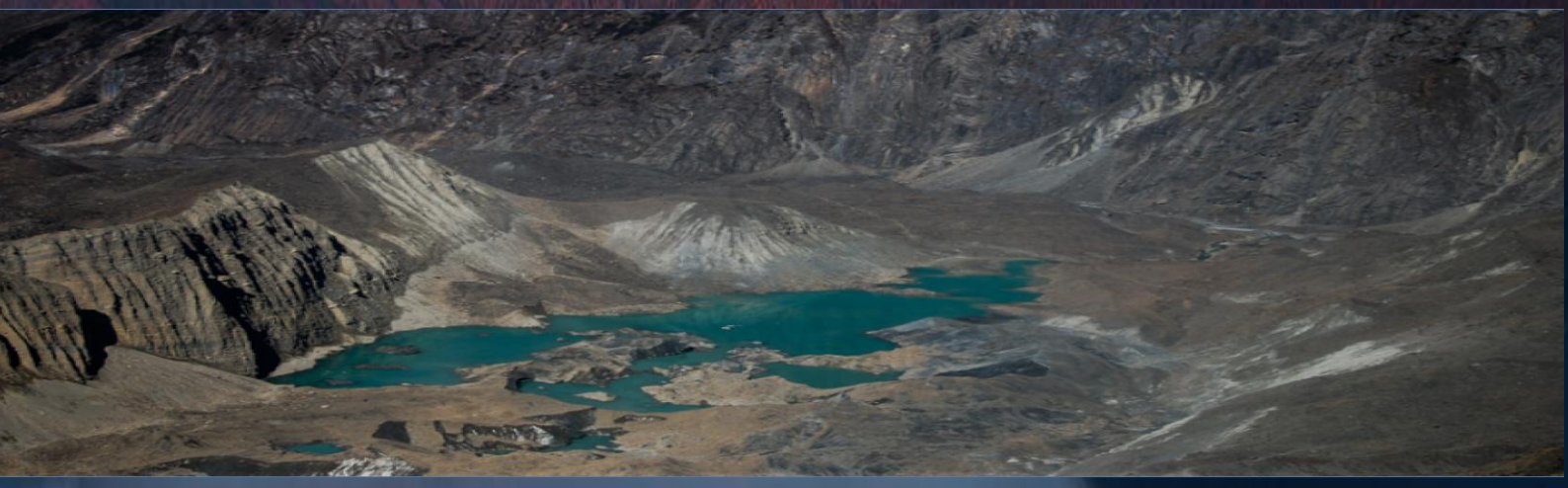
MUNICIPAL TRANSPORT MASTER PLAN (MTMP) OF

Annapurna Rural Municipality

2023 – 2027

FINAL REPORT

Volume – I: Main Report



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Submitted To

Office of Rural Municipal Executive

Annapurna Rural Municipality

Pokharebagar, Myagdi

Acknowledgement

The study team would like to express sincere gratitude to the Chairperson of Annapurna Rural Municipality Mr. Bharat Kumar Pun; Vice Chairperson Mrs. Diwa Kumari Tilija Pun; Chief Executive Officer of the Office of Annapurna Rural Municipality, Mr. Amrit Subedi; Elected Members of Municipality Executive Body, Technical Section Chief Er. Ishwor Bhandari and all other staffs of Annapurna Rural Municipality for the valuable co-operation and suggestions that guided us to accomplish the agreed task up to this level.

We are also thankful to the local people and social mobilizers of Annapurna Rural Municipality for their help and suggestion in selection and identification of the roads. We hope this ongoing process of preparation of Municipal Transport Master Plan (MTMP) of Annapurna Rural Municipality will be very helpful and a valuable guideline for the planning and development of effective and systematic transport network within Annapurna Rural Municipality.

The study team

Executive Summary

Transport facilities help in developing access with the rural-urban linkages. Road accessibility can reduce isolation, stimulate crop production and marketing activities, encourage public services and help to transfer technology. Road building has been seen to bring about notable enthusiasm and visible changes in rural life. Road infrastructure is considered as "the infrastructure for infrastructure". However, in the absence of notable criteria and rational guidelines, road construction is carried out in adverse manner resulting in haphazard use and wastage of limited resources. Municipal Transport Master Plan is prepared for assessing and planning the present road and transport infrastructures and facilities within the municipality and the surrounding local bodies.

Myagdi district is one of the major hubs of Dhaulagiri region located at the center point of Gandaki Province of Central West Nepal. It is located roughly 80 kilometres to the north-west of Pokhara, tourism capital of Nepal. Annapurna Rural Municipality is a rural municipality in Myagdi District in the Gandaki Province of central west Nepal, which is also the most popular tourism hub of the Nation. Annapurna Rural Municipality was established in 12 March, 2017. It was formed by merging then existing Doba, Bhurung Tatopani, Dana, Narchyang, Paudwar, Shikha, Ghara, Histan and Ramche village development committees. The Rural Muncipality got its name from the name of Annapurna Mountain which lies in this Rural Municipality. Pokhara Baglung Beni Jomsom Ghoktang Feeder Road runs throughout the heart of municipality. Small stream are flowing from all the way from north to south and towards Kaligandaki River. The Municipal Center lies in Pokharebagar. Jaljala Rural Municipality of Parbat District lies in the southern side of Annapurna Rural Municipality, Annapurna Rural Municipality (Kaski) lies on the East and Raghuganga Rural Municipality on west. Similarly Thasang Rural Municipality (Mustang) is in the Northern side of Annapurna Rural Municipality. The rural municipality is divided fairly in to two halves by the Kaligandaki river which flow North South through the mid of Rural Muniipality.

According to the 2021 census, total number of household is 3600 , total population of the rural municipality is 12323 with population density of 44.90 person per sq. km. The municipality is divided into 8 wards. Among them, the maximum nos. of population is in ward 6 with 2365 individuals & lowest in ward 2 with 827. Pokharebagar and Tatopani are the main market center in the rural municipality, which is rapidly developing in various sectors of city development.

The elevation in Annapurna Rural Municipality ranges from 1200m to 8091m with difference of altitude of nearly 7000m. So the rural municipality has varying range of climate with sub tropical in the lower areas to alpine climate at high altitudes. So, it will cool in the summer at plain area and freezing cold at higher altitudes. The maximum temperature rises up to 30 degree Celsius and falls down as low as -40 degree Celsius in high mountains. The rainfall is mainly due to the southern-eastern monsoon. The monsoon, generally starts from the mid of June and ends by the mid of October. More than 80% of the annual rainfall takes place between June and September.

MTMP started with the setup of Municipal Road Coordination Committee (MRCC) and the collection of demand and inventory of road within the municipality. Road inventory survey was done and details of all the roads and cross structures were collected. The total length of all the roads inside the Municipal Boundary was found to be 329.64 km out of which 18.16 km is Strategic Road Network (SRN) and remaining 311.48 km are Municipal Roads. Among the municipal roads, 51.02 km are Class A roads, 128.91 km are Class B roads, and remaining 131.55 km are Class C roads. 4.47 km of roads in the municipality are Blacktop, 3.30 km are Gravel, 269.51 km are Earthen and the remaining 52.36 km is to be newly constructed. Ward 7 has the maximum length of road (68.48 km) whereas ward 3 has the minimum road length (18.32 km).The roads in Annapurna Rural Municipality are classified in to Class A (ROW 10m), Class B (ROW 8m) and Class C (ROW 6m).

Currently, the road density of various wards in terms of length per sq. km of land depicts ward 1, 6 and 7 to have higher values. These wards are either densely populated ward or small ward area of Annapurna Rural Municipality. In case of road density per 1000 population ward 7, 2, 8 and 4 have comparatively more road density than other wards.

Vehicle composition of Municipality is based on the Classified Vehicle Survey conducted by the study team in various Municipal roads of Annapurna Rural Municipality. The composition of vehicle shows that the major vehicle that plies on the roads of Annapurna Rural Municipality are Car/Jeep with 54.5% followed by Motorcycle with 36.40% composition of whole traffic flow in Rural Municipality. Other than this, Buses/ Trucks/Tractors constitute 7.20% of traffic volume. Similarly, others transport means share around 1.90% of traffic vehicle composition.The high constituent of Car/Jeep in the traffic movement can be traced to the fact of daily vehicular movement of various Cars and Jeeps towards and from Muktinath Temple; one of the major religious sites of Hindu religious pilgrimage in the country. Huge flocks of people all over the nation and as far as India visits the temple contributing towards the large proportion of Cars and Jeep movement.

Present scenario of Annapurna Rural reflects the access to bus stop on an average about 80 minutes, Class “C” roads that are planned for public vehicle to ply are expected to reduce this time to within 30 minutes. People will have access to either Class “B” or Class “A” roads designed for more mobility within 45 minutes on an average walking distance that are designed for greater mobility. Planning work has focused on reducing access directly to highways, subsequent developments are recommended for national authority to develop required infrastructures.

Surface transport is the major mode of transport in Annapurna Rural Municipality as Myagdi district is not facilitated by airways. The nearest airport is Jomsom Airport, Mustang which is around 50.3 km from municipal centre. But since the Jomsom Airport lies in Alpine region and there is no airway service to this airport throughout the year and due to the poor road connection between Jomsom and municipal centre, the favored airport to reach municipal center is Pokhara International Airport which is 105 km from municipal centre. Pokhara Baglung Beni Jomsom Ghoktang Feeder Road (F042) links Annapurna Rural Municipality with others part of the country.

SRN and District Roads are the main road transport in Annapurna Rural Municipality and constitute main proportion of traffic within the rural municipality. Only a few section of Gharkhola Khibang Sikha Ghodepani Sadak within the planning area is paved. The entire road network contains all blacktop, graveled and earthen roads. Majority of traffic is concentrated in market places and municipal centers such as Pokharebagar and Tatopani. While the access situation in Municipality is satisfactory, mobility is a problem in present traffic situation. Almost all road network faces difficulty to operate throughout the year hence serving properly only during fair weather condition.

Visionary city development and Indicative Development Potential Plan is prepared basically showing the existing and potential market center/service centers (key growth centers) and the areas having various development potentials such as agro-based industries, high value cash crops and industries.

This study also formulated the road hierarchy for the various roads namely Class A, B and C. Class C basically deals with access while Class A and B basically deal with mobility and accessibility to higher services. The total cost for the required interventions proposed for all the municipal roads and to upgrade all of them (MTPP Cost) is calculated based on the rates of ToR and was found to be approximately **NRs. 2,874,063,400.00.** In figure: NRs. Two Billion Eight Hundred Seventy Four Million Sixty Three Thousand and Four Hundred. For the allocation of yearly budget, the total cost required for five years is first calculated and this amount is distributed to yearly assuming that budget spending capacity of municipality is expected to grow at the rate of 10% per year. Total budget required for the 5 years (MTMP Cost) was found to be approximately **NRs. 290,028,880** (Two Hundred Ninety Million Twenty Eight Thousand Eight Hundred and Eighty). During this span of five years, 24.43 km more roads will be blacktopped, 1.43 km additional roads will be graveled and addition 3.38 km of new road network will be constructed.

Due to the limitation of the municipality budget, the roads are ranked hierarchy wise based on the Demand priority of wards, Proposed road class, Total existing width, Population served, Road surface condition, Road density, Settlement density, Service provided by the road such as Recreational(R), Agricultural (A), Market(M) and Service centre(S) (RAMS), Access to poor and minor. And five year implementation plan is prepared.

Acronyms / Abbreviations

CBS	Central Bureau of Statistics
DDC	District Development Committee
DTMP	District Transport Master Plan
GIS	Geographic Information System
GPS	Global Positioning System
IDPM	Indicative Development Potential Map
MIM	Municipality Road Inventory Map
MRCC	Municipality Road Coordination Committee
NMT	Non- Motorized Transport
MTMP	Municipality Transport Master Plan
MTPP	Municipality Transport Perspective Plan
VDC	Village Development Committee
MTPP	Municipality Transport Perspective Plan
PCU	Passenger Car Unit
DOLIDAR	Department of Local Infrastructure Development and Agricultural Roads
GPS	Global Positioning System
OD	Origin and Destination
ToR	Terms of Reference
SRN	Strategic Road Network
HH	Household
VDCs	Village Development Committees
PT	Public Transport
Min.	Minute
Km.	Kilometre
RM	Rural Municipality
Sq. Km	Square Kilometre
Ha	Hectare
DCC	District Coordination Committee

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Section 1: Introduction

This chapter briefly explains the background for preparation of transportation master plan, objectives of study, scope of work to be performed for preparation of transportation master plan and limitations of the study thereof.

1.1 Background

Rapid urbanization has led formation of rural areas to urban areas in short time. The presence of goods, services and facilities attracts people from rural areas to live in urban areas. While in past policy were made to encourage people to reside on their native area due to haphazard urbanization, recent study from economics and market theories support dense population over urban areas based upon agglomeration and scale economies. Agglomeration economies are amplified by density and attenuated by distance. While in rural areas accessibility has been focused as major criteria in transportation, urban areas need better mobility with accessibility.

Transport facilities help in developing access with the rural-urban linkages. Road accessibility can reduce isolation, stimulate crop production and marketing activities, encourage public services and help to transfer technology. Road building has been seen to bring about notable enthusiasm and visible changes in rural life. Road infrastructure is considered as "the infrastructure of infrastructure". However, in the absence of notable criteria and rational guidelines, road construction is carried out in adverse manner resulting in haphazard use and wastage of limited resources.

Ministry of Federal Affairs and Local Development stepped up to bring forward proposal to create additional new municipalities from those urban and semi-urban settlements by combining prevalent Village Development Communities. Annapurna Rural Municipality was, amongst them, established in 2073/11/27. It was formed by merging then existing Doba, Bhurung Tatopani, Dana, Narchyang, Paudwar, Shikha, Ghara, Histan and Ramche village development committees.

After being designated as a municipal area, it will attract more population as socio-economic growth and other infrastructure development will gain pace. The rural municipality and its surrounding local bodies will see a rapid increase in housing, infrastructure and urban services demand. In this regard, under the coordination of Municipal Assembly and as per the decision of Municipal Executive Committee and its technical and Institutional support, is initiating the formulation of Municipal Transport Master Plan for assessing the present road and transport infrastructures and facilities within the municipality. So as to be presented as proper municipality or a city, it must have a very good mobility and accessibility by public and private means of transportation.

1.2 Objectives

The prime objective of this study is to prepare the Municipality Transport Master Plan and Perspective Plan (MTMP/MTPP) for Annapurna Rural Municipality. The planning approach is participatory and bottom-up from the settlement level. It will include a constructive plan to

incorporate all the transportation needs and facilities for now and tomorrow. The specific objectives of the MTMP are mentioned below:

1. Prepare the Municipality Inventory (MIM) of all road networks.
2. Identify the major road networks linking the municipality with the surrounding areas.
3. Prepare Indicative Development Potential Map (IDPM).
4. Prepare visionary city development plan
5. Collection of demands for new/rehabilitation transport linkages from Municipalities/settlements based on city development plan.
6. Analyse the present mobility and accessibility situation.
7. Identify and prioritize the interventions based on mobility and accessibility situation.
8. Develop scoring criteria and its approval from Municipality.
9. Prepare the Perspective Plan of transport services and facilities (Municipal Transport Perspective Plan)
10. Prepare physical and financial implementation plan of prioritized roads for the MTMP period.
11. Prepare a five years Municipality Transport Master Plan (MTMP).

1.3 Scope of Work

The scope of this work and service the consultant provided for the project is given below:

a. Accessibility data Collection and Analysis.
   The accessibility situation is evaluated from the settlement level and data is collected. Various surveys carried out to gain such data including their travel patterns, questionnaire surveys and origin-destination survey.

b. Analyze Mobility status of the municipality
   Mobility status is studied. This is important especially because the road network has not provided accessibility to all the population. The question then arises on how efficiently; economically and safely can the goods and passengers be transported, which is indicated by mobility.

c. Assess the condition of public transportation
   Data on different public transportation routes and their operation characteristics, which operate within the municipal area and to other adjoining area, is collected and studied.

d. Assess safety status and issues
   Road safety status and issues is accessed. For this, roadside condition survey during road inventory survey and other accident data is reviewed. Possible interventions to make the roads safer are proposed and recommended.

e. Prepare the Indicative Municipality Development Potential Map (IDPM)
   IDPM is prepared using topographical base maps and digitized GIS maps. In the IDPM, potential areas for development are identified and prioritized through ranking.

f. Prepare Municipality Inventory Map (MIM) of existing roads within Annapurna Rural Municipality.

Municipality Inventory Map linking to strategic road networks such as national highways, district core road network, main trails is prepared. The inventory map has included the road names, total length and breadth of the roads, surface type, existing condition, Right of way, vehicular traffic and pedestrian traffic flow etc.

g. Collection of demands for New/Upgrading/Rehabilitation transport Linkages from Wards/Settlements
   Data regarding the construction, maintenance or rehabilitation of roads according to the existing condition and demand is done. Such data was collected through ward meeting or community level discussion. The demand data was collected in priority order for each ward. The roadside conditions of all the linkages were noted during the road inventory survey.

h. Scoring criteria
   Scoring criteria to screen and prioritize all interventions potential interventions for proper allocation of limited budget is developed and approved by the municipality.

i. Road classification and Nomenclature
   Metric system of nomenclature is used and applied the same classification throughout the data collection.

j. Preparation of perspective plan of interventions of services and facilities.
   The data collected through accessibility survey, demand survey and inventory maps are used to prepare a perspective plan of interventions of services and facilities. All the identified interventions are screened and rated on the basis of approved criteria and forwarded to Municipality council meetings. The final perspective plan has been shown in GIS maps.

k. Prepare a realistic physical and Financial Implementation Plan of Prioritized Roads for the MTMP period
   Resources required for the implementation of the MTMP is assessed and the financial plan (required) for the next five years is prepared.

l. Prepare Municipal Transport Master Plan (MTMP) of Annapurna Rural Municipality.
   Municipal Transport Master Plan (MTMP) is prepared with due consideration to the existing situation of: vehicular parking, travel routes, modes of transport, etc. and purpose for future urban growth. A base scenario of the existing road and transport network and management based on the O-D survey and O-D matrix, and prepare road inventory map and transport infrastructure network and management plan based on the travel demand forecast, population growth forecast, and growth rate of vehicular and transport infrastructure is prepared.

m. Medium term and long term planning
   The scope of work demands a detailed work plan for five years period (short term). Forecast/estimate of the demand for medium term (10 years) and long term (20 years) is done and recommended a framework to guide future interventions and planning processes.

1.4 Limitations

- Lack of Comprehensive Town Development Plan, Proper Land Use Policy and Drainage Network Master Plan, which could have affect the future overall development pattern, and hence future development of these policy need to be based on the proposed MTMP.
- Lack of base year data for traffic and the trip

1.5 Organization of Report

Section 1 presents the concept and context of MTMP and lists out the objectives and scope of the same.

Section 2 briefly explains the method used to conduct the study, analyze the data and presentation of the findings.

Section 3 presents the basic profile of the study area through the available census data and sample data collected and the existing scenario of the study municipality with reference to transport in the rural municipality.

Section 4 gives the comprehensive forecast of the population, transport and other development scenario. It also gives the picture of the implications that may arise and the transport infrastructure to meet the demand and accelerate the development. It also describes the short term, medium term and long term plan.

Section 5 describes the formulation of road hierarchy and name and description of different classes of roads

Section 6 is dedicated to the five year (short term) municipality transport master plan (MTMP). It gives the comprehensive strategic framework, perspective plan of the municipal roads, budget expenditure, financial institution, capital investment plan and the staging implementation plan.

Section 7 summarizes the report and gives necessary recommendations.

Section 2: Study Method

Municipal roads are supposed to provide both access and mobility to all possible and potential areas. MTMP will helps to assist the planning of such roads to fulfill the stated objective. Better planning is incomplete without relevant quality data and quality data can only be acquired by use of properly selected survey methods. The chapter deals with the methodological framework adopted for data collection covering all used survey method, sampling techniques, quality and quantity of data along with data processing, analysis and presentation methods.

2.1 Approach

Municipality Transport Master Plan has been prepared using participatory bottom-up approach and differs from conventional practices of trickle down approach. Techno-Political interface has been incorporated in the planning process, where active participation from representatives of political parties, line agencies, municipality officials is crucial. The Municipality Road Coordination Committee (MRCC) has been constituted as authorized legislative body of municipality. This body, comprising all political parties' representatives and concerned technical officials, helps in necessary policy decisions during the MTMP preparation and implementation process.

2.2 Methodological Framework

The study started with preliminary planning or desk study where basic background of rural municipality is studied with help of secondary data including census data, GIS data. The study got acceleration with formation of MRCC and inspection report. Various field surveys have been carried out with objective of collecting primary data on transportation network, trip characteristics and service facilities. Along with the primary data, demands for various transportation projects (construction / upgrading / maintenance) have been obtained from each ward. Also, potential areas/location for various facilities have also identified based on interaction with local people and MRCC.

The scoring criteria for prioritizing road network has been identified based on ToR and has approved by rural municipality. Then, the hierarchy of road has been purposed and perspective plan of various interventions has been purposed and has been analyzed based on available fund and finally physical and financial implementation plan of prioritized roads for MTMP period. After analysis, the study has been come up with potential roads, that need immediate intervention and roads that need to be given consideration for effective future planning.

All the above mentioned strategy adopted for data collection, processing and analysis is summarized in the following chart.

