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Integrated Rural Accessibility Planning:

Application in Rajasthan

(India)

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International Labour Organization

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Preface

Eliminating poverty requires the reduction of isolation and social exclusion. Thus there is a need to provide access to infrastructure and services to the rural mass so that they can build their assets, reduce vulnerability and develop sustainable livelihood. As the factors affecting rural access are interactive and cannot be considered in isolation, an integrated approach is most suitable for effective accessibility planning. Integrated Rural Accessibility Planning (IRAP) is a need- based, multi-sectoral, sensitive methodology for local level planning. It pertains to the improvement of the living and working conditions and aims at ensuring that the available investments are directed towards the most urgent needs of rural communities, for access to basic goods, social and economic services and employment opportunities.

In a country like India where one of the objectives of the Central Government is to strengthening the Local Government System (*Gram Panchayat*), the concept of Integrated Rural Accessibility Planning (IRAP) can be easily incorporated into the existing planning process, which in turn will benefit the rural community to a great extent.

This report elucidates the study on the application of IRAP in a selected *Panchayat* in Jhunjhunu District in Rajasthan (India). Being a pilot study, only three sectors, namely, water, education and health have been considered for detailed analysis. Simple techniques have been suggested for the use of the officials at the local government level to rank villages based on their accessibility needs and to identify interventions to improve the accessibility situation using participatory approach.

Acknowledgements

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I am indebted to my team members, namely Dr. Motilal Dash, Dr. (Mrs.) Meenakshi Raman and Professor Rajiv Gupta of BITS Pilani for their inputs and team work. It would not have been possible to carry out the project without the help of the enthusiastic students of BITS Pilani, who were involved in each and every stage, starting from field data collection to the preparation of this report. I would specially thank Mr. P. Sameer Babu for helping me whenever needed.

It is not possible to complete a project of this nature without the support of the Local Level Government Officials and the villagers. I thank all the officials and elected representatives of the Surajgarh Block, Jhunjhunu District, Rajasthan (India) and the villagers of the concerned villages in the study area for cooperating with us enthusiastically.

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Abbreviations

MP	Member of Parliament
MLA	Member of Legislative Assembly
MLC	Member of Legislative Council
SC/ST	Scheduled Caste / Scheduled Tribe
PRI	Panchayati Raj Institution
IRAP	Integrated Rural Accessibility Planning
NGO	Non- Governmental Organisation
ADB	Accessibility Data Base
WPI	Water Priority Index
EPI	Education Priority Index
HPI	Health Priority Index
SPI	Sectoral Priority Index

Terminology

Panchayati Raj:	The Local Level Government Structure
Panchayat :	The lowest level Local Government consisting a few villages
Sarpanch:	The Elected Head of a Panchayat
Panchayat Samiti:	The Second Level of Local Government consisting of a few Panchayats.
Pradhan:	The Elected Head of a Panchayati Samiti
Zila Parishad:	District Level Local Government Body
Pucca Road:	Paved Road
Kuchha Road:	Earth road

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CHAPTER ONE

PANCHAYATI RAJ AND LOCAL LEVEL PLANNING

In the early fifties villagers gladly shared the burden of the Government by making contribution of free labor and materials for creating community assets in the villages. The response of the people was a natural phenomenon arising out of their great expectations after independence. The history of development planning of the next five decades reveal how and why these expectations remain yet to be fulfilled and the consequent decline in response of the rural masses to participate in development initiatives of the State. Successive plans emphasized on rapid economic growth and the growth processes were, by and large, taken as granted. Agricultural production was sought to be augmented through expansion in areas under cultivation, better irrigation system and adoption of modern technology.

The country did achieve self-sufficiency in food grains, but then there was the problem of regional and commodity imbalances. Regions endowed with resources gained a disproportionate share in the ingestible resources. Rapid industrialization through linkages between the urban and rural sectors was sought to ensure simultaneous development of both rural and urban sectors. The State engineered industrialization diversified the base and ushered in an era of veritable industrial revolution. However industrialization did not have a big impact on the rural-urban population ratio. Also there was no significant reduction in the poverty ratio or the unemployment rate.

The 'Percolation effect' never worked and much of the developmental expenditure never reached the poor in spite of its sizeable increase over the years. The *`trickle down theory'* didn't address the issues of poverty and unemployment, particularly in the rural areas. It was realized that growth by itself could not be a panacea for all economic ills of the country. Growth processes came to be considered as much important as growth itself. It dawned upon the planners and policy makers that development efforts in rural areas could be fruitful only if the development design rests on the foundation of people's participation. It was conceded that rural development strategies could realize their full potential only through the motivation and active involvement of the rural community starting from the grass roots level with special emphasis on the least advantaged.

"A government that governs the least is the best form of government and the ideal society is that which functions as a family." – M.K.Gandhi.

The concept of Panchayati Raj is based on a combination of the above two Gandhian concepts of government and society. India has a total of 638,365* villages. In a country with such a vast geo-political and cultural diversity there is a need to decentralize governance and encourage active participation of people at all levels. Panchayati Raj begins at the bottom of the chain with the primary community, which is conceived as an association of families living together, sharing together, endeavoring together, managing their affairs together and co-operation with other communities for their other needs and benefits, thus forming a wider association of communities and other institutions of Panchayati Raj.

1.1. Salient Features of the Panchayati Raj

Article 40 of the constitution of India, under the Directive Principles of the state, laid down that '*The state should take steps to organize village Panchayats and endow them with such power and authority as may be necessary to enable them to function as units of self government*". Accordingly, all the states passed the Panchayat Act. A number of committees were subsequently formed over the years to suggest measures to make the Panchayat System more effective. Accordingly the 73rd Amendment was passed in the Parliament in the year 1992.

The main features of the constitutional 73rd amendment Act, 1992 are:

- There shall be a three-tier system of panchayat at the village, intermediate and district level. States having a population of less than 20 lakhs will have the option not to have the intermediate level panchayat.
- Seats in panchayats at all the three levels shall be filled by direct elections.
- MPs, MLAs and MLCs could also be members of panchayats of the intermediate or the district level.
- In all panchayats, seats would be reserved for SC/ST in proportion to the population.
- One-third of the total number of seats in all panchayats will be reserved for women.
- Every panchayat shall have a uniform five year term. In the event of dissolution, elections will be compulsorily held within six months.
- An independent Election Commission will be established in the State for superintendence, direction and control of electoral process and preparation of electoral rolls.
- In addition to the schemes meant for economic development and social justice assigned by the State, the Act also indicates a set of twenty nine items in the Eleventh Schedule of the constitution which entrusted an effective role to the PRIs in planning and implementation of work of local significance ranging from drinking water, agriculture, land and water conservation, poverty alleviation programmes, family welfare, education and maintenance of community assets.

- Panchayats will receive adequate funds from the State for carrying out their functions, panchayats will also be permitted to collect and retain the revenue they raise.

1.2. Organizational perspective across Indian States

The Panchayati Raj system in India was launched with a goal of achieving decentralization with respect to economic and political powers. This was received with great enthusiasm at all levels of the Panchayati Raj. The need for PRIs to ensure people's participation in local planning and implementation was stressed. The panchayati Raj. System calls for people's participation not only in planning but also in plan implementation. Fig 1.1 shows the significance of the system.

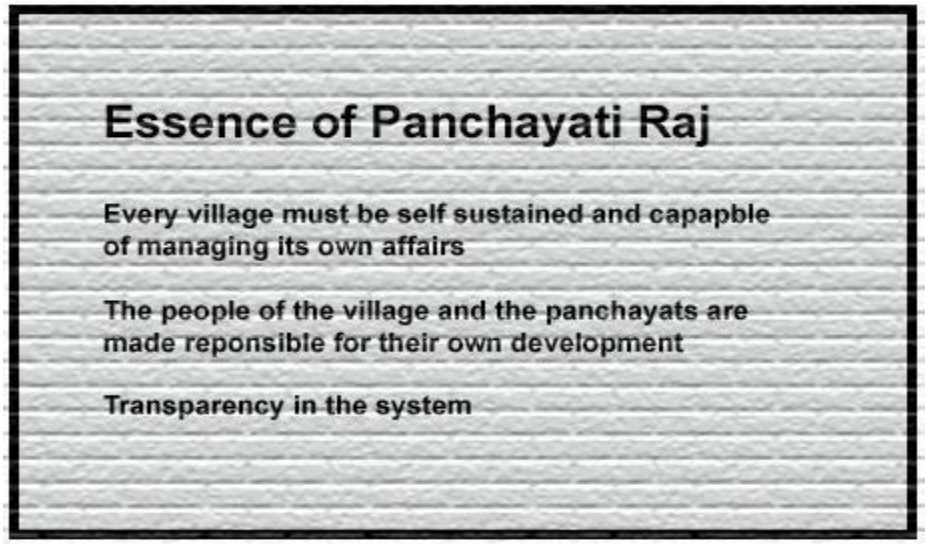

Figure 1.1 The Essence of the Panchayati raj system.

1.3. Three tier system

The launching of the Panchayati Raj system in the country ushered in a new era of democracy. There was a need to entrust people with the powers of making socio-economic decisions. People would be associated at the level of plan formulation through the Gram Sabha, plan execution through the Village Panchayat, monitoring through the Block Panchayats and review or guidance by the District panchayats. These were the three tiers of governance in the Panchayati Raj system. They are shown in Fig 1.2.

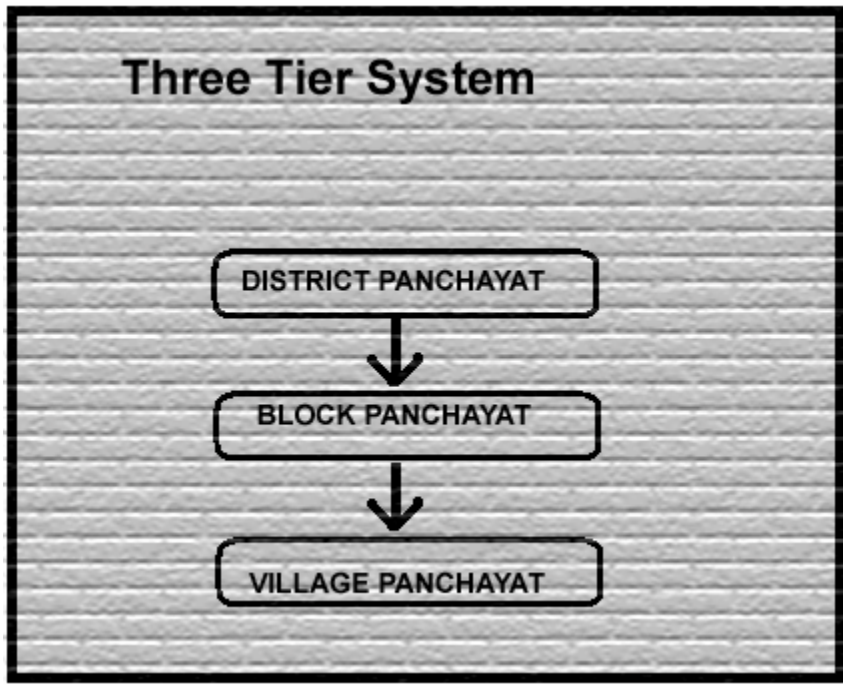

Figure 1.2 Three Tier System

1.4. Powers and functions

There is a great deal of misunderstanding about the respective powers and functions of the various bodies of the Panchayati Raj. The three tier structure is often conceived to be hierarchical - one being above the other. The term "government" is often reserved for the state or central government. However, each of these bodies is a government in its own level, performing all the possible functions of the government at the concerning levels. Every tier in a federal structure of government cannot discharge all functions of the government.

