview with Ms Maria Eugenia Torrico, PROCASHA

3 Balderrama Cossio O et al; undated

4 Balderrama Cossio O et al; undated

5 1 US Dollar = 7,67 Bolivianos, 1 Boliviano = 1,50 SEK

6 Interview with Ms. Liliana Arévalo Gonzales, Honorable Municipal Advice of Cochabamba

7 Interview with Ms. Liliana Arévalo Gonzales, Honorable Municipal Advice of Cochabamba

8 Interview with Mr Luis Ramirez, University of San Simón

Planning principles

1 Interview with Mr Luis Ramirez, University of San Simón

2 Interview with Mr Luis Ramirez, University of San Simón

3 Åstrand J; 1994, p.37

4 Interview with Mr Rojas Jorge Ernesto, CIPRODEC

Designed proposal No 1

1 Bjorneboe J; 2000, p.52

2 Åstrand J; 1994, p.42

3 Bjorneboe J; 2000, p.52

4 Berg et al; 1992, p. 12

5 Berg et al; 1992, p. 13

6 Lundewall O; 1985, p.39

7 Berg et al; 1992, p 32

8 Berg et al; 1992, p. 11
9 Sangregorio I; 2000, p.11
10 Gehl J, 1996; p. 55 ff
11 Gehl J, 1996; p. 60 f
12 Gehl J, 1996; p. 60 ff
13 Gehl J, 1996; p. 185
14 Gehl J, 1996; p. 64
15 Sangregorio I; 2000, p.13
16 Sangregorio I; 2000, p.13
17 Lundewall O; 1989, p. 22
18 Berg et al; 1982, p. 6 f
19 Berg et al; 1982, p. 6 f
20 Sangregorio I; 2000, p.13
21 Åstand J; 1994, p. 63
22 Separett, (2004-02-14)

**Detailed proposal No 2**

1 Vägverket, (2004-07-26)
Pictures
All photographs are taken by the authors. Also the maps, figures and illustrations are made by the authors, unless otherwise stated in the text.

Fig 1. Kleman M, Storsveen N; 2000, p. 99

Fig 2. Gehl J; 1996, p. 61

Fig 3. Gehl J; 1996, p.64

Fig 4. Åstrand J; 1994, p. 37

Fig. 5. Åstrand J; 1994, p.63

Pic. 1. FUCVAM (2004-01-12)
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Balderrama C et al; *Comunidad ”Maria Auxiliadora”*, Cochabamba, undated.


Bjorneboe J; *Småhusområder, bedre bebyggelseplaner og fottetning med kvalitet*, 2000.

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Gehl J; *Life between buildings, using public space*, 1996.


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Plan municipal de desarollo, Distrito 9, Cochabamba, 1997.
Sangregorio I; *Kollektivhus idag*, Borås, 2000.

Swaney D; *Bolivia a Lonely Planet travel survival kit*, 1996.


**Interviews**

Mrs Alanes Patricia, Auditor, Secritary, PROCASHA.

Mr Añz Mauricio, Architect, Pro Habitat.

Mrs Arévalo Gonzales Liliana, Architect, Technical Adviser of the Honourable Municipal Advice of Cochabamba.

Mr Bolivar Huáscar, Architect, PROMESHA, Technical assistant for PROCASHA.

Mr Cossio Fernando, Architect, Coordinator, PROCASHA.

Mr Delgado Marcelo, Architect.

Mrs Irusta Rosemary, President of the community Maria Auxiliadora, Representant for Human Rights (Derechos Humanos).
Ms Landaeta Graciela, Architect, Technology Licenciate at Lund University, Programme manager of the Latin American capacity building program PROMESHA (Programa de capacitación para el Mejoramiento Socio-Habitacional), President PROCASHA.

Mr Larrazábal Vallejos Miguel, student of architecture, University of San Simon, Cochabamba.

Mr Ramirez Luis, Architect, Director of Postgraduate Faculty of Architecture IIA / UMSS, Cochabamba, Bolivia.

Mr Rojas Jorge Ernesto, Civil Engineer, CIPRODEC.

Mr Sanches Vargas Rubén, student of architecture, University of San Simon, Cochabamba.

Ms Torrico Maria Eugenía, sociologist, PROCASHA.