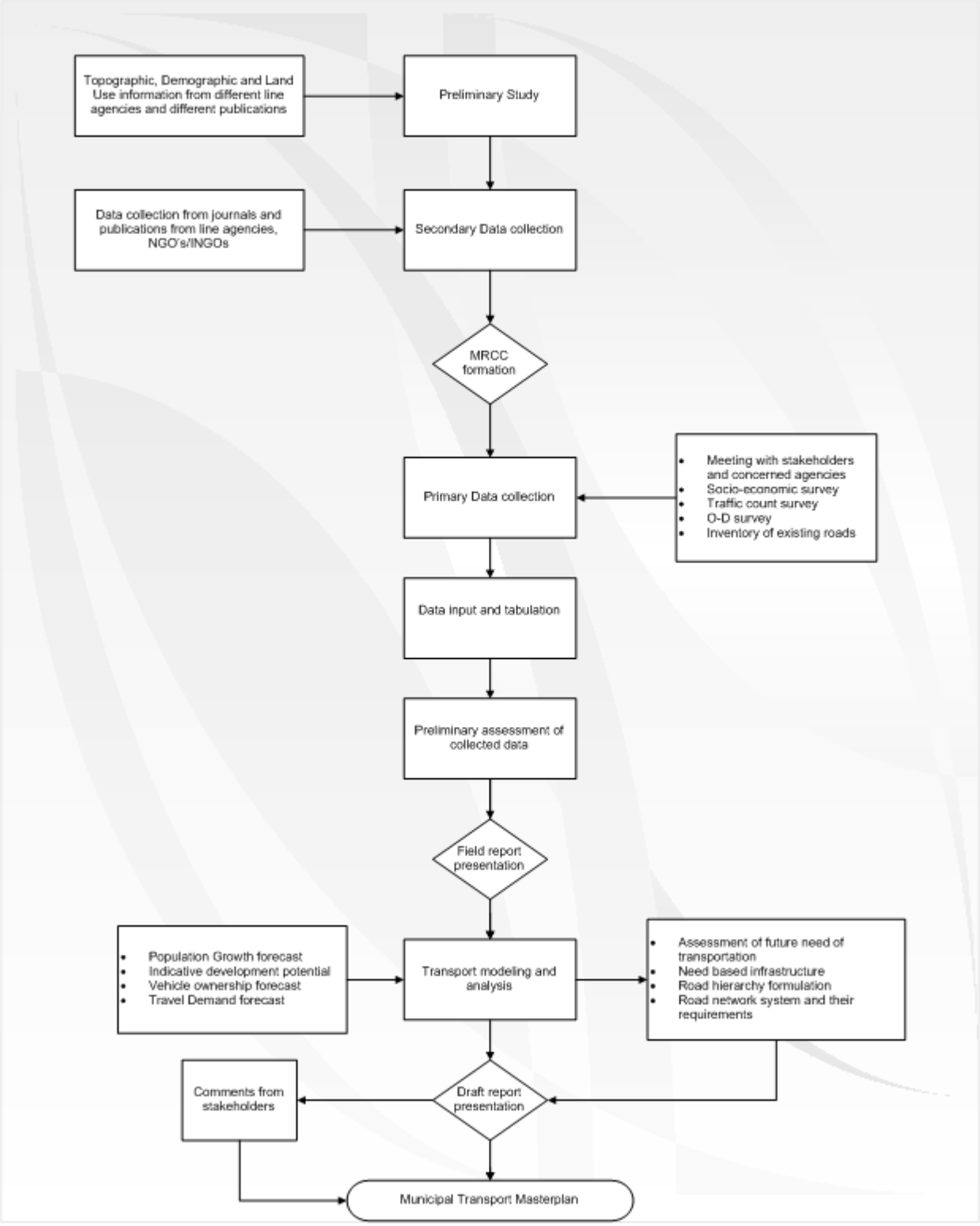

Figure 1: Methodological Framework

2.3 Secondary Data Collection

Any sorts of data that are collected from secondary sources are called secondary data. These data has been collected from annual report published by district level offices and consultation with various concerned stakeholders. Municipal Road Coordination Committee (MRCC), which compromises people from various fields and political parties, is the next source for various

secondary data. Field study was also carried out for general socio-economic assessment of the rural municipality that includes collection of data regarding high development potential areas such as extensive agriculture, horticulture, livestock farming, high value cash crops, cottage and agro-based industries, centre for business/commerce/markets places, information about demographic data of municipality, various maps showing service centers, transport infrastructure inventory, past plans and sector study reports, sector standards and policy targets were collected from the secondary sources, which includes Bureau of Statistics, Survey Department, Local NGOs, line agencies, DCC, municipality, DTMP etc. Digitized topographic maps, administrative map of rural municipality, strategic road network map prepared by DoR, etc. were some other secondary data that were used during the study.

2.4 Primary Data Collection

Primary information on present household and trip characteristics, traffic characteristics, existing accessibility and mobility level of settlements, prioritized road network required for each wards has been obtained via various reliable methods. Tracking of the existing road network along with detail information of its width, surface type and possible intervention required for the effectiveness of services is also carried out.

The primary data collection methods carried out in the field were:

- Origin and Destination (OD) Survey
- Road Inventory Survey
- Demand Survey
- Classified Vehicle Count Survey
- Public Transport and Services Study

Origin and Destination (OD) Survey Household questionnaire method is used to conduct OD survey which gave number of information reflecting, personal, household and trip making characteristics. This survey has also helped to visualize the accessibility and mobility scenario of road network and to public transportation from the settlement/wards. As all the household can't be covered a realistic and statistically significant sample size was calculated based on probabilistic method.

Road inventory survey was conducted to collect data on its condition of road, road linkage, road safety status and issues that need to be highlight. It helped in field validation of base maps and also assisted in the preparation of road inventory map, nomenclature and coding of the road linkages and proposed various interventions.

Road Demand survey comprised of interaction session with the members of ward committee followed by ward level workshop to fill up demand survey form, which included demand of new facility or interventions to improve existing roads based on priority.

Classified vehicle count was conducted so as to reflect the usage of various vehicles in the certain route, especially where maximum volume occurs. Twelve hour count has been done at required location and the vehicles have been classified to different types and finally traffic volume have been converted to passenger car unit (PCU) to visualize the exact condition.

Public Transport and Services Study highlighted the services provided by public transportation and location of various services and facilities. It was carried out by directly interviewing the route operators.

2.5 Data Processing and Analysis

Data collected at field were first entered at MS office tools (MS excel and word) and GIS database. All the complete and reliable sets of data were transformed into useable information and the present scenario of rural municipality are shown through graphs, figures and tables. Similarly, those which were entered into GIS database provide various types of maps. Population and traffic were forecasted for the MTMP and MTPP time period. Various transportation models were used for interpretation and forecasting. And, finally various intervention were purposed and their economic analysis were also performed.

2.6 Preparation of Indicative Potential Development Map (IDPM)

IDPM is basically the indication of the existing and potential market/service centers (key growth centers) and the areas having various development potentials such as high value cash crops, agro-based industries and tourism. Thus, IDPM shows the areas of high value cash crops, tourism potential, extensive agriculture, extensive horticulture, livestock farming, fisheries, hydropower location and the other social service centers areas such as hospital, post office, telecommunication, school, campus, Municipal centers, security offices and large settlements, important historic and religious places. Finally, it has indicated the grading of various markets of the district thus providing the basis of network planning.

2.7 Scoring Criteria for Prioritization

A network consists of several links. It is not possible to construct all roads at a time due to resource and time constraint. Therefore, each link in a network needs to be prioritized. After developing a municipal level network, the cost estimate of the road has been prepared. Existing population within the zone of influence, priority of road demand, road class, width of road, road density, density of settlement, type of service provided by the road and the service to minority were taken as the indicators for prioritization. The scoring criteria has been finalized after rigorous study and set in front of rural municipality and MRCC for its approval. Scoring criteria has been discussed detail in section 5 and appended in Volume II of the report.

2.8 Presentation of results

The results obtained can only be perceived well by the readers if presented properly. Presentation tools such as charts, graphs, maps and reports have been used to present the analysis and results obtained. The specific presentations of results are summarized below:

- Reports: The analyzed results have been properly explained in the reports. Report of the analysis has been presented at different levels as inception report, field report, draft report and final report. Any questions raised or clarifications demanded after the submission of draft report have been included in the final report.
- Charts and graphs: Relevant type of charts, tables and graphs have been used in the reports to present the information. Charts are especially useful to deliver the information more effectively.

- Maps: As the ToR demands, maps of road inventory, indicative development potential map, land use map and municipality transport prospective plan map has been prepared.
- In addition to the reports, the obtained results have been shared via presentation and electronic copy of GIS maps.

The analyzed data and obtained results in the form of numbers/ tables and maps have been collected in and presented as final report in two volumes. The results have been presented and discussed among the rural municipality authorities and other stakeholders before preparing the final report.

Section 3: Study Area Profile

The method of data collection described in chapter two was adopted in Annapurna Rural Municipality. Traffic count has been conducted at various places of Annapurna Rural. Household data is collected from different wards. Based on the collected data, study area profile has been mapped.

3.1 Location (Put on Study Area)

Nepal is a small landlocked South Asian country of 1,47,516 square kilometers located in between China and Himalayan ranges in the north and India in the south. This multi-dimensional heritage encompasses the diversities of Nepal's ethnic, tribal, and social groups, and it manifests in music and dance; art and craft; folklore and folktales; languages and literature; philosophy and religion; festivals and celebration; foods and drinks. Its culture is mostly influenced by Aryan, Mongolian and Tibetan culture.

Myagdi district is one of the major hubs of Dhaulagiri region located at the center point of Gandaki Province of Central West Nepal. It is located roughly 80 kilometres to the north-west of Pokhara, tourism capital of Nepal. Annapurna Rural Municipality is a rural municipality in Myagdi District in the Gandaki Province of central west Nepal, which is also the most popular tourism hub of the Nation. Annapurna Rural Municipality was established in 12 March, 2017. It was formed by merging then existing Doba, Bhurung Tatopani, Dana, Narchyang, Paudwar, Shikha, Ghara, Histan and Ramche village development committees. The Rural Muncipality got its name from the name of Annapurna Mountain which lies in this Rural Municipality. Pokhara Baglung Beni Jomsom Ghoktang Feeder Road runs throughout the heart of municipality. Small stream are flowing from all the way from north to south and towards Kaligandaki River. The Municipal Center lies in Pokharebagar. Jaljala Rural Municipality of Parbat District lies in the southern side of Annapurna Rural Municipality, Annapurna Rural Municipality (Kaski) lies on the East and Raghuganga Rural Municipality on west. Similarly Thasang Rural Municipality (Mustang) is in the Northern side of Annapurna Rural Municipality. The rural municipality is divided fairly in to two halves by the Kaligandaki river which flow North South through the mid of Rural Muniipality.

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The location map of Annapurna Rural Municipality is presented in the figure below and detailed location map is provided in Annex I, Vol I of the report.

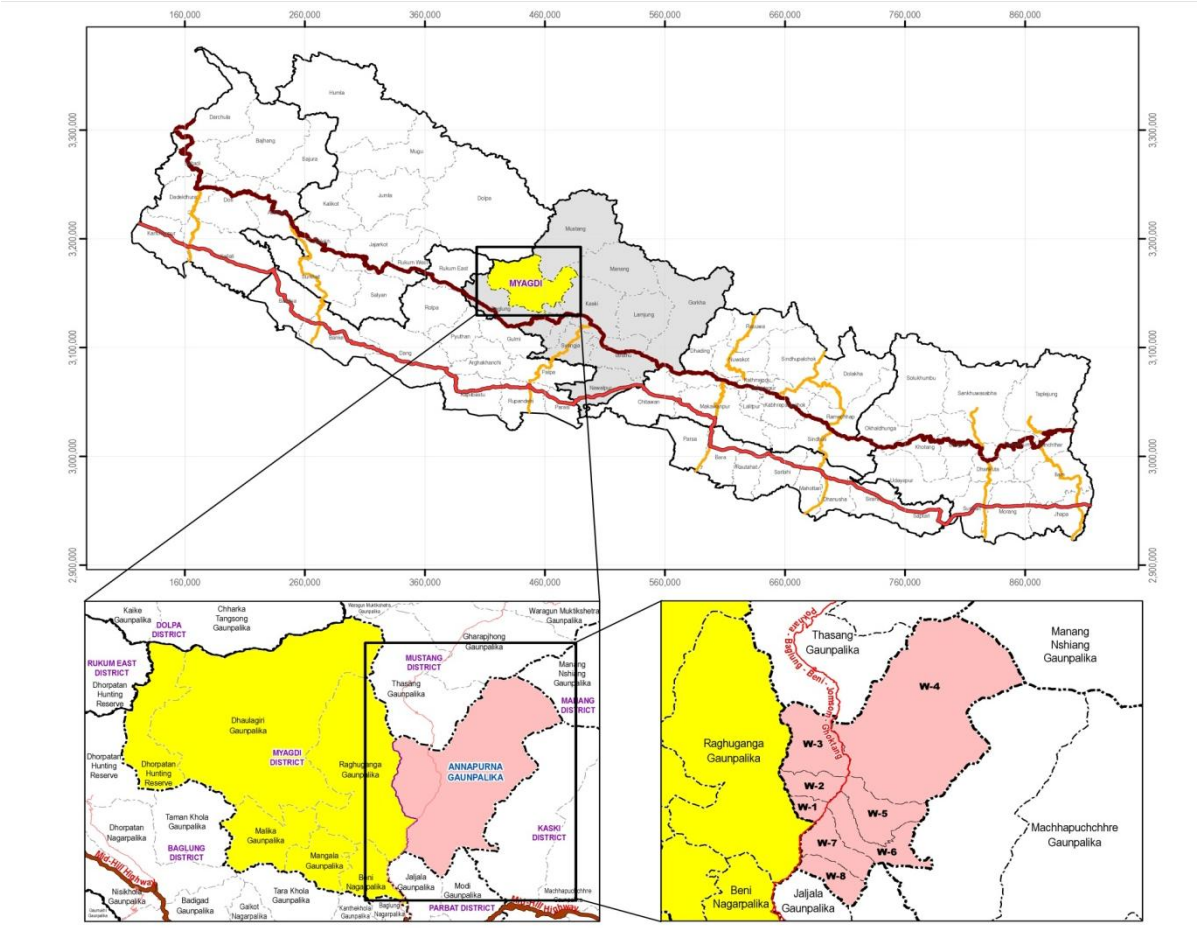


Figure 2: Location Map of Annapurna Rural Municipality

3.2 Socio Economic & Demographic Status

Wikipedia (2016) describes socio-economic as "Socioeconomics is the social science that studies how economic activity affects and is shaped by social processes. In general it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy"., Demographics, according to Merriam-Webster "is or relating to the study of changes that occur in large groups of people over a period of time". Population data were taken from census data of the National Household Survey conducted by the Central Bureau of Statistics (CBS) in 2021. Area data were obtained from GIS satellite image.

3.3 Population & Population Density

Municipality is populated with different castes and religions. Recently concluded National Household Survey conducted by the Central Bureau of Statistics in 2021 states the total population of the Rural Municipality to be 12,323. Among them 6,237 (50.6%) are women and remaining 6,086 (49.4%) are men. The average sex ratio of municipality is 97.58. Rural Municipality consists of 3,600 households with population density of 44.90 persons per sq.km and 3.42 people per household. The municipality is divided into 8 wards. Among them, the maximum nos. of population is in ward 6 with 2,365 individuals & lowest in ward 2 with 827. Highest population density can be seen in Ward 1 with 95.45 people per sq km whereas lowest

population density is seen in Ward 4 with 5.35 people per sq km. The household number of individual wards has not been yet published by Central Bureau of Statistics. The demographic data of the Rural Municipality is shown in Table 1 below.

Ward	Household		Population 2021			Population 2017	Area (sq. km)	Population Density (per sq km)		Average Household Size	
	2021	2017	Female	Male	Total			2021	2017	2021	2017
1		294	493	514	1007	1063	10.55	95.45	100.76		3.62
2		216	407	420	827	795	22.50	36.76	35.33		3.68
3		484	894	923	1817	1873	55.94	32.48	33.48		3.87
4		456	877	842	1719	1626	321.14	5.35	5.06		3.57
5		621	999	997	1996	2212	43.94	45.43	50.34		3.56
6		677	1228	1137	2365	2471	42.51	55.63	58.13		3.65
7		492	680	616	1296	1675	33.80	38.34	49.56		3.40
8		460	659	637	1296	1600	26.03	49.79	61.47		3.48
Total	**3600**	**3700**	**6237**	**6086**	**12323**	**13315**	**556.41**	**44.90**	**49.27**	**3.42**	**3.60**

Table 1: Demographic data of Rural Municipality (CBS 2021)

3.3.1. Household Structure

Annapurna Rural Municipality consists of 3,600 households with population 12,323 according to National Household Survey 2021. The recent household number of individual wards in National Household Survey 2021 has not been yet published by Central Bureau of Statistics. The average household size of Municipality is 3.42 people per household. According to the Household Survey conducted in 2017, Ward 3 has the maximum household size with 3.87 people per household and Ward 7 has lowest average household size with 3.40 people per household. The average household structure of Rural Municipality is presented in Chart 1 below.

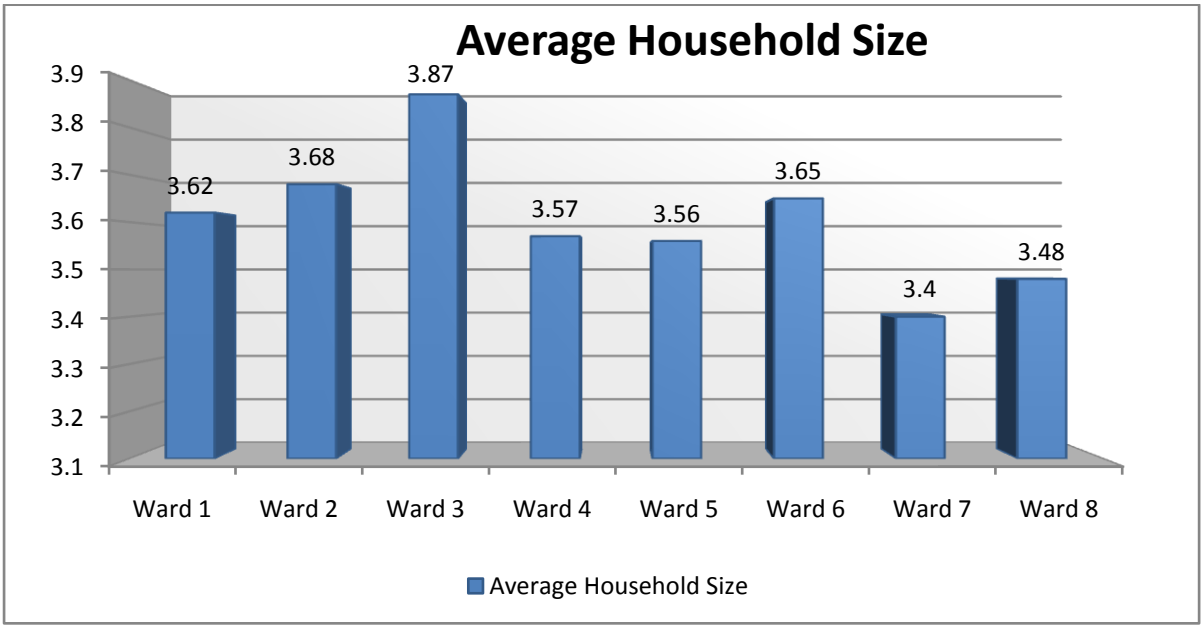


Chart 1: Average Household Size of Annapurna Rural Municipality (Household Survey 2017)

3.3.2. Education

Rural Municipality has a population of 12,323 among which 9,339 are above five years old. Population above five years in age is accounted for literacy status of the Municipality. Thus the literacy rate of Rural Municipality was found to be 86.88% in male whereas 72.2% in female bringing the average literacy rate to 79.54% while 20.46% of population is illiterate.

From the National Household Survey of 2021, it is found that nearly 6319 members of the rural municipality are indulged from pre primary level to basic level (Pre nursery to Class 8). Similarly 2102 people have completed or are perusing higher secondary level education (Class 9 to 12). About 164 individuals have bachelor's degree and 106 individuals have higher education. 411 people are not accounted for while 237 children haven't started their education yet. The education status of Rural Municipality is presented in Chart 2 below.

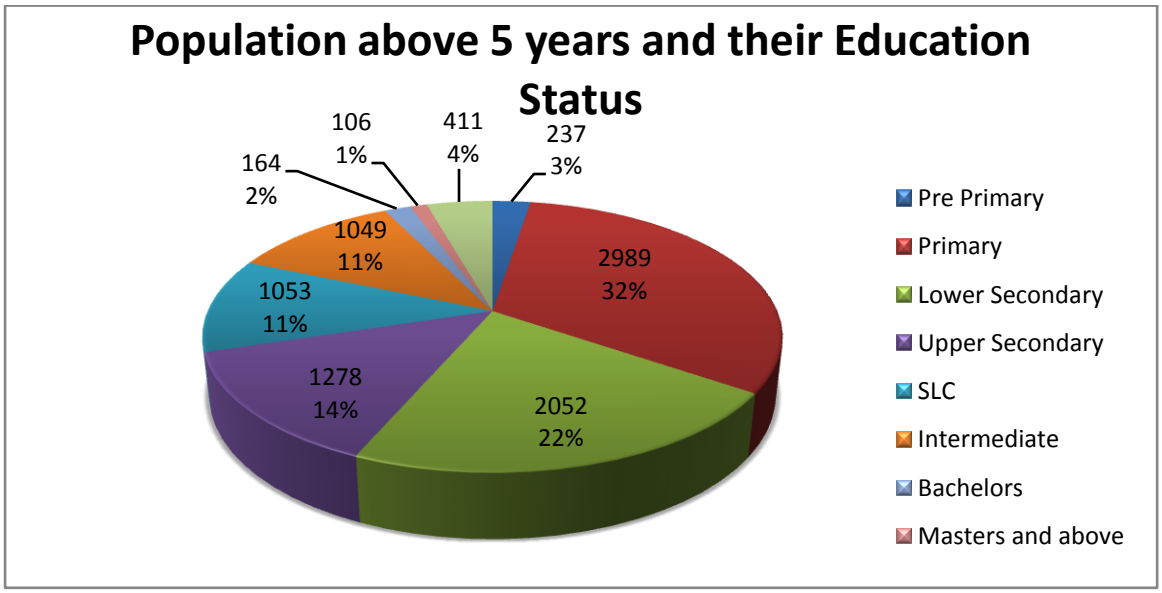


Chart 2: Population above 5 years and their Education Status (CBS, 2021)

3.3.3. Employment pattern and Income

Data from the National Household Survey of 2021 shows that Rural Municipality has a population of 12,323 out of which 1,571 (12.75%) are below 10 years of age and thus cannot be considered as economically active population. Apart from that, 2,286 (18.26% above 10 years) are not economically active population which brings the economically active population to be 8466. The majority of employment of the Municipality is seen as Skilled agriculture, forestry & fishery workers which accounts 6,213 (73.39% of economically active population), followed by Elementary Workers which is 990 (11.69% of economically active population) and Managerial Level workers 373 (4.41% of economically active population). Similarly 279 are professionals (3.3% of economically active population), 193 partake in craft and trade related works (2.28% of economically active population), 200 people (2.36% of economically active population) are involved as service sales workers, 82 people (0.97% of economically active population) are affiliated as plants and machine operators and assemblers while 68 people (0.80% of economically active population) are involved as Technicians and associate professionals. 50 individuals (0.59% of economically active population) are working as office assistants and 18 people (0.21% of economically active population) are affiliated to armed forces.

