A FRAMEWORK FOR RURAL ROADS ACCESSIBILITY PLANNING

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DECLARATION

I declare that the work in this Project Dissertation entitled "A FRAMEWORK FOR RURAL ROADS ACCESSIBILITY PLANNING" has been carried out by me in the Department of Civil Engineering. The information derived from existing literature has been duly acknowledged in the text, and a list of references provided. No part of this project dissertation was previously presented for the award of a degree or diploma at this or any other institution**.**

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CERTIFICATION

This project dissertation entitled A 'Framework for Rural Roads Accessibility Planning' by Asma'u Kankia HAMDANA meets the regulations governing the award of the degree of Master of Science of Civil Engineering of the Ahmadu Bello University Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This dissertation is dedicated to my beloved parents, Alhaji Hamdana Kankia and Hajiya Halima Kankia for their love, care and encouragement.

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ABBREVIATIONS AND ACRONYMS

CADP	-	Commercial Agriculture Development Project
DFID	-	Department for International Development
FHA	-	Federal Highway Administration
IRAP	-	International Rural Accessibility Planning
KDRAMP	-	Kaduna State Rural Accessibility and Mobility Project
KDCADP	-	Kaduna State Commercial Agriculture Development Project
LG	-	Local Government
NNPRT	-	Nigeria's National Policy on Rural Travel and Transport
PRP	-	Participatory Rural Planning
RAMP	-	Rural Accessibility and Mobility Project
RTI	-	Rural Transport Infrastructure
RTT	-	Rural Transport Technology
UN	-	United Nations
WB	-	World Bank

ABSTRACT

The concept of public participation and how it can be incorporated in transport planning was studied. Current planning methods and steps were reviewed, and a tool which incorporates public participation in planning (questionnaire) was developed. This study was carried out using questionnaires that incorporate socioeconomic factors that affect transportation in the rural areas of Kaduna State. Data were collected and processed via the following: questionnaires, discussions, and interviews with the local communities. Community Masterplans were developed with GIS coordinates in Google Earth maps with precision and accuracy. Accessibility database was developed for the studied communities, using MYSQL, a computer program that manages database. A number of queries were performed which included trip frequency of females in Turunku, and the number of male travelers in Wusono with a modal option of bicycles, e.t.c. Additional accessibility indicators were determined, for example 150,600 for access to portable water supply and for other facilities like Healthcare Centers, Local Govt. Offices, e.t.c. Prioritization instructions were also updated in the community master plan. The study concluded by recommending the use of Participatory Approach to Transport Planning, and to diligently follow the necessary steps to achieve a proper and cost effective rural accessibility through participatory approach.

CHAPTER ONE

INTRODUCTION

1.1 **Background**

Planning, design and construction of rural roads espeacially in the region of reference in this study is based on traditional methods mainly determined by the client and often dictated by eventualities and circumstances of funding. The appraisal process is normally based on cost-benefit analysis in some cases where international agencies and bodies like the World Bank are involved, while in others it is based on political and social considerations. However, there exist some associated problems with the current methods of planning, design and construction of rural roads, which include public acceptance, prioritization, funding/cash flow issues, resource allocation and maintenance to mention but a few. According to Riverson, et.al. (2001) rural roads investment has generally not received the correct emphasis in overall planning efforts. Resource allocation for instance, has usually been subject to ad-hoc decisions with lack of continuity, and fragmentation through separate projects. Designs often deviate from standards partly due to land availability issues and the level of priority given to such class of roads. On the other hand, construction is faced with poor workmanship by in-experienced contractors, lack of proper supervision and quality assurance programs among many other issues.

Rural roads are the tertiary road system which provides access to villages and farm lands from the main roads and various centers of activities. In developing countries like Nigeria, rural roads are termed as roads passing through rural and agricultural areas, connecting villages to main roads and/or a town/market centre. Traffic on such roads are relatively low, comprising of mixed modes of transportation like bullock carts, bicycle

and motorized modes. Nearly 55 per cent of the rural habitations are provided with all-weather road connectivity (Ken, 2011). In addition to these roads in rural areas some villages also have cart tracts and footpaths connected to the road system.

Traditionally rural transport planners have been concerned with understanding trip or journey patterns (in terms of distance, mode choice and time) as an indicator of travel demand. Whilst household trip rates can be disaggregated according to household attributes or characteristics and used to forecast future demand for transport, one problem with this approach is that it focuses on average values and patterns (which reflect on historic and largely static pictures of transport supply). Hence such quantitative approaches tend to conceal variations in demand, which is of interest to policy makers and planners, together with much of the details of transport use and supply.

In a participatory approach on the other hand, regardless of the method of actual participation, a large volume of qualitative or quantitative data can be generated which indicate people's views, desires and priorities, and can also provide much deeper insights into the complexities involved. These data from public participation form the basis of problems identification and subsequent plan preparation or policy formulation to address them. The tools and techniques of analyzing quantitative data are highly developed and are widely known to professionals. The body of the methodology is very rich in these areas and a wide variety of application software are also readily available. Compared with this, in relative terms much less effort has gone into the development of tools and techniques for analysis of qualitative data, synthesis of findings and using them in plan preparation and policy formulation(UN, 2003).

The study examined the case for a participatory approach to rural transport planning based on past experience, along with the use of more data, in the formulation of policy and the impact assessment of interventions and planning of rural mobility and access, with a view to improving the quality of infrastructure. The data included are:

i. Transport patterns (trip rates and purposes, distances, the roles of public transport for social and recreational purposes, and the correlation between fares, transport expenditure and household income)

ii. Travel needs and problems, service availability, affordability, integration between modes, quality of services etc.

iii. Livelihood opportunities: how do the poor respond to the changing conditions of livelihood and how does the transport market adjust

iv. Who are the rural poor? The heterogeneity of low-income groups, participatory poverty analysis, poverty impact indicators to measure poverty reduction, travel time and costs.

v. Level of services in communities: do other interventions such as in health care delivery and in schools, precipitate the generation of new travel routes?

vi. Activities of the rural poor: livelihoods activities, productive, personal investment activities, i.e. health care/education, investment in social networks and leisure activities.

It was argued that collecting this kind of data through a more participatory approach would enable policy makers and planners to understand both the nature of activity patterns within the rural areas, and the role (both current and desired) of transport in meeting the livelihoods aspirations of the rural community. Furthermore, this kind of

information would be an aid to predicting the likely outcomes (on poverty and in terms of impacts on the activities of the poor) of interventions (both direct and indirect) that influence the performance of the transport sector, and to suggest remedial measures as appropriate. Citizens play an essential role in the development of transportation plans by helping to identify community goals and objectives, establishing a common vision, identifying transportation problems and potential solutions, and helping decision-makers set priorities. Important products of the transportation planning process are the Statewide Transportation Plan, the State Highway Plan and the State Rail Plan. These, along with small urban/rural area studies and corridor and feasibility studies, help guide transportation improvements needed for the future (UN, 2003).

1.2 **Statement of the Problem**

In the traditional or current transportation planning, rural communities are not fully involved in the rural roads accessibility planning at both the short and the long terms. The flaw with this type of approach is that it is based on the analysis of some numeric values that are usually obtained through traffic studies. Analyzing such data may not solve or address the transportation needs of most communities. Furthermore, even if a problem is rightly identified, quantitative data may not capture or reveal all the complexities that may surround the problem.

The current transportation planning method is a process that is faced with inadequate knowledge of the range of individual travel and transport patterns of the community, and this means that the planning activities of the project may be biased towards a minority of

the population. Secondly, if the minority needs only are addressed then it is likely that long term sustainability will be undermined.

1.3 Justification of the Study

It is argued that if communities participate in the planning, development and maintenance of transport infrastructure, not only would this be more cost effective but it would have important developmental spin-offs. These would include the following needs, benefits and purposes:

The needs are:

1. Learning about people's needs, attitudes, aspirations, ability to pay, desires, priorities, possible contributions and help, how they could be affected by growth or changing land use and activity patterns, etc
2. Systematically evaluating existing programs, policies, and services provided
3. Considering actions taken, services provided and projects undertaken better reflect the needs and problems of the people
4. Utilizing people’s experience and community resources
5. Avoiding bias in preparing plans (especially when value judgment is involved)

The benefits are:

1. Improved governance
2. Increased quality of the functions performed and services provided by public agencies
3. Revitalization of democratic practice in general
4. Maintaining the stability of society. When people are directly involved in the decision-making process, they become more aware of the possible problems and

are more willing to live with the consequences than they are when decisions are imposed from outside. They become more aware of problems and tend to be less explosive towards situations or conflicts;

5. Guarding the public interest. To make public agencies more responsive to the needs of the public and the disadvantaged groups in society. Citizens can work as watchdogs of society;
6. Increased community cohesion and unity and capacity to reduce alienation of the individual.
7. Boost Employment opportunities in rural transport at the community level.

The purposes are:

1. Providing information to stakeholders;
2. Collecting inputs from stakeholders;
3. Negotiation with stakeholders;
4. Solving the problem of plan preparation;
5. Supporting people's initiatives.

1.4 Aim and Objectives

The aim of the study was to increase participation of the rural community in road planning.

1.4.1 Objectives

i. Identify the range of contributions made by local communities to the transport sector and the impacts these have on livelihoods.

ii. Identify the role of local communities in decision making in the rural transport sector.

iii. To explore the possibilities of introducing intermediate transport systems (IMTS) to enhance the movement of rural communities.

iv. Suggest the best planning criteria in terms of priority for selecting a rural road project to be constructed.

v. Develop accessibility data base

vi. Identify socio-economic characteristics

vii. Study trip characteristics

1.5 **Limitation of the Study**

This study only focused on 3 communities of Igabi Local Government Area in Kaduna State, but a statistically significant sample size was used in both the pilot and the main study.

1.6 **Scope of the Study**

The study covered three (3) communities in Igabi Local Government Area of Kaduna State as Case Study for the research. The study within the communities will:

i. Establish a framework for rural roads accessibility planning using participatory approach in the rural community.

ii. Suggest the best planning criteria in terms of priority in rural roads planning.

iii. Identify the range of contributions made by local communities, their contribution in decision making to the transport sector and the impacts these have on livelihoods.

iv. To explore the possibilities of introducing Intermediate Transport System (IMTS) to enhance the movement of rural communities.

The scope of the impact tool proposed here excluded environmental impacts. The reason for the exclusion was that the type of data collection needed to assess environmental impact was very different from that needed to assess socioeconomic impact. It typically requires specialized collection of air and water samples, or aerial surveys of forests, which are subject to different sampling rules than data collection at the household and community level. Furthermore, measuring air and water pollution is not tied as strictly to the concepts of treatment and control zones as measuring socioeconomic impacts.

CHAPTER TWO

LITERATURE REVIEW

2.1 Participatory Approach and Transportation Planning

Participatory approach to transport planning is a system of planning in which all stake holders have a chance in making choices and decisions when it comes to issues of transport planning. It involves the inclusion of all parties that are involved in the project in planning, financing, construction, maintainace and usage of the facility, to mention but a few. The input or contribution of every stake holder is treated importantly as it forms part of the factors leading to the success or failure of the project (UN, 2003).

One of the core principles of good governance is to facilitate public participation in the decision-making process. Nigeria's National Policy on Rural Travel and Transport (2006) supports the use of local communities in rural transport planning towards having improved Governance. The objective of the policy derives from the key principle that views transport as both a system and service as well as an aspect of good governance and realistic funding. The overall objective is to develop an adequate, safe, environmentally sound and economically efficient and sustainable rural travel and transport system that will ensure all season and basic access in the rural areas, to facilitate integrated rural development and poverty reduction, as well as empower rural dwellers to become more economically productive. In this regard, the systems under this policy cover all classified and unclassified rural roads that fall within the priorities of the benefitting communities, in the identified rural road networks. The Policy further states the roles and responsibilities of the stakeholders, but in this paper we are more concerned with those of the communities; they knows what their needs are but require guidance and support to

achieve them. Consequently, community initiatives for Rural Transport Infrastructure/Rural Transport Technology RTI/RTT development would be encouraged to allow a Community Driven-Approach to project identification, implementation, and maintenance. Thus, community driven projects are participatory in nature due to the community engagement at certain levels. Despite this policy, the rural communities are still left out in rural transport planning. (NNPRT, 2006)

Public participation increases the likelihood that actions taken or services provided by public agencies more adequately reflect the needs of people and that the benefits of development are more equitably shared. Public participation has been recognized as one of the core principles of sustainable development. Here, participation means contributing to development, benefiting from development and taking part in decision-making about development, which could be realized through activities facilitated by authorities as well as activities initiated or generated by the people themselves.

Public participation should be understood as a process in which all concerned parties including the affected people are involved in decision-making about developmental works and delivery of public goods and services. People's involvement could be realized in many ways and by different methods. However, they are to be designed and made compatible with the characteristics of the task to be accomplished, and of the culture being practiced and to be cultivated. (UN, 2003).

Many people believe that further to merely contributing to the planning process, people can prepare their own plans in most cases with some qualified help. The planner can limit his or her role to that of a facilitator of the planning process and provider of technical

inputs. Participatory approaches may be practiced at all levels of planning. However, the extent or nature of participation by various actors (beneficiaries/citizens, public officials elected by the people, professionals and civil servants, and other stakeholders) may vary. (Bryceson, et al., 2004)

A more holistic view of the transport needs of the rural poor and interventions to improve these is necessary. Participatory Rural Planning (PRP) identifies development needs, problems and priorities which can be addressed by improving access to facilities and services. Improvement of access to these may mean facilitating movement of people to these services, which is basically transport improvement, or, bringing the services closer to the people through carefully rationalised site selection procedures. Accessibility planning provides a menu of alternative solutions. It takes as its starting point the access needs of rural households. Since it has the fundamental concern of improving the economic and social conditions of rural people, it starts by understanding their needs, and the magnitude of their transport activity. This provides a basis for determining priorities for access improvements, and the most effective means of achieving them. PRP is a new approach to planning in rural access. It has been developed and continuously improved as a result of studies and pilot projects in several African and Asian countries. It is a multi-sectoral and integrated approach that considers all aspects of household access needs for subsistence, economic and social purposes. The approach integrates rural households' mobility needs, the siting of essential social and economic services, and the provision of appropriate transport infrastructure. It involves communities in different stages of planning procedures. It is based on a thorough but easy to execute data collection system which uses households as a focus of the planning process. In the process the approach

includes gender issues in its analysis. The approach is simple to use and does not require substantial amount of resources. It emphasizes use of a bottom up approach to planning and links it to the planning structure at the District level. It also gives high priority to the protection of the environment. (Ilo and Sdc 1997)

Improving the mobility of the rural population and improving their access to employment opportunities and other socio-economic services and facilities, is an effective way of reducing poverty. Thus integrated rural transport fosters an approach which considers a wider range of transport interventions, including paths and tracks, intermediate means of transport and transport services, to complement the conventional interventions in roads for motorised vehicles.