Mr Urquizo César, Engineer Agronomist, Pro Habitat.

Mr Villca Sergio, Architect, PROCASHA.

World Wide Web

FUCVAM / english / The Uruguayan Mutual Aid Housing Experience

Promesa / El programa

Lund university / Hdm / Promesa
Separrett / English / General info

SIDA / Landinfo / Latinamerika / Bolivia

Vägverket / Linjeföring / Lutningar
Involved organizations

The people in Maria Auxiliadora contacted some organizations for helping them in the process. The two most involved are PROCASHA and Pro Habitat, two NGO’s, Non Governmental Organizations. Their wish is to work as a complement to each other.

PROCASHA

PROCASHA, La Fundación de Promoción para en Cambio Socio Habitacional, was founded in August 2001 with the vision to cooperate with all forms that allow improvement of the quality of life in general that works for sustainability and improvement of the living in particular. The program of capacity is designed through a relation with the Swedish Cooperative Center (SCC) and la Federación Uruguaya de Vivienda por Ayudua Mutua (FUCVAM).

After the first contacts with FUCVAM that took place in 1999, the administrations began to define a mark of collaboration that facilitates to visualise the possibilities to better establish the cooperative system of housing for mutual aid in Bolivia. The wish is to relate to the Uruguayan system, but adjusted to Bolivian context.

PROCASHA is composed with human resources from different institutions that are familiar with the thematic problem of housing. The capacity is guided to form and to join professional teams in technical, juridical-legal, administrative, technology and social areas, for the first groups of cooperative housing projects through self help in Cochabamba.¹

The vision of PROCASHA:

• to develop, motivate and promote action methodologies for the improvement of housing for low-income families.
• to cooperate the design of political and housing strategies to local and national scale.
• to motivate investigation processes related to the problem of the popular habitat.
• to promote attention to the housing problem of low-income families.
• to promote the training of human resources specialised in the problem of the popular habitat.
PROCASHA has an ideal number of 50 families in a cooperative, the minimum is 30 families and maximum is 70 families. In big groups it is difficult to be heard, many people stay quiet and it is just a few that is deciding. In Maria Auxiliadora it is difficult because people already are living in the area and therefore they have to work harder to make the cooperative work.\(^2\)

**Contributions in Maria Auxiliadora:**

PROCASHA’s task in Maria Auxiliadora is:

- To empower the leaders of the community.
- To work within the community and support the assemblies.
- To develop community activities, engage the families, not only the members of the cooperative (for example the children).
- To support the building process, self help means that everybody needs to work\(^3\).

The community Maria Auxiliadora is not a total cooperative but it has cooperative thoughts that PROCASHA think are important to support. They already have a solidarity, a own identity and strength in the community.

**Workshops**

The workshops carried out by PROCASHA were about social activities, how to collaborate and about the economic situation. Some workshops were carried out for the children to make them involved in the work. One of these workshops was called ”painting my house”. Flower petals in different colours were used to paint the house the children of the community would like to live in.

*Children painting with flowers.*
Pro Habitat

Pro Habitat was founded in 1993 as a national organization, formed with a small group of professionals. Pro Habitat is specialised in housing improvement and the elimination of the vinchuca beetle causing the Chagas disease in rural communities. The objective of Pro Habitat is to develop community participation through training of people, so low-income groups can participate actively in the process of population settlement. A main trust of their work is to train and offer technical evaluation to control the Chagas disease.4

Their work has been recognised by the Bolivian government which uses Pro Habitat as technical adviser for training and evaluation, in addition they have provided housing improvement loans in peri-urban neighbourhoods of Cochabamba and Tarija since 1996 using loan fund capital originally provided by Homeless International5. Pro Habitat has four offices in Bolivia, in La Paz, Tarija, Sucre and Cochabamba.6

In year 2000 Pro Habitat started a Credit Project in association with Homeless International for housing improvement and the control of Chagas disease. The project will continue until 2005 and will be carried out in three municipalities in Tarija and Cochabamba.

Contributions in Maria Auxiliadora

Pro Habitat mainly works in rural areas and with the project in Maria Auxiliadora they got the opportunity to work in peri-urban areas.