Most of the respondents with higher education are involved in service sector. Illiteracy is highest among unemployed people while Agriculture dominates all other occupation. A majority of the household have monthly family income of less than NRs. 25,000. The employment pattern of Rural Municipality is presented in Chart 3 below.

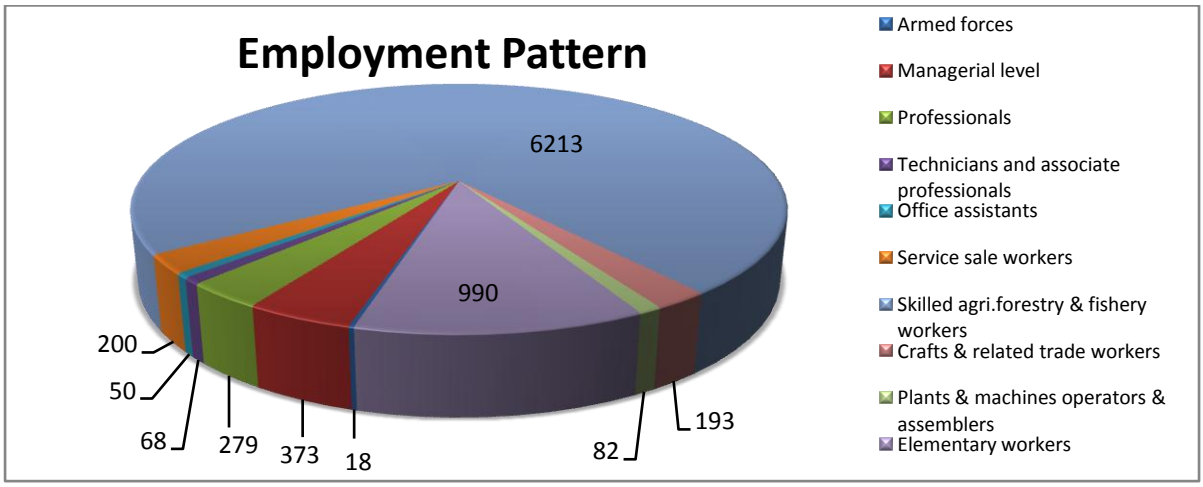


Chart 3: Employment Pattern of the population (National Household Survey 2021)

3.4 Land use pattern

The total area of Annapurna Rural Municipality is 556.41 sq. km. (55641 Hectare). The land use distribution of Annapurna Rural Municipality shows that 174.49 sq. km (31.36%) of the total area is covered by forest. About 4.28 sq. km (0.77%) of land is used for residential purpose and 41.52 sq. km (7.46%) for cultivation purpose. About 308.719 sq.km (55.48%) of land area is covered by grass, bush and vegetation whereas 22.39 sq km area of land (4.02%) is glacier and 0.86 sq. km (0.16 %) is covered by streams and rivers whereas 0.03 sq. km (0.01%) is covered by ponds and lakes. 4.12 sq. km (0.74%) of land is sandy banks and river beds.

So analyzing the land use pattern of Municipality we can conclude that 86.84% of land area of the rural municipality is covered by forests, grass and vegetation followed by glaciers covering 4.02 % of total area. Cultivation area (7.46%) and residential area (0.77%) share very few part of the total area. The land use pattern of Rural Municipality is presented in Chart 4 below.

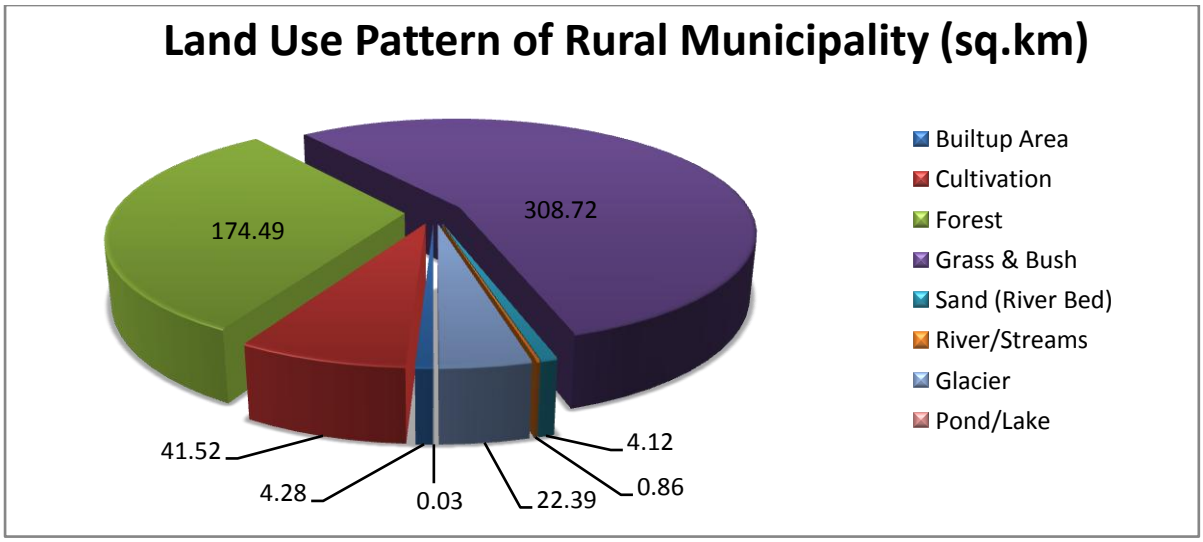


Chart 4 Land Use Pattern (Survey Dept, 1996)

3.5 Road and Traffic

Surface transport is the major mode of transport in Annapurna Rural Municipality as Myagdi district is not facilitated by airways. The nearest airport is Jomsom Airport, Mustang which is around 50.3 km from municipal centre. But since the Jomsom Airport lies in Alpine region and there is no airway service to this airport throughout the year and due to the poor road connection between Jomsom and municipal centre, the favored airport to reach municipal center is Pokhara International Airport which is 105 km from municipal centre. Pokhara Baglung Beni Jomsom Ghoktang Feeder Road (F042) links Annapurna Rural Municipality with others part of the country.

SRN and District Roads are the main road transport in Annapurna Rural Municipality and constitute main proportion of traffic within the rural municipality. Only a few section of Gharkhola Khibang Sikha Ghodepani Sadak within the planning area is paved. The entire road network contains all blacktop, graveled and earthen roads. Majority of traffic is concentrated in market places and municipal centers such as Pokharebagar and Tatopani. While the access situation in Municipality is satisfactory, mobility is a problem in present traffic situation. Almost all road network faces difficulty to operate throughout the year hence serving properly only during fair weather condition.

3.5.1 Road Inventory

Road inventory survey was done and details of all the roads and cross structures were collected. The total length of all the roads inside the Municipal Boundary was found to be 329.64 km out of which 18.16 km is Strategic Road Network (SRN) and remaining 311.48 km are Municipal Roads. Among the municipal roads, 51.02 km are Class A roads, 128.91 km are Class B roads and remaining 130.95 km are Class C roads. 4.47 km of roads in the municipality are Blacktop/Rigid Pavement, 3.3 km are Gravel, 268.91 km are Earthen and the remaining 52.36 km are to be newly constructed. For detail refer Annex.

From the Chart 5 below, it is found that Ward 7 has the maximum length of municipal road (68.48 km) whereas ward 3 has the minimum municipal road length (18.32 km).

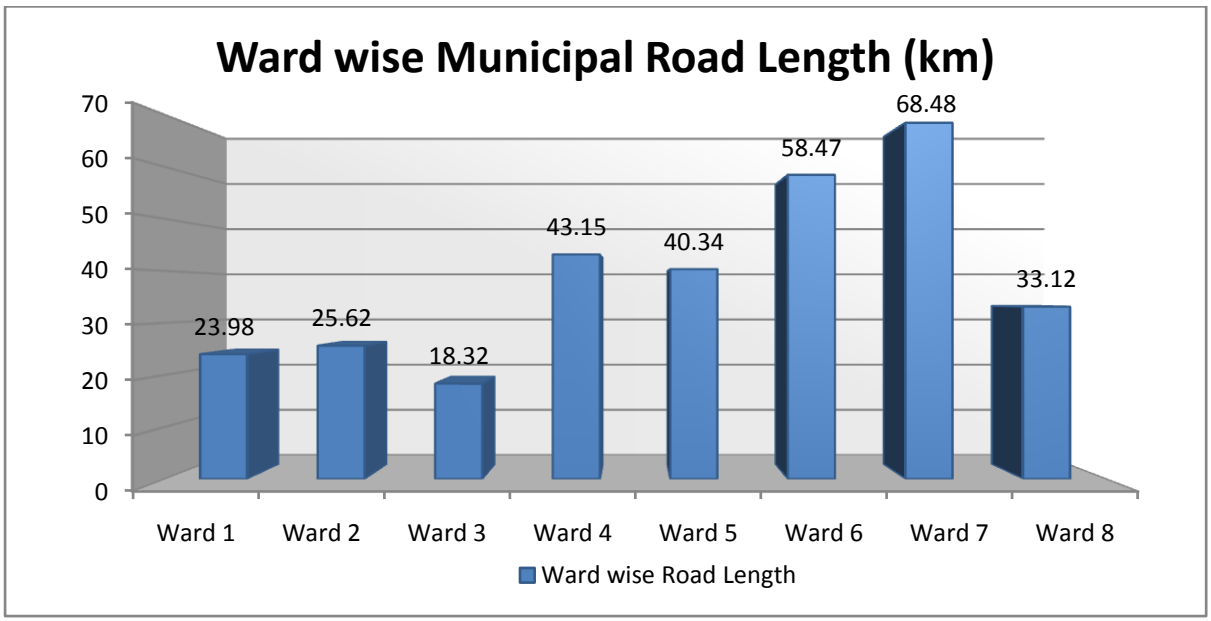
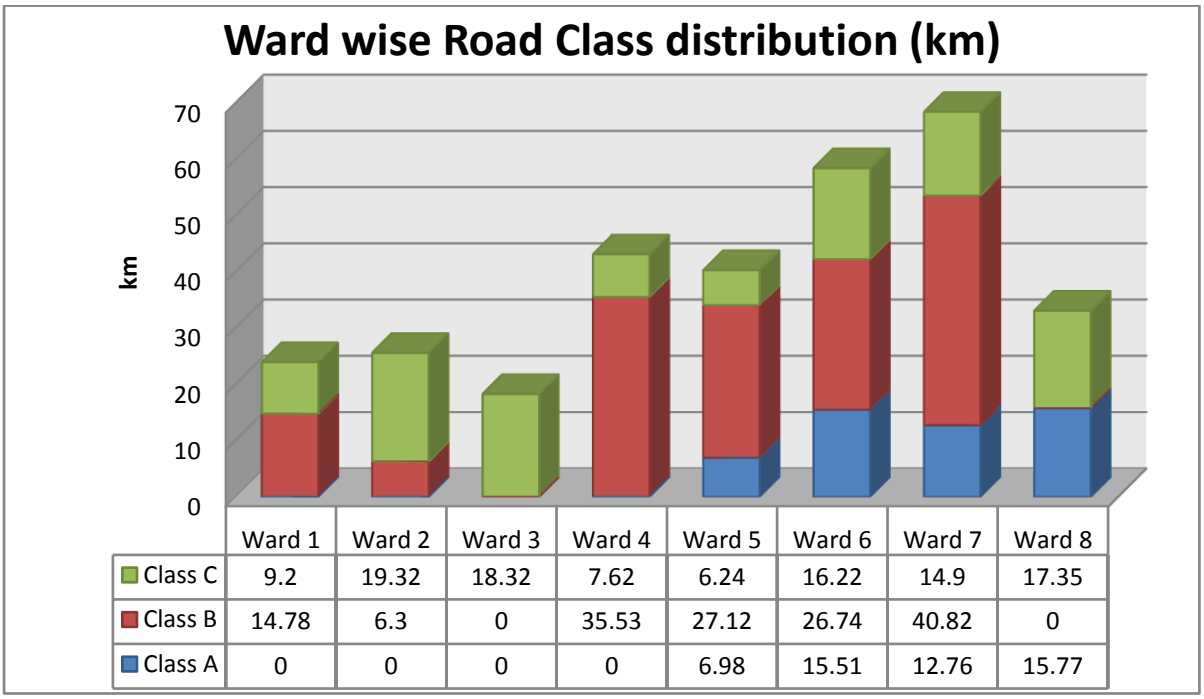


Chart 5: Ward wise length distribution of Municipal Road Network

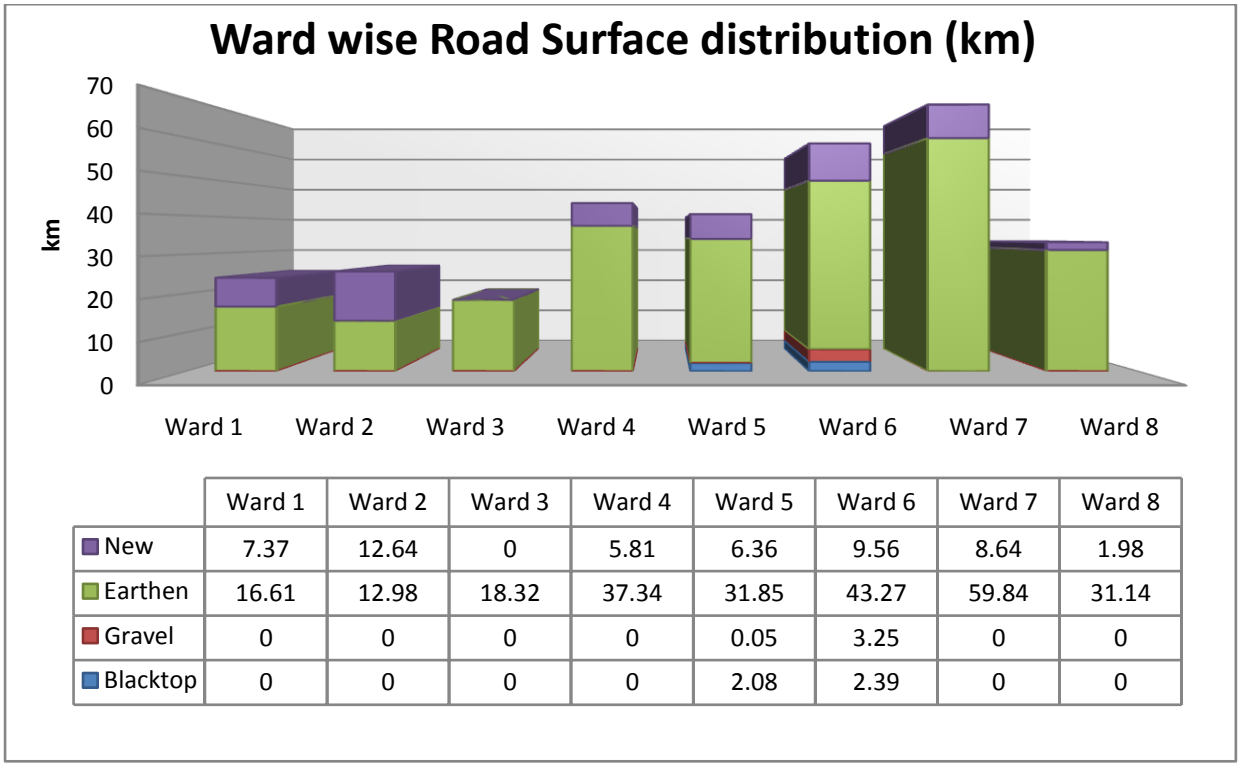
The ward wise road classification according to Class is presented in Chart 6 below.



	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
Class C	9.2	19.32	18.32	7.62	6.24	16.22	14.9	17.35
Class B	14.78	6.3	0	35.53	27.12	26.74	40.82	0
Class A	0	0	0	0	6.98	15.51	12.76	15.77

Chart 6 Ward wise Road Class distribution

The ward wise road classification according to Surface is presented in Chart 7 below.



	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8
New	7.37	12.64	0	5.81	6.36	9.56	8.64	1.98
Earthen	16.61	12.98	18.32	37.34	31.85	43.27	59.84	31.14
Gravel	0	0	0	0	0.05	3.25	0	0
Blacktop	0	0	0	0	2.08	2.39	0	0

Chart 7: Ward wise Road Surface distribution

3.5.2 Road Density

Currently, the road density of various wards in terms of length per sq. km of land depicts ward 1, 6 and 7 to have higher values. These wards are either densely populated ward or small ward area of Annapurna Rural Municipality. In case of road density per 1000 population ward 7, 2, 8 and 4 have comparatively more road density than other wards. The computation of these data is presented in Chart 8 below.

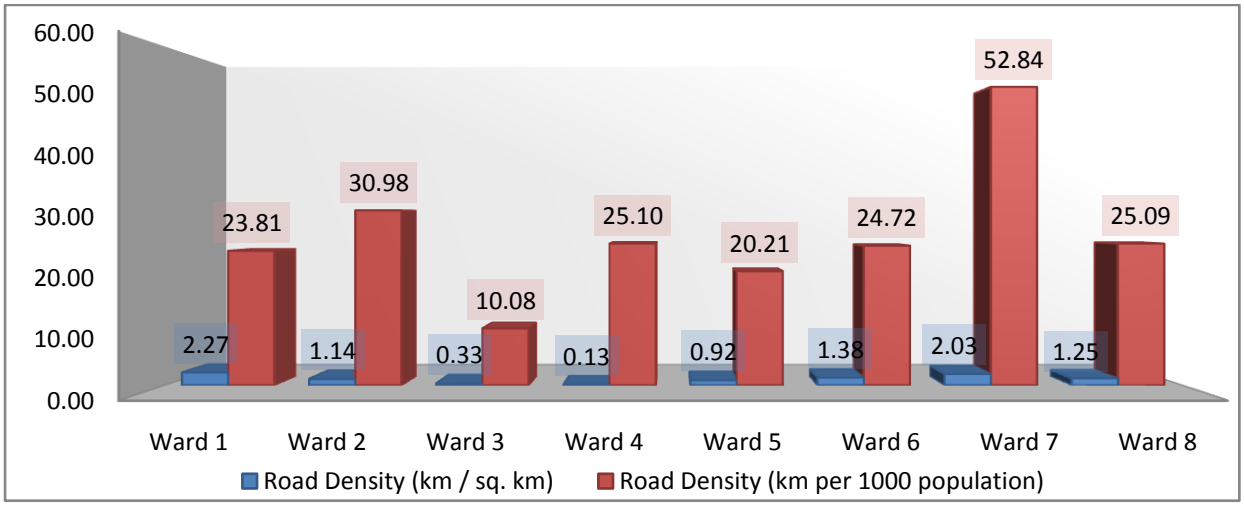


Chart 8: Ward wise Road Density

3.5.3 Vehicular Traffic Composition

Vehicle composition of Municipality is based on the Classified Vehicle Survey conducted by the study team in various Municipal roads of Annapurna Rural Municipality. The composition of vehicle shows that the major vehicle that plies on the roads of Annapurna Rural Municipality are Car/Jeep with 54.5% followed by Motorcycle with 36.40% composition of whole traffic flow in Rural Municipality. Other than this, Buses/ Trucks/Tractors constitute 7.20% of traffic volume. Similarly, others transport means share around 1.90% of traffic vehicle composition.

The high constituent of Car/Jeep in the traffic movement can be traced to the fact of daily vehicular movement of various Cars and Jeeps towards and from Muktinath Temple; one of the major religious sites of Hindu religious pilgrimage in the country. Huge flocks of people all over the nation and as far as India visits the temple contributing towards the large proportion of Cars and Jeep movement. The representation of these data is presented in Chart 9 below.