The Participatory Rural Planning (PRP) methodology led to the development of comprehensive information on the location, condition and use of rural infrastructure and services, prioritized investments and identified access interventions. PRP further emphasizes the building of local capacity and the use of local resources (material and human) in the implementation and maintenance of locally initiated projects, including the adoption of appropriate technologies and labour intensive methodologies. The end result of the PRP process is a set of defined and prioritised interventions that address the access needs of the rural population. (DFID and WB, 2004).

2.2 **Rural Accessibility and Planning**

Accessibility is defined as the ease or difficulty of reaching or using a facility or service. It relates to the availability of a service or its location as well as the mobility aspects Dingen, (2000). Accessibility is a measure of how easy a place is to get to. A place is

accessible when a person can get to it with what he or she considers an acceptable outlay of time, effort and money (David, 2006). It is further defined as the ease or difficulty for rural folks to satisfy their access-related needs (IRAP, 2000).

Rural accessibility planning is defined as the access needs of rural households in relation to the basic social and economic services required by them. It looks at the whole range of possible solutions and provides an opportunity for selecting one or a combination of the most appropriate ones (DFID and WB, 2004). Accessibility Planning is defined as a plan that seeks to address access needs of the rural people in a cost effective manner with the purpose of improving access to socio-economic services. (Dingen, 2000). Accessibility planning is also defined as a planning which provides a menu of alternative solutions. It takes as its starting point the access needs of rural households (Ilo and Sdc, 1997).

2.3 **The Overall Processes of Transport Planning**

The transportation planning process comprises seven basic elements, which are interrelated but not necessarily carried out sequentially. The information acquired in one phase of the process may be helpful in some earlier or later phase, so there is a continuity of effort that should eventually result in a decision. The elements in the process are:

i. Situation definition or Problem definition
ii. Search for solutions
iii. Analysis of performance
iv. Evaluation of alternatives
v. Choice of project
vi. Specification and construction (Garber & Hoel, 2009)

A rural transportation planning process must identify the network of transportation facilities to be addressed by the plan. For a successful rural transportation planning to be in place, the following components/elements must have been addressed:

i. System Performance

ii. Mobility and Access for People and Freight

iii. Creating an Integrated Region

iv. Building Healthy Communities

v. Environmental Sustainability (Jason, 2006)

The following are the basic elements of transportation planning considered:

i. Data Collection,-Entry, -Analysis, Mapping, Validation, Access Profiles

ii. Definition of Accessibility targets

iii. Prioritisation of Access Problems & Project Identification

iv. Prioritisation of Accessibility

v. Improvement interventions

vi. Evaluation of Impact on accessibility (IRAP, 2000)

The following are the processes of analysis and synthesis of findings considered:

i. Situation Analysis

ii. Identification of major problem areas

iii. Cause and effect analysis

iv. Identification of objectives and alternative interventions

v. Assessing effectiveness of alternative interventions

2.4 **Transportation Inventories**

Transportation system inventories involve a description of the existing transportation services – the available facilities and their condition; location of routes and schedules; maintenance and operating costs; system capacity and existing traffic; volumes, speed, and delay; and property and equipment. The types of data collected about the current system will depend on the specifics of the problem. The transportation facility inventories provide the basis for establishing the networks that will be studied to determine present and future traffic flows. Data needs include the following items:

i. Public streets and highways

- Rights of way
- Roadway and shoulder widths
- Locations of curbed sections
- Locations of structures such as bridges, overpasses, underpasses, and major culverts
- Overhead structure clearances
- Railroad crossings
- Location of critical curves or grades
- Identification of routes by the governmental unit having maintenance jurisdiction
- Functional classification
- Street lighting

ii. Land use and zoning controls

iii. Traffic generators

- Schools, Parks, Stadiums, Shopping Centers, Office Complexes

iv. Laws, ordinances, and regulations

v. Traffic control devices

- Traffic signs, Signals, Pavement markings

vi. Transit system

- Routes by street, Locations and lengths of stops and bus layover spaces, location of off-street terminals, change of mode facilities.

vii. Parking facilities

viii. Traffic volumes

ix. Travel times

x. Intersection and roadway capacities

In many instances, the data would already have been collected and are available in the files of city, county, or state offices. In other instances, some data may be more essential than others. A careful evaluation of the data needs should be undertaken prior to the study (Garber & Hoel, 2009).

Rural Accessibility Planning defines access needs of rural households in relation to the basic social and economic services a household requires. With respect to mobility needs, it pays attention to:

i. The purpose for which people travel,

ii. The availability of public transport services,

iii. The condition of the transport infrastructure, i.e. local level roads, footpaths, footbridges, etc.

iv. The means by which people transport themselves and their goods - foot, bicycles, animal carts, donkeys, wheelbarrows etc. (level of mobility).

v. The availability of social and economic services in relation to population density.

vi. This approach argues that poor access to facilities leads to isolation, which is a major factor contribution to poverty. (ILO and SDC, 1997)

The following performance indicators will be used to measure success of the Project.

The key outcome/impact indicators proposed to be used to measure the contribution of the project to the achievement of the stated objectives are:

i. Improved access to markets for key farm products measured by the decrease in average travel time and cost to market for selected products in specific project areas.

ii. Reduction in travel time associated with household activities measured by reduction in the ratio of travel time associated with household activities and total time spent by households on traveling.

iii. Increased opportunities for employment from transport and small scale infrastructure related project activities measured by the number of jobs created through such activities. (Kaduna State Rural Accessibility Mobility Project KDRAMP, 2006)

In transportation planning of rural roads, the following data would be collected to enable the planning process:

i. Travel time

ii. Travel cost and purpose of travel

iii. Modes of transportation

iv. Road Construction/Rehabilitation

v. Traffic studies (Kaduna State Agriculture Development Project KDCADP, 2009)

Accessibility Indicators: Accessibility Indicators refer to the main access problems and prioritization of interventions**.** Data related to accessibility indicators include the following:

i. Number of households and their level of access to goods and services

ii. Distance between communities and services

iii. Time it takes to reach the services and facilities. (Department For International Development DFID and World Bank WB, 2004)

2.5 **Public Engagement in Rural Transportation Planning**

The participation of communities in rural transportation planning suggests the use of focus groups to establish key issues and problems that relate to transportation Planning. The output from this technique is a broader appreciation (for particular target groups) of the resources needed for transport and the strategies employed by urban households to improve their livelihood. This information was fed into the overall analysis of survey data, and more specifically helped to triangulate the data extracted from the questionnaire surveys on the behavioral and attitudinal aspects of the purposes of rural journeys by public transport. The following are a number of techniques that were used to facilitate this process:

i. Key Informant Interview

ii. Participatory Work

iii. Transport Surveys

iv. Household Surveys

v. Detailed activity analysis at household level Fouracre, et al (2005).

Public participation in a planning process is more effective if it is targeted at those stakeholders (groups or individuals) that have interest in the issues likely to arise during the course of making a particular decision. Some issues and decisions may be of interest to a limited number of people, but many others could be of interest to thousands. The public (meaning those people who have some interest) is different for each decision. The real challenge is to design a process appropriate to the particular groups that fits within the overall framework of a planning process. The following steps are suggested for consideration in the organization of a participatory process:

Form a planning team;

i. Identify possible issues and list all broad groups of stakeholders;

ii. Carry out participants analysis;

iii. Determine the purpose and level of public participation;

iv. Identify constraints and special circumstances;

v. Select a method (or a combination of methods) of participation;

vi. Decide if sampling would be needed and if so, decide about the sampling procedure and its size;

vii. Determine the functions and tasks of stakeholders;

viii. Write the overall plan and timeframe for public participation (United Nation UN,2003)

The rural transportation planning process involves creating a structure where well-informed decisions are made, and a process that is inclusive of all members of the public. The processes included are:

i. Set the overall transportation direction for the rural area and define the transportation future/vision to plan forward

ii. Provide a decision making structure, incorporating a participatory public involvement process, to plan and prioritise improvements to the rural transportation system

iii. Build on existing knowledge, resources, and information to conduct technical analysis including evaluation of current and future conditions, forecasts, and trends

iv. Balance multiple and competing stakeholder objectives and funding expectations

v. Identify and provide long-range funding program

vi. Provide a framework for priority expenditures based on policy goals and objectives

vii. Focus short-range investments on long-term goals

viii. Provide accountability to transporting users on future direction and action to get there (Jason, 2006)

Success factors for implementing an effective and inclusive public consultation process considered include:

i. Selecting the public involvement mechanisms that are right for your situation.

ii. Establishing reasonable timelines.

iii. Considering the cost effectiveness of different techniques.

iv. Coordinating and streamlining public involvement activities.

v. Showing that input is considered seriously.

vi. Building balanced and broad-based public involvement.

vii. Ensuring staff has the skills necessary to obtain input on needs and present plans and ideas.

The public involvement process provides for communication among all parties involved through public meetings, forums, and workshops. Citizens have access to information, plans, and programs for review and comment (FHA, 2001)

This component will strengthen and improve the capacity of State and LGCs through technical assistance and training. Specific areas covered varied depending on the needs of the implementing agency, but the expected issues included are:

a) identification and use of appropriate technologies;

b) organizational principles;

c) techniques for participatory planning and conflict management;

d) information, communication and awareness raising strategy;

e) strengthening capacity for environmental screening, review and enforcement of subprojects;

f) financial management, procurement and contracting;

g) subproject cycle management ; and

h) Methods of monitoring and evaluation.

i) Other necessary technical skills (KDRAMP,2006)

Participation of the beneficiary communities in planning, implementation and maintenance of RID initiatives is increasingly emphasized as the key element in ensuring sustainable RID activities. Participation of the beneficiary communities is generally organized following the bottom up approach which included the following:

i. There is mass sensitization and social mobilization process within the communities. Membership distribution activities take place to prepare base for membership based organizations.

ii. Potential groups within the communities suited for specific tasks are identified and engaged in discussion.

iii. Local community institutions are formed using stipulated procedures already known to community members.

iv. Further mobilization takes place to select potential members to work as Labour group leaders and laborers.

v. Transparency measures are discussed and an approach agreed. Skills development opportunities are analyzed and agreed.

vi. Accountability issues at the community level are discussed and procedures established to ensure that any breach of responsibility is reported and discussed. (Shuva, 2000)

2.6 **Steps in Transportation Planning**

Proposed guidelines aimed at transport planners and engineers alike, wishing to engage communities or groups of people in the rehabilitation and maintenance of transport infrastructure. The guidelines have been developed over three years from research conducted in East Africa, specifically Uganda, Tanzania and Kenya. They also draw on worldwide experience from other development projects engaging communities in the sustainable maintenance of communal resources.

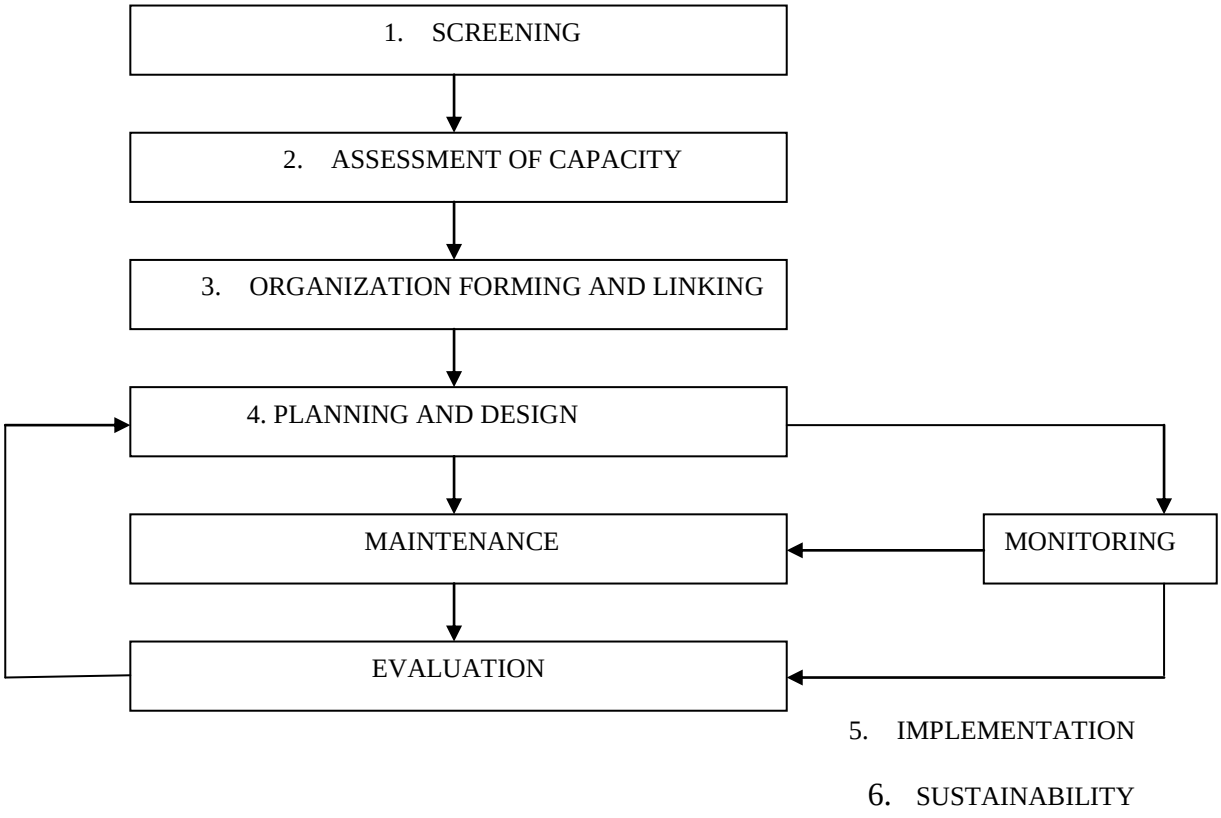


Figure 2.1: Steps in Transportation Planning (Wattam, 1998)