Pro Habitat is financing some parts of the project in Maria Auxiliadora. But they can not give a loan for the whole area of Maria Auxiliadora. 50 percent of the credit goes to the construction. The credits are small and it is a large area, but if the whole community work together they can get strong and get loans. There are two lines Pro Habitat can work after; as a bank or as a NGO but it is not sure which of the lines that is to prefer today. Pro Habitat wants people to learn to take care and develop the area by themselves and then they can go to the government by themselves and ask for money.7
Workshops

Each Sunday Pro Habitat has a workshop in Maria Auxiliadora. The workshops are carried out in an educational way. The topics of the workshops were different from time to time, most of them dealt with the building process, how to place the house on the plot and how to build their houses in the best way.

The big group of people was divided in to smaller groups to discuss and to get more detailed information from Pro Habitat. The groups were divided according to where they have their plot and what type of house they would like to build.

The first workshop was about how they wanted their house, ”their dream house”. The problems Pro Habitat recognised was that the people just wrote what they knew. For example most of the people draw their house in the back of the plot in a L-form because they did not know alternatives. This is a problem that Pro Habitat have to think of and solve before they start with the next group of people.

Architect Mauricio Añs, Pro Habitat, and his collaborators designed four-five different house models for another workshop to show alternatives of how to build a house. This explained that the same type of house can not be used in every place, it depends for example on the orientation of the plot.

In the future Pro Habitat hopes that the people will be able to handle the process by their own and in the end without any help from Pro Habitat. This first group of people is going to teach the next group and Pro Habitat is only going to act as support until they can handle the whole process by themselves.
**FUCVAM**

FUCVAM, *Federacion Uruguaya de Cooperativas de Vivienda por Ayuda Mutua*, was founded in 1970. FUCVAM is the biggest and most active social organization in Uruguay working with popular housing problem and urban development. They are dealing with more than 300 cooperatives in different stages all over Uruguay. FUCVAM obtained important achievements that contributed to the expansion of the cooperative proposal in Uruguay: larger and faster allocation of land for housing cooperatives, acceleration of the administrative procedures for approval of the legal status, negotiation of better terms and conditions for the loans.\(^9\)

PROCASHA is collaborating with FUCVAM to learn by their experiences of cooperative housing. People from PROCASHA and Maria Auxiliadora have been visiting Uruguay to take part of their experiences and people from FUCVAM have been in Bolivia to teach and tell about the Uruguayan projects.

**CIPRODEC**

CIPRODEC’s, *Centro de Investigacion Promocion y Desarrollo de la Ciudad*, task in Maria Auxiliadora is to co-ordinate and direct the work in the topic of drinkable water. CIPRODEC’s work consists of the perforation of a well and to storage the water in a tank. The well will be perforated of approximately 80 metres of depth. The water will be pumped to a semi-buried tank. Above the tank there will be a box with chemicals for cleaning the water. Pipes will be buried and give each house water through a faucet. There will be a meter in each house that marks the consumption and then they will pay a small amount to the cooperative.\(^{10}\)

CIPRODEC will also take care of the sewerage system but this project has not started yet though the financing is not finished.
Endnotes

Appendix 1

1 Propuesta de proyect, modelo de cooperativismo de vivienda por ayuda mutua, p. 3

2 Interview with Ms Maria Eugenia Torrico, PROCASHA

3 Interview with Ms Maria Eugenia Torrico, PROCASHA

4 Fundacion Pro Habitat, Bolivia 2003

5 Homeless International, founded 1989, is a UK charity that supports community-led housing and infrastructure related development in partnership with local partner organisations in Asia, Africa and Latin America.

6 Interview with Mr César Urquizo, Pro Habitat

7 Interview with Mr César Urquizo, Pro Habitat

8 Interview with Mr César Urquizo, Pro Habitat

9 http://www.fucvam.org.uy/

10 Interview with Mr Rojas Jorge Ernesto, CIPRODEC
Questionnaire

The following interview questionnaire was used:
El formulario que se utilizó fue el siguiente:

Encuesta María Auxiliadora

A: Características Socio-Económicas De La Familia

A.1. Composición Familiar y Actividad Ocupacional

Nombre Completo:

Sexo: Edad: Estado civil:

1. ¿Cuántas personas viven con usted, cuantos niños y cuantos adultos?