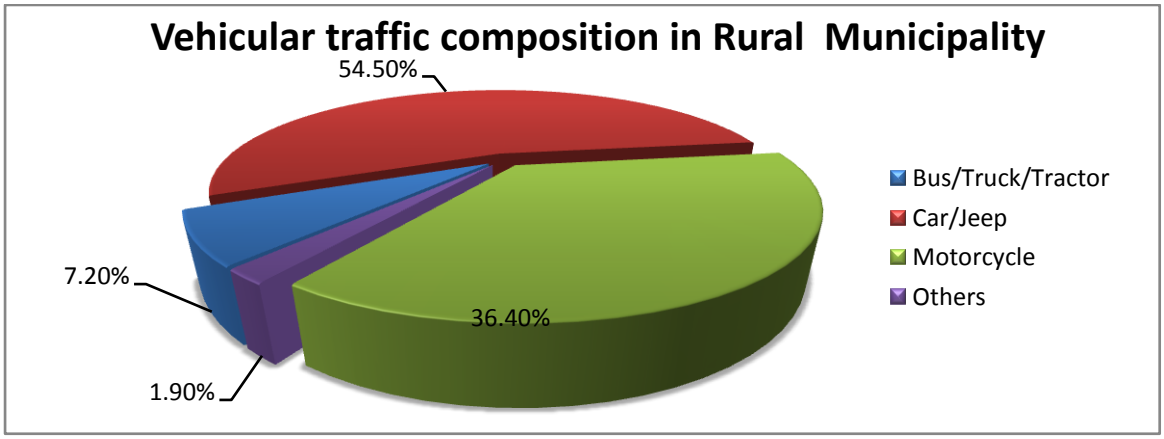


Chart 9: Vehicle composition in Annapurna Rural Municipality (Classified Vehicle Survey)

3.5.4 Vehicle Ownership

Vehicle Ownership of Municipality is based on the National Household Survey conducted by the Central Bureau of Statistics. The ownership of vehicle shows that the major vehicle that the household of Annapurna Rural Municipality own is Motorcycle with 128 (3.56%) households. The survey revealed that 3395 (94.30%) of household do not possess any type of vehicle. Similarly, Car/Jeep were owned by 50 (1.39%), 21 (0.59%) household owns either of Bus/ Truck/ Tractor whereas 6 (0.16%) households had an ownership of other vehicles type. The representation of these data is presented in Chart 10 below.

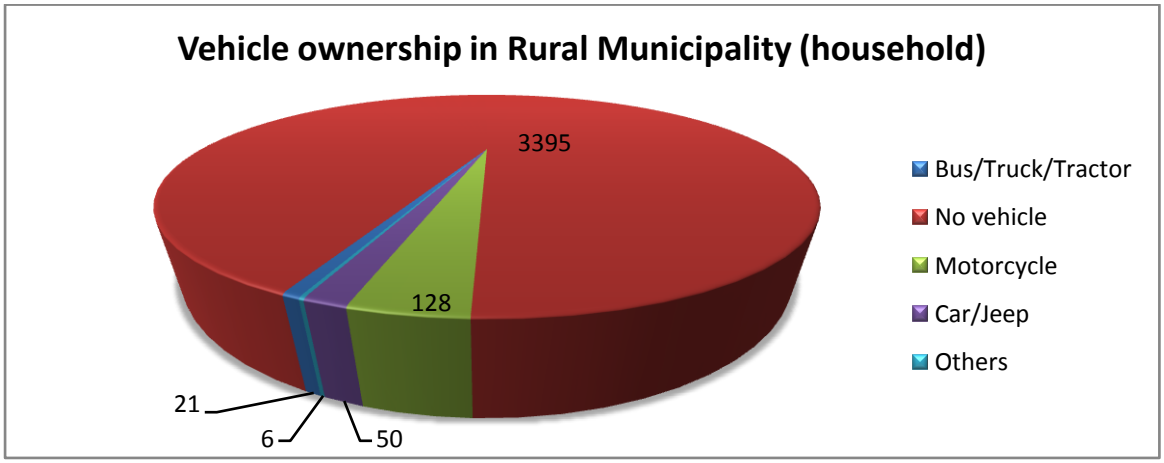


Chart 10: Vehicle ownership in Annapurna Rural Municipality (CBS 2021)

3.5.5 Origin and Destination Survey

From the origin and destination survey carried out in the Rural Municipality, the following places were found to be major destination points in Chart 11 below:

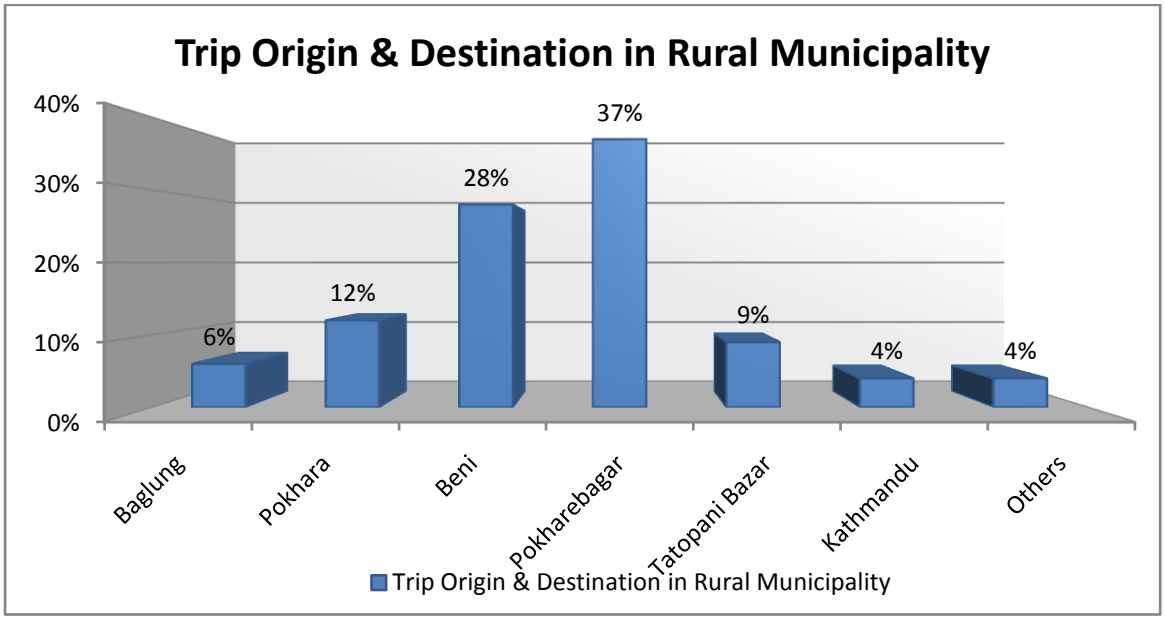


Chart 11: Trip Origin & Destination in Annapurna Rural Municipality (O&D Survey)

3.6 Transport and Land Use

Population density by buildable land data shows that presently wards 1 and 2 do have higher density while ward 4, 6, 7 and 8 have lower population density per hectare of buildable land. Ward 1 has the highest with 45.21 people living per hectare of buildable land while lowest in

ward 6 with 2.42 people living per hectare of buildable land. The road density based upon buildable land shows that ward 8 has the lowest road infrastructure developed with 36.95 per km of buildable land while highest in ward 1 with 109 per km of buildable land. The representation of these data is presented in Chart 12 below.

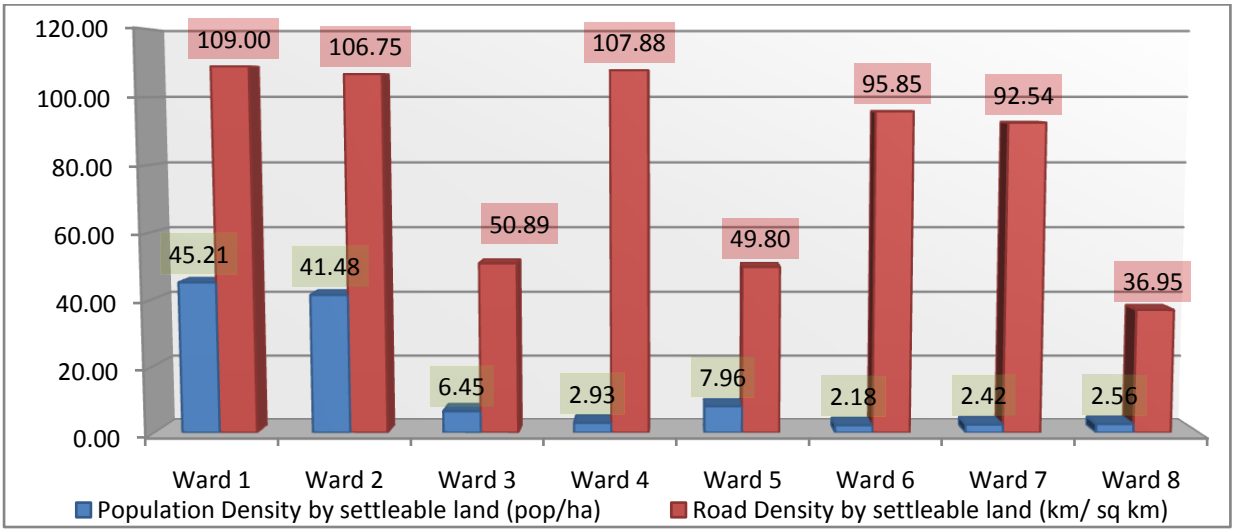


Chart 12: Population Density by settle able land in Annapurna Rural Municipality

3.7 Accessibility and Mobility

The overall accessibility situation to public vehicles in Annapurna Rural Municipality can be termed very poor. The data collected from origin and destination survey in various wards found out that an average person had to travel 80 minutes to board public vehicle. The population of ward 4 has relatively easy access to public transportation service with 45 minutes but this situation is still far from satisfactory. Ward 8 suffers the most with walk of 180 minutes on average to board public vehicles. This condition is appalling since people are compelled to walk 3 hours in order to board public vehicles. This worse condition is a direct result of poor road infrastructure and unavailability of public vehicles in Municipal roads. The diagrammatic representation of average time required for an individual to board public vehicle in all the wards of Rural Municipality is presented in Chart 13 below.

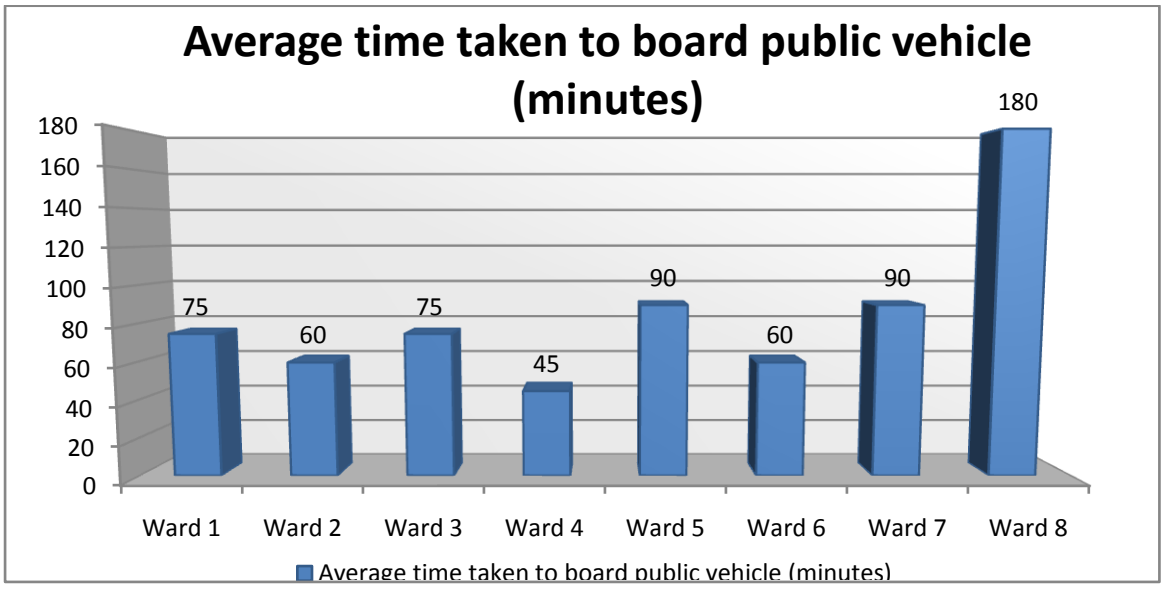


Chart 13: Average time required to board public vehicle (O&D Survey)

A handful district and strategic road networks run through various wards of Municipality. Public transportation service is not available in these roads except for the SRN. The geographical location of the Municipality with difficult terrain serviced very poorly by road networks also aids to the fact that the accessibility situation of municipality is extremely poor. The access of public vehicle on various wards roads and the time to reach bus stop needs a huge consideration as well. The mobility of transportation vehicles in ward roads for public vehicles needs to be conducted as soon as possible.

Average travel time taken to travel to destination follows somewhat similar trend to time to bus park. More or less people travel 80 minutes to get to their destination which is tremendously high. In the past couple of years, availability of private jeeps and cars has made the life and travel of the residents fairly easy reducing the time to board vehicle. But the fare is quite high than the other public transport so it may not be a financially viable for everyone to travel in such vehicles. Similarly the poor road condition in most of transport linkage in the rural municipality, the transportation mobility is hugely affected. There is no uniformity in road widths in majority of roads.

The origin and destination survey showed that a majority of trips made are by walking with 71% followed by motorcycles with 16%. 4% of trips were generated through public vehicles. Similarly trips made on small four wheelers was found to be 9%. The graphical representation of vehicle wise trip composition in Rural Municipality is presented in Chart 14 below.

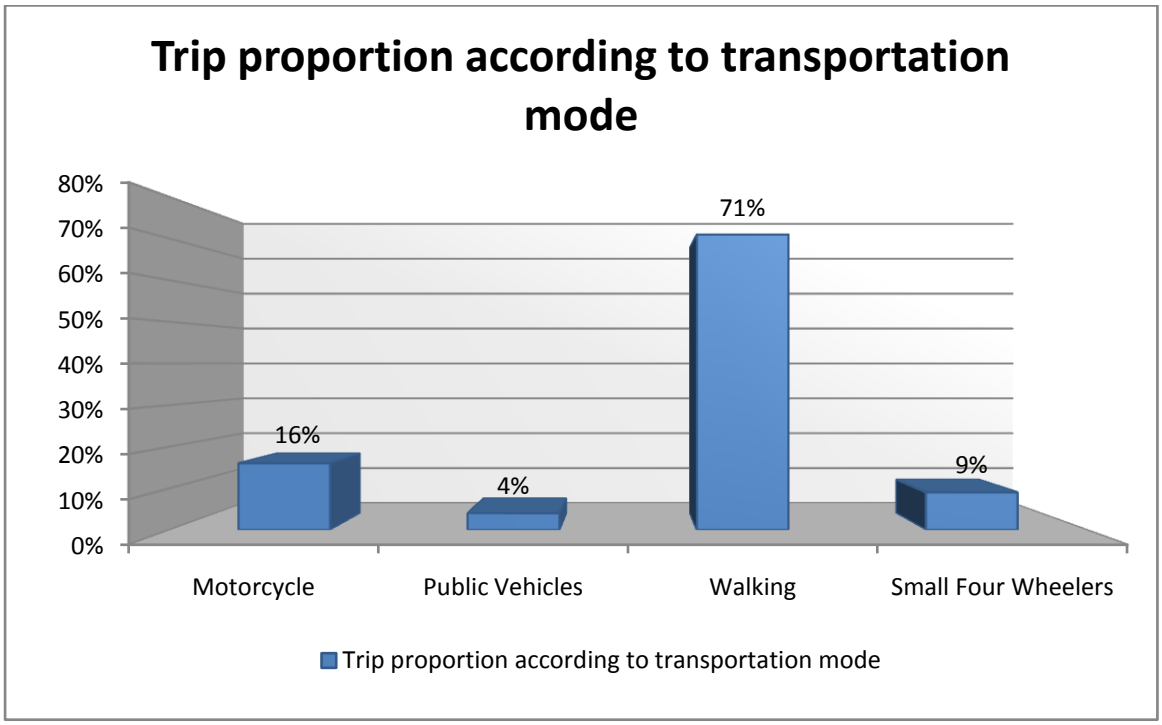


Chart 14: Trip proportion according to transportation mode (O&D Survey)

This shows that motorcycle are the most used means of motorized transportation while walking is the most widely used mode of transportation. In the past recent years, introduction of cars and jeeps has had a vast impact on the transportation sector. Now people can easily reach their destination since these small vehicles can cover most of the road in the Rural Municipality which was impossible before. So due to the road friendly vehicles and not the good road conditions,

residents of Annapurna Rural Municipality are now facing less hardship to board a public vehicle now than they were a few years back but it comes with the hefty price so people are compelled to walk over a long distance. Distance of travel is variable based on the mode of transportation and the destination. Still, Motorcycles are the best mean of mechanical transportation since they can reach almost every corners and roads and mobility is relatively easy in motorcycle than other mechanized means of transportation.

Due to the poor road conditions and high price to board small public vehicles, some people are still compelled to walk on foot. This has been identified as major problem in mobility and access. So identifying the most used destination and upgrading the road standard to imply more public vehicles in a convenient fare is recommended in order to facilitate the people.

3.8 Active and passive transport users

Active transport (also called non-motorized transport, NMT and human powered transport) refers to walking, cycling, and variants such as wheelchair, scooter and handcart use. It includes both utilitarian and recreational travel activity, plus stationary uses of pedestrian environments such as standing on sidewalks and sitting at bus stops (Litman, 2015). The sample household survey shows that nearly 79% of the daily trips are done via active mode of transport. Active mode of transport is beneficial in many aspects: this mode can be used by people of any age group irrespective of gender and economic status, it consumes human energy and does not depend on fossil fuel, and it is environment friendly and provides many health benefits to the user.

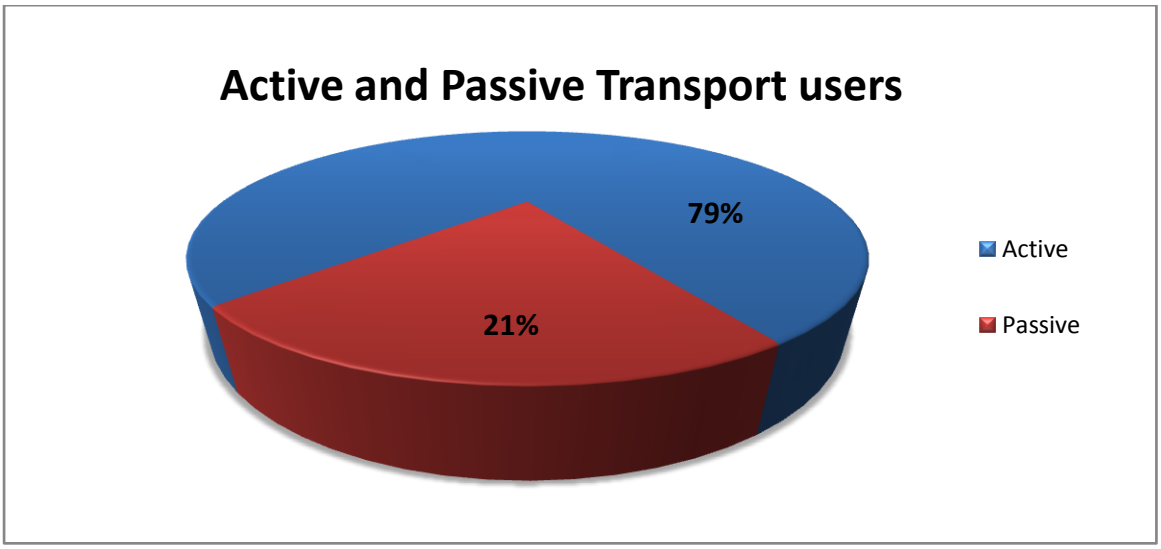


Chart 15: Active and Passive Transport users (O&D Survey)

In the rural municipality we find that the active mode of transportation is more extensively used (79%) than passive mode (21%). So this implies that large number of people travel by non motorized means of transportation than motorized means of transportation on daily basis. This is basically due to extensive use of walking for transportation purpose. Due to the fact that there is a growing urbanization in the rural municipality and that it should be tackled as soon as possible in order to create a planned transportation network in future, the trend of walking as main mode of transportation is predicted to decrease in upcoming years. So a systematic transportation

network should be developed to avoid the chaotic, unsafe and unplanned road networks and facilitate people with a well distributed network of roads.

Public Transport and Road Safety

A few couple of years back, the road conditions was poorer than that of today. Various new tracks have been built in recent past years to link various places within the rural municipality and this process is still being continued till this day. The use of public transportation for daily trips is still limited to very few municipal roads while no public transport were plying along majority of municipal road sections. But introduction of small public vehicles has been a blessing in transportation sector and now many of the roads have access to such vehicles as compared to previous years. Since the majority of movement is along the SRN, it serves as the backbone to the municipal road network. Many municipal roads are planned according to the alignment of SRN and the places it connects. More than three fourth of the vehicles running in the rural municipality are through SRN.

Mobility relies on the privately owned vehicles, small vehicles or walking. Due to the introduction of small transport vehicles and services, a transportation system has been established. However not everyone can afford it on a daily basis.

The municipal roads are mainly used by motorcycle users. Use of motorized vehicles is very limited as the ownership of motor vehicles is low. Thus, with majority of pedestrians plying in the municipal roads, the roads are safe till this date but increase in vehicle ownership since past few years has raised the risk and so proper interception should be taken in order to stop increase in risk in future.

The existing municipal roads are not maintained periodically and vehicles face difficulties. Also during the rainy seasons the movement is restricted. Hence Annapurna Rural Municipality faces quite a problem in public transportation.

Location of main market areas along the SRN has exacerbated the risk. There are no proper footpaths along the market section. Due to the modest volume of traffic in the rural municipality, pedestrians may not be at high risk of meeting accidents at this time but the chances are increasing with each passing period. So preparing a planned public road network now is very essential to tackle the problems that will arise in the future.

3.9 Summary and Findings

Literacy is moderate, but sample shows that education level above plus two levels are very low. Unemployment among the non-student sample is very high only about one fourth of the sample population is involved in earning jobs of business and service. Most of the population is involved in agriculture. In any sector of occupation, people with only school level education are dominant. Service sector has employed most of the people with Bachelor level education. As the monthly income level of households increases, the proportion of family members pursuing education is seen to increase and so does the proportion of individuals involved in business and service.