The Participatory Rural Planning (PRP) methodology led to the development of comprehensive information on the location, condition and use of rural infrastructure and services, prioritizes investments and identified access interventions. PRP further emphasized the building of local capacity and the use of local resources (material and human) in the implementation and maintenance of locally initiated projects: including the adoption of appropriate technologies and labour intensive methodology. The end result of the PRP process was a set of defined and prioritised interventions that addressed the access needs of the rural population. In summary the processes involved the following steps:

i. Development of a Local Government Transport Masterplan

ii. Identification and consultation of key stakeholders

iii. Define planning objectives

iv. Define rural access needs that relate to these objectives

v. Collect data on relevant access needs and priorities and produce Accessibility Database

vi. Define the main access problems

vii. Define strategy to address access problems

viii. Prioritise locations of specific interventions

ix. Consolidate prioritised interventions to produce action plans (ILO and SDC, 1997)

Steps in Transportation planning involved the following:

i. Set project objectives based on specific factors

ii. Consultation with existing project key stakeholders

iii. Selection of intervention sites

iv. Define rural access needs that relate to these objective

v. Collect data based on project objectives

vi. Implementation

vii. Monitoring and Supervision (KDCADP 2009)

Steps in Transportation planning involved the following:

i. Set project objectives based on specific factors

ii. Identification and consultation of key stakeholders

iii. Selection of intervention sites

iv. Define rural access needs that relate to these objective

a. Collect data based on project objectives

b. Implementation

c. Monitoring and Supervision (KDRAMP 2006)

A rural transportation planning process identified the network of transportation facilities to be addressed by the plan. Successful rural transportation planning addressed the following components:

1. System Performance:

- Transportation needs identified through analysis of existing/future conditions
- Areas to expand and improve transit services

2. Mobility and Access for People and Freight

- Enhancement in the mobility of freight
- Mobility needs for people and goods
- Urban and regional connectivity that support economic growth
- Bicycle and pedestrian facilities

3. Creating an Integrated Region

- Linking transportation services such as public transportation to communities along a transportation corridor.
- Creating linkages through tourism (IRAP, 2010)

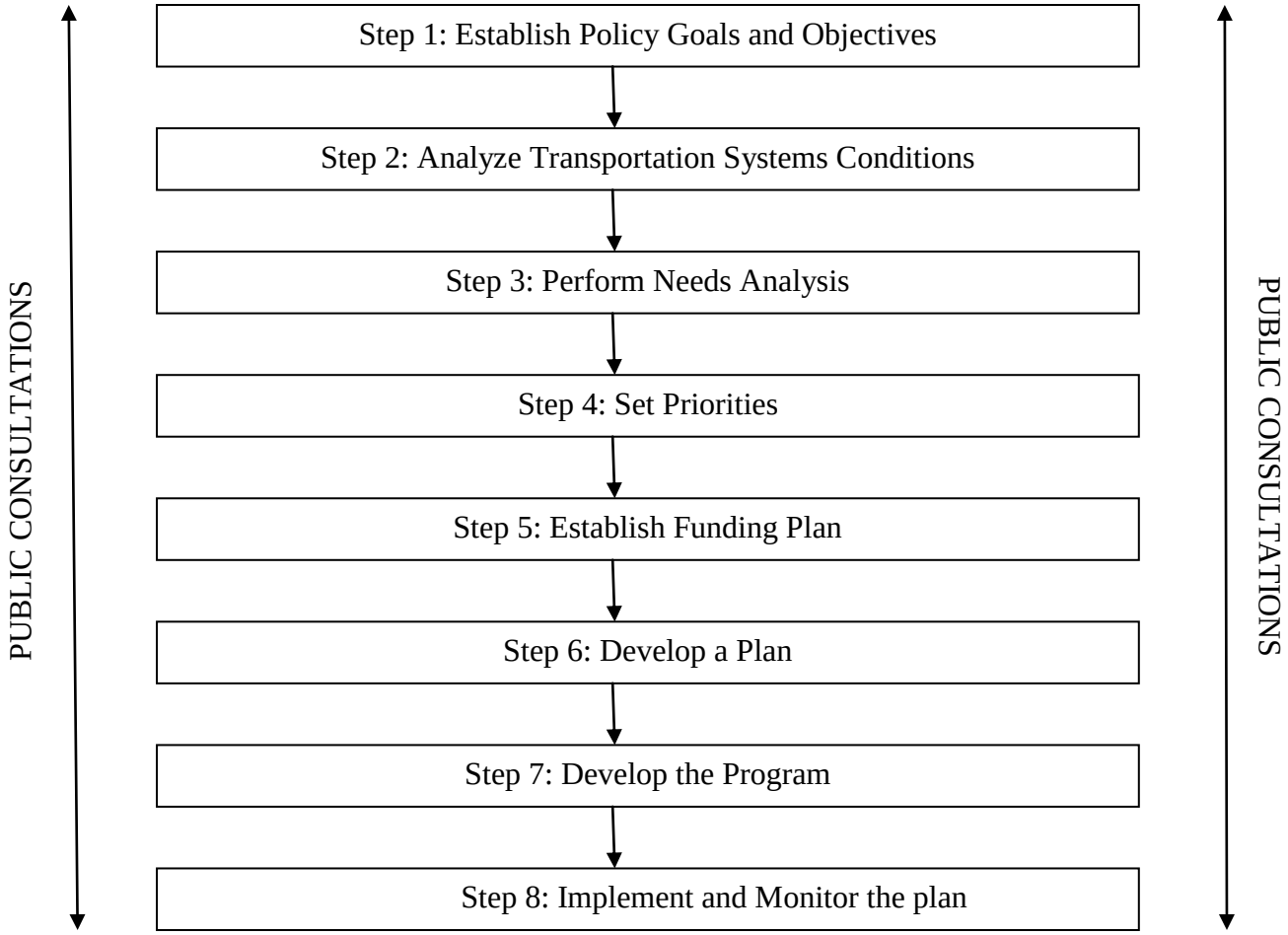


Figure 2.2: Steps in Transportation Planning (Jason, 2006)

2.7 Collection, Compilation and Analysis of Data

Before the data collection process began, it was essential to define the scope of the project which ensured that all the data required was collected and that relevant information was not missing. The basis for the decision making process was the data collection exercise. This is the most critical stage in transportation planning as sufficient

data are usually not collected. That is why there is always access problems as the beneficiaries needs are always not felt.

The purpose of this activity was to accumulate reliable and specific information on the accessibility in the villages in terms of goods, services, facilities, and mobility in all relevant sectors. A baseline survey helped us in building an "accessibility database" at two levels, i.e. district level and village level.

Data Collection (step 1) was the first exercise. Enumerators held interviews with key-informants of target villages in the district, using a questionnaire that contains questions on accessibility in all sectors, like drinking water, agricultural marketing, health, education, etc. It collected data on the existing transport, travel and access problems and prioritises possible interventions for improvement.

Data Processing (step 2): Involved data encoding and processing into a computerised database.

Data Analysis (step 3): Of the encoded data led to specific information on access in all sectors.

The information was grouped for different administrative levels. Tables and graphs helped the users to interpret the results. (Integrated Rural Accessibility Planning (IRAP 2000)

RAMP and CADP are World Bank assisted Projects; they have similar approach to data capturing, whereby a few data were obtained to enable assessing the impact after a certain period of project completion. The data collected by the staffs of these

organizations included travel time, traffic studies e.t.c along the proposed roads to be constructed and such data collected are being processed (RAMP 2006) (CADP, 2009)

CHAPTER THREE

DATA COLLECTIONS

3.1 Location of Study Area

Turunku, Wusono and Gwaraji are villages located in Igabi Local Government area of the northern part of Kaduna State.

3.2 Socio-economic characteristics of the Study Area

Administrative structure

The administrative structure of the Local Government is of a pyramidal nature with the Director of Personnel management at the head. Under him are departments that take care of the day to day running of the Local Government Affairs.

These are Personal Management Department, Internal Audit unit, Information Unit, Legal Services Unit, Finance Department, Agriculture Department, Medical and Health Department, Works, Land/Survey Department, Local Education Authority and social Welfare Unit.

Agriculture

The Local Government is dominated by farmers who produce food crops on commercial level. Major crops produced in the Local Government include: Yams, maize, guinea corn, beans and sugarcane.

Chief Executive (PAST)

When the Local Government was created in 1989

Commerce

The commercial activities of Igabi Local Government Area Centre mainly on markets

and transport. There are many weekly and daily markets in the Local Government Area that attract buyers from different parts of Kaduna state in particular and Nigeria in general.

Good example of these markets is Rigasa and Gadangaya markets. The Local Government generates at least N4,000:00 weekly from Gadangaya Market for instance.

The Local Government also generated some substantial revenue from motor parks.A good example of this is the Maraba Jos Motor park where trailers to and from far places like Jos, Kano, Ibadan and Lagos do park for a day or two.

Education

Igabi Local Government has good plans for the educational development of its citizens. The Local Government for instance has 71 public primary schools with a total enrolement of 40,214 pupils. There are 33 private primary school with 10,797 pupils, giving an overall total of 51,001 primary school pupils in the Local Government .

Igabi Local Government has seven (7) Day Secondary Schools at RigaChikun, Jaji,Birnin Yero Kwanan Farakwai, Zangon Aya, Gadan Gaya and Turunku.

Executive

a) Director of Personnel Management

b) Head of Administration

c) Treasurer

d) Head of Agric

e) Head of Works/Lands

f)Education Secretary

g) Head of Health

Financial Institutions

Igabi Local Government enjoys a reasonable presence of Federal Government. The following government agencies exist in the Local Government.

a) Directorate for Food, Road and Rural Infrastructure (DFRRI)

b) National Electoral Commission (INEC)

c) National Orientation Agency(NOA)

d) National Directorate for Employment (NDE)

e) Business Apprenticeship Training Centre (BATC)

f) NTI

Headquarter

Headquarter of Igabi Local Government is Turunku.

Health Facilities

a) Rigachukun P.H.C.

b) Rigachukun M.CH.

c) Rigachukun Health Office

d) Sheikh Abubakar Gumi P.H.C. Maraban Jos

e) Korau H. Clinic

f) Ruhogi P.H.C

g) Kurmin Kaduna Health Clinic

h) Sani Zangon Daura P.H.C. NDC(Anguwan Kaji)

i) Igabi P.H.C

j) Ahehu (Kasuwan Daji) Health Clinic

k) Turunku P.H.C

l) Zangon Aya Health Clinic

m) Kamfanin Zango Helth Clinic

n) Bargu P.H.C.

o) Farakwai Health Clinic

p) GadanGayan P.H.C

q) Rigasa P.H.C

r) Sabon Birni Health Clinic

s) Mando Afaka Health Clinic

t) Gwada Health Clinic

u) Wusono Health Clinic

v) Dinki Health Clinic

Total 23 Health Facilities

Judiciary

The L.G.A. has seven (7) Sharia Court of grade one Status.

People

The L.G.A. has the Hausa, Fulani and Gwari

Population

According to 2006 the National Census figures, Igabi L.G.A has a population of 430,753 people.

Postal Address

Igabi L.G.A. Secretariat, P.M.B.001, via Jaji .

Problems of the L.G.A.

The Major problem of the L.G.A is lack of good and road network. The road to Turunku secretariat from Jos junction needs urgent attention.

Recreation Facilities/Sport

L.G.A .organizes football and traditional competitions. There are video operators whose activities are overseen by the social welfare unit of the Local Government.

Religious Institution

Islam and Christianity are the two religious being practiced in the L.G.A. Mosque and Churches are built in different parts of the L.G.A. for worshipping activities.

Tourist Attractions

The only tourist attraction in the L.G.A. is Turunku Hill where Zazzau took her origin.

Towns and Village

There are at least 56 towns and villages in Igabi L.G.A .Some of these are Turunku,Kwara, Rigachikun, Gwada, Dunki Padda, Ifira, Igabi, Rihogi, Kaban, Birnin Yero, Jaji, Gwaji, Maraban Jos, Wuson.

Traditional Rulers

The L.G.A. has three traditional rulers who assist the Chief Executive of the L.G.A. to administer the people of the L.G.A. effectively. The traditional rulers act in their capacity

as district heads. They are:

a) Igabi District

b) Rigachikun District

c) Rigasa District

d) Kwarau District

e) Farakwai District

f) Zangon Aya District

g) Afaka District

h) Sabon Birni District

i) Fan shanu District

j) Kwaro

k) Gwaraji

l) Kerawa

m) Jaji

Water Supply

Main source of drinkable water for the people of the L.G.A. is bore holes which are provided in many parts of the L.G.A. These are however tap water in Rigachikun, Rigasa and Jaji, from river Kaduna.

3.3 Current Status of transportation in the Study Area

The transportation system needs to be looked into, because of mainly bad roads and no sufficient network of roads in all the villages.

3.4 Accessibility Problems in the Study Area

The accessibility problems in the study area poor access to basic socio-economic facilities/services because generally the roads are bad and in most places no access.

3.5 Pilot Study

A pilot survey was conducted in order to test the reliability of the questionnaire, the fieldwork and data entry plans, and all other aspects of the survey. It involved interviewing 20 households from different locations of the state covered by the survey. Results, observation and problems encountered during the pilot test were used to improve on the final questionnaire that was used for data collection.

Before moving to the site to take real data, contact was made to enable easier access to people in the villages. This was achieved through liaising with two people each in the villages; this was because they were knowledgeable about their community and how to go about them in order to get the information needed.

A trip was first made to Turunku, material incentives were used to gain the attention of the local communities, and whoever was interviewed or has filled the questionnaire was given a gift (small detergent pack or small pack soaps). This method was also applied to the remaining two villages. Three survey methods described below were used in the study.

3.6 Data Collection Procedure

3.6.1 Key Informant Interviews

These comprised a simple questionnaire administered to a gathering of key informants from the settlement, including but not restricted to, a senior administrative leader,

teacher, health worker and religious leader. The questionnaire elicited information about the settlement including population, topography, social service provision, local economy, road network and transport service characteristics and a description of the transport (in non-control settlements) and non-transport (in control settlements) interventions and their socio-economic impact on the community. The key informants assisted in mobilising the household surveys and focus groups disaggregated by age and gender. The key informant questionnaire is included in the Appendix 1

3.6.2 **Village Focus Group Discussions**

In each settlement, three focus group discussions were undertaken directed separately for adult women, adult men and secondary school students respectively. Each group comprised of 10 people. The focus group discussions centered on an exploration of the socio-economic characteristics of the community. These included definitions of income groups, the pattern of daily mobility, and the impact of transport and non-transport interventions on the livelihoods and wellbeing of different income groups.