The Zila Parishad (*a district level panchayat body*) cannot do certain things that the state government can do, and so on. For instance, the Zila Parishad cannot run a university or build a power plant. Each body is autonomous but within its own sphere. The various functions of the different tiers of the Panchayati Raj system have been tabulated in Table 1.1.

Table 1.1 Functions of the PRIs

Village Panchayat	Intermediate level Panchayat	District level Panchayat
1. Provision and maintenance of civic Services. 2. Public hygiene 3. Maintenance of public work 4. Primary education 5. Providing inputs for agricultural production 6. Rural industries, primary health care and women and child welfare	1. It has to instill among people within its jurisdiction a spirit of self-help and initiative and work for raising standard of living. 2. Providing support for implementation of Development programmes. 3. Execution of welfare and Development activities in the fields of agriculture, animal husbandry, health, sanitation elementary education, cottage Industries and social welfare. 4. Utilizing village housing Project funds and loans.	1. Advisory and funds distributing bodies 2. Secondary education. 3. advise to government in all matters relating to rural development in the District. 4. Review the progress made under various Schemes in all blocks.

Source: Joshi R P and Narwani G S; 2002.

1.5. Structure of financial administration

Financial Independence is a pre-requisite to self-sufficiency. Effective functioning of the panchayats requires timely and proper funding. One of the main reasons, as identified by various committees, for the failure of the Panchayati Raj Institutions prior to the 73rd Constitution Amendment Act was that they were mostly dependent on the Government and, hence failed to perform as institutions of self governance. There is no doubt that since the PRIs share the responsibility of the state at the village level it was the duty of the states to devolve funds and encourage them to raise their own resources to enable them to discharge their functions effectively to the satisfaction of the people. The Constitutional Amendments recommended the formation of State Finance commissions to study the financial inputs to the panchayats and their expenditure. The panchayats were empowered to generate their own revenues thorough tax collection. The State Commission divided it as:

1. Own Income
   (a) Tax revenues and (b) Non-tax Revenues.
2. Grants from the State Government.
3. Grants from the Central Government.

The existing financial structure of the Panchayati Raj System is shown in Table 1.2.

Table 1.2 Structure of financial administration

Own Taxes	Assigned revenues	Grants	Other revenues
I. Village Panchayat			
1) House tax 2) Profession Tax 3) Vehicle Tax 4) Tax on agricultural land	1) Local Cess 2) Entertainment tax 3) Stamp duty surcharge 4) Surcharge on sales tax 5) Minor Minerals	1) House tax matching grant 2) Water supply grant 3) Lighting grant 4) Rural development programmes grant (1-statutory 2&3 adhoc)	1) Non-tax revenues like income from properties such as shops, Bus stands, guest house etc. 2) License fees on D & O Trade 3) License fees on building regulations 4) User charges 5) Misc. revenues.
II. Panchayat Unions:			
Local Cess surcharge on land revenue	1) Local Cess and Entertainment tax	1) Local Cess surcharge matching grant 2) Local roads grant 3) Discretionary grants for entrusted functions like dispensary, maternity centres, minor irrigation (all on adhoc basis) 4) Agency function grant	Income from properties & Misc. Revenues.

Source: Joshi R P and Narwani G S; 2002.

1.6. Existing Planning Process at the Panchayat level

The Gram Sabha is a communion of the villagers which analyses and comes up with development projects every year. Gram Sevaks (volunteers) and the whole community come together and come up with a list of projects that will be forwarded to the Gram Panchayat for screening. The Gram Panchayat in association with the panchayat samiti considers the various aspects of the projects

like funding, effectiveness, etc; and then forwards the plausible projects to the zila parishad which in turn looks into the projects and selects feasible projects out of the lot and considers their implementation. The zila parishad in consultation with the district planning committees and other standing committees comes up with consolidated development plans for the entire district. Thus, there are various points in the above-mentioned process where a decision has to be made and IRAP can be implemented into any of the three tiers of the panchayati raj system. A pictorial representation of the existing planning process is shown in Fig. 1.3.

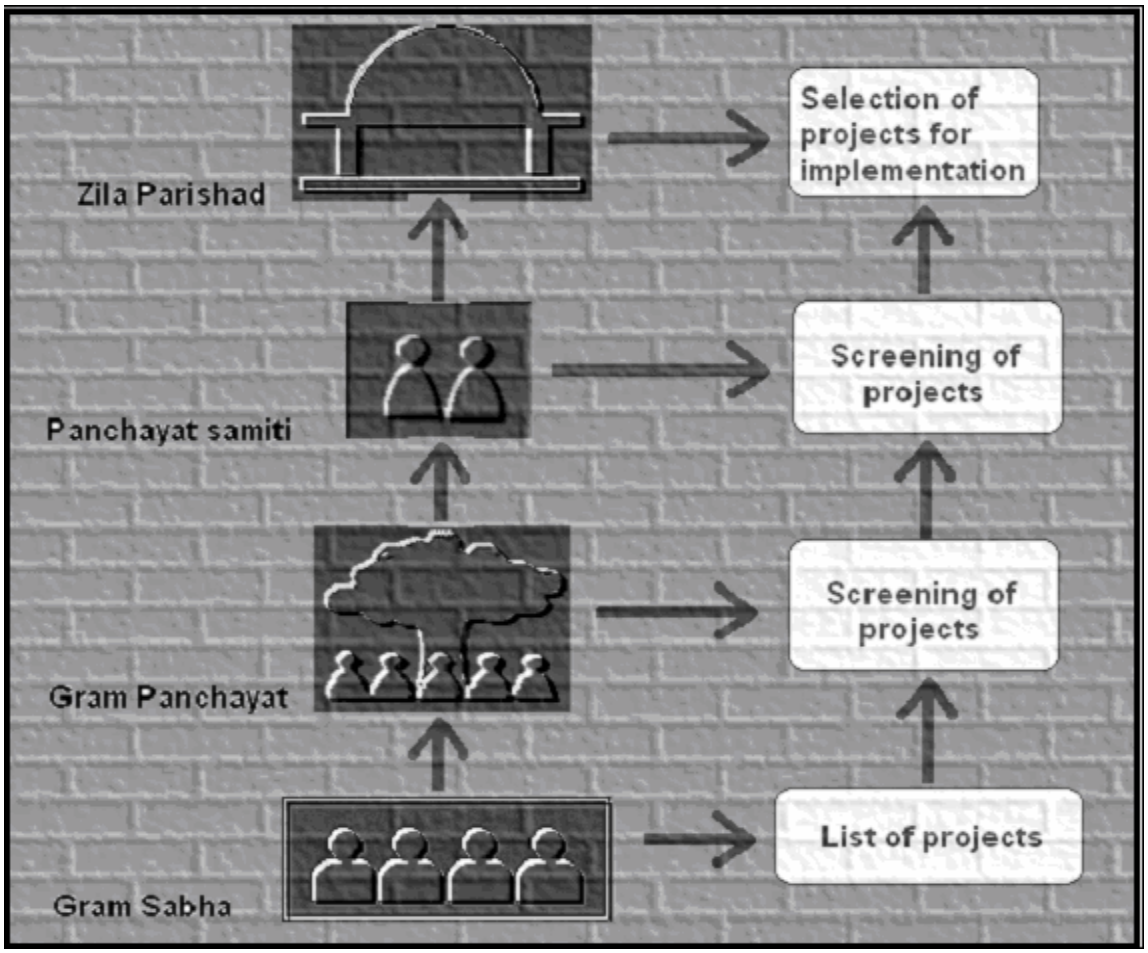

Figure 1.3 Existing Planning Process

It can thus be concluded that the Panchayati Raj institutions have the overall responsibility for social and economic development within their spheres of influence. The productivity of the projects implemented depends on the development and management of the Infrastructure. The Panchayati Raj institutions hold the responsibility of identifying and planning these interventions in the most effective and efficient manner.

1.7 The Need for an Integrated Approach

The impact of transport facility on the lives of the rural poor in India has been insignificant, partly due to the absence of maintenance. Road simply did not last long enough to change people's ways. However, it was mainly due to the fact that roads simply did not succeed in making the places where people wanted to go more accessible. People did not become more mobile; perhaps they could not afford it or perhaps transport services did not improve.

Roads came into being to facilitate the movement of wheeled vehicles. They are of course useful for pedestrians or pack animals but it is unlikely that their improved mobility alone would be sufficient to cover the cost of building and maintaining a road. By making it easier for motor vehicles to operate, a good road can reduce their operating costs or enable them to travel to places they could not before. However, unless the owners actually seize the opportunity to improve transport services or cut fares, they will simply pocket the savings and the people served by the road will benefit little. If the owners pass at least a fraction on to users, then we can expect a multiplier effect as individuals exploit the increased mobility available to them, for example, by marketing perishable products.

Integrated Rural Accessibility planning (IRAP) sets out to capture, through questioning and analysis, the particular pattern of isolation of a community and hence derive a hierarchy of actions to be taken to reduce it. Road improvements are a possibility, but so also are improvements of tracks and footpaths, propagation of intermediate means of transport, measures to improve conventional transport, and relocation of social and economic services. Measures are prioritized by their cost-effectiveness relative to indices of accessibility, preferably set nationally to ensure equity among regions.

In the meantime, road engineers and planners must take as wide a view as their situation allows. Rather than hunting down more refined ways of selecting roads and speculating on the benefits they may bring, they should reflect, together with the population concerned, on what the road is really for (which activities will develop because of its presence) ? Will the people who most need it be able to use it (and what measures should be taken if it appears they cannot)? Finally, are there cheaper ways to bring users and services closer to each other?

In the following chapters, the role of *Integrated Rural Accessibility Planning* (**IRAP)** in making the existing planning process at the panchayat level more efficient and effective has be discussed.

CHAPTER TWO

INTEGRATED RURAL ACCESSIBILITY PLANNING (IRAP)

2.1 Introduction

Access to facilities is a major factor in rural development. A lack of access (Isolation) is perceived as one of the main underlying factors of poverty, particularly in rural areas in developing countries. It also limits the opportunity that people have to improve and sustain their social and economic well-being. To understand the concept of accessibility in the context of rural development, it is important to define the terms Mobility and Accessibility. Mobility is defined as the ease or the difficulty with which people and goods move from one point to another. It is associated with the transport infrastructure as well as the means of travel. Accessibility is defined as the ease or difficulty of reaching a facility or a service. It relates to the availability of the service, its location as well as the mobility aspects. Fig. 2.1 explains the difficulty in accessibility between two villages A and B.