Road transport is major transport mode for movement in Annapurna Rural Municipality and facilitated mainly through SRN. Built up area is quite middling so there is still probability for settlement expansion in the rural municipality. Vehicle ownership is very less among the people

of the rural municipality. Annapurna Rural Municipality shares almost all portion of earthen roads with intermediate carriageway. The vehicle composition shows that most of the vehicles that ply along the roads are motorbikes.

Section 4: Perspective Planning

This section discusses about the future anticipated population and the traffic and the planning road infrastructure to cater these traffic in short, medium and long term.

4.1 Projection of Population

The underlying assumption for the preparation of MTMP is that, the recently designated municipal area has a growing population and has to fulfill the population criteria (one of many criterion to be a municipality) to be a municipality. As such the rural municipality is a slowly growing into urbanizing area. One of the characteristics of an urban area is higher population densities and corresponding higher demand for services and facilities all of which directly demands proper transport infrastructure. For sustainable supply of transport infrastructure, it is pertinent to forecast the population in the future so that the infrastructures can be planned and constructed accordingly.

A population forecast requires certain information on historic population counts, births, deaths, other rates which affect population change. Population forecasting is essentially a matter of judgment in selecting the kind of forecast to present, in determining the procedures for making it, and in appraising effects of the factors that induce population changes. The problem, of course, is much simpler for areas which have shown marked stability in the size of their populations for several decades, and for which no great change in the economic and social conditions of the locality seems likely. On the other hand it may be extremely difficult and complex for areas which have had sharp fluctuations in the direction or rate of population change in the past, and which may continue to have them.

The main factors affecting the population projection are birth rate, death rate and migration to the city/town concerned. Out of these factors, the migration is chief factor. The factors for migration may be the desire for better economic opportunities, desire for better living or housing conditions (this applies particularly to short distance migration within the same general locality), movement for reasons of health, education, or retirement etc. The level of national economic activity also affects the direction of migration. When employment is high or rising, the movement is generally from rural areas and small towns to the medium-size and larger cities, because of the relatively larger rate of wages and economic opportunities in urban areas.

In the present time the urban population is increasing in high rate although the proportion of it is very small. To forecast the population in the rural municipality for the preparation of MTMP the geometric method have been used considering the rapid urbanization of the area. For this the following formula is used:

$$P_n = P\ (1+ IG/100)^n$$

Where, IG = geometric mean (%)
P = Present population
n = no. of decades.
P_n=population at the end of nth decade

By using this method we found that the average growth rate of population in this rural municipality is on average -7.45% as shown in table 2 which indicates decline in population.

This may be due inter district migration and migration to other local bodies and districts. Based on this trend, the average projected population of this municipality on the year 2031 will be 11405.

Municipality	Population of Year		Growth Rate (%)	Present Year Population (2023 AD)	Remarks
	2011 AD	2021 AD			
Annapurna Rural	13315	12323	**-7.45%**	12228	Avg. growth rate

Table 2: Population Growth Rate and Base Year Population

4.2 Projection of Road Traffic

Transportation forecasting is the process of estimating the number of people or vehicles that will use a specific transportation facility in the future. Forecasts explain what the needs of the future might be and provide benchmarks for from developing overall transportation policy, to planning studies, to the engineering design of specific projects, and efficient transportation system operation. At the same time, the transport infrastructure and facilities paves the path for the development of the area. Thus, the existing trend in the development of the economy and change in land use along with the planned development and land use are considered to plan the transport facilities requirements in the future. In the planning process of the transport infrastructures, projection of the traffic is the most crucial factor. Traffic forecasting for planning projects determines the required number of lanes and road width to meet the future anticipated traffic demands. Future transportation demand will depend upon demographic and geographic factors, including population size and age, economic and employment growth, transportation network and operating conditions and transportation and land use policy, including cost of travel.

In case of Annapurna Rural municipality, there is no traffic data from past. Lack of proper city development plan and land use plan further restricts the use of complex models for reliable traffic forecast. Thus, the use of primary data collected during the study is used to forecast the traffic.

4.3 Indicative development potential

IDP is basically the indication of the existing and potential market center/service centers (key growth centers) and the areas having various development potentials such as agro-based industries, high value cash crops and tourism. Thus, IDP shows high value cash crops, tourism area, and area of service centers such as hospital, post office, telecommunication, school, campus, security offices and large settlements, important historic and religious places. Finally it prepares the ranking of the markets of the municipality as the basis of network planning.

For Annapurna Rural municipality, the following areas have been proposed for the potential development area. For this the "Annapurna Rural Municipality Profile 2077" has been used as a reference document.

S.N.	Development Potential	Area
1	**Institutional**	Pokharebagar
2	**Major Touristic &**	**Ward 1:** Chuchhe Dhunga, Lamchuka, Mohani Barahathan,

S.N.	Development Potential	Area
	Religious Areas	Maha aune Jharana, Udaune Chhahara, Bakhrakhor Danda, Sekarku Tatopani, Shreekharka Gurans Park **Ward 2:** Damaha Chhahara, Mundra Chadaune Danda, Tatopani Kunda, Bhumethan, Barahathan gufa and jharana, Madal bajaune Dhunga, Manibaraha **Ward 3:** Rupse Jharana, Kaligandaki George (Deepest of World), 108 Dhara Madichaur, Baja bajaune Dhunga, Bhumethan Mandir **Ward 4:** North Annapurna Base Camp, Phutphutey Jharana, Narchyang Jharana, Swara Phant, Shivalaya Mandir, Kibot Barahi Mandir, Kaji Bhume Mandir, Krishna Bhume Chinna Bhume Mandir, Siddhababa Mandir, Banskot Bhume Mandir, Nawadurga Mandir **Ward 5:** Khopra, Khayar Lake and Temple, Andhagalchi View Point, Dhankharka Bayali, Khayar Barahisthan, Chirika Shivalaya Mandir, Gesainbhara, Kalibhara, Swata Ganesh Mandir, Kedareshwor Shivalaya, Saraswati Mandir, Kanchi Barahi Mandir, Harihar Mandir **Ward 6:** Ghorepani, Poonhill, Devikot Mandir, Shivalaya Mandir, Ram Mandir, Poonhill Laligurans Park, Ratopani Kunda, Hallekharka Siddha Gufa **Ward 7:** Tikotgaun Homestay and Community Hall, Phulbari, Devibaraha Mandir, Manibaraha Mandir, Giddheshwor Mandir, Mahabhir Jharana, Panchyal Jharana, Thaulakharka, Peribaraha Mandir, Bhumethan, Nangi Baraha **Ward 8:** Mohare Danda, Kalidaha, Aaldanda, Chhaharekhola Jharana, Nangi, Karpakelithan, Pun Museum and Temple, Pun Community Lodge, Nangi Community Lodge, Nangi Barahi Mandir
3	**Commercial area**	Pokharebagar, Tatopani Bazar, Ghorepani, Dana
4	**Future Urban Expansion**	**Ward 1:** Besi, Maraka, Bugar, Pallaka **Ward 2:** Thulobagar, Mandredhunga, Tatopani **Ward 3:** Dwarekhola, Dana Bazar **Ward 4:** Bagartole, Banskot, Gharap, Thareswara **Ward 5:** Paudwar Area **Ward 6:** Pokharebagar, Birauta **Ward 7:** Mahabhir, Gharamdi **Ward 8:** Nangi, Dobhanphant, Dharapani
5	**Agricultural area**	Bhirkate, Dobagaun, Okharbot, Naula, Dandakhor, KOt Khalanga, Matanga, Karase, Thara, Swara Phant, banskot, Chemdi, Besigaun, Shikha, Phalate, Swata, Nepane, Goganpani, Ghara, Khibang, Kutuka, Birauta, Gharamdi, Tikot, Rima, Aula, Dosalle, Nangi, Ramche, Kaphaldanda, Mahabhir
6	**Industrial Area**	Upallo Rima area proposed.
7	**Palika Stadium**	Annapurna Stadium, Ward 1

S.N.	Development Potential	Area
8	**High Population Density Area**	Dobagaun, Aula Maraka, Sunari Bagartole, Mandredhunga, Chisapani, Tatopani, Dandagaun, Dwarekhola, Phagam, Kabhre, Bagartole, Banskot, Narchyangaun, Paudwar, Shikha, Swata, Phalate, Ghara, Birauta, Khibang, Aula, Tikot, Gharamdi, Ramche, Nangi, Kaphaldanda
9	**High Population Density Area**	Majhkharka, Dwari, Titar, Rupse, Chemditole, Gadpartole, Pakai, Bishnekharka, Nepane, Ghibang, Thulakharka, Deurali, Dosalle, Rima, Thalthale, Jaringe, Kaule, Mahabhir, Khar, Dharapani
10	**Foot trails**	Dhaulagiri Icefall Paryatan Padamarga, Doba Dhaulagiri Icefall Paryatan Padamarga, Kaamkhola Depti Dhungdhunge Padamarga, Titar Thaata Padamarga, Tathikhola Kot Khalanga Padamarga, Ligma Dandagaun Duwari Padamarga, Duwarikhola Purano Padamarga, Sukhebagar Padamarga, Jalthale Guite Phagam Padamarga, Maurice Herzog NABC Paryatan Padamarga, Ghorepani Tatopani Padamarga, Mundra Chadaune Danda Padamarga, Narchyang Swaraphant Padamarga, Paudwar Shikha Ghara Padamarga, Khopra Khayar Paryatan Padamarga, Phulbari Poonhill Padamarga, Moharedanda Paryatan Padamarga

Table 3: Indicative development potential areas of Annapurna Rural Municipality

4.4 Transport and Land Use

Land-use potential is a measure of the scale of socioeconomic activity that takes place on a given area of land. A unique property of land use is its ability to generate traffic. The connection between transportation and land use is a fundamental concept in transportation. Everything that happens to land use has transportation implications and every transportation action affects land use. Actions by transportation agencies shape land use by providing infrastructure to improve accessibility and mobility.

Planning of any land-use and transportation system is to ensure that there is an efficient balance between land-use activity and transportation capability. Trip generation provides the linkage between land use and travel as depicted in the below cycle.

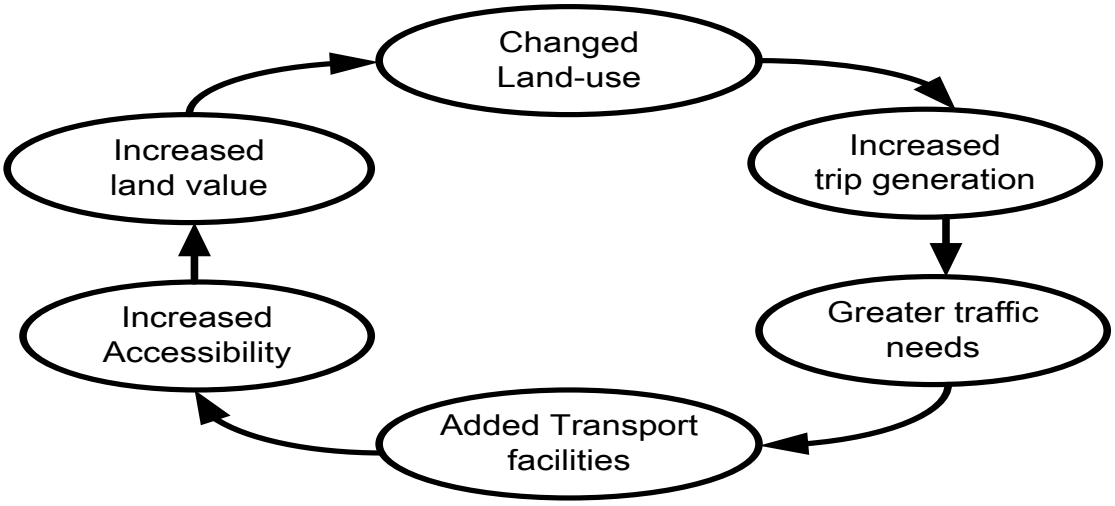


Figure 3: Relationship of land use and transportation model

4.5 Accessibility and mobility scenario

Transportation system most often needs to trade-off between accessibility and mobility. Need of travel is a derived demand, not being end in itself but a means. Accessibility is the ease with which goods, services, people and opportunities can be reached. In the context of Annapurna Rural municipality with core market centers as epicenter of all goods, services and facilities, people lying on the peripheral regions need accessibility.

Mobility is efficient movement of goods and people. Mobility is more focused on trips and distance covered. Mobility values transportation as end rather than means, but still in outlying areas accessibility requires a lot of mobility, while central population need smaller trip lengths. While we provide space for active mode users and public transits as a means of enhancing accessibility, we are trading a part of road space from the mobility sector, and when we provide more road space for private vehicles to move efficiently we trade part of road space associated with accessibility.

Present scenario of Annapurna Rural reflects the access to bus stop on an average about 80 minutes, Class "C" roads that are planned for public vehicle to ply are expected to reduce this time to within 30 minutes. People will have access to either Class "B" or Class "A" roads designed for more mobility within 45 minutes on an average walking distance that are designed for greater mobility. Planning work has focused on reducing access directly to highways, subsequent developments are recommended for national authority to develop required infrastructures.

4.6 Transport infrastructure planning

Land use and transport, developed road hierarchy, accessibility and mobility scenario are the policy level guidelines for development and planning of transport infrastructures.

Nearly 94.30% of household do not own any type of vehicle, whereas around 3.56% of people own motorcycle. Thus from the perspective of sustainable transport also, we need to protect the peoples' utilization of non motorized transport in planning works.

While 79% of the trips made as of today is on foot, the planning works has incorporated footpaths for pedestrians segregated from carriage-way width.

With projection of population at present growth rate of -7.45%, population is expected to fall below 11500 in 10 years which will certainly lessen the economic size reducing better income scenario. Intervention should be applied to check the decreasing population growth rate. People will aspire to have private vehicles of their own to increase mobility, requiring greater road space width which will be provisioned by class A and class B roads but the aim of sustainable transport and accessibility policy will be to check private ownership of vehicles under control.

Class A and Class B road would have provision of bus-bay to facilitate public transit riders. Green belts would be developed for aesthetic purpose and noise reduction purpose as well as segregation of pedestrians from road traffic. Road side furniture would be installed as deemed necessary.

4.7 Short term Municipality Transport Master Plan (Five years)

The short term municipality transport master plan has been developed to guide the municipal investments on road infrastructure through 2023-2027. This short term plan will mainly focus on the demand by the people and for the accessibility of the people in the first step. The plan will advance the rural municipality towards the medium and long term plan as outlined in the later topics.

Short term planning elements generally known as transportation system management (TSM) are basically meant for efficient use of existing and proposed infrastructure (Verma & Ramanayya, 2015). Short term MTMP refers to maintenance and upgrading of the existing road networks to the proposed standards to support the present and future (5 years) transport demand paving the demand for the implementation of medium term and long term plan. It also includes construction of new road linkages which are necessary to support the current road network and the envisaged road network for the future. The interventions are applied to the road sections based on their priorities (based on the developed scoring criteria) and the annual budget. The transport infrastructure envisaged at the end of five years plan is for the development and maintenance of access road linkages and collector roads that maintains a road hierarchy (as formulated above) and justifies the construction and development of higher hierarchy roads in the medium and long term (in short term if justified).

As such, short term plan focuses on the accessibility of all the settlements, moving towards mobility to increase the access to wider services, thus paving the way for development of proper sustainable public transport services within and around the rural municipality. The strategy and investment plans for short term municipality transport master plan is elaborated in the next section.

4.8 Medium term Municipality Transport Master Plan (Ten years)

The development of the road network in medium term plan includes opening of the track and clearing the right of way (ROW) along the Class B roads. The period of short term plan controls the encroachment and urban sprawl growth along the ROW of the Class B roads.

Medium term and long term municipality transport plan gives the layout for the development of higher hierarchy road corridors with higher mobility and limited direct access. During the short term (first five years) development of local access roads and collector roads develops the concept and culture of wide roads among the locals. This facilitates in creating the demand for expansion of the roads to their designated class width during the medium term (five to ten years). Medium term plan continues the development and maintenance of the access roads and, expansion and maintenance of collector roads to their respective standard layout. Class “B” roads will also be constructed and expanded during the medium term plan depending upon the necessity/demand of road hierarchy.

All the roads of Class “C” will be constructed and maintained at their designated standard layout at the end of medium term plan. Class “B” and Class “A” roads will also be constructed wide enough to address the demand generated during this period. Few Class “B” roads will be constructed to their full width with designated pedestrian paths and tracks. For other Class “B”

roads, the medium term time period will allow opening of the track by shifting the existing structures and stopping further construction of other structures within the designated ROW.

4.9 Long term Municipality Transport Master Plan (Twenty years)

The development of Class A roads is necessary in the long run of the rural municipality for the structured development of the road network hierarchy and thus the proper development of the trips and the rural municipality as a whole. The period of short term and medium term plan controls the encroachment and urban sprawl growth along the ROW of the Class "A" roads.

Long term municipality transport master plan envisages the development of the roads of all hierarchy within the rural municipality as depicted by the perspective plan whose demand is set out by the indicative potential development of the rural municipality.

Short term period (first five years) identifies the higher hierarchy roads necessary for the rural municipality in the long run and set necessary bylaws. It also implements those higher hierarchy roads in the policy level by controlling the development of other structures within the proposed ROW and shifting of the existing structure away. It will facilitate clearing of the ROW and track opening during the medium term time period (five to ten years). During medium term plan, these roads will be developed to certain level as per the existing demand.

This time period (first ten years) is critical in developing proper implementation policies, tools and plans for the construction and implementation of the standards of these roads in the long term time period of ten to twenty years. Plans to integrate other service facilities such as electricity, drainage and drinking water pipes should be developed during this period. Other plans such as land use plan, city development plan (if not developed), drainage network master plan should be developed in compliance with the municipality transport master plan. Depending upon these plans, MTMP may also be revised. During the long term plan of ten years to twenty years, the higher hierarchy roads will be constructed in full phase.

Section 5: Formulation of Road Hierarchy

Roadways serve a variety of functions, including but not limited to the provision of direct access to properties, pedestrian paths, bus routes and catering for through traffic that is not related to immediate land uses. Many roads serve more than one function and to varying degrees, but it is clear that the mixing of incompatible functions can lead to problems. Thus it is important to distinguish road in different class or type based on various criteria. A road hierarchy is a means of defining each roadway in terms of its function such that appropriate objectives for that roadway can be set and appropriate design criteria can be implemented. It is an important tool of road network and land use planning to asset management.

Road hierarchy restricts or reduces direct connections between certain types of links, for example residential streets and arterial roads, and allows connections between similar order streets (e.g. arterial to arterial) or between street types that are separated by one level in the hierarchy (e.g. arterial to highway and collector to arterial.) These hierarchical distinctions of road types become clearer when considering the recommended design specifications for the number of through lanes, design speed, intersection spacing and driveway access.

A well formed road hierarchy will reduce overall impact of traffic by concentrating longer distance flow onto routes in less sensitive locations, ensuring land uses and activities that are incompatible with traffic flow are restricted from routes where traffic movement should predominate and preserving areas where through traffic is discouraged.

The road hierarchy principles will assist planning agencies via orderly planning and provision of public transport routes, pedestrian and bicycle routes. It also identifies the effects of development decisions in and on surrounding areas and roadways within the hierarchy and also facilitates urban design principles such as accessibility, connectivity, efficiency, amenity and safety. Further, it also identifies treatments such as barriers, buffers and landscaping to preserve amenity for adjacent land uses.

This study also formulates the road hierarchy for the various roads. After going through large number of literature, the study has proposed four level hierarchy roads namely Class A, B, C and D. Class C and D basically deals with access while Class A and B basically deals with mobility and accessibility to higher services.

Criteria	Class A	Class B	Class C	Class D
Purpose	Mobility	Mobility and control access	Access and mobility	Access
Function	Through and long distance movement	Connection between Class A and C roads; and also Provide alternative connection routes between Class A	Connects higher order roads and mobility to local trips	Connect local trips to higher level roads
	High network	Support through	Access to	direct access to

Criteria	Class A	Class B	Class C	Class D
	coverage	movement of traffic	property	property
	Segregated NMT facilities and Bus lay bys	Segregated NMT facilities and Bus lay bys	Segregated NMT facilities	Local NMT movement
	Complete access to public transport	High access to Public transport	Limited access to public transport	
Maintenance Responsibility	Central & Provincial Government	Municipality	Municipality & Local people	Local people
Speed (Kmph)	Above 70	50-70	40-50	Below 40
Capacity (PCU/hr)	4000-4800	2400-3600	1500-2400	Less than 1500
Access Control	Full Control	Partial Control	No	No
Public transport services	Mass Transit facilities	Mass Transit, Local Public transport	Limited access to public transport	No public transportation

Table 4: Criterion of Road hierarchy

5.1 Class "A" Road

All major roads which connect major Growth Centers (market, tourism Centre, industry, etc.) or several Wards with high network coverage, connected directly or through the National Strategic Road Network or district road falls on the road class A. For Annapurna Rural Municipality, ROW of Class B is adopted 10m with immediate carriageway of 7m with extra 1.5m shoulder each on both sides. Walking pavements are provided on both side of width 2m on both sides with drain flowing below them. Setback of 2m is adopted.

List of class A road is given below and the detail map is presented in Vol II. Typical cross section of class 'A' road is as given in Figure 4 below and the detail is given in Vol II.