2. ¿A qué se dedica la mayor parte del tiempo, en qué trabaja?

3. Su trabajo es:
   -Permanente -Eventual

4. ¿Cuánto gana usted en una semana?

5. ¿Usted realiza una de estas actividades en su tiempo libre?

   - Comercio
   - Artesanía
   - Ama de casa
   - Profesional
   - Servicios
   - Estudiante
   - Otro
B. Datos de la vivienda

B.1 Acerca de la vivienda y el terreno

6. ¿Qué tiempo habita la vivienda?

7. ¿Cuántos cuartos tiene?

8. ¿Tiene un cuarto solo para cocina?

9. ¿Dónde cocina y lava los platos?

10. ¿Tiene baño en su vivienda?

11. ¿Cuánto mide o que superficie tiene su lote?

12. ¿Cómo esta ubicada la vivienda en el terreno, en que posición y por qué?

13. ¿Dónde lava la ropa, dentro o fuera de los cuartos?

14. ¿Usted realiza otras actividades en su terreno o en el patio?

B.2. La vivienda y su construcción

15. ¿Cómo construyó su vivienda?

- autoconstrucción
- con ayuda de los vecinos
- con albañil
- arquitecto o ingeniero
- otros
16. ¿Quienes le ayudaron a construir su vivienda?

- Esposo/a
- Hijos/as
- Otros familiares
- Vecinas/os
- Amigos/as
- Otros

17. ¿Qué materiales usó en la construcción de su vivienda?

Cimientos:

- Piedra con cemento
- Piedra con barro
- Piedra con cal y cemento
- Hormigón armado
- Otros

Revoques:

- De barro
- De cemento
- De yeso / estuco
- Otros

Pisos:

- Tierra apisonada
- Cemento
- Mosaico
- Otros

Cielo raso:

- Yeso/ estuco
- Tela/yute
- Otros
Teclos:

- Teja
- Calamina
- Placa de fibro cemento
- Otros

18. ¿Cuál es la parte más difícil al construir su vivienda?

19. ¿Qué problemas hay en la construcción de la vivienda?

20. ¿Se tiene espacio suficiente en el terreno?

**B.3. Calificación de la vivienda**

21. ¿En que lugar de la casa permanece mas tiempo la familia, juntos?

- Dormitorios
- Cocina
- Sala múltiple
- Patio y jardín
- Otros

22. ¿Con que servicios cuenta su vivienda?

- Agua potable
- Electricidad
- Alcantarillado
- Teléfono
- Otros

23. ¿Que quiere mejorar en su vivienda y por qué?

24. ¿Puede mencionar algunos aspectos positivos de las viviendas?

25. ¿Puede mencionar algunos aspectos negativos de las viviendas?
C. Mejoramiento del barrio

C.1. Características del barrio

26. ¿Con que servicios cuenta su barrio?
   - Agua potable
   - Alcantarillado
   - Electricidad
   - Teléfono
   - Transporte
   - Guardería
   - Centro educativo
   - Centro de salud
   - Áreas recreativas
   - Alumbrado público
   - Otros

27. ¿Qué otras cosas quiere tener y mejorar en su barrio?

28. ¿Dónde se reúne la gente del barrio?

29. ¿Su barrio tiene espacio donde los niños puedan jugar (parques)?

30. ¿Qué tareas realizan los vecinos juntos?

C.2. Acerca del cooperativismo

31. ¿Le gusta vivir de manera colectiva y solidaria?

32. ¿Qué sería lo primero que quisieran construir los vecinos juntos para su barrio?
   - Centro Comunal
   - Guardería
   - Centro Educativo
   - Centro de Salud
   - Transporte
   - Público de Alumbrado
   - Áreas Recreativas
   - Otros
**Otras preguntas**

33. ¿Dónde realiza sus compras?

34. ¿Con que frecuencia va al centro de Cochabamba?

35. ¿Que medio de transporte utiliza?

- Trufi
- Micro
- Taxi
- Auto propio
- Camina

36. ¿Se siente seguro en su barrio?

37. ¿Dónde botan la basura?

38. ¿Cómo y de donde obtienen agua, con que frecuencia, cada cuanto?