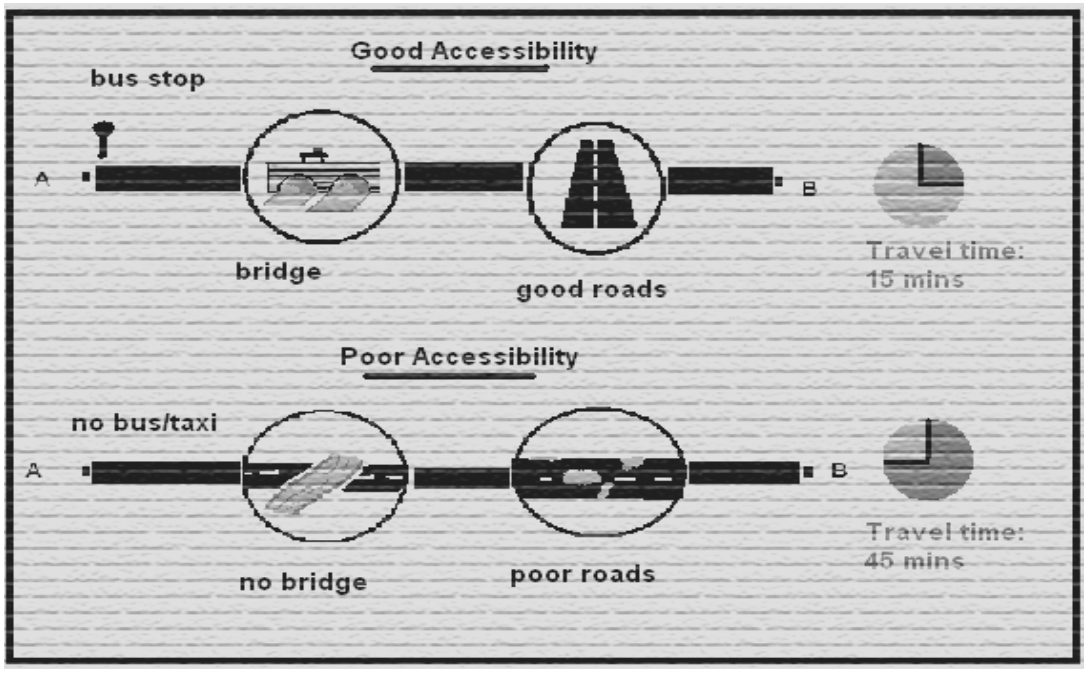

Figure 2.1 Transport Factor in Accessibility

By comparing the above two cases, it can be observed that good accessibility results from a good transport infrastructure which includes footbridges, overbridges, all weather roads, good transport services, etc, Poor accessibility results from bad roads, lack of bridges and transport services. As a consequence, a person using the route with good accessibility can reach B in a shorter interval of time with lesser effort and cost than a person who happens to take the other road. The "transport" factor which affects accessibility has been shown in Fig. 2.1.The other factor that affects accessibility is the "non-transport factor" – distribution of goods and services.

All households need to have access to facilities, goods and services in order to fulfill their basic, social and economic needs. A household's well being depends to certain extent on their ability to access the necessary goods and services identified in the Fig. 2.2. Thus it is very essential for the Panchayati Raj Institutions to address these issues of accessibility in their planning system.

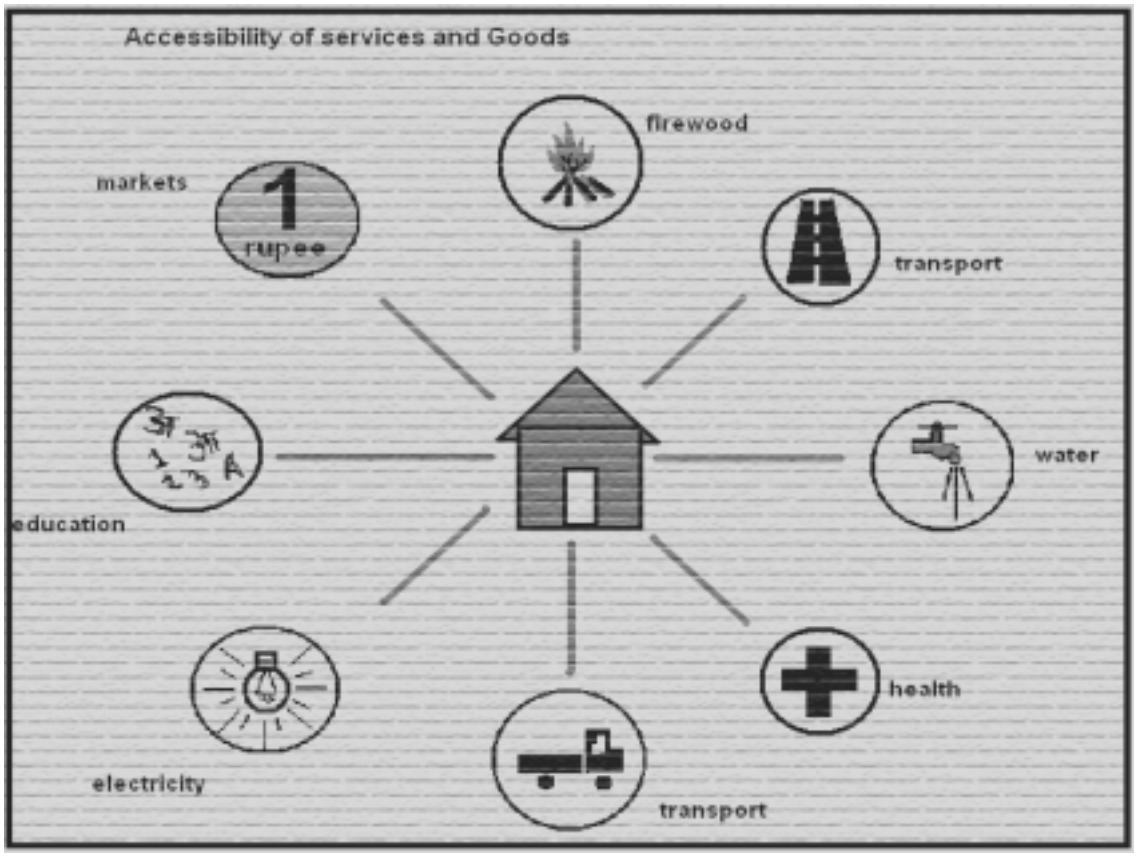

Figure 2.2 Accessibility to Service and Goods

Accessibility has three elements
1. location of the households
2. location of the facilities and services
3. transport system bringing 1 and 2 together

Access improvement can be done by using

1. Transport Intervention – better sitting of basic facilities, goods and services.
2. Non-Transport intervention – improving the mobility of rural people.

The steps involved in determining accessibility interventions are shown in Fig. 2.3.

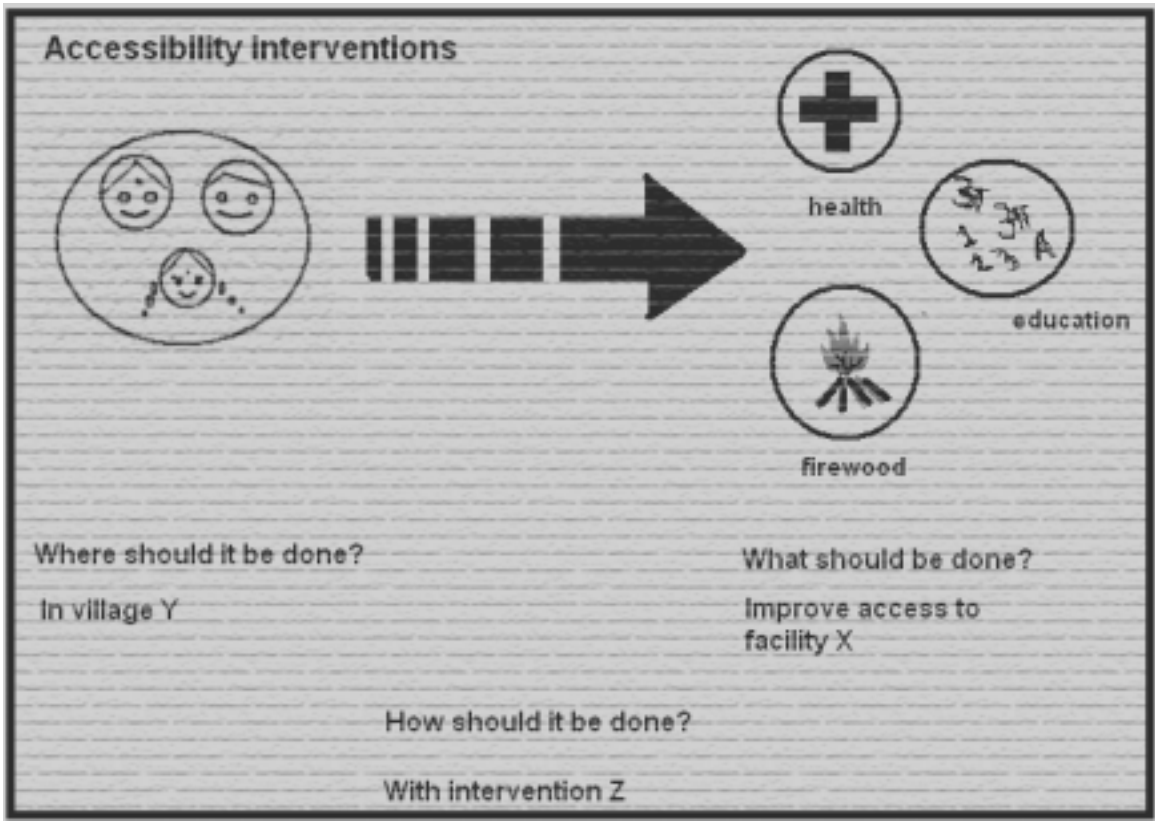

Figure 2.3 Accessibility Interventions

Integrated Rural Accessibility Planning is a multi sectoral, integrated planning tool that addresses the major aspects of access needs of rural households for subsistence, social and economic purposes. It can adapt itself to the existing system and can help to optimize the functioning without altering the intrinsic characteristics of the existing planning system used by the panchayat raj.

IRAP has been developed by the International Labor organization as a planning process for improving access and can be applied at the local government level. IRAP simultaneously seeks to improve the rural transport system and distribution of services and facilities. IRAP is a participatory and pro-active i.e., it involves the beneficiaries in all stages of planning and creates a platform for local planners and villagers to pro-actively plan for their own development.

The objective of the process is improving access to goods and services in rural areas in particular for poor and disadvantaged communities in a cost-effective way.

IRAP introduces a set of planning tools, which are based on the access needs of rural people. It focuses on maximizing the use of local resources.

Figure 2.4 Main Features of IRAP

The existing planning process at the panchayat level has been explained in chapter 1. It was observed there that the whole process beginning with the "list of projects" at the gram sabha level to the "selection and implementation" at the Zila parishad level is marked by decision making steps. The adaptability of IRAP into the local level planning process and its role in making the most cost-effective and efficient decisions are explained in Fig. 2.4. Consider a situation where a critical decision is to be made by the local planners.