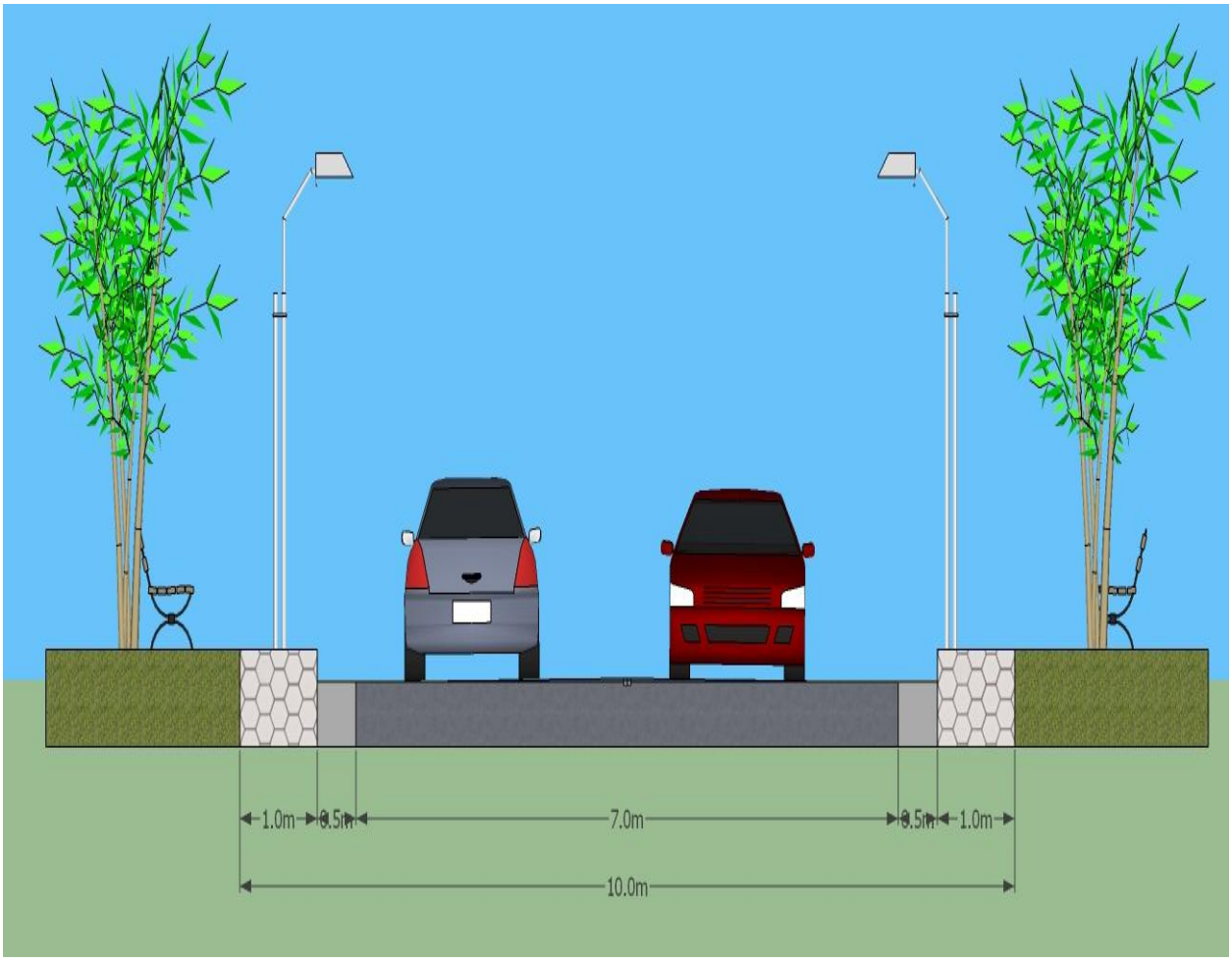


Figure 4: Typical Cross Section of Class A Road

Road Code	Name of Transport Linkage	Class & Category	Settlements served	Wards Passed	ROW (m)	Total Length (km)
43M01A001	Gharkhola Khibang Sikha Ghodepani Sadak	A	Pokharebagar, Hallekharka, Birauta, Khibang, Shikha, Phalate, Ghara, Chitre, Ghorepani, Ulleri	6, 5	10	22.48
43M01A002	Mahabhir Histan Ramche Nangi Sadak	A	Mahabhir, Dosalle, Luga Palyang, Pairagaun, Rangkuledil, Rima, Jisere Rima, Sansarekhola, Tumai, Dharapani, Karwakeli, Kaphaldanda, Ramche, Nangi, Jaljala RM	7, 8	10	28.54

Table 5: List of Class A Roads

5.2 Class "B" Roads

All roads which connect to a major road network and other roads of similar hierarchy with a road connecting major Growth Centre of the same or neighboring wards which provide access between Class A and class C road falls on the category of Class B. For Annapurna Rural Municipality, ROW of Class C is adopted 8m with immediate carriageway of 5.5m. Walking pavements are provided on both side of width 1.2m each on both sides with drain flowing below them. Setback of 1.5m is adopted.

List of class B road is given below and the detail map is presented in Annex. Typical cross section of class 'B' road is as given in Figure 5 below and the detail is given in Annex.

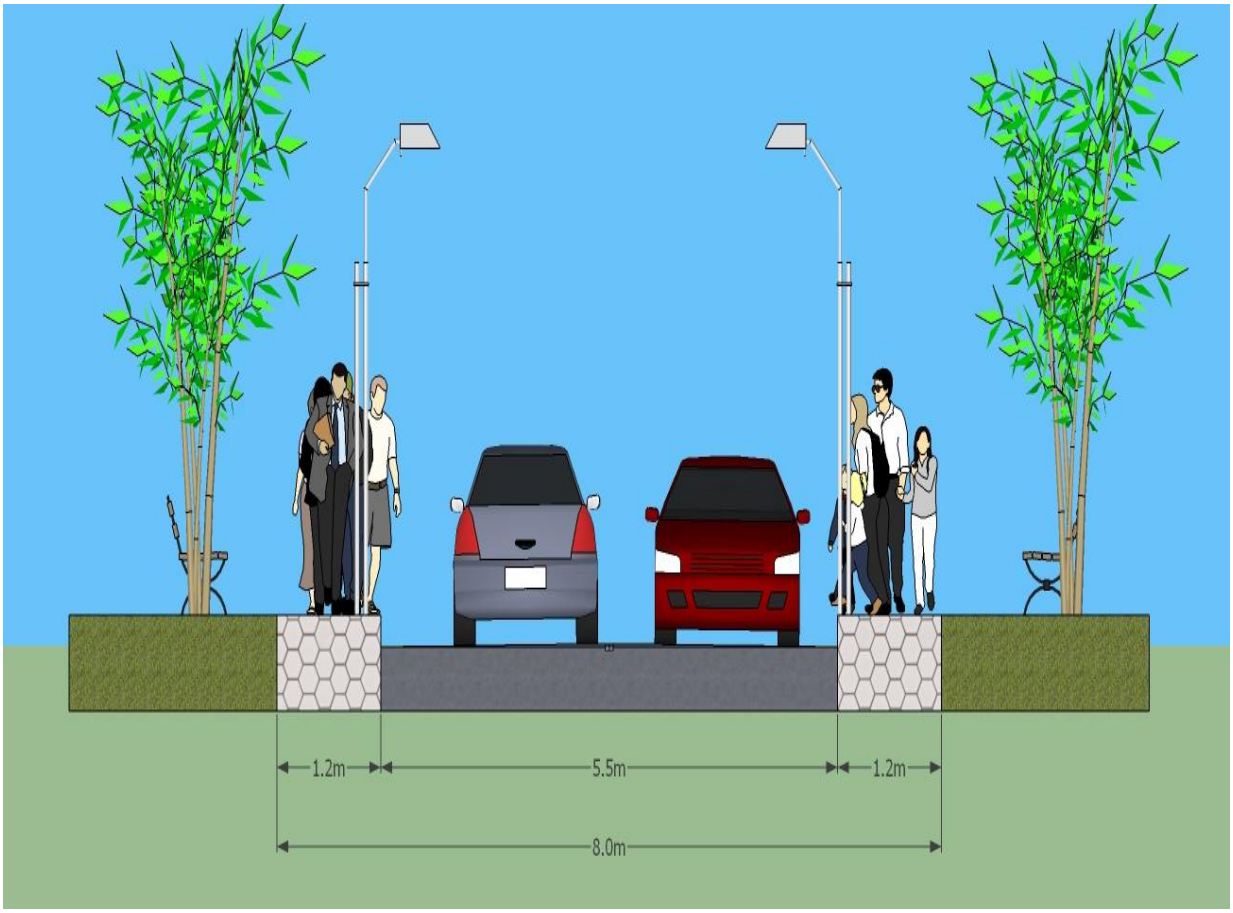


Figure 5: Typical Cross Section of Class B Road

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01B001	Maurice Herzog NABC Sadak	B	Nagdhunga, Nilgiri Substation, Shiva Mandir Mistara, Patar, Banskot, Dovilla, Malarani, Chotapaha, Humkhola	4	8	15.54
43M01B002	Bhirkate Doba Barahathan Sadak	B	Bagar, Marhaka, Aulabagar, Salleni, Pallophant, Tusara, Barjara, Doba, Sankhola, Chhap, Wakhe, Barahathan	1	8	12.74
43M01B003	Mahabhir Gharamdi Histan Sadak	B	Mahabhir, Gharamdigaun, Tikotgaun, Rangkulidil	7	8	13.69
43M01B004	Gharkhola Paudwar Kindu Shikha Sadak	B	Gharkhola, Nepane, Paudwar, Kindu, Swata Shikha	5, 6	8	14.22
43M01B005	Tikot Matheni Gharamdi Sadak	B	Tikot, Matheni, Thulakharka, Gauhernedil, Gaurakharka, Manibhara, Gharamdi	7, 6	8	16.91
43M01B006	Khibang Kutuka Ghorepani Sadak	B	Khibang, Mahabhir, Kutuka, Thulakharka, Pyuri Barah, Ghorepani	6	8	10.35
43M01B007	Nagdhunga Narchyanggaun Lekgaun Sadak	B	Nagdhunga, Bagartole, Besigaun, Phedi, Rakata, Narchyangaun, Lekgaun, Ghalemdikhola	4	8	9.97

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01B008	Tatopani Mandredhunga Sadak	B	Tatopani Besi, Chisapani, Mandredhunga	2	8	5.21
43M01B009	Ghara Shikha Sadak	B	Ghara, Shikha	6, 5	8	3.53
43M01B010	Patar Kopchepani Ghasa Sadak	B	Patar, Machhekhola, Gharap, Gadpar, Thareswara, Bhalebas, Kopchepani, Ghasa	4	8	8
43M01B011	Doba Mahaaunejharana Sadak	B			8	3.19
43M01B012	Bhaishari Aula Upallorima Matheni Sadak	B	Bhaiseri, Kalleri, Aula, Kolalibang, Upallorima, Matheni, Tauka	7	8	9.82
43M01B013	Lakhubari Aula Rima Sadak	B	Lakhubari, Sabandre, Aula, Kolalibang, Rima	7	8	5.74
43M01B014	Swata Phalate Sadak	C	Swata, Phalate	5	6	4.04
43M01B015	Birauta Ghara MyagdiHP Sadak	C	Birauta. Jharpat, Patpakha, Ghara, Maidan Gharkhola, Paudwar	6	6	3.44
43M01B016	Shikha Kindu Sadak	C	Shikha, Ghirbang, Kindu	5	6	3.39
43M01B017	Khibang Thumkodil Gharamdi Sadak	C	Khibang, Thumkodil,	6, 7	6	4.58

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
			Hurkekhasedil, Gharamdi			
43M01B018	Paudwar Gibang Sadak	C	Paudwar, Gibang	5, 4	6	4.89
43M01B019	Chemdi Krishi Sadak	C	Chemdi, Narchyang Besi	4	6	2.04

Table 6: List of Class B Roads

5.3 Class 'C' road

All roads which provide connection to higher order roads with all agricultural roads which connect a farm with a mini-market Centre or an agro-based production Centre and means for mobility of local trips are understood as road Class C. For Annapurna Rural Municipality, ROW of Class D is adopted 6m with immediate carriageway of 3.8m with extra 0.5m shoulder each on both sides. Walking pavements are provided on one side of width 1.2m with drain flowing below it. Setback of 1.5m is adopted.

List of class C road is given below and the detail map is presented in Annex. Typical cross section of class 'C' road is as given in Figure 6 below and the detail is given in Annex.

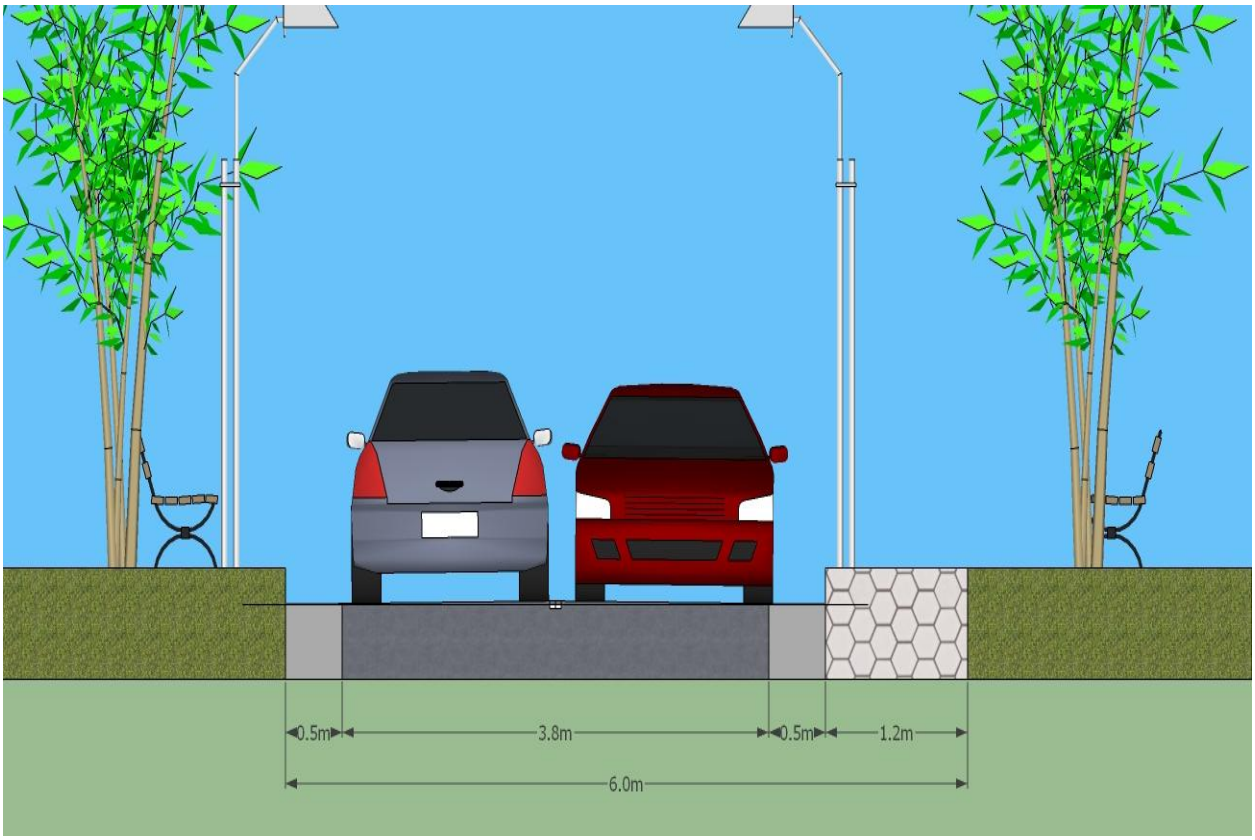


Figure 6: Typical Cross Section of Class C Road

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01C001	Thatitole Gyanprakash Kot Khalanga Thara Sadak	C	Thatitole, Kot, Khalanga, Thara	3	6	7.02
43M01C002	Tatopanibazar Sadak	C	Tatopani Bazar	2	6	0.45
43M01C003	Jalthale Phagam Suwa Dwarekhola Sadak	C	Jalthale, Phagam, Suwa, Dwarekhola	3	6	4.13
43M01C004	Ghattedanda Ligma Dandagaun Pulibang Dwari Sadak	C	Ghattedanda, Ligma, Dandagaun, Pulibang, Dwari	3	6	3.29
43M01C005	Ramche Naka Ghorepani Sadak	C	Ramche, Aaldanda, Kholakogala, Kakalchaur, Simalikhola, Melkharka, Naka	8, 7	6	9.39
43M01C006	Thulobagar Kataunje Sadak	C	Thulobagar, Kataunje, Mandredhunga	2	6	5.86
43M01C007	Kolalibang Dharapani Kaule Sirbari Sadak	C	Kolalibang, Dharapani, Marna, Kaule, Sirbari	8, 7	6	3.07
43M01C008	Pokharebagar Gadekhola Baiseri Hallekharka Sadak	C	Pokharebagar, Gadekhola, Baiseri, Hallekharka	6	6	3.22
43M01C009	Rithaaahal Matheni Sadak	C	Rithaaahal, Matheni	7	6	2.78
43M01C010	Karwakeli Mahabhir Sadak	C	Karwakeli, Sirwari, Mahabhir	8	6	2.71

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01C011	Myardi Krishi Sadak	C	Inara, Bhirmuni, Khwopakodil	6	6	5.16
43M01C012	Majhkharka Doba Sadak	C	Majhkharka, Dhankharka, Dhadegauda, Chhap	1	6	6.28
43M01C013	Narchyang Healthpost Sadak	C	Narchyang	4	6	0.17
43M01C014	Kindu Bisnekharka Pakai Sadak	C	Kindu, Bisnekharka, Pakai	5	6	4.14
43M01C015	Mahabhir Gharamdi Saadhikharka Hurkekhasedil Sadak	C	Mahabhir, Saadikharka, Kotkharka, Hurkekhasedil, Thulokhola, Gharamdi	7, 6	6	3.59
43M01C016	Deurali Ulleri Jugepanikhola Mahabhir Deurali Sadak	C	Deurali, Ulleri, Jugepanikhola, Mahabhir Deurali	6, 7	6	2.86
43M01C017	Dobhan Sadak	C	Bhantatole, Kamire, Dora, Dobhan	8	6	2.84
43M01C018	Deurali Gaudakharka Bayachaur Arubot Gharamdi Sadak	C	Deurali, Gaudakharka, Bayachaur, Arubot, Gharamdi	6, 7	6	2.55
43M01C019	Swata Ghurja Sadak	C	Swata, Ghurja	5	6	1.9
43M01C020	Bagar Sonari Sadak	C	Bagar, Sonari	1, 2	6	1.8
43M01C021	Chisapani Mandredhunga Krishi Sadak	C	Chisapani, Mandredhunga	2	6	1.56

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01C022	Jaringe Sadak	C	Jaringe, Upallodanda	8	6	1.49
43M01C023	Rupse Kabhre Sadak	C	Rupse, Kabhre	3	6	1.45
43M01C024	Ghoptekharka Phalate Sadak	C	Ghoptekharka, Phalate	5	6	1.37
43M01C025	Gadapani Upallogaun Sadak	C	Mandredhunga, Gadapani, Upallogaun	2	6	6.03
43M01C026	Banskot Gadpar Thareswara Sadak	C	Banskot, Gadpar, Thareswara	4	6	3.58
43M01C027	Gaakhar Aula Sadak	C	Gaakhar, Doba Bagar, Neele, Paire, Kalampur, Puranogaun	1, 2	6	5.19
43M01C028	Phalate Pyuribaraha Sadak	C	Phalate, Pyuribaraha	6	6	1.36
43M01C029	Upallo Nangi Sadak	C	Pakhapujne, Upallo Nangi, Gaighat	8	6	1.19
43M01C030	Gadpargaun Sadak	C	Gadpargaun	4	6	1.11
43M01C031	Jyoti Aa.Vi Sadak	C	Kot, Titar	3	6	0.91
43M01C032	Pahiregaun Sabande Sadak	C	Pahiregaun, Sitaltapnedil, Saabande	7	6	2.05
43M01C033	Dwarekhola Sadak	C	Dwarekhola Tole	3	6	1.1

Road Code	Name of Transport Linkage	Class & Category	Settlements Passed	Wards Passed	ROW (m)	Total Length (km)
43M01C034	Tallokhor Daidanda Sadak	C	Pakhapujne, Bhanta, Tallokhor, Daidanda	8	6	0.97
43M01C035	Bagartole Sadak	C	Bagartole	4	6	0.93
43M01C036	Tallodanda Sadak	C	Pakhapujne, Tallodanda	8	6	0.83
43M01C037	Sekarku Tatopanikunda Sadak	C	Sekarku Tatopanikunda	1	6	0.26
43M01C038	Annapurna Club Sadak	C	Bagartole	4	6	0.68
43M01C039	Besigaun Sadak	C	Besigaun	4	6	0.95
43M01C040	Gaunphant Sadak	C	Kaphaldanda, Gauphant	8	6	0.7
43M01C041	Chisapani Kimlakharka Sadak	C	Chisapani, Kimlakharka	2	6	1.25
43M01C042	Dana Thatitole Sadak	C	Dana, Thatitole	3	6	0.4
43M01C043	Nangi Bhanbade Sadak	C	Daidanda, Salleri, Bhanbade	8	6	0.6

Table 7: List of Class C Roads

Section 6: Five Years Municipal Transport Master Plan

This chapter explains the framework basis of preparation of master plan. The perspective plan of road network formed by different categories of road, financial institution for financing the projects and budget expenditure are elaborated in this chapter. This chapter concludes with plans to stage implementation.

6.1 Strategic Framework

The framework adopted during the entire planning and how it is compatible with long term vision of transportation planning and economic-social development is described in the underlying headings.

6.1.1 Hierarchy of Roads

In any urban area, provision of proper hierarchy of roads at proper spacing helps to reduce traffic congestions and increase the mobility along the roads. A well-formed road hierarchy and its network of roads will reduce overall impact of traffic on the land use and at the same time guide the planned change of the land use. Thus, a proper hierarchy of road networks should be provided at proper spacing so that their purpose and functions can be justified.