The discussions encompassed a series of semi-structured questions and exercises which dealt with the community's perception of social costs and benefits attributed to transport interventions. They incorporated some visual participatory approaches including social mapping, and mobility diagrams along with pair-wise and matrix ranking exercises. Participants were also asked to rate the level of improvement in accessibility and significance in livelihoods and mobility since the interventions were implemented. The focus groups allowed for verification of data acquired from the household questionnaires

through triangulation and were designed to be participatory and not prescriptive, while ensuring consistency in the methods applied.

3.6.3 **Household Survey at Village Level**

Participants that took part in key informant interview and village group discussion were the same as respondents of the household survey to ensure consistency of responses. The household survey was administered to a total of 30 villagers, those who had attended the focus group discussions in each of the three sample settlements, with assurance from the key community informants that all the survey respondents came from separate households to avoid duplicated responses. The questionnaire comprised questions on household composition, income and expenditure, transport requirements, ownership and access to means of transport and transport problems and solutions. The questionnaire (see appendix 1) also allowed respondents to describe the transport/non-transport intervention and rank them in terms of social, economic and environmental benefit to the community.

Having submitted 150 questionnaires in all the three villages, 120 questionnaires were returned in Turunku, 108 in Wusono and 95 in Gwaraji.

Data obtained with the aid of the questionnaires were analyzed to establish the variation in local contextual conditions between the selected communities, to compare social benefits and costs of road improvements between villages studied, and to explore the impact of road network interventions on socio-economic livelihoods. A synthesis of the research findings is being provided in chapter four (4).

3.7 **Pilot Study Results**

Table 3.1: Pilot Study Tables

Village Population.

Settlement	Population							No of Household
	Men	Women	Male Youth	Female Youth	Male Children	Female Children	Total	
Number	12	30	9	17	36	54	158	20

Village Topography

Village Topography	Number	Vegetation					Terrain			
		Marsh	Open	Forested	Grassland	Semi-Arid	Flat	Rolling	Hilly	Mountainous
	20	3	7	5	1	4	2	11	1	6

Key Stakeholders

Key Stakeholders	Turunku	Wusono	Gwaraji
Government Agencies	✓	✓	✓
Transport user Groups	✓	✓	✓
Transport Provider/Supplier Groups	✓	✓	✓
Vulnerable Groups (Community)	✓	✓	✓
Labour union	✓	✓	✓
Credit association	✓	✓	✓
PTA	✓	✓	✓
Religious Groups	✓	✓	✓
Women Group	✓	✓	✓
Village Committee	✓	✓	✓

Average Household Sources of Income

Average Household Income Sources	Number
Agriculture	9
Trading (self employed)	2
Services (self employed)	2
Salary	17
Casual Work	1
Rent	2
Remittences	0
Pension	1
Others	0

Components of average household expenditure

Components of Average Household Expenditure	Number
Food	20
Rent	3
Transport	20
Utilities	7
Schooling	13
Health	17
Clothes	20
Remittances	10
Social activities	19
Other activities	16

Mode of transportation

Mode of Transport	Number
Motor Bike	17
Animal Aided	2
Other Vehicle	54
Bicycle	12
Walk	43

Ownership of transport mode

Ownership/Access to Modal Means of Transport	Number
Motor Bike	17
Bicycle	10
Animal Aided	1
Vehicle Access	20

Average Trip Characteristics Number of Trips per Month per Capita

Average Trip Characteristics Number of Trips per Month per Capita	Turunku
Number of destinations	21
Number of Trips	420
Total Number of Persons/trips made	21
Time(hr)	22
Distance(Km)	387
Speed(km/hr)	18

Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose Recreational	(km)	No
Town	111	20
Informal Employment	18	2
Formal Employment	170	17
Post Office	9	1

Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	**(km)**	**No**
Agriculture	23	7
Market	162	12
Farmers Group	3	2

Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose Education	**(km)**	**No**
PTA	7	0
Education	27	71

Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	**(km)**	**No**
Health Centre	8	20

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS OF RESULTS AND DISCUSSION

4.1 A Developed Framework for Rural Roads Accessibility Planning

Many planning processes were reviewed and based on finding from this study; the following steps have been proposed in accessibility planning.

i. Development of a Community Transport Masterplan

ii. Identification and Consultation of key stakeholders

iii. Defining planning objectives

iv. Define rural access needs that relate to these objectives

v. Collect data on relevant access needs and priorities and produce Accessibility Database

vi. Define the main access problems

vii. Define strategy to address access problems

viii. Prioritise locations of specific interventions

4.1.1 Development of Community Base Map

The development of a Community Transport base map in many countries, require rural transport infrastructure network to be set out as part of the national road network. In most local government offices, rural maps are not usually available.

In this research, GIS was used by the researcher to come up with the actual point on ground and Google earth was used to develop base map on precise/accurate map of the communities showing the locations of households, facilities and services, and transport infrastructure e.t.c.