There are two villages A and B without any health facilities in them. A hospital is to be built and the local planners have to decide on the location. The decision as to where the hospital has to be constructed is an important one and needs to be analyzed taking into consideration lots of factors. After analyzing the situation carefully and taking all the necessary constraints into consideration, IRAP is applied into the process. With the help of carefully designed planning tools of IRAP, the local planners can come up with a village priority list and a sector priority list. Once the priority list is generated, the project is selected by the local planners. After this, the implementation and monitoring of the project can be done with the help of the necessary funding from the higher tiers of the PRIs and the local community. A pictorial representation of the suggested planning process with IRAP is shown in Fig. 2.5.

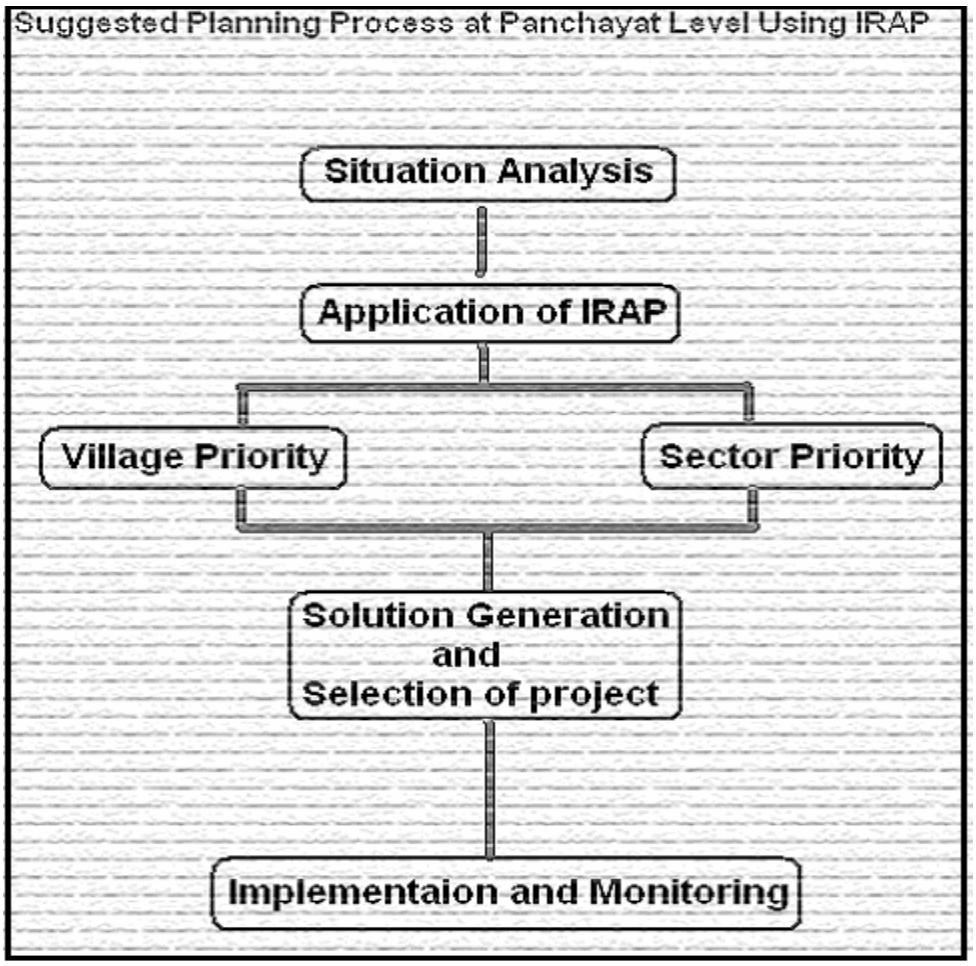

Figure 2.5 Suggested Planning Process Using IRAP

2.2 IRAP Methodology

IRAP process can be divided to three main components – T1, T2 and T3. The overall process is diagrammatically represented in Fig. 2.6

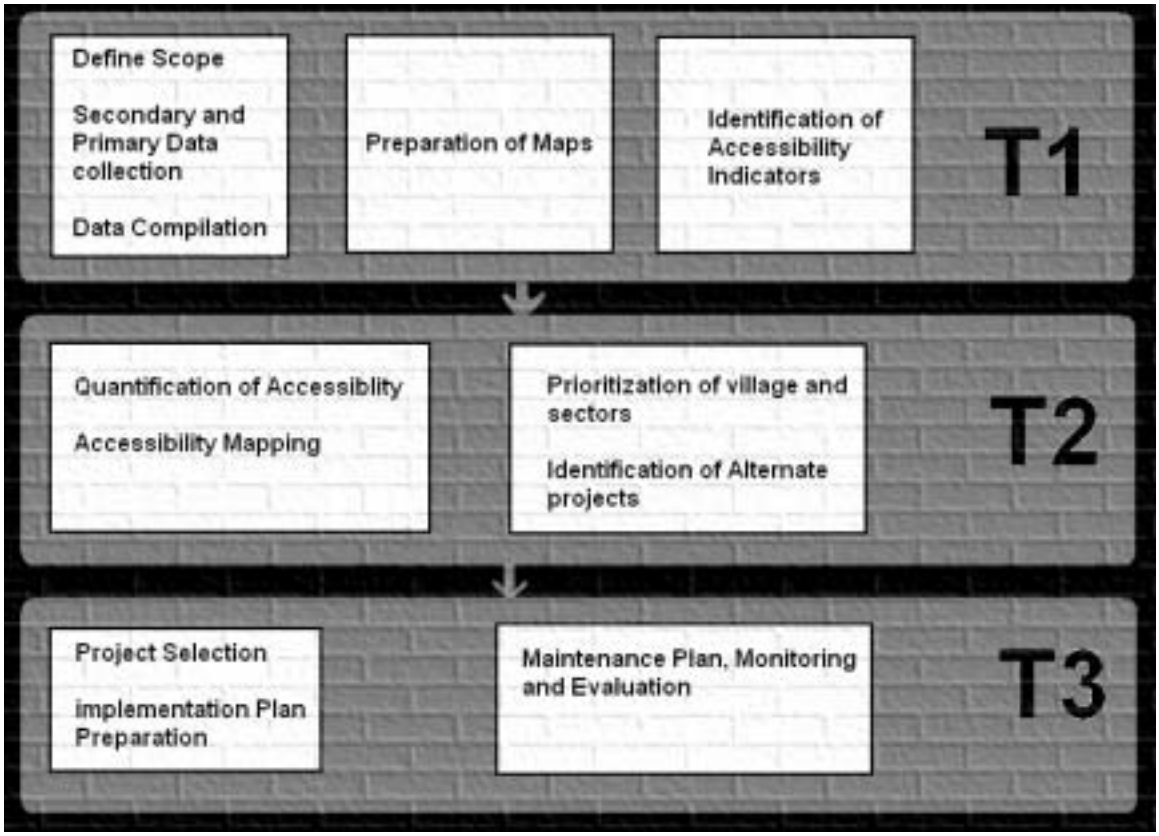

Figure 2.6 IRAP Methodology

In the following chapters, these three important steps in this methodology have been explained in detail. IRAP may be applied at different levels of the three-stage Panchayat Raj system. More and more decentralization process is going on at present and each level is being strengthened in terms of capacity and finance. In the process the Panchayats are being empowered to plan, design and implement development projects within their spheres of influence. Thus, it is felt that IRAP may be most useful at the lowest level i.e. Panchayat level of the present system of governance.

CHAPTER THREE

SITUATION ANALYSIS T-1

The purpose of situation analysis is to identify the access problems in the villages comprising the Gram Panchayat. This is done by focusing on the mobility of the village population and the location of services and facilities. T-1 consists of a set of activities at the end of which we would have all the necessary data to analyze the situation in a wider perspective (Fig. 3.1).

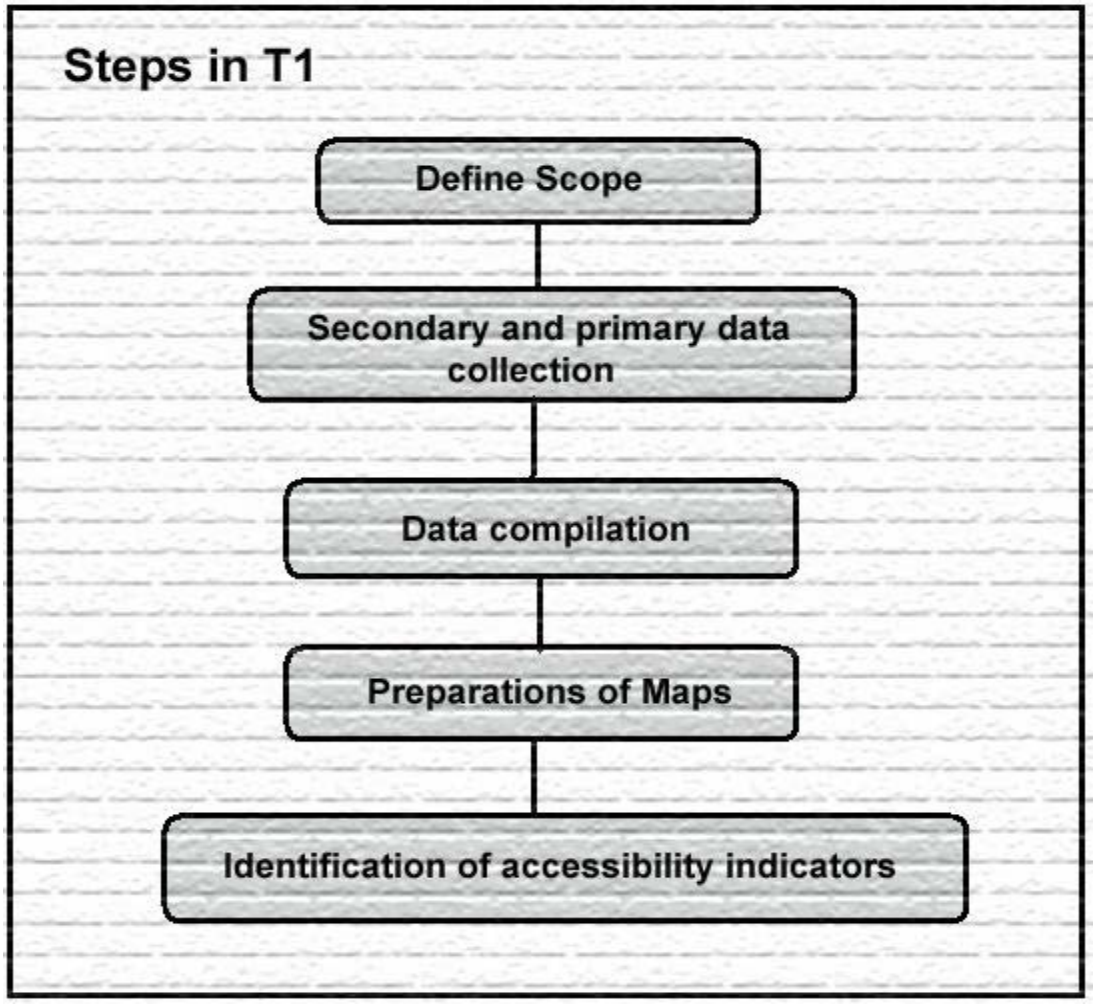

Figure 3.1 Steps in Situation Analysis

3.1. Data Collection

Before we can start data collection, it is essential to define the scope of the project which would ensure that all the data required is collected and that relevant information is not missing. The basis for the decision making process is the data collection exercise. The purpose of this activity is 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 should help us in building an "accessibility database" at two levels, i.e. district level and village level.