Hierarchy should be maintained according to the major SRN road (national highway, feeder road) that passes through the rural municipality or is closest to the municipal area. Urban/municipal roads that open into these SRN should be have proper ROW and spacing so that the traffic that enters the SRN is justified and the purpose of the road is also preserved. The NRS (2070) gives the provision of parallel service (frontage roads) at the spacing of at least 750 meters. Larger spacing creates bottlenecks while closer spacing may be unnecessary.

A well-formed network of Class “A” and “B” roads creates blocks of 1 sq. km. to 2 sq. km. in the urban area and bigger blocks in the sub-urban areas. The hierarchy also provides well connected pedestrian way.

6.1.2 Urban Roads

- Expressway and Urban Road

The expressway and the urban roads should be segregated in terms of their function and thus their use. Expressway (highway) is meant for long route thorough traffic. Long distance mobility is the sole purpose of such roads. Development of core market centers of the municipalities along the Highway has hand devoured their mobility functionality and also made road safety questionable at those sections. Thus it is necessary to segregate such roads via direct property access control along with adequate spacing of other road that links the settlements to these roads.

- Segregation of road users

Urban roads are used by all sorts of users including pedestrians, cyclists, motorists and pubic vehicles. Their speed of travel varies significantly. Pedestrians and cyclists move slowly while other motorized vehicles travel at greater speed. Sharing of common roadway by all these users is very unsafe and unpleasant, especially for the active users. Their volumes are also very

significant and thus cannot be ignored. Thus, adequate road infrastructure should be provided to ensure their safety by segregated pedestrian facilities and bicycle tracks. Such segregation can be achieved by level difference in those facilities and construction of green belt between the facilities.

- Green Belt

Urban area is characterized by dense population and high built up area. Unplanned urbanization has rendered many cities unlivable because of the growing pollution and lack of green/open spaces. Road space is most frequently used public space. Provision of green belt along the urban roads creates safer and pleasant walking spaces, and acts as median to separate motorists from each other and from the NMT users. It also reduces the road side air temperature and absorbs more pollutants generated from the motor vehicles on street than other distant trees. Green belts can absorb precipitation and reduce the size of required drainage. The trees also act as screen and results in attenuation of air, noise and light pollution alongside the urban roads. Thus, green belt between the motorists and NMT users and in the median strip is a compulsory infrastructure in the urban roads.

Urban roads are used by all sorts of users including pedestrians, cyclists, motorists and pubic vehicles. Their speed of travel varies significantly. Pedestrians and cyclists move slowly while other motorized vehicles travel at greater speed. Sharing of common roadway by all these users is very unsafe and unpleasant, especially for the active users. Their volume is also very significant and thus cannot be ignored. Thus, proper road infrastructure should be provided to ensure their safety by segregated pedestrian facilities and bicycle tracks.

6.1.3 Public transport

Public transport is a means for enhancing mobility of local people. High proportion of active transport users justifies the necessity of public transport to increase their mobility and thus access to wider services and facilities within the perceived travel time budget. Proper structured public transport routes are vital for sustainable transport development. The existing economy and travel pattern may not sustain on its own. Development of proper roads to facilitate access and (through access) mobility to various services and facilities will create more trips and thus demand. Strategic development of such roads will not only create demand for public transport (greater mobility) but also develop proper road network where public transport vehicles can ply.

As the demand increases, before well-structured and formal transport is justified economically, the local government should introduce city buses. City buses are government run public vehicles. Their sole purpose is to provide greater mobility to the local people even when the demand is not economically justified. Such provision adds fuel to the overall development of the local economy. It also captures the potential public transport users and retains those users. This is a "pull factor" to increase public transport users in the future and creates an environment to introduce formal public transport services.

6.1.4 Principle guideline of road planning

Change in land use and transport are cause and effect of each other, as depicted by the land use cycle in previous chapter. Thus, current land use and the predicted/planned change in land use in the future is the basic guideline for transport planning. Development of compact settlements and

corresponding development scenario has been considered for road planning. The rural municipality is urbanizing area whose population is expected to rise in the coming years. As the population is added, the settlements grow both horizontally and vertically. Horizontal expansion increases the built up area while vertical expansion increases the population density. With higher road densities, the required width of the transport facilities also increases locally and along the major roads. Increase in built up area demands bigger network of local and collector roads which ultimately demand wider roads of higher hierarchy.

6.1.5 Hierarchy of settlement

A proper hierarchy of settlement should be developed to segregate the commercial and business centers from settlement areas and industrial area. A hierarchy of the market centers should be developed as main market centre and local market centers. Promotion of bi-nuclear or multi-nuclear city is necessary for even development of the settlements within the rural municipality. These bring many services and facilities closer to the demand and reduce the need to travel to the main market centre. Pokharebagar and Tatopani area has highest settlement density.

6.1.6 Introduction of basic road and road side infrastructure

There is a need to redefine the term “road way” among the local people who perceive only paved road surface for motorized vehicles as proper road way. Although, the proportion of active transport users is very high, the road infrastructure necessary to support these users do not fit within the defined road by the locals. Such perception and construction of road infrastructure accordingly will lead to high rate of motorization which creates problem to manage the generated traffic, pollution and other externalities.

In the present context, with very high active users, proper networks of pedestrian way and tracks should fit in the basic road width. It should be planned and implemented as basic road side infrastructure. Similarly, the landscaping of the road sections with proper greenbelt increases the greenery in the market areas, provides shade to the active users, segregate different users and a pleasant travelling environment for all the users.

Proper lay bys are necessary elements for proper public transport system. Bus stops should have proper sheltering furniture, seating benches, lighting system, trash boxes, information boards and displays of routes and schedule of buses and proper connected pedestrian ways and zebra crossings.

Intersections are major part of urban roads. Adequate design of sight distance, turning radius, islands, signs and signals need to be incorporated during early phase of construction of intersection.

6.1.7 Urban Road Discipline

Obeying of proper discipline and enforcement of it is equally important as the provision of the urban road infrastructure itself. Proper discipline not only makes the use of the facility efficient, it also creates a sense of comfort and safety. Segregation of the pedestrian way and track from the main carriageway enforces certain level of discipline among the users. Provision of proper NMT crossing facilities and control of jay walkers is necessary to maintain proper flow of traffic in the Main Street and safety.

6.1.8 Integrated service planning

Integrated service planning is a very important factor for damage minimization during construction and expansion of various facilities. As the road follows, settlement also expands which demands other facilities such as electricity, drainage and drinking water. All these facilities are provided along with road infrastructure, mostly within the ROW of road. Proper integration of these services with road planning is necessary to minimize multiple investments in the individual infrastructure and the damage to other infrastructure during maintenance and/or expansion.

6.1.9 Development phase of roads

The proposed roads cannot be directly implemented at a glance. Proper phases of development of roads of all hierarchy should be envisaged and planned. The first phase is simply the formulation of necessary hierarchy and identification of road sections that serves/ can serve as different hierarchy roads. During this phase, bylaws as demanded by the formulated road hierarchy along the identified roads should be enforced. The next phase is to develop necessary policy and implementation plan for expansion and construction of the road. The phases of construction total road width should also be worked out as development of full road width as demanded by the respective road hierarchy may not be possible. As such, implementation of road hierarchy starts from roads in lowest hierarchy and stage wise expansion of the roads according to the demand and necessity of wider roads and facilities to the higher hierarchy roads.

6.1.10 Grass root institutions

The grass root institutions/committees should be empowered with the provision of local technicians in such institutions. Such institutions include consumers' groups, ward level committees, MRCC and others.

6.1.11 Land Acquisition

Land development and management should go parallel with clearance of RoW of higher classes of road. Road corridor development project should be introduced for acquisition of land required to clear RoW for various classes of road. Each road project requires being individual project. The development project is aimed at minimizing social, financial and physical loss. The process of development needs to internalize the value created beyond the corridor as a result of corridor development in trickle down order. Generation and sales of sales plot can be enough to compensate for physical loss of building and account for social exclusion and rehabilitation. Moreover, the development project should be launched by the land owners committee rather than local government. To conduct feasibility study and advocate, Rs 10 lakhs has been apportioned to this sector from MTMP fund.

6.2 Prospective plan of municipal road network

Perspective plan of municipal road network includes the maintenance of the access and collector roads and development of higher hierarchy road corridors supporting mobility of the roads. First five years should focus on development of existing access roads and their maintenance. It also incorporates construction of new road linkages to provide basic access to the settlements. Roads of Class "C" will also be widened to its functional width providing proper tracks and pedestrian ways where permitted by the available road space. During this period formulated road hierarchy

will be implemented in terms of policy and enforcement of bylaws. Within 2 years other complementary plans of land use and city development will be developed. In the third year, the MTMP and its perspective plan should be revised in coordination with the other plans formulated and changes captured during this period.

Year five to ten will then implement the higher hierarchy roads in stages of clearing of the required ROW road space and construction of necessary infrastructure. Proper development stages of roads should be planned (construction of Class "A" roads to the standards of Class "C", then gradually upgrading to Class "B" and then to Class "A"). Other implementation strategies should also be developed and finalized at the end of this period. The road network developed during this period shall complete construction of Class "C" roads. This will demand higher class roads to support the local road networks. Gradual upgrading of the higher hierarchy road networks during year ten to twenty will be justified by the traffic generated and level of mobility demanded to support the emerging economy. The total cost for the required interventions proposed for all the municipal roads and to upgrade all of them (MTPP Cost) is calculated based on the rates of ToR and was found to be approximately **NRs. 2,874,063,400.00.** In figure: NRs. Two Billion Eight Hundred Seventy Four Million Sixty Three Thousand and Four Hundred

6.3 Financial institution and capital investment plan

To determine how much of the proposed work can be carried out in the 5-year MTMP period, it is necessary to estimate the budget available in this period. This is done by estimating the amount of money available from different sources based on the actual amounts of the current or last financial year, assuming certain growth rates for each funding source.

Firstly, the total budget for the current or last financial year needs to be determined. This information needs to be obtained from the rural municipality account and planning section or the Annual Budget Book published by the rural municipality, indicating the different sources of funding and the amount of funding from each source allocated to the road sector. Sources of funding should be clarified as much as possible to avoid confusion and duplication. In writing up the budget of the last financial year, the wording of the funding sources below should be used to facilitate understanding and comparison with other municipalities. Additional funding sources may be included where relevant.

Planning of the investment is essential to support local government in developing good and best practice in construction, upgrading, overall asset management and especially operation and maintenance the road project. Most of local governments in Nepal have accounting systems that are not capable to meet today's requirements, and it is assumed that there are growing differences between public and private sector accounting policies and practices. The poor standards in public sector accounting do have multiple consequences, most obvious in the area of auditing and accountability. It is recommended that the planning section of rural municipality should incorporate funding source from different line agencies as well as NGOs, INGOs, people's contribution fund for proper management, infrastructure development and maintenance of road within the rural municipality.

6.4 Five year budget expenditure

One of the final outcomes of this study is to provide annual budget expenditure for proposed intervention (new construction, upgrading, maintenance and rehabilitation).

For the allocation of yearly budget, the total cost required for five years is first calculated and this amount is distributed to yearly assuming that budget spending capacity of municipality is expected to grow at the rate of 10% per year. Total budget required for the 5 years (MTMP Cost) was found to be approximately **NRs. 290,028,880** (Two Hundred Ninety Million Twenty Eight Thousand Eight Hundred and Eighty). During this span of five years, 24.43 km more roads will be blacktopped, 1.43 km additional roads will be graveled and addition 3.38 km of new road network will be constructed.

The estimate of budget required for the five years is prepared based on the assumption that the Class A road is to be made two lane, Class B road is to be made intermediate lane and Class C roads are to be made single lane and lane considered are assumed to be metalled. Due to limitation of budget, the roads are assumed to have simple cross drainage structures within this period whereas cross drainage structures such as Bridges are not included in this budget and expected to be completed within this time period by external sources. For approximate costing, the construction rate of road appurtenances is assumed to be equal to that of gravelling cost and for short term the minimum width of 4m is assumed if existing road width doesn't exists.

MTMP mainly deals with Class A and B roads, and it may found that Class C roads are not given much consideration. Interventions on those roads need to be incorporated in annual budget plan. Intervention that need can't be completed in predetermined year should be the next priority in coming year. If a certain road, which was targeted to complete in first year could not be finished in first year, need to be given first priority in next year expenditure plan. If there is deficit in annual expenditure, municipality needs to incorporate that particular heading in next year at any cost. They can look for grant, assistance from province or even central level or they can incorporate them by shifting budget from less importance item/heading.

Total budget is first broken down to 70% for road construction and 30% for maintenance. Of the total budget available for construction of roads, 40% is allocated for construction of class A roads, 30% is allocated for Class B and remaining 30% is allocated to Class C roads.

Maintenance cost has been allocated 30% of fund available for municipal road. Yearly maintenance plans according to need based assessment of required maintenance has to be prepared and cost allocation needs to be done through this plan. Rs 10 lakhs required for advocacy and promotion of higher classes of road for clearance of RoW through land development and land pooling projects is allocated from budget available for maintenance. These projects of road corridor development should be conducted by directly involving local people.

In absence of specific fund granted for special project, all other fund available to rural municipality for construction of road should come through one window system collected in under single basket and allocated to the roads based on ranking of roads.

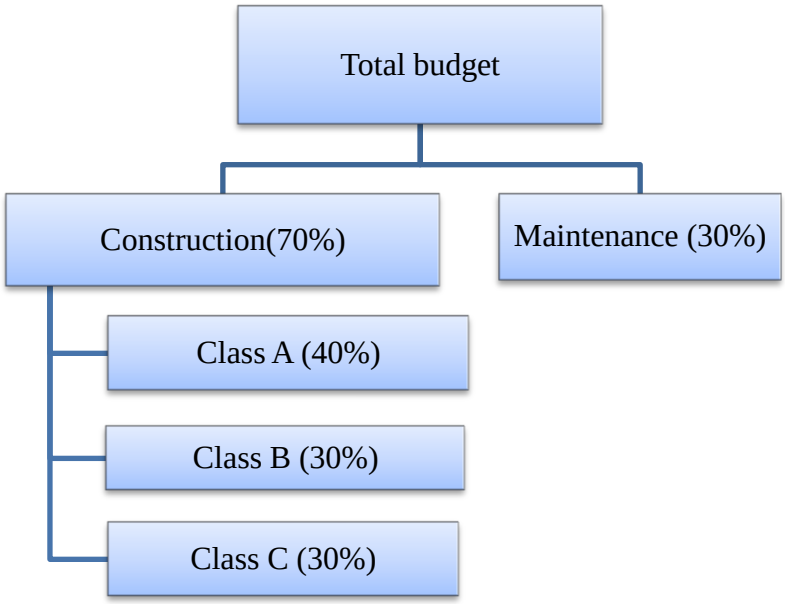
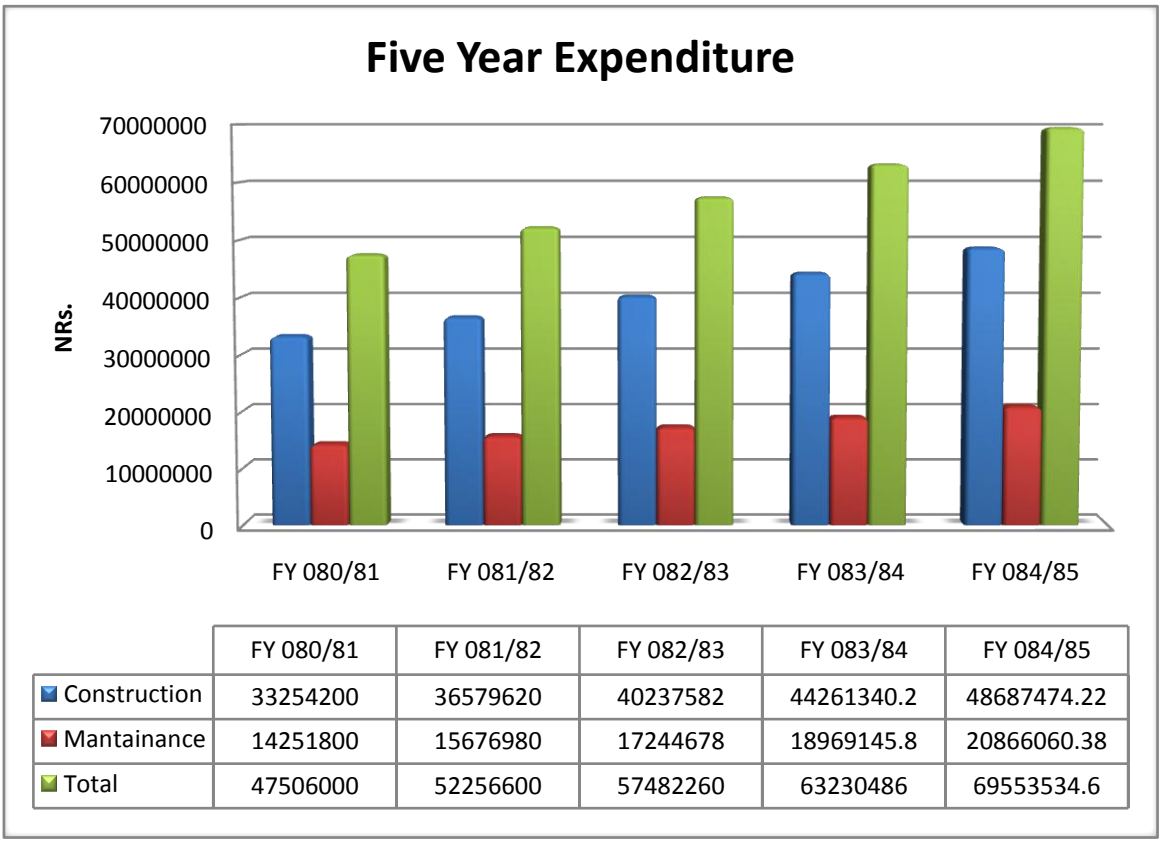


Figure 7: Budget Allocation

Out of total budget of Annapurna Rural Municipality for the fiscal year 2080/81, **NRs. 47,506,000** (Forty Seven Million and Five Hundred Six Thousand) has been allocated for road infrastructure development. Taking into consideration of the infrastructure budget will be allotted for road and allied structure, we have prepared a five year budget as presented in chart below.



	FY 080/81	FY 081/82	FY 082/83	FY 083/84	FY 084/85
Construction	33254200	36579620	40237582	44261340.2	48687474.22
Mantainance	14251800	15676980	17244678	18969145.8	20866060.38
Total	47506000	52256600	57482260	63230486	69553534.6

Chart 16: Five Year Budget Expenditure

6.5 Scoring Criteria and Priorities

A network consists of several links. It is not possible to construct all roads at a time due to resource and time constraint. Therefore, each link in a network needs to be prioritized and various interventions need to be taken based on the prioritization. After developing a municipal level road network, the cost estimate of the road is prepared and benefit of each link in the network is assessed. There might be various criteria of prioritization, which may differ from place to place The basic criteria that is used for prioritization includes existing population within the zone of influence, present road demand, future potential route, accessibility situation, land use pattern, proximity to the market/service centers, religious and tourism places, existing road width and surface type. These criteria are given various weight age and weight age average of all the criteria is summed up to come with a priority of intervention. All type of intervention is provided with same scoring criteria. The finalized scoring criterion based on rigorous study is set in front of rural municipality and MRCC for its approval.

Each road link is allocated the number of points corresponding to the fulfillment of the particular criteria. The weighted average of score that each intervention receives leads to a ranking/prioritization of the intervention options. Short description of the indicators used is given below and detail discussion is given in Annex of the report.

- **Demand priority of wards** indicates higher the priority order of the road by ward, higher the weight age the road gains.
- **Proposed road class:** higher the road class, higher number of people it serves and it should get more priority.
- **Total existing width:** the road with more width should get higher priority because it indicates the necessity of road and the people's dedication for wide roads.
- **Population served:** the main purpose of the road is to serve people and more a road serves for population it should be given high priority.
- **Road surface condition:** from the point of view of accessibility to mobility, more priority should be given to road of poor surface condition to upgrade to higher condition.
- **Road density:** it may be defined in two ways. In one way it is the length of road per unit area of the settlement and in another way it indicates the length of road per 1000 population it serve.
- **Settlement density:** higher the settlement density, higher will be the road users and hence such area should be given more priority.
- **Service provided by the road such as Recreational(R), Agricultural (A), Market (M) and Service centre(S) (RAMS):** if a road provides more service than another then this road should be given higher priority.
- **Access to poor and minor:** if a road serves for poor and marginalized people then it should be given higher priority.

6.6 Staging Implementation

Mid period review

In light of present context without proper land use and city development plans of the rural municipality, the formulated municipal transport plan for five years and long term perspective

plan cannot be complete. Comprehensive drainage plan and layout also guides the placement of cross drainage structures along the roads. Therefore, a mid period review is necessary. This review follows the formulation of comprehensive city development plan and land use plan. These plans will bolster the transport master plan and also suggest necessary deviations and revisions. The surveys conducted to prepare this MTMP are baseline survey for future planning. In reference to these surveys, the mid period review will track the changes and its effect on the formulated five year plan and long term perspective plan. Based on the recommendations of land use and city development plan, and the changes during the first two years in the road infrastructure and road traffic the mid period review will guide MTMP in the later stages.

The next MTMP will be prepared in the sixth year which will create a void in continuity of transport infrastructure development during the sixth year. The mid period year shall also formulate implementation and investment plan for that period which will be carried over the next MTMP.

Yearly maintenance plan

According to the yearly progress of transport infrastructure development and construction, yearly maintenance plan should be prepared. This maintenance plan addresses the recurrent maintenance, specific maintenance and emergency maintenance requirements of the municipal roads.

Stages of development of roads

Visualization of stages of development of roads is very important aspect of long term municipality transport master plan (perspective plan). Current land use and road side development may not allow immediate implementation of wider roads. These restrictions should be addressed in various stages. The stages can be visualized in reference to various variables.