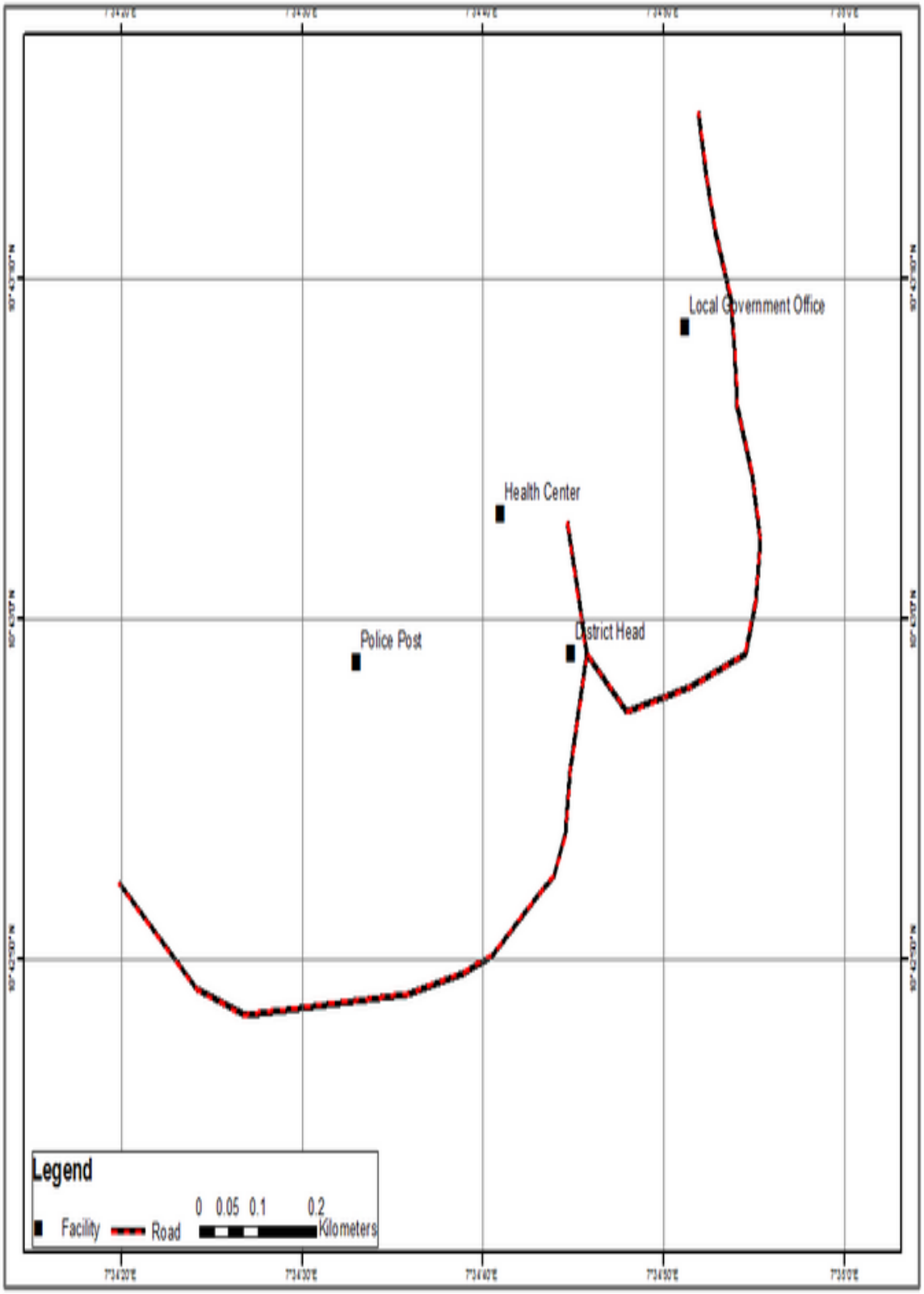


Figure 4.1: Maps showing community proposal in Turunku

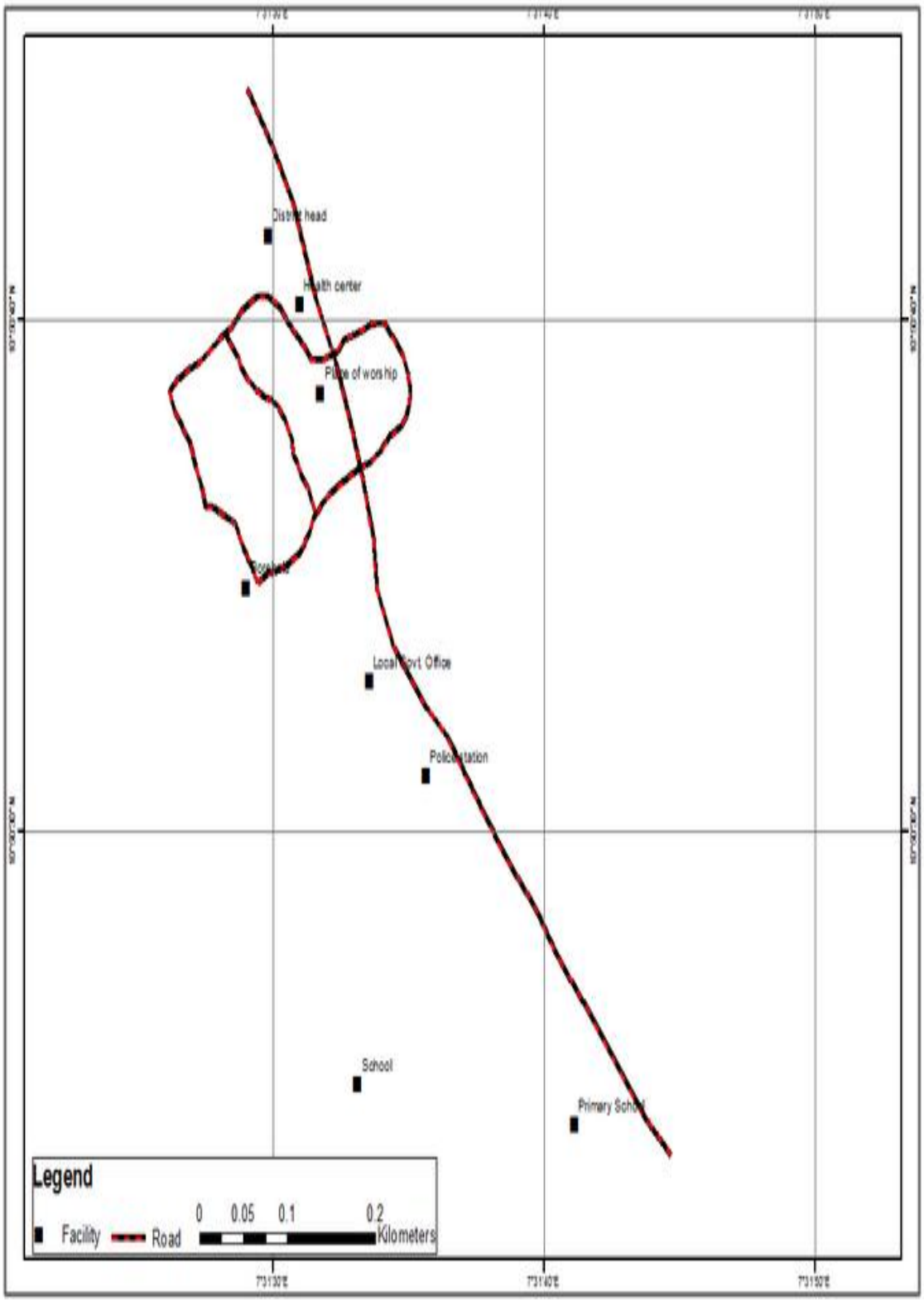


Figure 4.2: Maps showing community proposal in Wusono

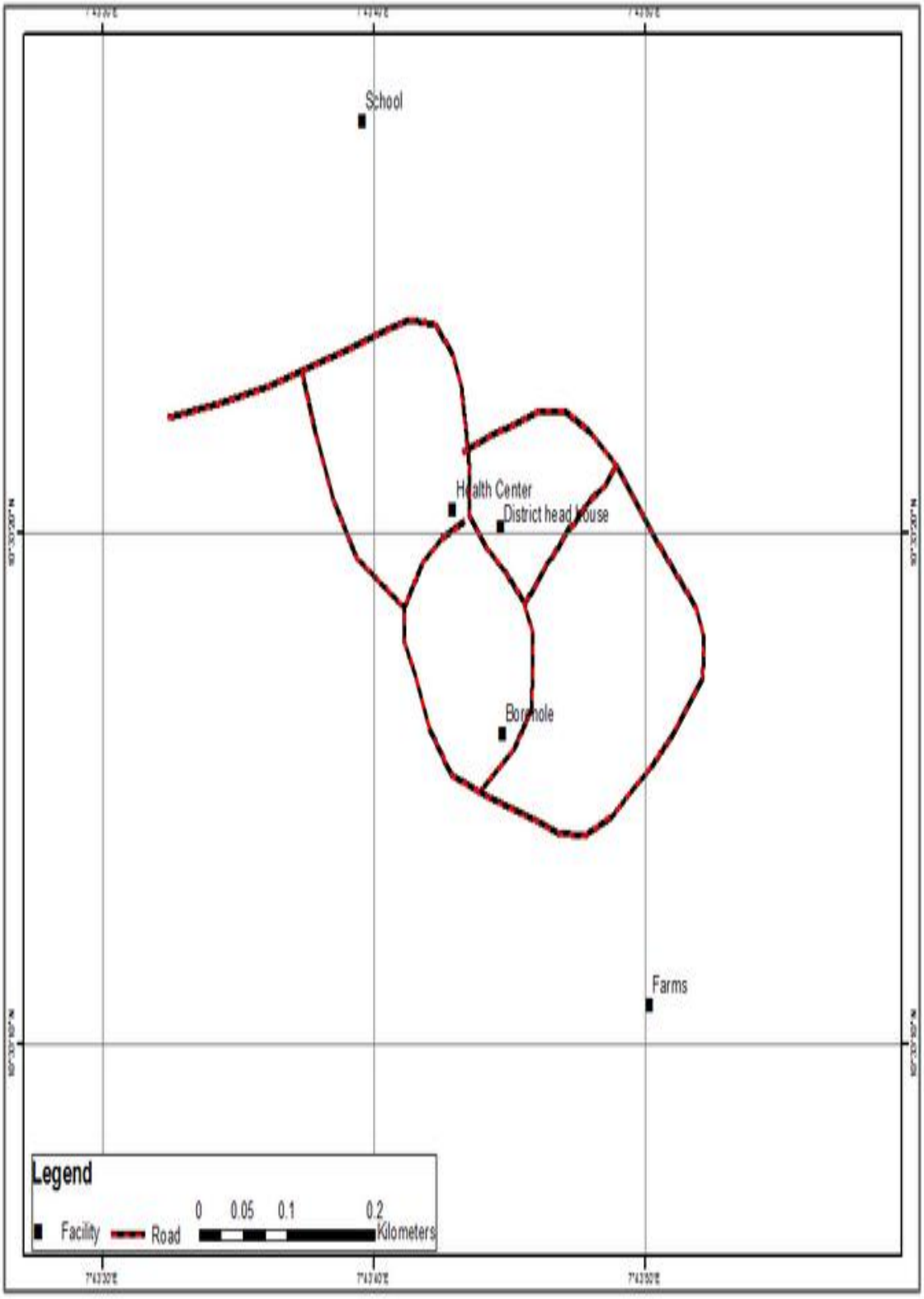


Figure 4.3 : Maps showing community proposal in Gwaraji

4.1.2 **Identification and Consultation of Key Stakeholders**

It was important to establish liaison between those groups of people who had different interests in the project. The social and economic livelihoods of some categories of people (e.g., travelers, marketers, traders and transport operators) will be affected directly by the project. The primary stakeholders are interest groups that are directly affected by the project; these include the District leadership, the District's Works agencies and the Department of Feeder Roads, communities, community groups, transport providers. While, the secondary stakeholders are donors, labour union, media, chamber of commerce, research institute, banks or financial institutions. Because leaders' standpoints can differ significantly from the experiences of "average" village members, it is important for any consultation process to go beyond the leadership. The most significant stakeholders identified and consulted are listed below: Roads users, Public transport providers e.t.c

4.1.3 **Define Planning Objectives**

Defining the planning objectives is a must important step in participatory approach as the community vision would define these objectives. Major questions that were asked here were who will benefit and whether women's needs would be addressed as the objectives did not spell out that the needs of both men and women have to be considered.

4.1.4 **Defining Rural Access Needs Relating To Planning Objectives**

People need to travel for different purposes. For rural development all needs were considered, were baselines data in rural needs have been collected. Baseline data collection is a foundation in the accessibility planning procedure. However, its importance as a basis for decision making depended on its reliability and accuracy.

Baseline data provided the main source of information in identifying priorities for interventions in order to improve transport and access to services and facilities.

4.1.5 **Data Collection and Compilation**

At this stage, the questionnaires developed were used as a tool to get the socio-economic activities/characteristics of the community to transport planning.

Information needed was collected on an array of possible access needs. Most data required were related directly to the accessibility of rural households to facilities, goods and services. This baseline survey helped in building up an "Accessibility Data Base" at two levels, i.e., district level and village level. The purpose of collecting data at these levels is discussed below:

4.1.5.1 **District Level Data**

Data was collected on the following aspects:

i. Basic characteristics (total population, population distribution and demography)

ii. Economic activities (Agriculture and other areas of income generation)

iii. Distribution of facilities (health facilities, schools, etc.) within the district

iv. Transport infrastructure (distribution of road network and current condition)

v. Transport services (numbers and types of vehicle, routes, frequency of operation, fare structure, availability of IMT)

vi. Development activities

4.1.5.2 **Village Level Data**

The district level data was complemented by village level data. Though secondary data collected at the district level gave some indication of accessibility conditions of an area,

bulk of the information was collected from the communities. The aim of collecting data at this level was to;

i. Get a picture of the basic physical and socioeconomic characteristics of each village.

ii. Obtain data on the magnitude and pattern of rural household transport demand, including:

iii. Amount of time taken to get to a facility or service

iv. Frequency of trips to a facility/ service

v. Mode of transport used for different trip purpose

vi. Distribution of various transport responsibilities within the household among men, women and children

vii. Get an indication of the existing state of rural transport facilities, and of the present level of access to goods and services for each village.

4.1.5.3 **Data Compilation and Analysis**

The data was compiled in the form of averages, tables, charts and maps and a descriptive report, with information on;

4.1.5.4 **Accessibility Database**

From the data obtained, accessibility database was produced in accordance with the accessibility indicators. The database is contained in an Excel sheet and imported into MYSQL database. MYSQL is a computer program that manages database using queries as shown below;

- From Village Topography table: What is Vegetation type of Turunku village? SELECT vegetation type FROM village topography WHERE village=1;

- What are the stakeholders identified in Gwaraji? SELECT * FROM key_stakeholders WHERE village=Gwaraji;
- Retrieve trip purpose in an ascending order- SELECT * FROM `trip_purpose` ORDER BY number asc;
- What is the data from serial number 1 to 5 in table mode of transport? SELECT * FROM mode_transport WHERE id<= 5;
- SELECT * FROM `trip_purpose` ORDER BY number asc;