3.1.1. District Level Data

District level data should consider the overall situation in the district in terms of socio-economic conditions, the transport facilities, development programs that are related to transport issues. The data obtained from the village level can then be seen in the context of the overall district, for setting priorities and action plans. Some of the important district level data to be collected have been explained in Fig. 3.2.

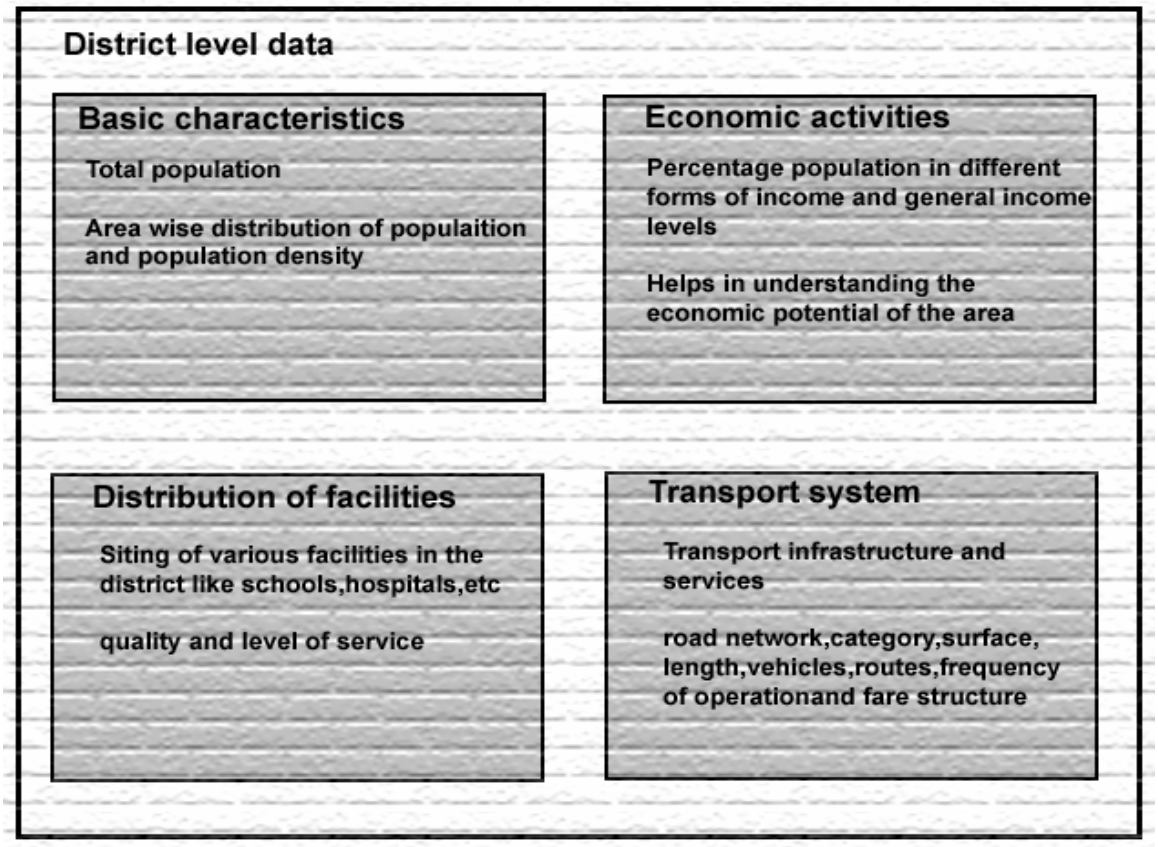

Figure 3.2 District Level Data

Information should also be collected on planned or ongoing projects in these districts. Details of developmental organizations or groups which are active in the

district including government groups, NGOs and community-based organizations should also be collected.

3.1.2. Village Level Data

The district level data is complemented by the village level data. Though secondary data collected at district level gives an indication of the accessibility conditions of the area, the bulk of the information still needs to be collected from the villagers themselves. Primary data at the village level gives a picture of the accessibility needs at the grass roots levels. The information that has to be collected across the various sectors in the villages is described in Fig. 3.3.

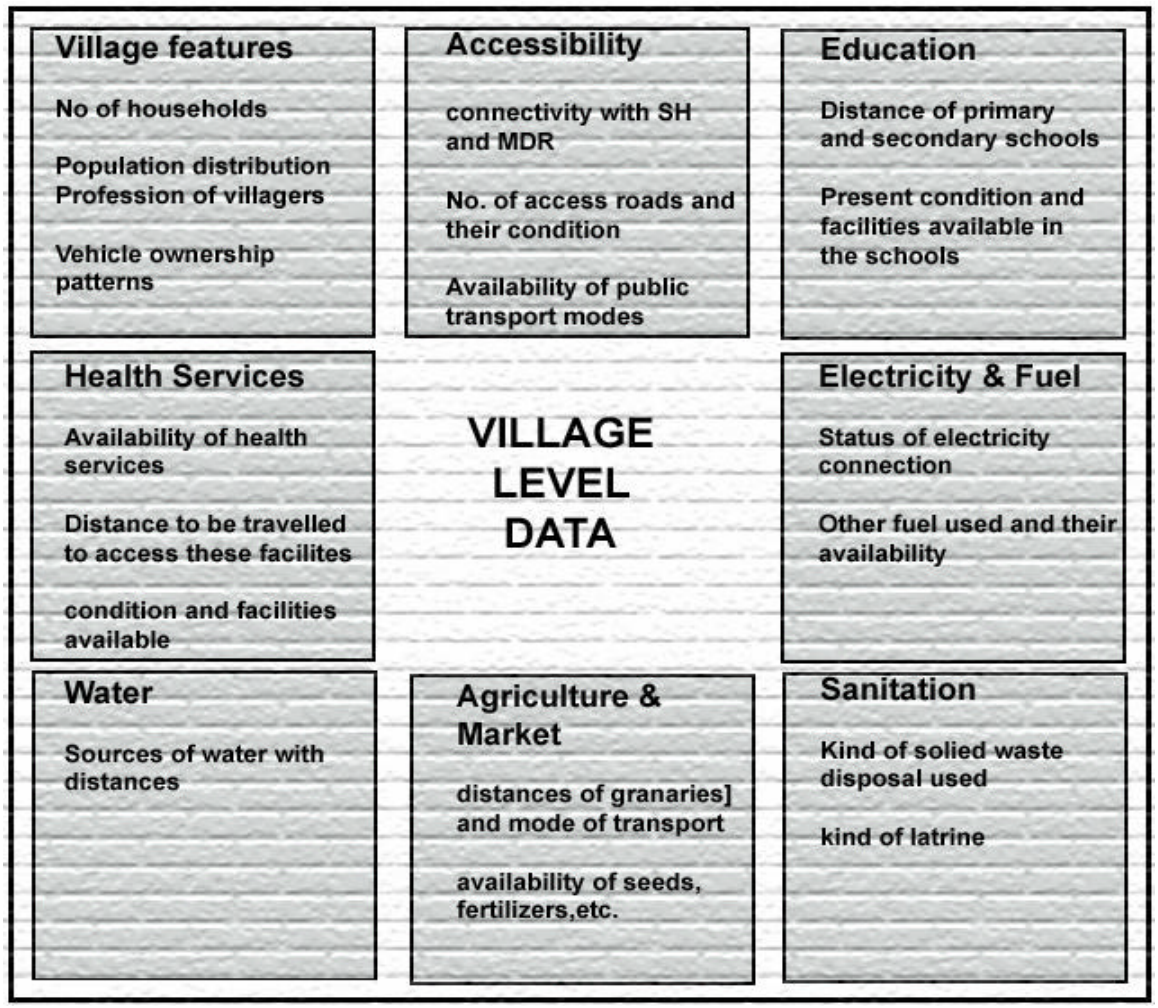

Figure 3.3 Village Level Data

3.1.2.1 Preparation of Questionnaire

After understanding the data needed, a questionnaire is developed. The questionnaire should cover all the aspects mentioned below (Fig. 3.4):

- Primary village data on transport time, means of transport and ease or difficulty in reaching the service or facility in each sector

- Data on each facility in particular sector, such as location, condition and quality of service, queuing time as perceived by the villagers and catchment areas of the facilities.
- Accessibility problems as perceived by the village community regarding travel time, means of transport, sectors, etc,
- Priorities for interventions as proposed by the villagers to address their predominant access problems.

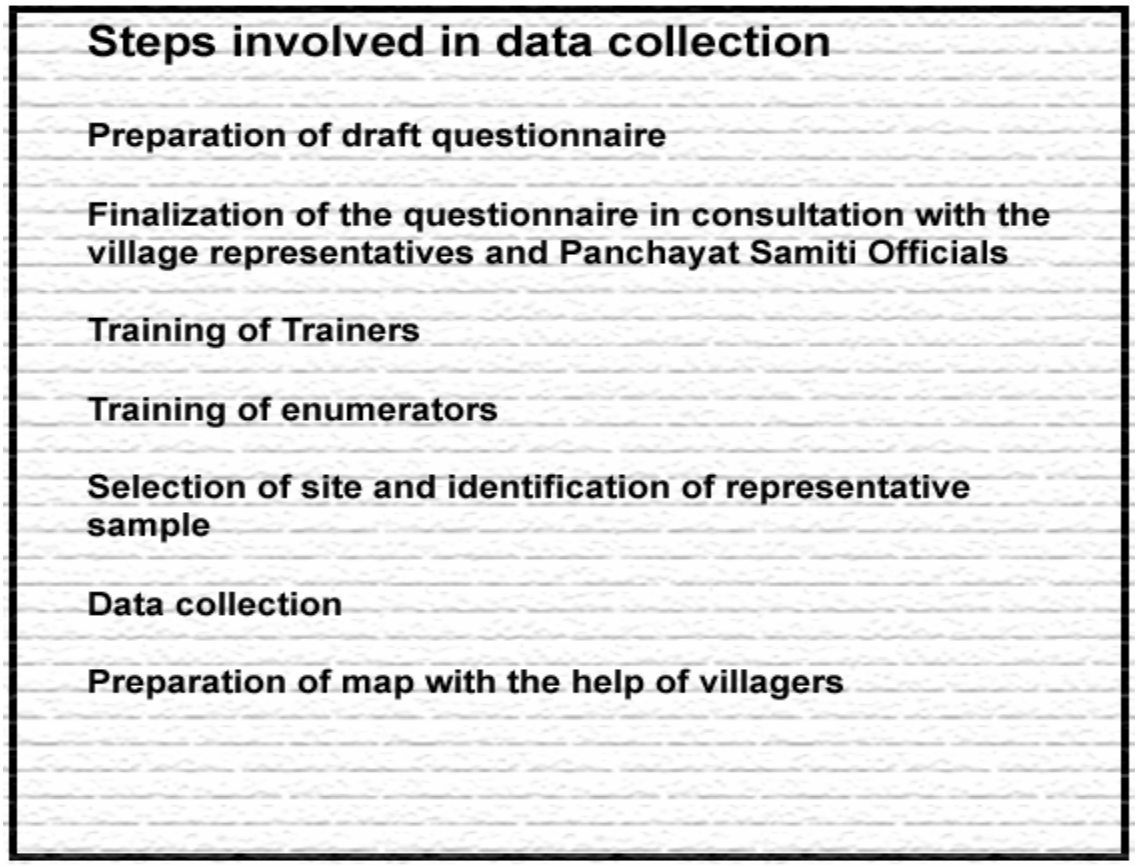

Figure 3.4 Steps Involved in Data Collection

Based on the above aspects, a **draft questionnaire** is prepared and presented to a forum. The forum consists of the village representatives, Panchayat samiti members, and representatives from various governmental and non-governmental organizations. The forum members go through the draft questionnaire and suggest changes. Based on their recommendations, the necessary changes are made in the draft questionnaire and the final draft is prepared. The sample questionnaire used for survey in Jhunjhunu district, Rajasthan is attached in Annexure-I.