The prime stage is the formulation of policy and plans. This stage formulates the hierarchy and their geometric and physical characteristics, purpose and functions along with necessary ROW. With the formulation of road hierarchy, road bylaws will be enforced. It should be followed by formulation of proper implementation strategies for/and use of various tools for land acquisition and compensation, method and stages of construction of roads and road side infrastructures and enforcement of road discipline and right of users. Development of such policies will support continuous development of the roads. The next stage is to clear the total right of way so that other infrastructures integrated with road can be developed. Until the end of clearing of proper right of way, the policies should be strong and well-informed. This will mark the entry to the next stage which is construction of full phase of all hierarchy roads.

Construction of higher hierarchy roads should be done in stages according to the necessity as guided by the developed lower hierarchy roads and corresponding demand of higher hierarchy roads they generate. The first stage should connect the pedestrian path and tracks along with double lane carriageway for all higher hierarchy roads. The development of Class “A” roads should follow construction of road space to the standard of Class “C” then gradually expanding to Class “B” and finally to Class “A”. Class “B” roads should also follow the same development stages. Construction of well-connected pedestrian way, cycle tracks and green belt along the edges of the ROW restricts any possible encroachment of the road space.

Section 7: Conclusion and Recommendation

Municipality Transport Master Plan has been prepared for Annapurna Rural Municipality. A series surveys for data collection, series of different level interaction with the locals and various authorities was conducted. The study has identified all the roads of the rural municipality, their status and interventions required. The map of IDPM, MIM, MTPP and other maps has been prepared. Detail implementation strategy and budget expenditure plans have been prepared. The inventory shows that majority of roads are narrow and needs maintenance and upgrading. This is in line with the demand by the wards. The accessibility of roads has addressed most of the settlements but their mobility is very low. Access to facilities is hindered due to lack of reliable and safe public transport services within the rural municipality. Introduction of proper city buses and public transport is pertinent to fuel the development process at earliest.

The study has formulated hierarchy of roads which is necessary for long term rapid development of the rural municipality area. The report presents the necessary functions of the roads and their characteristics. Possible cross sections are also recommended. The study has shown high proportion of active road users which have been addressed thorough provision of pedestrian facilities and tracks is all roads except access roads. This is necessary to be implemented as the developed cities are having trouble to address the demand of active mode user friendly urban road infrastructures, Annapurna Rural Municipality has the opportunity to sustain the road users and create a sustainable and well-planned urban road network and infrastructure. As the implementation strategy suggests, the rural municipality needs to develop proper framework and policies for the implementation of the perspective plans, built the capacity of the rural municipality and the local organizations and committees and proper stages of development of the roads.

This study, being first of its type for this rural municipality, should be revised and integrated with other plans that will be developed in coming years. Periodic review and update of the plans is necessary according to the change in land use and traffic that occurs in the future. A mid period review in the third year and five yearly MTMP should be prepared every five years.

Glossary

Active transport user	Active transport (also called non-motorized transport, NMT and human powered transport) refers to walking, cycling, and variants such as wheelchair, scooter and handcart use. It includes both utilitarian and recreational travel activity, plus stationary uses of pedestrian environments such as standing on sidewalks and sitting at bus stops
Capacity	The maximum number of vehicles that can pass over a given section of a lane or roadway in one direction (or in both directions for a two-lane or three-lane highway) during conditions.
Collector road	Collector roads provide both access and movement within residential, commercial and industrial areas. They are typically discontinuous between residential areas, so as to avoid traffic infiltration through neighborhoods. Lower density developments and community land uses such as schools and convenience retail are often located on collector streets.
Emergency maintenance	Maintenance works that are to be carried out due to unexpected and sudden blockage of roads that stop vehicular movement due to natural disaster
Forecasting	The process of determining the future values of land use, socioeconomic, and trip making variables within the study area.
Local road	Local roads provide direct property access in residential, industrial, commercial and downtown areas. With local streets connecting primarily to collector roads, travel distances are short, speeds are relatively low and volumes are modest, as their primary function of accommodating traffic from adjacent lands.
Maintenance	The process of preserving the original condition or function of an asset
MTMP	The MTMP is a strategic planning document designed to identify and address the municipality's needs to the year 2025 and beyond. The MTMP is the documents that identify, classify and prioritize the municipal roads; identify possible sources of funds and materials for the construction of the prioritized roads according to their respective standards and scientific mobilization of the available resource.

Network	Set of nodes and connecting links that represent transportation facilities in an area.
Origin	The location of the beginning of a trip or the zone in which a trip begins.
Periodic maintenance	Maintenance works to be carried out in intervals of years and of large-scale
Recurrent maintenance	Small maintenance works not falling under routine maintenance that are carried out a few times a year in all roads to repair minor damage resulting from traffic and rainfall
Routine maintenance	Small maintenance works that are to be carried out in all the seasons on all roads on a regular basis
Specific maintenance	Spot treatments and repairs that do not occur every year or in every road, and which are very specific in nature and location.
Trip	A one-direction movement which begins at the origin at the start time, ends at the destination at the arrival time, and is conducted for a specific purpose.
Upgrading	The process of addition or change that makes something better than it was before

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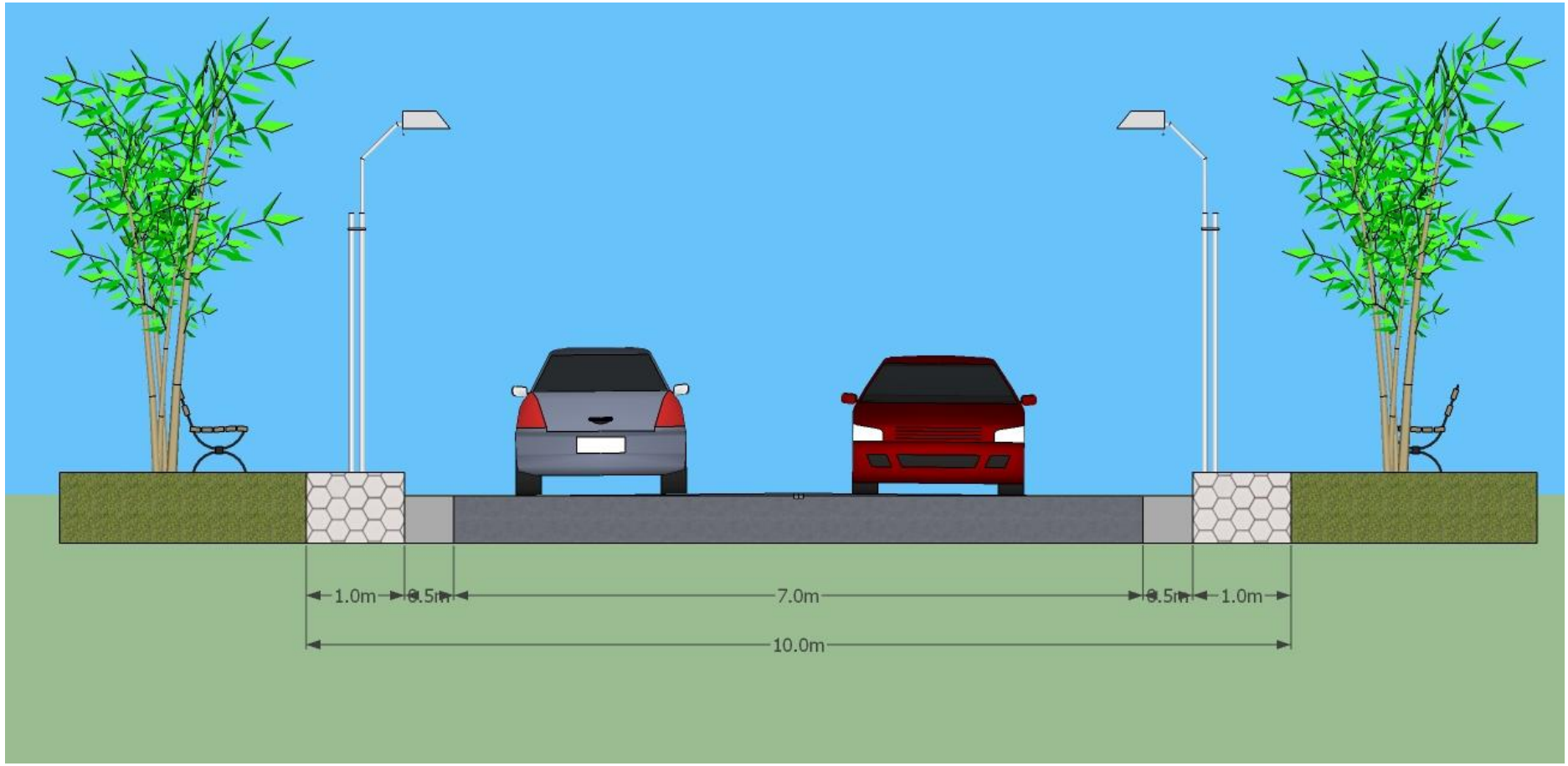
Annex

Annex I: Road Classification Diagrams

Class A Road

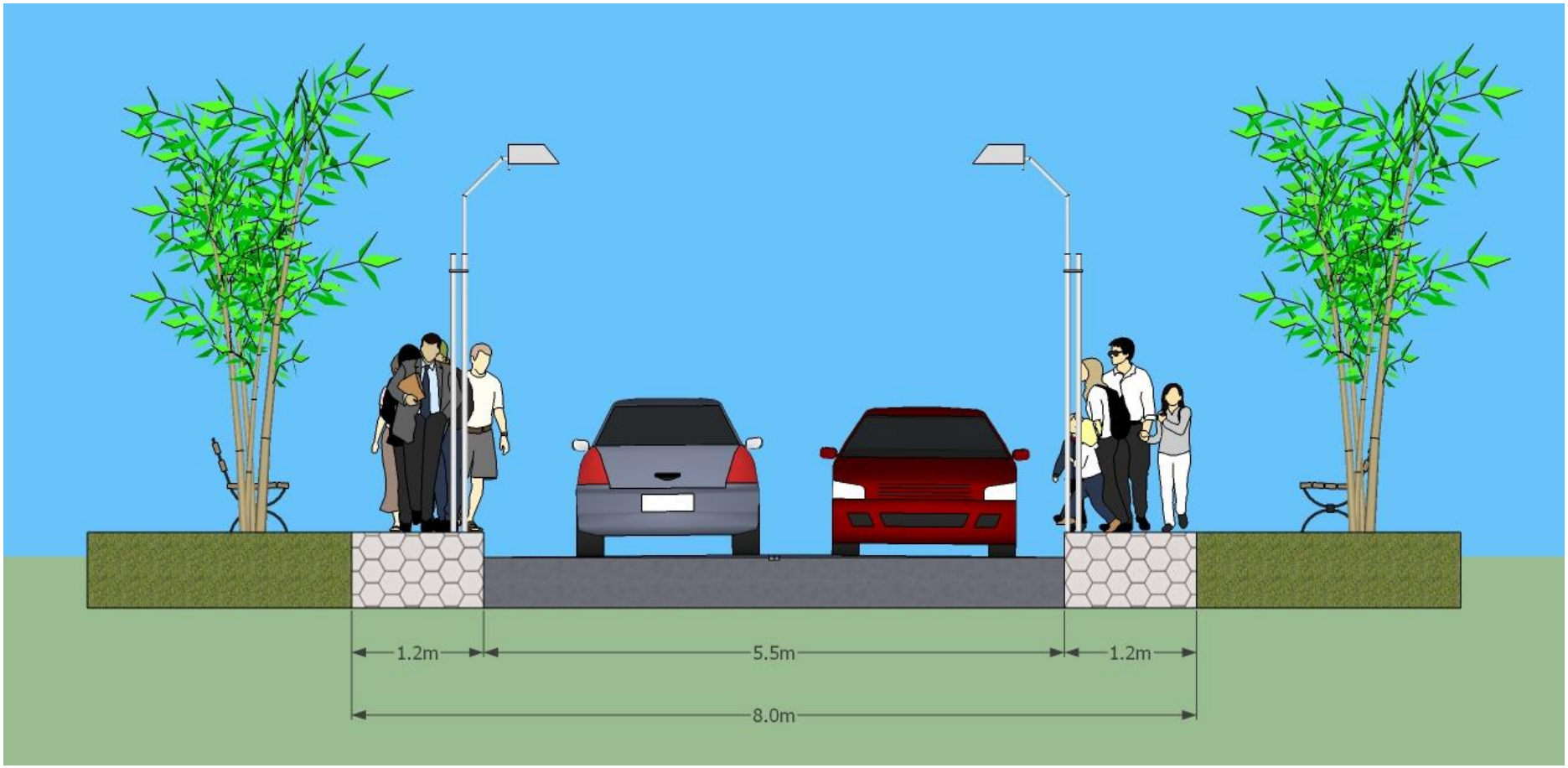


Cross Section of Class A Road

Aerial View of Class A Road

General View of Class A Road

Class B Road

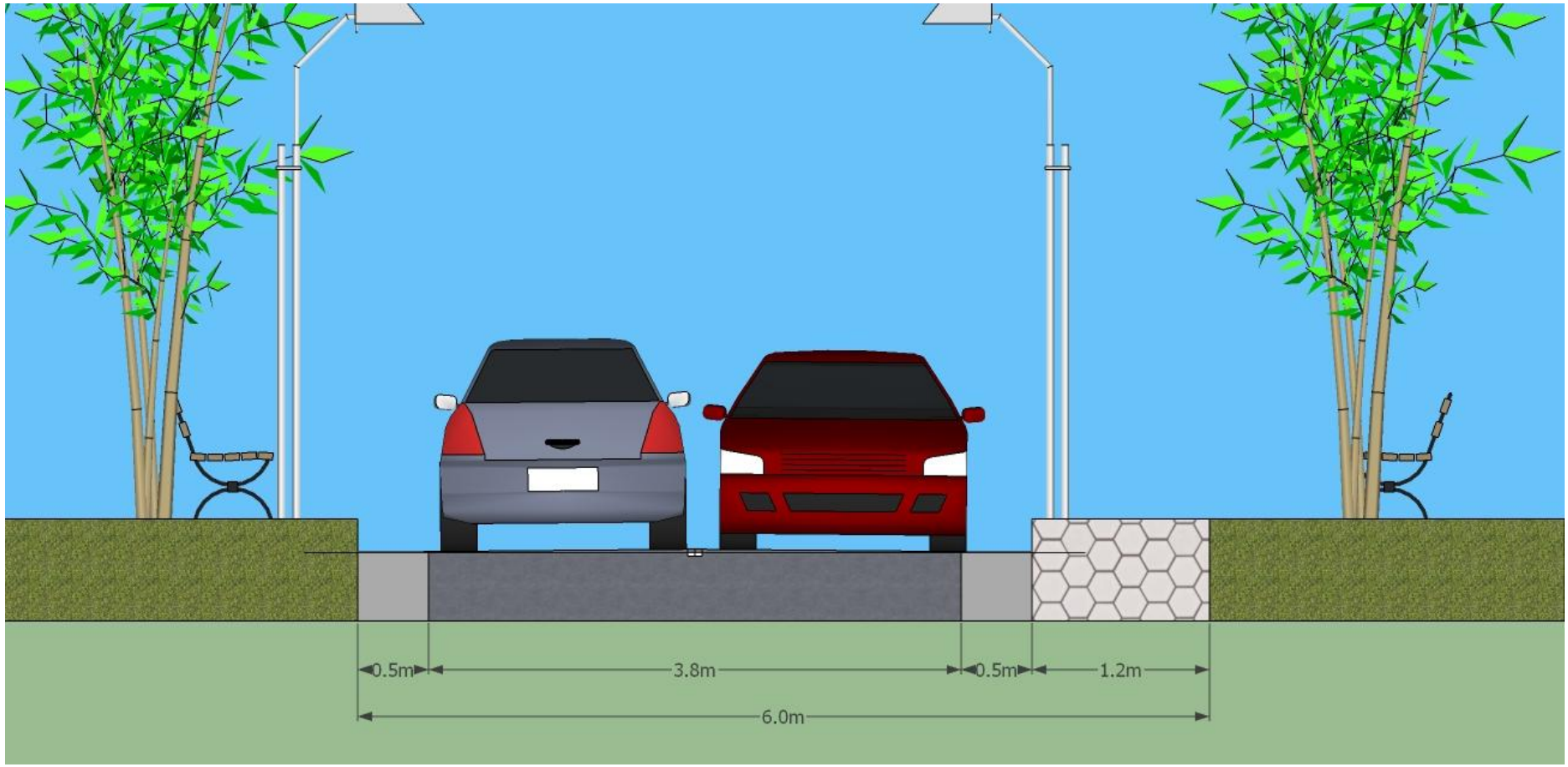


Cross Section of Class B Road

Aerial View of Class B Road

General View of Class B Road

Class C Road



Cross Section of Class C Road

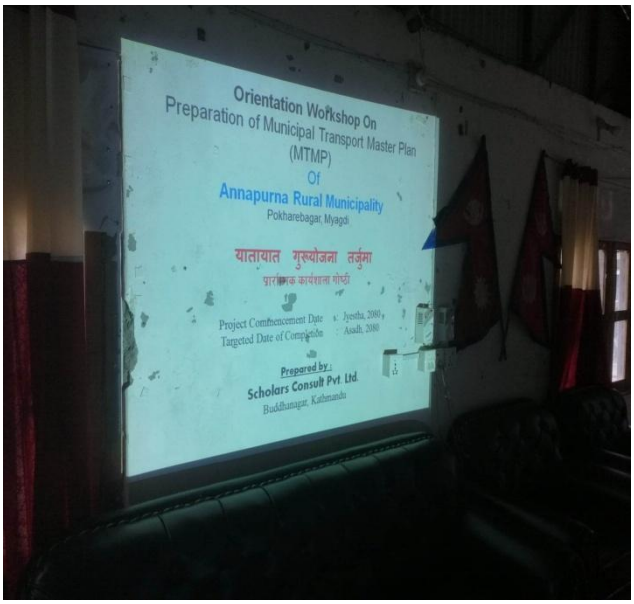
Aerial View of Class C Road

General View of Class C Road

Annex II: Maps

Annex III: Photographs


ANNAPURNA RURAL MUNICIPALITY


Orientation Workshop On
Preparation of Municipal Transport Master Plan
(MTMP)
Of
Annapurna Rural Municipality
Pokharebagar, Myagdi
यातायात गुरुयोजना तर्जुमा
प्रारम्भिक कार्यशाला गोष्ठी
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Prepared by :
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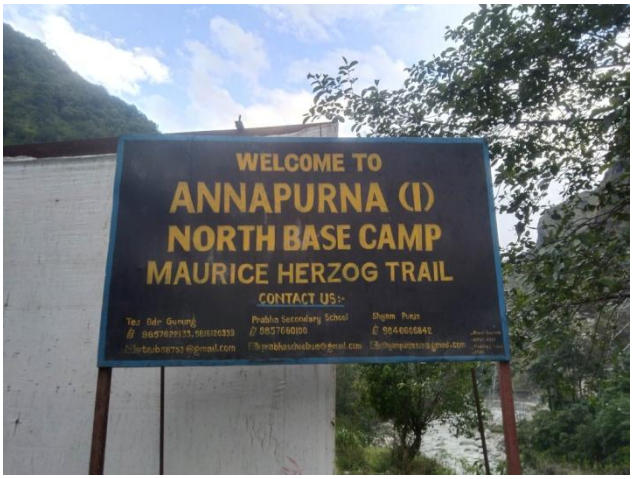
WELCOME TO
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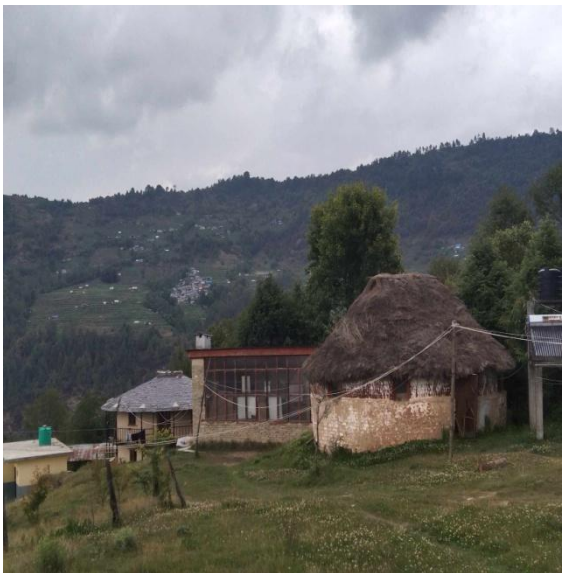
MAURICE HERZOG TRAIL
CONTACT US:-


TREKKING MAP OF ANNAPURNA(I) NORTH BASE CAMP
MAURICE HERZOG TRAIL
LEGEND
RIVER
PATH
ROAD
PORTER SHELTER
BRIDGE
WATERFALL, CAVE
HYDRO POWER
VILLAGE


3313 M±3
MOHARE DANDA

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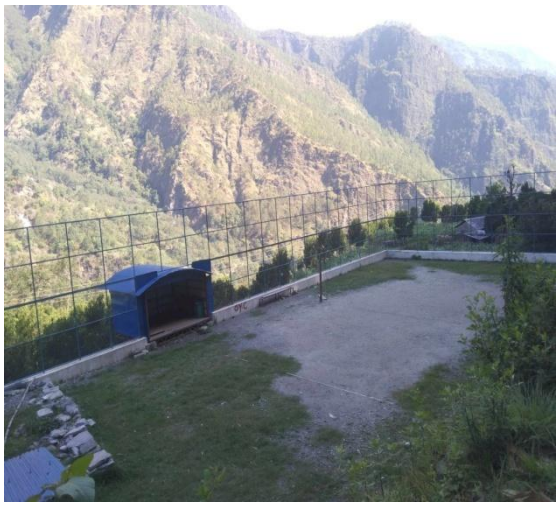
sports

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