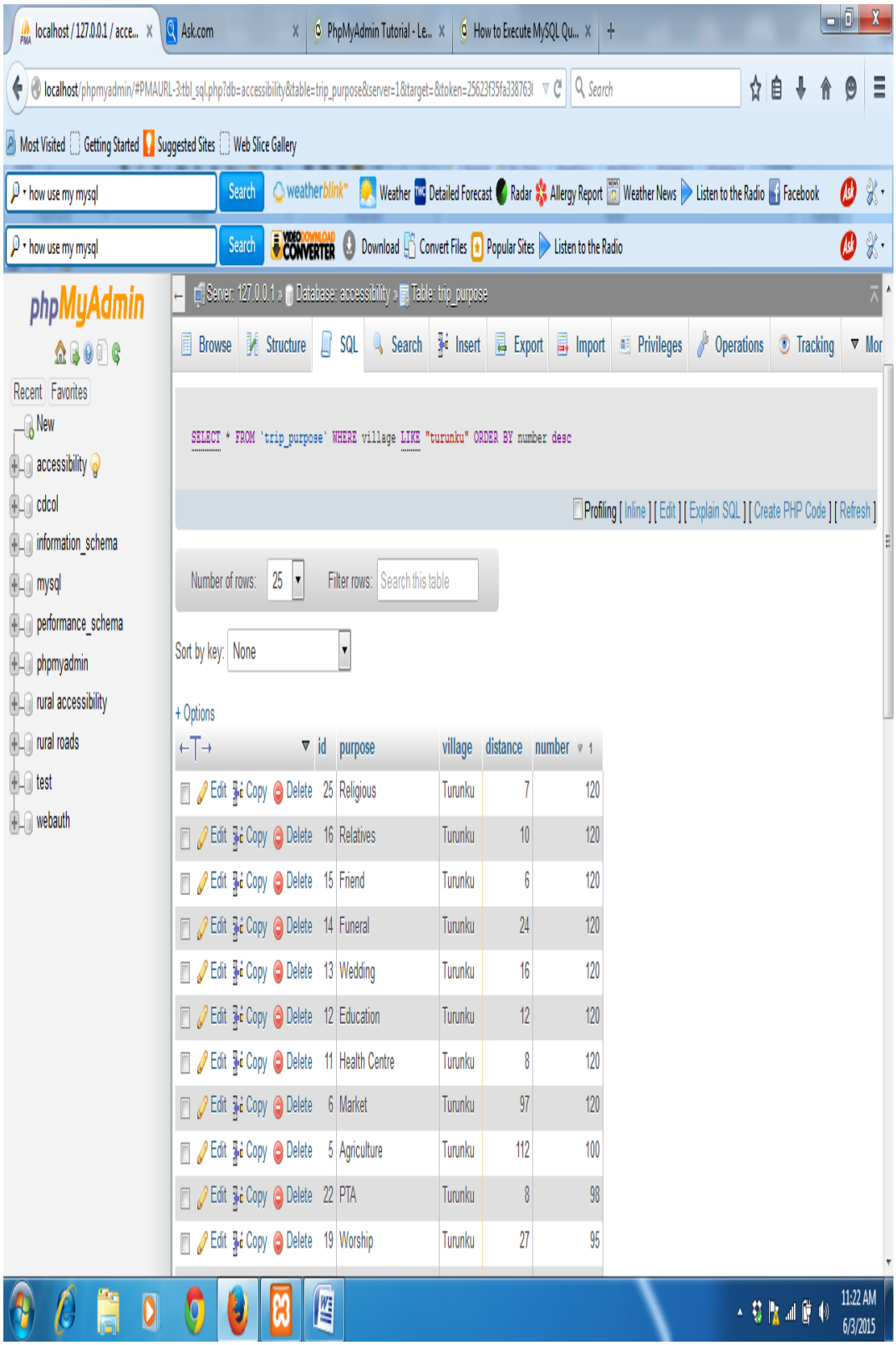


Figure 4.4: Sample query 1- MYSQL Database

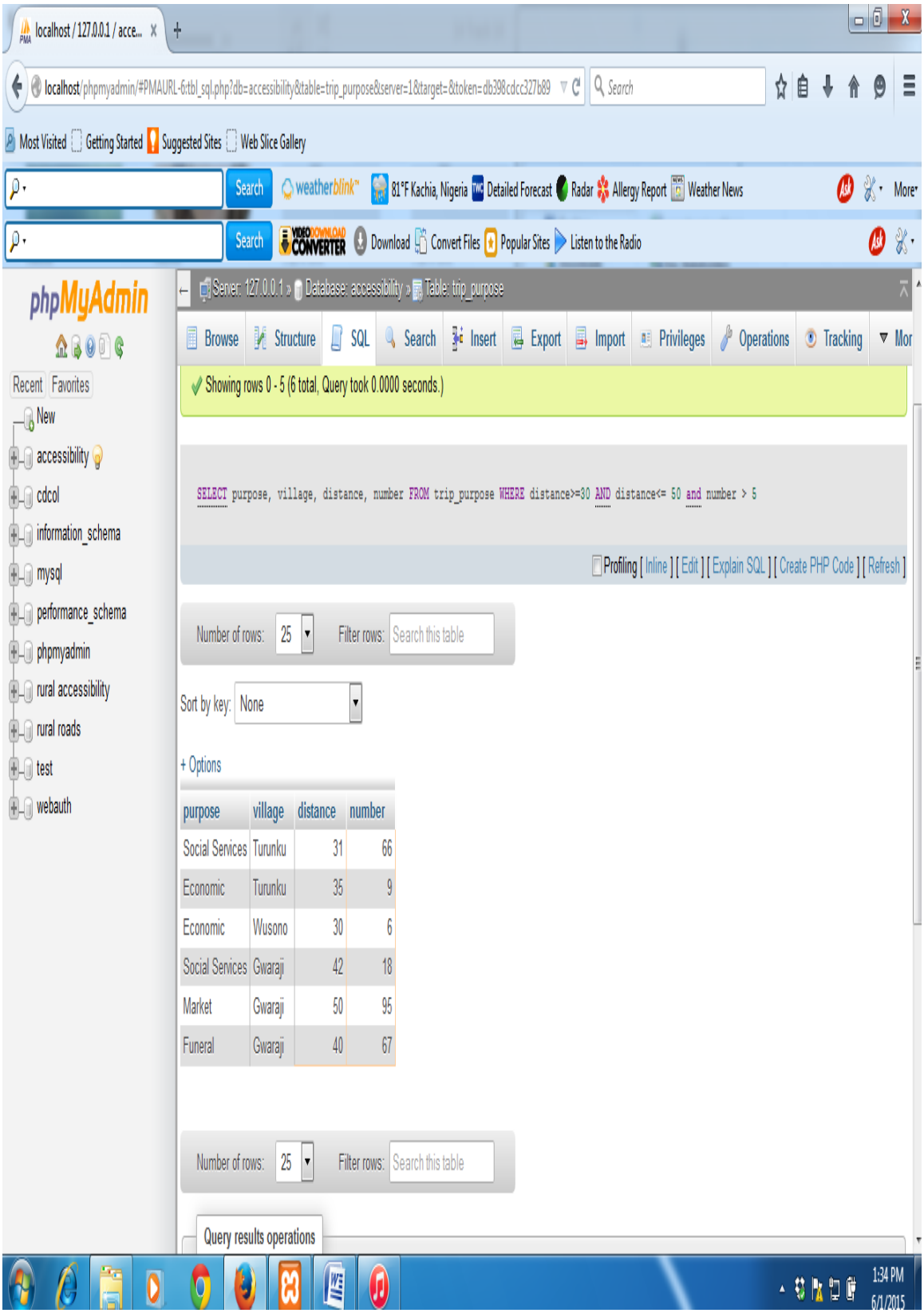


Figure 4.5: Sample query 2- MYSQL Database

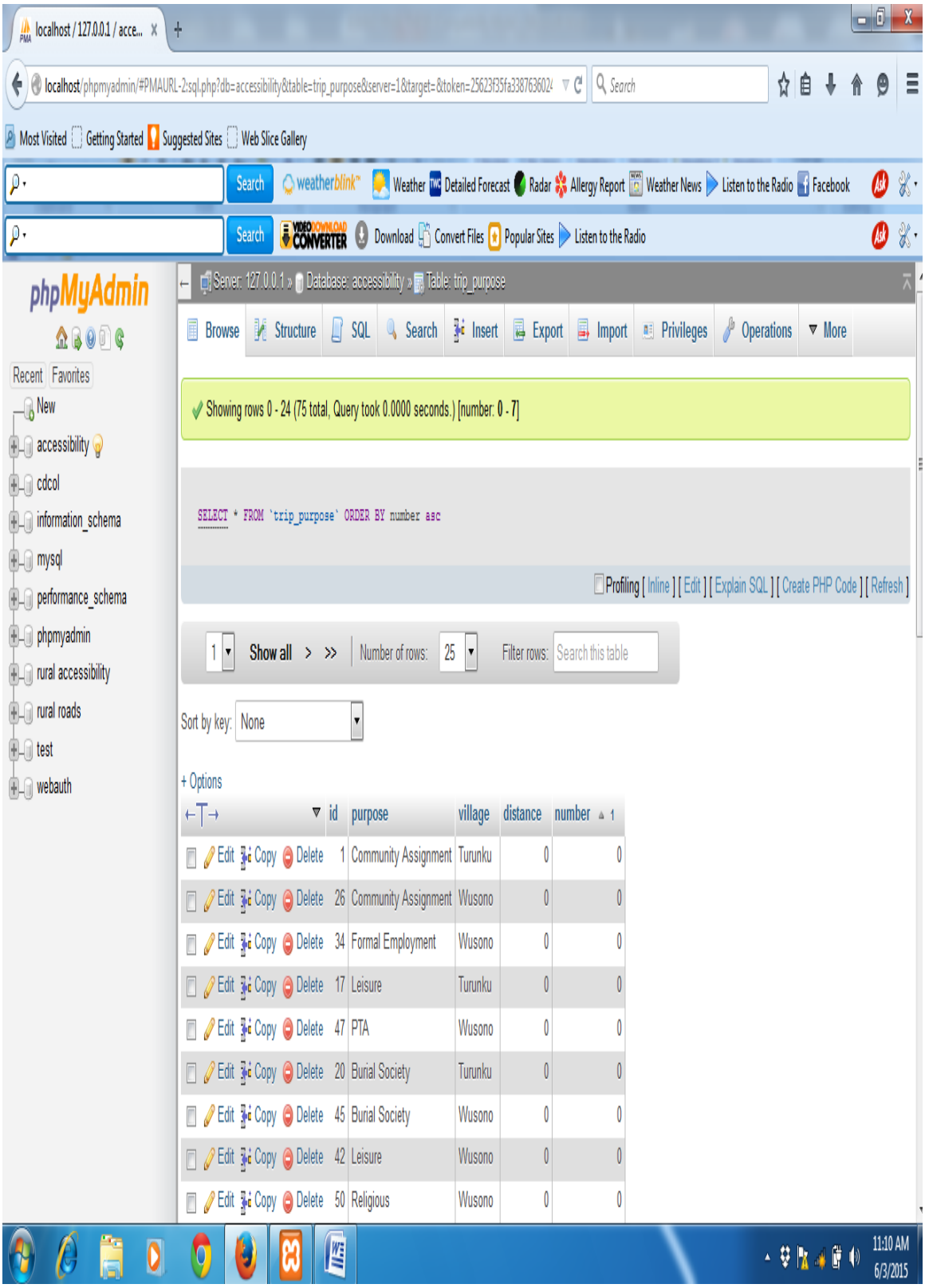


Figure 4.6 : **Sample query 3- MYSQL Database**

4.1.6 **Outline of the Main Access Problems**

The aggregation of data collected at the district and village level, and classifying the level of access to various goods and services in the villages within a district allowed for identification of main access problems, and prioritization of interventions.

Quantitative assessments and Accessibility Indicators, showed the difficulty or ease with which households have access to goods and services. Accessibility indicators defined for the following access needs; water, fuel, wood, land for crop production, crop processing, education, health, agricultural inputs and markets, retail and small industries.

Calculating accessibility indicators simply relates the number of households who need access to services/facilities to the time it presently takes to get to them. The basic formulation accessibility indicator according to (ILO and SDC, 1997)

Equation 1: H x T

where;

H = Number of households that need access to a certain service facility/ service, and

T = Amount of time taken to reach the service/facility.

4.1.6.1 Transport Accessibility Indicators

Table 4.1: Accessibility Indicators for Turunku

Access Problem	**Number of households**	**Time taken(mins)**	**Accessibility Indicators**
Water	2,510	60	150,600
Education	2,510	70	112,950
Health Center	2,510	20	50,200
Market	2,510	10	25,100
Place of Worship	2,510	5	12,550
Police Station	2,510	15	37,650
Local Govt. Office	2,510	6	15,060

Table 4.2: Accessibility Indicators for Wusono

Access Problem	Number of households	Time taken(mins)	Accessibility Indicators
Water	1,978	22	43,516
Education	1,978	45	89,010
Health Center	1,978	10	19,780
Market	1,978	50	98,900
Place of Worship	1,978	5	9,890
Police Station	1,978	60	118,680
Local Govt. Office	1,978	26	51,428

Table 4.3: Accessibility Indicators for Gawaraji

Access Problem	Number of households	Time taken(mins)	Accessibility Indicators
Water	1,456	15	21,840
Education	1,456	85	123,760
Health Center	1,456	20	29,120
Market	1,456	50	72,800
Place of Worship	1,456	5	7,280
Police Station	1,456	60	87,360
Local Govt. Office	1,456	20	29,120

4.1.6.2 Gender Based Accessibility Indicators

From the district planning point of view, the accessibility indicators showed which villages had more access problems for specific needs. For instance, different villages had a different score for a certain service. A village that scored highly on water meant that amount of time taken to get water was more, or there were more people who had to travel to get water, or both of these. Therefore, have a higher priority for improving access relative to another village with a smaller score. In order to bring out the gender perspective these scores were segregated by women and men. Also weighted according to the means of transport used since, for example, a longer trip by bus scored lower, in

accessibility problems, than a shorter distance travelled on foot over steep hills. Such accessibility was based on:

Equation 2: Number of women x time taken x score for means of transport

Equation 3: Number of men x time taken x score for means of transport

The more difficult the means of transport the higher the score, e.g.:

Other Vehicle= 1, Motor Bike=2 Bicycle= 3, Animal Aided= 4, Walk=5

4.1.6.3 Gender Based Accessibility Indicators

Table 4.4: Gender Based Accessibility Indicators for Turunku

Mode of Transport	Number of people		Average Time taken (mins)	Score	Accessibility Indicators	
	Men	Women			Men	Women
Other Vehicle	224	215	900	1	201,600	193,500
Motor Bike	407	390	380	2	309,320	296,400
Bicycle	143	4	180	3	77,220	2,160
Animal Aided	51	0	60	4	12,240	0
Walk	101	94	420	5	212,100	197,400

Table 4.5: Gender Based Accessibility Indicators for Wusono

Mode of Transport	Number of people		Average Time taken (mins)	Score	Accessibility Indicators	
	Men	**Women**			**Men**	**Women**
Other Vehicle	79	89	840	1	66,360	74,760
Motor Bike	274	308	780	2	427,440	480,480
Bicycle	53	59	120	3	19,080	21,240
Animal Aided	56	1	120	4	26,880	480
Walk	95	106	480	5	228,000	254,400

Table 4.6: Gender Based Accessibility Indicators Gwaraji

Mode of Transport	Number of people		Average Time taken (mins)	Score	Accessibility Indicators	
	Men	Women			Men	Women
Other Vehicle	78	86	1,080	1	84,240	92,880
Motor Bike	174	195	1,380	2	480,240	538,200
Bicycle	51	56	300	3	45,900	50,400
Animal Aided	29	3	240	4	27,840	2,880
Walk	142	159	600	5	426,000	477,000

4.1.7 **Outline of the Blueprint for Tackling Rural Access Problems**

The main aim of the accessibility planning is to reduce time, cost and effort needed by rural people to gain access to essential services and facilities. Strategies for addressing rural access problems were grouped into two categories:

i. Closer proximity to essential services

ii. Increasing the accessibility to services by improving the transport system

Accessibility planning looked at the whole range of possible solutions and provided an opportunity for selecting one or a combination of the most appropriate ones.

4.1.8 **Prioritization of Locations for Specific Interventions**

This stage dealt with the question of where interventions were going to be introduced. It was concerned with the identification and selection of roads, villages and wards for specific measures. Accessibility Indicators have given an overview of the access situation both in terms of; degree to which different sectors were affected by access problems, and the degree to which a village was affected by a particular access need.

4.1.9 **Integrating Prioritized Interventions into Existing Development Plans**

Information for defining and prioritizing strategies for addressing rural access problems were packaged and integrated into an overall plan of action or development plan.

Data obtained from the questionnaire used to measure the socio economic values of the three villages is summarized in Tables below

4.2 **Case Studies**

4.2.1 **Settlement**

The settlements data obtained in the three villages is presented in Table 4.7

Table 4.7: Village Population.

Settlement	**Population**							**No of HH**
	Men	**Women**	**Male Youth**	**Female Youth**	**Male Children**	**Female Children**	**Total**	
Turunku	1200	1491	2566	3192	1870	2032	10,351	2,510
Wusono	1723	2204	2459	3140	1399	1570	12,495	1978
Gwaraji	2111	1607	2514	3020	2923	1553	13,728	1456

Table 4.7 showed that the local communities have slight ideas of the population and the no of households in each community. But the actual populations are 38,000, 8,200, and 12,000 for Turunku, Wusono and Gwaraji respectively. Having this kind of information guides the planner in determining accessibility problems and accessibility needs, as well as in prioritization in general. Population number is very vital to planning in general as it's the benchmark a planner uses to plan for the current/target and future population, this is because with the current population data at hand help the planner forecasts the

expected future growth of the population and plan in anticipation of population growth. HH is the number of Household.

4.2.2 **Village Topography**

Table 4.8 represents the results obtained from the questionnaires from the topographic data in the three villages.

Table 4.8: Village Topography

Village Topography	**No**	**Vegetation**					**Terrain**			
		Marsh	**Open**	**Forested**	**Grassland**	**Semi-Arid**	**Flat**	**Rolling**	**Hilly**	**Mountainous**
Turunku	120	5	40	-	73	2	18	1	36	65
Wusono	108	2	71	3	23	9	62	13	7	26
Gwaraji	95	-	-	44	37	14	56	-	-	-

The perception of the villagers on the vegetation and terrain of the areas, as obtained from the questionnaires shows that Turunku is mountainous and grassland, Wusono is flat and an open whereas Gwaraji is flat and forested in terrain and vegetation respectively. As such, this is an insight that the local communities are aware of their environment, but they need to be guided in order to actualize their needs in transport planning.

4.2.3 **Key Stakeholders**

Table 4.9: Key Stakeholders

Key Stakeholders	**Turunku**	**Wusono**	**Gwaraji**
Government Agencies	✓	✓	✓
Transport user Groups	✓	✓	✓
Transport Provider/Supplier Groups	✓	✓	✓
Vulnerable Groups (Community)	✓	✓	✓
Labour union	✓	✓	✓
Credit association	✓	✓	✓
PTA	✓	✓	✓
Religious Groups	✓	✓	✓
Women Group	✓	✓	✓
Village Committee	✓	✓	✓

4.3 **Economic Foundations of the Village Economies Studied**

The average income source per month for the beneficiaries in each local Government and the corresponding number of people in households, is presented in Table 4.10

Table 4.10: Average Household Sources of Income

Average Household Income Sources	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male	Female	%	Male	Female
Agriculture	59	67	22	82	74	3	59	29	4
Trading (self employed)	18	46	17	7	53	9	12	24	3
Services (self employed)	5	38	4	5	43	1	4	30	0
Salary	6	45	5	1	5	3	11	84	0
Casual Work	3	23	2	1	8	0	1	8	0
Rent	5	42	0	3	26	1	4	31	0
Remittences	0	0	0	0	0	0	0	0	0
Pension	3	24	1	0	0	0	2	15	0
Others	1	6	2	1	8	0	7	53	0

Table 4.10 presents the distribution of components of the expenditure with the corresponding percentages and the total number of household in each of the three villages surveyed.

Table 4.11: Components of average household expenditure

Components of Average Household Expenditure	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male	Female	%	Male	Female
Food	12	78	42	10	91	17	10	88	7
Rent	1	5	2	3	26	3	0	0	2
Transport	14	63	3	20	85	21	23	67	3
Utilities	2	36	6	5	44	3	1	8	1
Schooling	50	78	42	36	31	11	39	82	6
Health	3	25	7	5	44	13	7	53	3
Clothes	2	16	4	1	9	1	1	8	1
Remittances	0	0	0	0	0	0	0	0	0
Social activities	15	26	3	20	17	3	19	14	2
Other activities	1	8	2	0	0	0	0	0	0

Before moving on to a consideration of travel patterns and social differentiation, it is useful to consider the category breakdown of household expenditure which revealed material priorities in household provisioning in figure above. Schooling expenditure ranged from 39 to 50 percent of total expenditure, clearly indicates that there is relatively high cost of schooling despite the free universal basic education, this arose from general cost of living in the state and the country at large as the country's economy is dependent on imported on Crude oil. Food expenditure demonstrated that our sample villages consisted of self-sufficient farming household; as the households had a strong agrarian orientation in terms of agricultural income and food expenditure flows.

4.4 **Modal Options**

Table 4.12 presents the total transport mode in each community with respect to the percentage usage and total number.

Table 4.12: Mode of transportation in the communities

Mode of Transport	**Turunku**			**Wusono**			**Gwaraji %**		
	%	**Male**	**Female**	**%**	**Male**	**Female**	**%**	**Male**	**Female**
Motor Bike	49	407	390	52	274	308	38	174	195
Animal Aided	3	51	0	5	56	1	3	29	3
Other Vehicle	27	224	215	15	79	89	17	78	86
Bicycle	9	143	4	10	53	59	11	51	56
Walk	12	101	94	18	95	106	31	142	159

Most of the rural households surveyed did not own cars, In addition to being availed easier bus access, growing rural affluence is giving rise to the rapid acquisition of motorcycles, mostly low-powered motorbikes. Traditionally bicycles were heavily relied upon but this is being augmented or even displaced by motorbike usage, particularly by the middle and high-income group (Figure below). Since 1998, motorcycle registrations have increased by four and eight times in the whole of Nigeria. This has led to a motorcycle count of 64 and 54 motorcycles per 1000 people on average in the two local Governments respectively with the ratio of motorcycles to cars widening considerably in both Motorcycle ownership seems to be accessible to lower income groups as well as the

more affluent (Figure 4). This is because Politicians have been giving out motor cycles to the low income group as a support or means of empowerment to boost their earning for their livelihood.