Plate No. 1 Finalization of the Village-Level Questionnaire in consultation with the village representatives.

3.1.2.2 Training of Enumerators

Trainers can be representatives from voluntary self help groups, representatives from the villages or local level planners. They should be trained by qualified personals on the purpose of the survey and the art of preparing a questionnaire. The people who conduct the data collection exercise may not be fully conversant with the techniques used in the data collection surveys. Therefore, it is necessary to equip the enumerators with appropriate tools and knowledge. Trainees should be fully familiar with techniques and must understand the purpose of the exercise. The survey should involve members of the Gram Panchayat and Panchayat Samitis and local volunteers with supervision by the Zila Parishad officials. Involving local enumerators would create a sense of ownership among the officials and participation on a longer-term basis. Further, local knowledge of the geographical, social, economic and cultural aspects is an added advantage.

Enumerators are responsible for the following tasks:

- To organize and pre-arrange field visits in agreement with their supervisor.
- To complete the interviews in all allocated villages in accordance with the planning
- To ensure that all the settlements of each village are represented and that the key informant group is truly representative of the village.
- To ensure that consensus is reached on all answers given.

The enumerators and other participants will be new to the whole exercise of surveying. As a result a well structured supervision with a sufficient number of efficient supervisors is essential. It is recommended that the people who will be involved in the analysis and interpretation of the information be responsible for supervision. Supervisors are responsible for the following tasks:

- Give logistic support to the enumeration teams
- Supervise their allocated enumeration teams in the field, by regular visits on a rotational basis.
- To check, discuss and correct the information needed.

Plate No. 2: Training of the Enumerators

3.1.2.3 Questionnaire survey

After **finalizing the questionnaire**, the first step for data collection is to make an inventory of the number of villages to be covered in the survey. Organization of enumeration groups with their supervisors should be done before the training begins. The gram panchayats should be informed in advance. Collection of village level data is done by interacting with the representatives from the villages and the local level planners and by surveying with the help of surveyors and enumerators. While interacting with the village community then it is necessary to involve people from all the sectors to get a clear multi-sectorial view of the situation. The forum should consist of the sarpanch, gram sevaks, teachers, village elders, women epresentatives, farmers' representatives, youth, volunteers from locally active NGOs. (Fig. 3.5).

Figure 3.5 Forum Members

Once the survey process is over and the quality of the data collected is validated. The final step in data collection is the compilation of the questionnaires. All the primary and secondary data forms are collected, sorted out and delivered to the planning team. Informal interaction does help to gain information which can serve as the starting point for some detailed analysis.

Plate No. 3: Village-Level Data Collection: Efforts need to be made to get representation from all sections of the villagers

Plate No.4: Informal discussions with different groups separately help to understand the problems of the villagers better

3.1.2.4 Quality Control

Emphasis should be laid on the need to collect good quality data. The data collected is the basis for the planning process and the process might become less effective if the data is inaccurate or irrelevant. Wrong data may result in less than optimal results. The data should be accurate, reliable and recent. It is the responsibility of the supervisor to ensure that the data collected by the enumerators is consistent and reliable.

3.1.2.5 Mapping

In order to prepare the accessibility maps, the first step is to prepare a base map of the study area showing the locations of households, facilities and services, and transport infrastructure. Such a map usually will be available for a Panchayat Samity at the local government offices. Thus for a map of the panchayat, a cluster of villages or a village it is suggested that it may prepared during the data collection process. The main features of a map are shown in Fig. 3.6. The villagers should be encouraged to draw the map themselves. It should be large enough to be visible from a distance. The facilities and services should be located by the villagers and proper symbols needs to be used for uniformity. Maps can be used as an effective medium of communication between the planners and village community. They can also be used as a monitoring tool for the levels of access in particular areas. The aggregation of the data mentioned in Fig. 3.7 will help to classify each village in a Panchayat or a Panchayat Samiti using accessibility indicators.

Figure 3.6 Features of a Base map

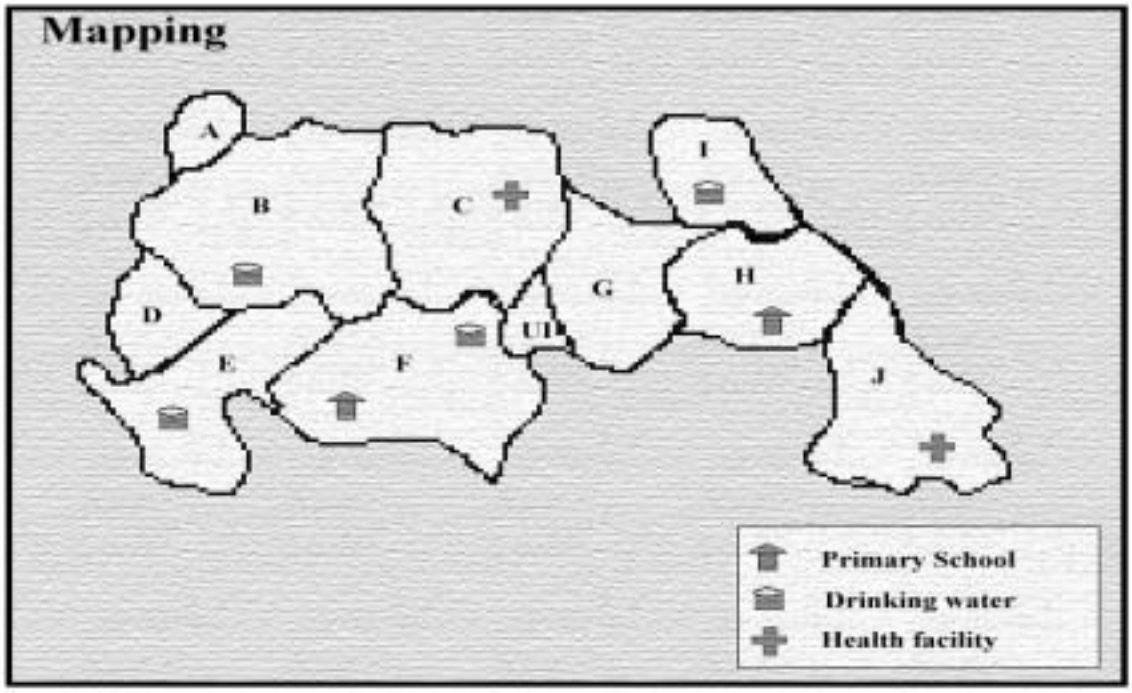

Figure 3.7 Mapping

3.2. Data Entry and Analysis

3.2.1. Computerization of data

The data collected from the survey is in the "raw" form. To understand the data collected in a comprehensible way it needs to be processed and stored in the required form. It is processed and computerized into tables presenting the data for the different sectors and villages. The information contained in these data banks can be used by the local planners for a variety of information and planning purposes. The data entry and analysis step should be preferably conducted at the

lower most level of the local planning process where computing facilities are available. Fig. 3.8 gives a block diagram of the process.

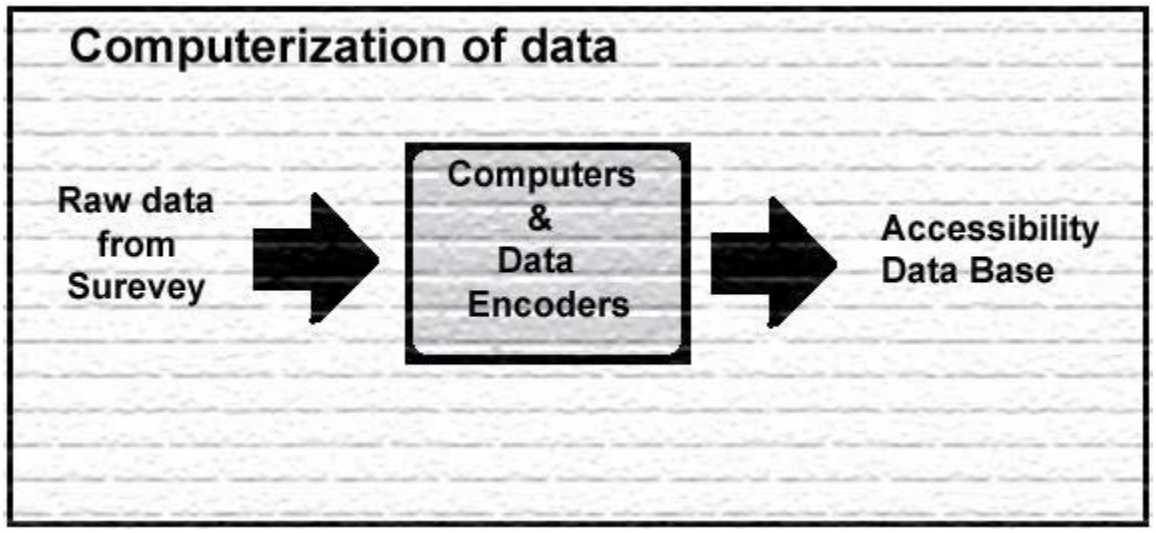

Figure 3.8 Data Compilation

3.2.2. Resources

The following equipment would be needed for the data entry process

- Personal computers
- Appropriate software for data entry and analysis
- Storage devices
- Printers

Human resources requirement will be as follows:

- Data entry operators will be based in the district headquarters. The number of operators will depend on the size of the task and timeframe of the project
- A member of the Zila Parishad will be appointed as the data entry supervisor who will be responsible for the progress and quality of the data entry operation.