4.5 **Modal Ownership/Access**

Table 4.13 presents the Ownership/Access to modal means of transportation in the three villages of Igabi LGA.

Table 4.13: Ownership of transport vehicles in the three villages

Ownership/Access to Modal Means of Transport	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male	Female	%	Male	Female
Motor Bike	61	58	30	70	78	14	82	91	6
Bicycle	63	44	21	62	35	6	82	39	3
Animal Aided	37	26	12	38	21	4	18	9	0
Vehicle Access	39	38	17	30	34	6	18	19	2

Analysis of data from the questionnaire administered in Turunku, Wusono and Gwaraji, showed that the total numbers of people with access/ownership to motorized means of transport are 143,132, and 118 while for non motorized means of transport are 103, 66 and 51 respectively.

While most of the rural households surveyed did not own cars, the percentage that have access to public vehicle services are 39% in Turunku, 30% in Wusono and 18% in Gwaraji. The essential part of securing this kind of data is that it guides the planner in the quality of road to be constructed/maintenance, design, type as well as the route. This is because frequent use of heavy vehicles as a modal choice influences the design particularly thickness of the carriageway.

4.6 **Wealth Differentiated Modal Access/Ownership**

The average modal ownership/access by income group of the three villages is as presented in Table 4.14

Table 4.14: Ownership of Transportation Vehicles among Low Income Group

Type of Vehicle	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male		%	Male	Female
Motor Bike	50	44	15	47	36	7	32	29	2
Bicycle	38	17	8	37	13	2	8	3	0
Animal Pack	0	0	0	0	0	0	0	0	0
Vehicle Access	5	3	1	7	3	0	13	3	0

Table 4.15: Ownership of Transportation vehicles among medium income group

Type of Vehicle	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male	Female	%	Male	Female
Motor Bike	37	22	11	38	29	6	29	26	2
Bicycle	45	19	10	34	12	2	22	9	0
Animal Pack	41	11	5	33	7	1	12	1	0
Vehicle Access	22	8	4	41	14	2	27	5	0

Table 4.16: Ownership of Transportation Vehicles among high income group

Type of Vehicle	Turunku			Wusono			Gwaraji		
	%	Male	Female	%	Male	Female	%	Male	Female
Motor Bike	13	8	3	15	12	2	39	36	2
Bicycle	17	8	3	29	10	2	70	27	2
Animal Pack	59	15	7	67	15	2	88	8	0
Vehicle Access	73	26	14	52	21	3	60	12	1

The question arose as to how much income affected modal ownership and access. The data provided a contrast between the three villages. In Turunku village, access does not seem to be heavily influenced by income except that lower income people were far more likely to own bicycles. Contrary to expectations, motorcycle ownership seems to be open to all income groups. Bus access is also not influenced by income. Pack animal ownership however does rise slightly with higher income. In Gwaraji villages, pack animal and bus ownership are positively correlated with income but not as strongly as might be thought.

4.7 Travel Patterns

Table 4.6 presents the result of the average trip characteristics by the local communities in the three villages surveyed.

Table 4.17: Average Trip Characteristics Number of Trips per Month per Capita

Average Trip Characteristics Number of Trips per Month per Capita	Turunku	Wusono	Gwaraji
Number of destinations	21	17	18
Number of Trips	5710	4812	4770
Total Number of Persons/trips made	1627	1119	970
Time(hr)	49	39	60
Distance(Km)	585	501	633
Speed(km/hr)	11.9	12.84	10.55

Given the preceding road network and modal access data, this gave the ability to compare and contrast the travel patterns of rural people in the study sites using the household survey data. Villagers generally travelled faster than the normal walking speed of 4 km per hour that was probably linked to their higher access to road-based wheeled and motorized transport (Figure 4.2). It should be borne in mind that these travel speeds were based on recalled by people who do not generally wear watches and were certainly not concerned with the precise passage of time in the way that urban commuters in the West are who clock their daily journey times. There may also be cultural differences in the perception of journey time that bias the reported times. Thus the reported speeds of these villagers were only taken as indicative. However, having used the same questions and methodology in posing the questions in two different communities, the comparative findings suggested that the average speeds were considerably high and in the case of the Wusono village remarkably so.

4.7.1 **Trip Purpose**

Trips are defined as travel both inside and outside the village by any means for the following purposes: economic activities, social services, social activities and community association. It has shown the relative importance of these major categories in terms of monthly distance travelled within the study area. The results are shown in Tables below:

Farm; Farmers group, Agriculture and Market

Non Farm; Social, Recreational, Religions, Educational, Work

Table 4.18: Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	**Turunku**		**Wusono**		**Gwaraji**	
Work	**(km)**	**No**	**(km)**	**No**	**(km)**	**No**
Informal Employment	6	14	7	33	10	20
Formal Employment	13	12	0	0	0	0
	142	33	104	40	125	24

Table 4.19: Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	Turunku		Wusono		Gwaraji	
Recreational	**(km)**	**No**	**(km)**	**No**	**(km)**	**No**
Town	123	7	97	7	115	4
Informal Employment	6	14	7	33	10	20
Formal Employment	13	12	0	0	0	0
Post Office	0	0	0	0	0	0
	142	33	104	40	125	24

Table 4.20: Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	Turunku		Wusono		Gwaraji	
Farm	**(km)**	**No**	**(km)**	**No**	**(km)**	**No**
Agriculture	112	100	123	45	180	23
Market	97	120	71	108	50	95
Farmers Group	9	82	13	54	8	76
	218	302	207	207	238	194

Table 4.21: Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	Turunku		Wusono		Gwaraji	
Education	**(km)**	**No**	**(km)**	**No**	**(km)**	**No**
PTA	8	98	0	0	0	0
Education	12	120	6	78	11	53
	20	218	6	78	11	53

Table 4.22: Average Monthly Distance travelled per capita by Purpose

Average Monthly Distance travelled per capita by Purpose	Turunku		Wusono		Gwaraji	
Education	**(km)**	**No**	**(km)**	**No**	**(km)**	**No**
Health Centre	8	120	16	108	11	95

Travel for agricultural activity and within the town dominated trips in the study area, the activities comprise the major share of distance travelled whereas in both economic activities and social service travel are more balanced, although, as already mentioned, the average distance travelled for social services in the Turunku village was found to be high. This type of data on travel pattern is very useful as it helps the planner to rank the villages based on their access problems/needs, thereby avoiding bias in preparing plans. This method of planning enables the planner in estimating the number/type of mode of transport or people that will use a specific transportation facility in the future.

4.8 Wealth Differentiated Travel Patterns

The average distance travelled by household income group in the three villages with the corresponding number of people to have covered the distances are shown below

Table 4.23: Travel pattern based on Household Income and distance

Average Monthly Distance travelled per Capita by Household Income Group, Village	Turunku			Wusono			Gwaraji		
	(km)	Male	Female	(km)	Male	Female	(km)	Male	Female
Low Income	98	416	398	120	384	433	75	408	407
Medium Income	172	308	294	161	95	106	52	49	48
High Income	315	108	103	220	48	53	506	29	29

Result in the table shows that in Turunku out of a total of 1627 trip, were made by 814 were Low income earners with an average travel distance of 98km, 602 were by medium income earners with average travel distance of 172km and 211 while High income earners with an average travel distance of 315km. In Wusono it was observed that out of 1119 persons 817 are low income, 201 are medium income, 101 are high income earners numbers with average travel distance of 120, 161 and 220km respectively. In Gwaraji out of 970 persons, it was observed that 815, 97, 58 with average travel distance of 75, 52 and 506km were low, medium and high income earners respectively. This is very important as it guides the planner to provide better network of rural transport infrastructure that will serve all classes of income earners. This is an indication that the more income earn the more distance being covered.

Table 4.24: Travel speeds based on Household Income

Average Travel Speeds by Household Income Groups	Turunku			Wusono			Gwaraji		
	Km/hr	Male	Female	Km/hr	Male	Female	Km/hr	Male	Female
Low Income	6	416	398	9	384	433	4	408	407
Medium Income	13	308	294	15	95	106	9	49	48
High Income	16	108	103	15	48	53	14	29	29

Result from the Table 4.24 shows that, low income groups of 814, 817 and 815 persons travelled with the average speed of as low as 6, 9 and 4km/hr in Turunku, Wusono and Gwaraji respectively. Medium income groups of 602, 201 and 97 travelled with average speed of 13, 15 and 9km/hr in Turunku, Wusono and Gwaraji respectively. High income groups of 211, 101 and 58 travelled with average speed of 16, 15 and 14km/hr respectively. The speed gives the planner guide to be considered when selecting design speed of the road, while the number gives the planner idea on the expected number of income groups to utilize the rural transport infrastructure now and in the future.

4.9 **Gender Differentiated Travel Patterns**

The average trip frequency by gender and the corresponding percentages and numbers, is as presented in Table below

Table 4.25: Travel patterns based on Gender

Average Monthly Trip Frequency by Gender	**Turunku**		**Wusono**		**Gwaraji**	
	%	**Number**	**%**	**Number**	**%**	**Number**
Men	22	358	22	246	23	223
Women	21	342	24	269	18	175
Boys	29	472	25	280	27	262
Girls	28	455	29	324	32	310

One of the striking findings of rural transport studies over the last two decades is the socially differentiated pattern of village travel and transport, especially within household differences by gender. In Sub-Saharan Africa gender differences are especially marked with women shouldering the major share of the daily domestic transport of water and firewood. Once one removes the domestic firewood and water collection component of household transport, as this study did, gender differences in mobility are no longer very silent. In Wusono Women travel more frequent than men. Age differences, however, come to the fore. The mobility of children is striking in those rural communities where school attendance is common. Despite the overall economic depression, the imposition of school fees and the effect of demoralized social service provisioning have led to an increment in school attendance.

Table 4.26 presents the average monthly trip distance based on gender

Table 4.26: Travel patterns based on distance

Average Monthly Journey Distance per Capita by Gender and Age	**Turunku**		**Wusono**		**Gwaraji**	
	(km)	**Number**	**(km)**	**Number**	**(km)**	**Number**
Men	197	358	136	246	214	223
Women	64	342	94	269	119	175
Boys	245	472	159	280	177	262
Girls	79	455	112	324	123	310

In Turunku out of the 1627 trips and distance of 585km travelled by purpose, 358 were men that travelled a distance of 197km, 342 were women that travelled a distance of 64km, 472 were boys that travelled a distance of 245km, 455 were girls that travelled a distance of 79km. In Wusono out of the 1119 numbers and 501 km distance travelled by purpose, 246 were men that travelled a distance of 136km, 269 were women that travelled a distance of 94km, 280 were boys that travelled a distance of 159km, 324 were girls that travelled a distance of 112. In Gwaraji out of the 970 numbers and 663km distance travelled by purpose, 223 were men that travelled a distance of 214km, 175 were women that travelled a distance of 119km, 262 were boys that travelled a distance of 177km, 310 were girls that travelled a distance of 123km. Gender differences reappeared when considering monthly travel distances. It was observed that Men and boys travel further than women and girls on average. It should be noted that this data arose from a

rather general question about which gender/age ‘usually travels’ for a specified purpose and hence this data reflected a generalized attitudinal orientation to travel rather than detailed trip measurements.

The conclusion from the above is that perception of social benefits varied considerably from one village to another and that is what differentiates this method of transportation planning from the traditional method of planning. This method encourages equitable sharing of resources and prevents long term sustainability.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The objectives of this research were to review the process in rural accessibility planning, Compare rural planning methods, suggest the best planning Criteria in terms of priority for selecting a rural road project to be constructed, identify the range of contributions made by local communities to the transport sector and the impacts these have on livelihoods, identify the role of local communities in decision making in the rural transport sector, review employment opportunities in rural transport at the commune level, to explore the possibilities of introducing intermediate transport system (IMTS) to enhance the movement of rural communities.

The review and comparison of the planning methods/processes were carried out while a new planning framework for rural transport planning and the best criteria when it comes to prioritization of a road project to embark upon was suggested.

One of the objectives of this research was to assess the kind and range of all the contributions (for transport and others) paid by local people and their impact on local livelihoods. In addition, a look at the role of local community participation in rural transport was studied to propose recommendations to improve participation of local people and increase local employment opportunities in rural transport development.

It should be emphasized that this study was meant to provide a deeper understanding on issues related to community participation, its benefits and its drawback in rural transport as well as to present findings that would statistically represent the rural transport situation

on contribution, current state of roads and participation in the areas in question. The research methodology applied for this study was qualitative in nature. Field research was carried out in three communities each in Igabi Local Government. (Appendix)

5.2 **Conclusion**

The tool for planning has been developed (Questionnaire) in this study to assist in decision making at local Government level, It has been designed to assist in local level planners to make decisions regarding cost-effective investments for improving accessibility to goods and services in rural areas. The focus on the local level provided a foundation for developing the planning capacity at the lower level of the local Institutions.

This study examined the road transport situation in Igabi Local Government rural areas of Kaduna State, Nigeria. This work adopted an integrated approach whereby, rural road transport is viewed as consisting of the available roads, transport services and Intermediate Means of Transport (IMT). This study also used a Participatory Rural Appraisal technique whereby, the people identified the types and magnitude of transportation problems they encounter.

Overall, road network connectivity and level of road accessibility were found to be poor in all the areas. Also, transport services are generally poor and inadequate in rural areas sampled. However, spatial variations were found to exist in the area. Gwaraji was found to have the least level of road accessibility and road network connectivity among the sampled Villages. Gwaraji is also the poorest in terms of availability of transport services. This implies that there is a greater restriction on mobility with attendant negative effects on the economy and general wellbeing of the people in the area. In

addition to inadequate transport services other road transport problems faced by rural residents in the villages in question include that of poor road surface conditions, high cost of transport, overloading and incessant highway robberies. Based on the result of this study, various policy options for improving rural road transport conditions in the areas are hereby suggested.

The use of Intermediate Means of Transport (IMT) was found to be relatively low along the roads of our study areas, generally earth or gravel, where motor traffic volumes were low and levels of service and the scope of works needed to provide them were closely adapted to the needs of users. Such roads would be constructed to aid movement of people in areas with high traffic volume.