3.2.3. Organization of data:

The purpose of data entry is to sort out the raw data collected from the survey into a comprehensible and useful information bank which will form the basis for the panning process. Good planning and organization of the work for the data entry stage is essential to bring out an effective data base.
The following steps should be followed in the process of data entry:

- A coding procedure should be adopted for the questionnaires. The code number should be representative of the village and panchayat samiti to which it belongs
- A suitable back up plan to avoid loss of data
- Supervisors should check the data entry process and correct any mistakes
- A time plan should be set up for coding and data entry

3.2.4 Output

The final output of the data entry procedure is a completed Accessibility Data Base (ADB) which can adapt to any other data base format. The database consists of data, ordered by village, panchayat samitis and blocks. The database is validated for any incompatibility and is ready for further processing and analysis.

3.3 Preparation of Accessibility Profile

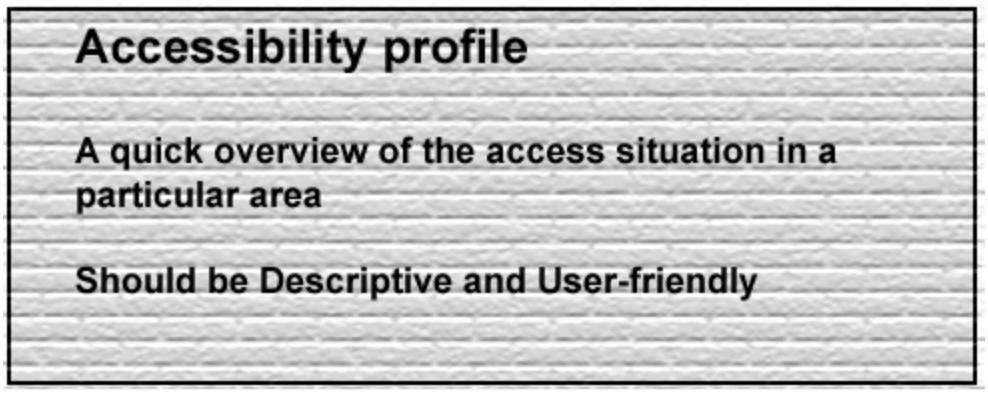

Figure 3.9 Accessibility Profile

The Accessibility Data Bases provide the basis for the preparation of the accessibility profile (Fig 3.9). This profile briefly describes a district/samiti and summarizes access conditions. It should be of a descriptive character, more reader friendly and could be disseminated on a larger scale. It should provide a written summary as well as a numerical assessment of access conditions in the area. The accessibility profile together with the indicators will reflect levels of access in the individual villages on a sectoral basis. Aspects to be covered in accessibility profile is shown in Fig. 3.10.

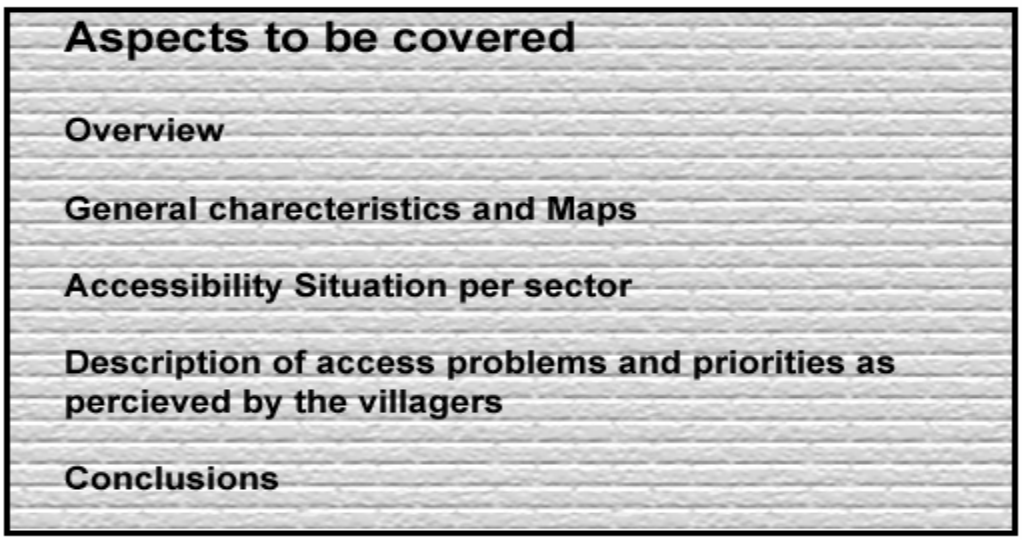

Figure 3.10 Aspects of Accessibility Profile

3.4 Example of the Presentation of Accessibility Profile

To explain the representation of accessibility profile, an example has been shown from the IRAP study conducted in Jakhod Panchayat in Rajasthan. The name of the villages in the Panchayat and the number of households are shown in Table 3.1.

Table-3.1 Number of Households in the Villages

Village	Number of Households
Jakhode	700
Netrampura	120
Bhisanpura	180
Painisingpura	125
Bhudanpura	120
Rajveerpura	90
Khusalpura	60

Plate No. 5: Formal Inauguration in the presence of the Local Level Officials and Elected Representatives helps to sensitize the villagers about the project.

3.4.1 Vehicle ownership pattern

Camel carts play an important role in the transportation of goods in the villages of this Panchayat and thus a number of households own them. The roads in the villages are mainly earth roads and have thick dust cover almost all throughout the year except for rainy seasons, when they become muddy. Such a situation does not encourage the use of bicycles and two-wheelers and thus their number is not very high (Table-3.2). Most of the villages are dependent on the near by town for bank, hospital, market, post office, court, police station and administrative office facilities.

Table-3.2 Vehicle Ownership Pattern in the Villages

Village	Bicycle	Camel Cart	Two-wheeler
Jakhode	1	4	2
Netrampura	9	20	18
Bishanpura	25	15	5
Painisingpura	2	10	1
Bhudanpura	10	14	4
Rajveerpura	5	8	2
Khusalpura	25	5	0

3.4.2 Road connectivity and transport services

The Panchayat Head Quarters, namely Jakhode is connected by Black top road with the nearest town Surajgarh and public transport services are available (Tables 3.3). The bus services are not frequent and very often do not follow the schedule strictly. This creates problems for the passengers, who need to wait at the bus stop for a long period of time. The gap in the demand and supply of transportation services has been partially filled by Jeeps in recent times. Often they provide services to interior villages through earth roads. They do not have a schedule and are not always available when needed. Most of the times the jeeps are over crowded and also they do not have good track records in terms of safety.

All the villages in the Panchayat are connected to Jakhode directly or indirectly by road. Walking is the primary mode of transport through these roads. However, camel carts are quite popular for the transportation of goods. To access to most of the facilities available in Surajgarh, the villagers need to come to Jakhode to avail public transport.

Table 3.3 Road Connectivity of the Villages in Jakhode Panchayat

Village	Connected to Villages	Length of road (Km)	Road Type	Availability of Public transport
Jakhode	Surajgarh	7	Blacktop	Bus, Jeep
	Satnali	15	Black top	Bus, Jeep
	Painsingpura	3	Earth	-
	Bhudanpura	2	Earth	-
	Rajveerpura	4	Earth	-
	Netrampura	0.7	Earth	-
Netrampura	Bishanpura	1	Earth	-
	Lotiya	10	Earth	-
	Dhingria	10	Earth	-
Bishanpura	Pathadia	5	Earth	-
	Pilani	7	Black top	Jeep
Painsingpura	Manipal Vaas	3	Earth	-
	Bhudanpura	2	Earth	-
	Khmael	3	Earth	-
	Kusalpura	4	Earth	-

Bhudanpura	Bauthadi	5	Earth	-
	Khudkaloth	3	Earth	-
	Mannipal Vaas	6	Earth	-
	Bishanpura	2	Earth	-
Rajveerpura	Kushalpura	7	Earth	-
	Surajgarh	12	Earth	-
Khusalpura	Bishanpura	3	Black top	-
	Rajveerpura	7	Earth	-

3.4.3 Availability of basic facilities

All the villages in the Panchayat have Primary schools and there is a Secondary school in Jakhod. The statistics related to schools and primary health units is shown in Table 3.4.The condition of the school buildings is satisfactory in all the villages. The main problem is the low number of teachers and the absence of basic infrastructure facilities. There is a primary health care centre in Jakhod, but the facilities and services available are unsatisfactory. This condition forces the villagers to go to the nearest town where better health care services are available.

Table 3.4 Availability of Educational and Health Care Facilities in the Villages

Village	Primary School	Secondary School	Primary Health Unit
Jakhode	v	v	v
Netrampura	v	X	X
Bishanpura	v	X	X
Painsingpura	v	X	X
Bhudanpura	v	X	X
Rajveerpura	v	X	X
Khusalpura	v	X	X

v Available X Not-available

3.4.4 Distances to Agriculture related services

The primary profession of most of the villagers in the Panchayat is agriculture and thus access to services related to agriculture is very important for them. But none of these facilities are available in any of the villages in the Panchayat. The villagers need to travel quite a long distance to avail these services (Table 3.5).

Table 3.5: Distances (in Km) between the Villages and a Few Selected Services

Village	Distance in Km				
	Seed sale center	Fertilizer and pesticide	Grinding mill	Animal feed	Gramin Bank
Jakhode	7	7	7	7	7
Netrampura	11	11	11	11	11
Bishanpur	9	9	9	9	9
Painsinghpura	12	12	12	12	12
Bhadanpura	8	8	8	8	8
Rajveerpura	12	12	12	12	12
Khusalpura	9	9	9	9	9

3.4.5 Access to Market:

The main source of income for the villagers is farming and they need to sell agricultural produce in the market. As none of the three Panchayats has such a market the villagers need to travel long distances with their produce to the nearest available market. Usually camel carts and tractors are used for this purpose. All details related to market accessibility are shown in Table 3.6 for all the villages in the study area.