It has also been observed from results of study that villagers relied on motorbike for transportation. Because it's cheaper and can move around even if road condition is very poor as it requires a small path for movement. If these people are left out in the planning/decision making processes, they will not bother giving a helping hand when the need arises. But having them partake in such activities creates sense of belonging among stakeholders, skill development and sense of ownership. Direct and connected bicycle infrastructure would be provided to and between key destinations including activity centers, public transport nodes and major attractions. Cycling infrastructure (on-road Motorcycle/bicycle lands off-road Motorcycle/bicycle paths) would be planned to:

- Separate cyclists from other road users, particularly motor vehicles.
- Provide the most direct route practical.

Local cycling networks and new cycling facilities that link to and complement the village-wide network of motorcycle/bicycle routes – the Principal Motorcycle/Bicycle Network would be developed.

It has also been seen from the result that purpose of a trip, destination, economic activities of a village are some of the determinant factors of the transport modal choice of local communities. Beyond the issues of terrain, road density and quality of the road network and the state of its maintenance, the form and content of rural mobility and transport depend on both public and private investment to provide transport modal choice. From the result, Travel patterns are usually affected by the cost of travel, income, gender, and distance to destination, number of trips, speed and time of trips, purpose of trip, availability of transport services, road conditions e.t.c Inadequate knowledge of the range of individual travel and transport patterns in a community means that the planning and activities of the project may be biased towards a minority of the population. Secondly, if only these minority needs are addressed then it is likely that long term sustainability will be undermined. High quality pedestrian environments would be developed that are accessible to footpath-bound vehicles such as wheelchairs, prams and scooters. It would be ensured that development provides opportunities to create more sustainable transport options such as walking, cycling and public transport.

5.3 **Recommendation**

Based on the results of the study, the following recommendations have been suggested

i. Planning should ensure an integrated and sustainable transport system that provides access to social and economic opportunities, facilitates economic prosperity,

contributes to environmental sustainability, coordinates reliable movements of people and goods, and is safe.

ii. There should be conscious efforts on the part of governments at all levels in the country to allocate adequate funds for the improvement of roads in the country. Priority should be given to construction of new roads and reactivation and improvement of existing roads especially in rural areas where majority of Nigerians reside. Also, improving access in rural areas require clear understanding of local situations in different areas. It is therefore, very important to always incorporate the ideas and perceptions of the rural dwellers on their transport needs and problems into transport planning. The rural dwellers should also be involved in implementation and maintenance of transport improvement programmes. Community oriented approach to development helps to develop a sense of ownership among the people. This will ensure programme success and people's interest in the maintenance of transport infrastructure and help

iii. Improve lifespan of roads.

iv. In addition, there is the urgent need to introduce interventions that will improve the provision of rural transport services. This can be achieved through the provision of credit and extension of the current government palliative measures in the transport sector to rural transport service operators.

v. Programs should also be designed for training and improving the skill levels of local artisans and technicians to be able to respond to the needs of the rural transport sector. This will ensure sufficient back-up services and supply of simple vehicle parts at reduced cost.

vi. Locate and design new transport routes and adjoining land uses to minimize disruption of residential communities and their amenity.

vii. Critical inputs are required for a good planning system; many social and economic factors should be taken into consideration when developing a questionnaire of this kind of exercise.

viii. Set parameters to decision making and follow examples of best practices of Rural Road Management and Planning Systems in order to develop a country specific system.

ix. In principle, need for a tool to investigate transport investment choices with respect to social concerns.

x. Require the provision of adequate Motorcycle/bicycle parking and related facilities to meet demand at education, recreation, shopping and community facilities and other major attractions when issuing planning approvals.

xi. Provide improved facilities, particularly storage, for cyclists at public transport interchanges, rail stations and major attractions.

xii. In planning for the location of education facilities, consideration should be given to demographic trends, the existing and future demand requirements and the integration of facilities into communities.

xiii. Ensure areas near to education facilities, adjoining streets and access ways are designed to encourage safe bicycle and pedestrian access.

xiv. In consideration proposals for communication/telecommunication services, seek a balance between the provision of important telecommunications services and the need

to protect the environment from adverse impacts arising from telecommunications infrastructure.

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Appendix 1- Questionnaire

Questionnaire A: For Key Informants within the Settlement

To be administered to a gathering of 1 senior administrative leader, 1 teacher, 1 health worker and 1 religious leader

Survey No. _____ Date _____ Interview duration _____

Enumerator _____ Interview Location _____

1. **Settlement**

What are the settlement's boundaries?

Area of km^2 _____

What is the total population? _____ How many households? _____

How many: Men _____

Women _____

Male youth _____

Female youth_____ Male children_____

Female children _____

Aged 12-18 years

Under 12 year old

2. **Village Topography**

(a) Describe the terrain along which the road passes: (tick one of the following)

Flat …….. Rolling ……..

Hilly …….

Mountainous ……..

(b) Describe the vegetation cover around the village: (tick one of the following)

Marsh …… Open ……..

Forested ……..

Grassland …….. Semi-arid

……..

3. **Distribution of Facilities**

(a) Distance to:

- Main road? _____km
- Main local town? _____km
- All weather road? _____km
- Local capital? _____km

(b) What is the distance to the nearest educational facilities and how many services are available in and around the settlement? (If Education facility in village, write 0 against km)

Type	Nursery	Primary	Secondary	Technical	Other
Km					
No.					

(c) What is the distance to the nearest health facilities and how many services are available in and around the settlement? (if health facility in village, write 0 against km).

Type	Health Centre	Clinic	Hospital	Other
Km				
No.				

(d) What is the distance to other facilities and how many services are available in and around the settlement? (If facility in village, write 0 against km)

Type	Market place	Place of worship	Police Station	Local govt. office	Other
Km					
No.					

4. **Economic Activities (**Local Economy)

(a) Major occupations in settlement (Please indicate in the box below the four main economic activities in your community in order of importance, and estimate of % of total population involved each gender category.

Economic Activities	1:	2:	3:	4:
Adult men %				
Adult women%				
Male youth%				
Female youth %				

(b) What are the defining characteristics of the following income groups in the community? Indicate the income range that applies to each group:

- High-income people

- Medium-income people

- Low-income people

(c) Major sources of local tax revenue (list 4 main ones in order of importance)

1. ……
2. ……
3. ……
4. ……

5. **Transport Infrastructure**

(a) What constitute the road network in your village; sketch?

(c) Describe the ownership structure of the roads. Established:

- By whom?

_____

(a) Describe the current condition of the road in your village (Tick the box below)

Excellent(Newly Constructed)	
Very good (Good and no Damages)	
Good(Fairly Damaged)	
Fair(Damaged but motorable)	
Poor(Damaged but not motorable)	

6. **Development Activities**

(a) Describe planned/Ongoing project activities within your district (If any)?

_____

_____

_____

(b) What are active groups in within your district (Tick box)?

No	**Group**	**Tick Below**
1	Farmers group/Co-operative	
2	Religious Meeting	
3	Women's Group	
4	Village Committee	
5	Burial Society	
6	Parent Teachers Association (PTA)	
7	Credit Association	
8	Others (Please state)	

QUESTIONNAIRE B: SOCIAL BENEFITS SAMPLE SURVEY

		Enumerator	
Survey No.		Interview Location	
Date		Interview Duration	
FAMILY SURNAME			

Q1 HOUSEHOLD SIZE/LOCATION HISTORY

No. Resident HH members		Years HH in present location	
No. of Absent HH members		Were you born at this location	
Non-family:		Previous residential location	
Lodgers		Reason for location change	
Live-in servants			

Q2 HOUSEHOLD COMPOSITION (list members' in order of age beginning with HH Head, wife, etc)

MARK* spokesmen	FIRST NAME (optional) list members names in order of age beginning with HH Head, Wife, etc	WHERE RESIDENT H-in HH OR-other rural OU-other urban OF-other foreign	Months AWAY	RELATION to HH Head	SEX	AGE	BIRTHPLACE (District)	Year of ARRIVAL	ETHNIC GROUP	EDUCATION LEVEL attained	CASH-EARNING ACTIVITY	CASH EARNING for: 0-None E-earner F-family E+F-both O-other

0		H	O R	O U	O F									E	F	E + F	O
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

Q3 AVERAGE HOUSEHOLD EARNINGS AND EXPENDITURE FOR LAST YEAR (read out lists before asking respondent to answer)

% Monthly Total Household Earning from		% of Household Expenditure/Month on:		Estimate your EXPENDITURE relative to other people in this area per month (tick one)		HH's Living Standard Experience (over 10 years) (tick one)	
Agricultural production		Food		Very high		Great improvement	
Self-employed trading		Rent		High		Some improvement	
Self-emp'd service sector work		Transport (fuel & public transport)		Medium		Stable	
Regular salaried employment		Utilities (water, gas, elect)		Low		Some deterioration	
Casual wage work		Schooling		Very low		Great deterioration	
Rent		Medical					
Remittance		Clothing					
Pension		Remittances					
Other (specify)		Social					
ABSOLUTE TOTAL		Other (specify)					
		ABSOLUTE TOTAL					

Q4 LOCATION/MOBILITY OF YOUR INCOME EARNING OR STUDY?

WHERE does most of your income-earning work or study primarily take place?				SITUATION 5-10 years ago		
In Your Locality		Outside Your Locality		Main work/study activities 5-10 years ago (in order of importance)	COMPARED with 5-10 YEARS does you State of employment/study now involve:	
Home based		In a rural area		(1)	Much greater mobility	
In the neighbourhood		In an urban area		(2)	Somewhat greater mobility	
Within locality but distant		In both urban & rural area		(3)	Roughly the same	
Your work/study usually takes place in how many locations daily?				(4)	Somewhat less mobility	
Average commuting time from home to work/school (minutes)				(5)	Far less mobility	
Main transport mode for home-work/school commuting				(6)	Didn't work/study 5-10 years ago &/or now	

Q5. TRANSPORT REQUIREMENTS INSIDE/OUTSIDE THE VILLAGE (FOR THE LAST YEAR)

	Destination		Roughly how many journeys (round trips) made per month?	Time taken for one way trip (minutes)	Distance for one way trip (km).	Cost of journey for one way trip (dong) if none, write "0"	Duration of stay at destination (hours)	Who makes these trips for men (M), women (W), boys (B) and/or girls (G)				Mode of transport (See Key)
								M	W	B	G	
INCOME GENERATION	Travel to farms	Farm 1										
		Farm 2										
	Collection of farm inputs											
	Transport of harvest											
	Travel to market:	to sell										
		to buy										
	Travel to town											
	Travel to formal employment											
	Travel to informal employment											

	Travel to informal employment												
HUMAN CAPITAL	Travel to grinding mill												
	Education:	Primary											
		Secondary											
		Tertiary											
	Health-travel to:	Health post											
		Local clinic											
		Hospital											
OTHER	Use of post office/public telephone												
	Other (please state):												
	1.												
	2.												

Key: 1 walk, 2 Bicycle, 3 Motorcycle, 4 Car, (owned by household), 5 Transport operator, 6 Bus, 8 Boat, 9 Animal Cart, 10 Tractor, 11 Other

	Destination	Roughly how many journeys (round trips) made per month?	Time taken for one way trip (minutes)	Distance for one way trip (km).	Cost of journey for one way trip (dong) if none, write "0"	Duration of stay at destination (hours)	Who makes these trips for men (M), women (W), boys (B) and/or girls (G)				Mode of transport (See Key)
							M	W	B	G	
COMMUNITY ASSOCIATIONS	Farmers group/co-operative										
	Religious meeting										
	Women's group										
	Village committee										
	Burial society										
	Parent Teacher Association (PTA)										
	Credit association										
	Other (please state)										
	1.										
	2.										
SOCIAL VISITS	Weddings										
	Funerals										
	Visiting friends										

	Visiting relatives										
	Place of worship										
	Leisure activities										
	Sport activities										
	Other (please state)										
	1.										
	2.										

Key: 1 walk, 2 Bicycle, 3 Motorcycle, 4 Car, (owned by household), 5 Transport operator, 6 Bus, 8 Boat, 9 Animal Cart, 10 Tractor, 11 Other

Q6. ACCESS TO TRANSPORT SERVICES

<table>
<tr><td rowspan="2">Does the settlement have road access</td><td>Yes/No</td><td>If yes, how many months a year (average)</td><td>What kinds of vehicle are coming to the settlements?</td><td colspan="2">Describe the condition of the road access (Engineered/ Un-engineered)</td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Are transport services available in the settlement?</td><td>Yes/No</td><td>If yes, how many months a year (average)</td><td>What kinds of transport services are available in the settlements? (Regular/Irregular)</td><td colspan="2">What are the final destinations of these transport services and the one way fares?</td></tr>
<tr><td></td><td></td><td></td><td>Destination</td><td>Fare</td></tr>
<tr><td colspan="4"></td><td>1.</td><td></td></tr>
<tr><td colspan="4"></td><td>2.</td><td></td></tr>
<tr><td colspan="4"></td><td>3.</td><td></td></tr>
<tr><td colspan="4"></td><td>4.</td><td></td></tr>
</table>

Q7. OWNERSHIP AND ACCESS TO MEANS OF TRANSPORT/COMMUNICATION? (specify total number in each column).

Non-motorized Transport Means

Means of transport	**Ownership**		**Access**
	W	**NW**	
Pack animal/donkey			
Animal cart			
Handcart			
Wheelbarrow			
Bicycle			
Other non-motorized vehicles (please specify)			
1.			
2.			
3.			

Motorized Transport means

Means of Transport	**Ownership**		**Access**
Motorcycle	**W**	**NW**	
Car			
Pickup			
Lorry			
Bus			
Tractor			
Power tiller			
Other motorized vehicles (please specify)			
1.			
2.			
3.			

Communication Means

Other	**Ownership**		**Access**
Home phone	**W**	**NW**	
Mobile phone			
Fax			
Radio			
Television			
Email (office or home)			
Other means of communication			
1.			
2.			
3.			

W-Working

NW-Not Working

Q8. (a) What are your major transport problems?

_____

_____

_____

_____

(b) How could these transport problems be solved?

_____

_____

_____

_____

_____

(c) ACCESS PROBLEMS

Is Physical Access a Problem for:	Big Problem	Minor Problem	No Problem	If big Access Problem, Describe why?
	Tick appropriate answer			
Primary Education				
Secondary Education				
Health Care				
Domestic Water Supply				
Transport Services				
Electricity				
Agricultural Service Center				
Livestock Service Center				
Markets				
Agricultural Supply Centers				
Telephone/PCO				
Postal Service				
Visiting the VDC Center				
Visiting the DDC Center				
Road				
Trail/Bridges				
(other, describe)				
(other, describe)				