Table 3.6: Details of Access to Market for the sale of Agricultural Produce

Village	Distance	Modes used	Travel time	Travel cast/s (Rs.)
Jakhode	7	Tractor	1 hr.	300
Netrampura	11	Tractor/Camel cart	2 hr./ 2.5 hr.	500/200
Bhisanpura	9	Tractor/ Camel cart	1 hr./ 2 hr.	500/150
Painsinghpura	5	Tractor/ Camel cart	30 min./45 min.	500/150
Bhudanpura	10	Tractor	2 hr.	600
Rajveerura	12	Camel cart/ Tractor	2 hr. /1hr. 30 min	10 per bag
Khusalpura	9	Tractor	30 min.	150

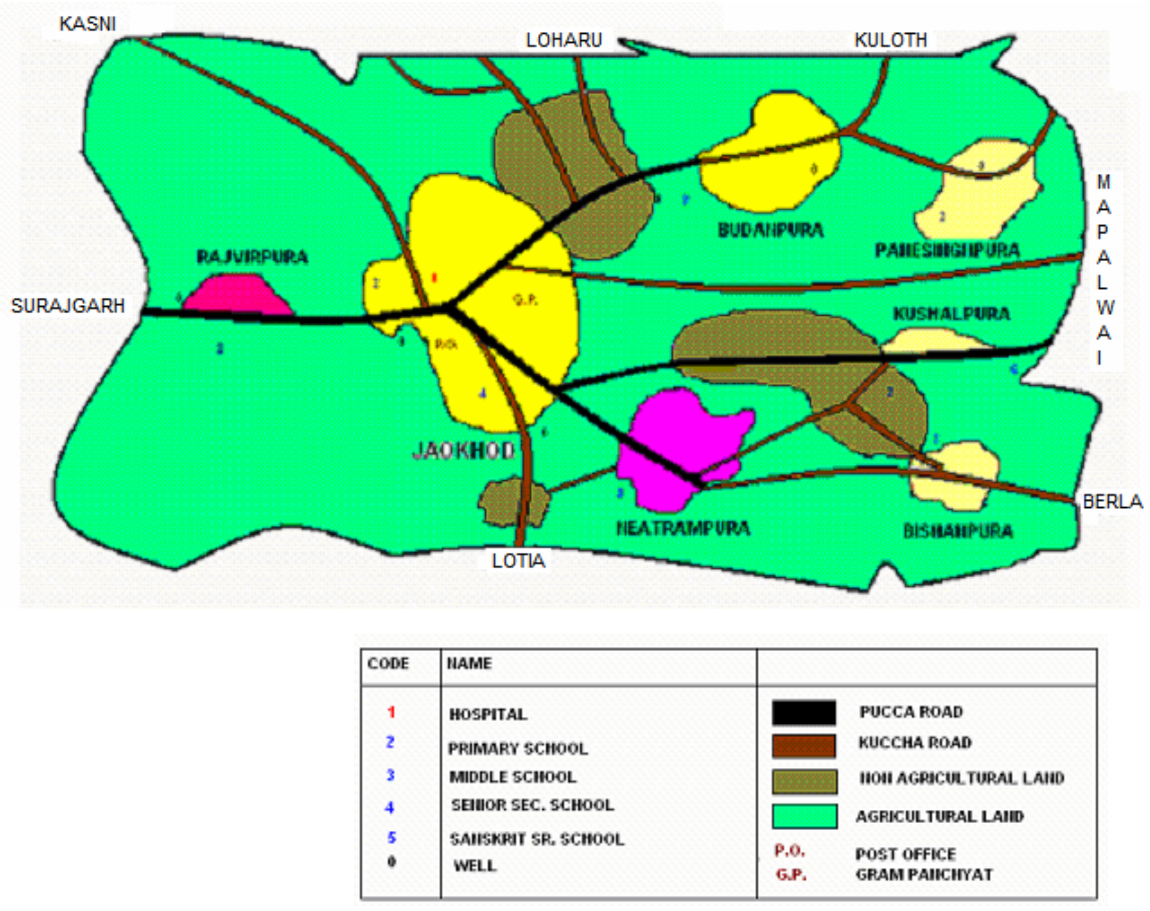

Plate No. 6: Map of Jakhode Panchayat showing the positions of infrastructure and services

3.4.6 Access to Fuel and Electricity

In all the villages, firewood collected from around the village is the main source of fuel. Gas (LPG) is being used only in a few households. Except for Pinigsingpura, gas supply points are not available in the villages and the villagers need to go to the nearby town for collecting gas cylinders. Electricity is available in all the villages though only a few households have connections. One of the reasons for not taking connection may be the fact that electricity is only available for a few hours in a day due to power shortage in the area. Electricity is being used for pumping water from the well to supply in the agricultural fields and its non-availability on a regular basis is a major problem for the farmers. Tables 3.7 and 3.8 show the availability of fuel and electricity respectively.

Table 3.7: Fuels and Availability

Village	Households (%) using		
	Firewood	Gas	Dist. To Gas collection point (Km)
Jakhode	100	0	-
Netrampura	96	4	11
Bishanpura	100	0	-
Painsingpura	95	5	0.5
Bhudapura	96	4	8
Rajeevpura	100	0	-
Khusalpura	100	0	-

Table 3.8: Details of Availability of Electricity

Village	Households (%) having electricity	Availability of electricity (hours) in 24 hours
Jakhode	70	4
Netrampura	42	4
Bishanpura	5	5
Painsingpura	4	4
Bhudapura	15	5
Rajeevpura	7	6
Khusalpura	4	6

3.4.7 Access to Water

Supply of potable water is a major problem in Rajasthan in general. There is no river or stream in the study area and thus the villagers are primarily dependent on tube wells. Most of these tube wells have been provided by the government and in some cases they have been installed by the villagers. In some of the villages water is pumped from a well and stored in a tank. Taps are provided from the tank for the collection of water. In all the villages the water source is available within the village and thus walking time for the collection of water is not very high. However, some times the number of points is not adequate which results in long waiting time. This increases the collection time substantially even though the travel time to the points is not high. (Table 3.9).

Table 3.9 Details of Water Collection

Village	Source of Water	Dist. Of Water Source (Km.)	Mode of Collection	Average time per trip
Jakhode	Tube Well	0.2	Walk	5
Netrampura	Tube Well	0.5	Walk	30
Bishanpura	Deep Well	0.5	Walk	15
Painsingpura	Tank	0.5	Walk	30
Bhudanpura	Deep Well	1.0	Walk	15
Rajveerpura	Tank	0.5	Walk	15
Kushalpura	Tank	0.5	Walk	30

3.4.8 Access to Primary School

The Government has a policy to provide primary school in each and every village. However, the essential facilities such as lavatories for boys and girls, water supply, play ground and library have not been provided in most of the schools and they are in poor shape wherever been provided. To attract students, the Government of Rajasthan has introduced the provision of mid-day meals some time back and this has improved the attendance to some extent. However, in the absence of sufficient number of teachers the quality of education has not improved (Table 3.10). For example, in Bhudanpura, the school is up to Class 8 having 450 students and there are only 4 teachers. Moreover, the villagers generally complain that the existing teachers are not always sincere. These factors have encouraged the establishment of private schools even in remote villages and the villagers: those who can afford, prefer to send their children to these schools.

Table 3.10: Details of Facilities in Primary Schools

Village	Classes offered (Grade)	No. of students in the school	No. of teachers in the school
Jakhode	5	150	4
Netrampura	8	180	4
Bhisanpura	5	60	1
Painisingpura	5	90	2
Bhudanpura	8	450	4
Rajveerpura	5	50	2
Khusalpura	5	30	1

3.4.9 Access to Medical Services

It has already been mentioned that the quality of service provided by the existing health centres in Jakhode is poor. Doctors and nurses are not always available and even basic medical facilities are inadequate. The villagers need to go to the nearest town namely Surajgarh to meet all their medical care. During emergency, especially during night, they take help from the owners of Jeeps in the village for carrying patients to the nearest hospital. Sometimes, camel carts are also being used, which take a long time to reach. Travel details for availing emergency medical services for all the villages are as shown in Table 3.11.

Table 3.11: Travel Details During Emergency Medical Needs

Village	Dist. (km.)	Mode Used	Travel time (min.)
Jakhode	25	Jeep	90
Netrampura	25	Jeep	90
Bhisanpura	13	Jeep	45
Painsingpura	16	Bus	90
Bhudanpura	10	Jeep	30
Rajveerpura	12	Bus	45
Khusalpura	9	Jeep	25

3.5 Identification of Accessibility Indicators

To generate a village priority list/ sector priority list we have to identify the priority areas for access improvement. The tool to be used for identifying these priorities is the accessibility indicator. Accessibility indicators are (Fig 3.11) qualitative and quantitative assessments of different circumstances. Accessibility indicators generally relate to the number of households affected, levels of accessibility expressed in travel distance, travel times and frequency of trips.

Figure 3.11 Use of Accessibility Indicators

Before going into the next step (T2), it is important to identify the accessibility indicators. For instance, accessibility indicators can be defined for transport, Water resources, healthcare, education and markets. To explain their significance and quantification steps, we have defined our accessibility indicators for the pilot project undertaken to be health facilities, safe drinking water and educational facilities in the villages.

CHAPTER FOUR

INTERVENTION IDENTIFICATION AND PRIORITIZATION T-2

The first phase of IRAP (T1) completes the task of data collection, compilation, base maps and identification of accessibility indicators. Now the second phase. T2 will identify village priorities for improving accessibility by sector. Figure 4.1 depicts the steps involved in T2:

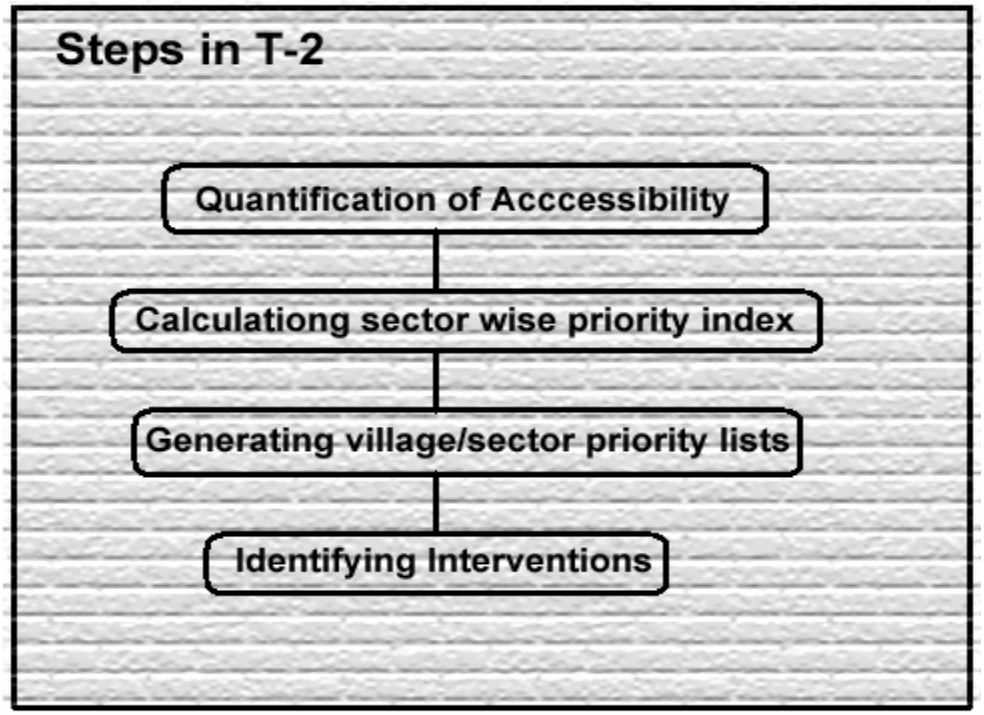

Figure 4.1 Steps in intervention Identification

The outcome of the T2 phase will be a list of priorities by villages and sectors ranked according to their levels of inaccessibility.

4.1. Quantification of Accessibility Indicators

Accessibility Indicators are calculated which show the difficulty or ease with which households have access to goods and services. Accessibility Indicators are defined on a sectoral basis in T1.

The quantitative assessment involves assigning weights to various factors affecting the sectoral index. The factors involved in the quantification are as follow:

- Population factor
- Time factor
- Quality factor

To calculate these factors and thereby the priority index, we use the following expression:

Priority index = population factor + time factor + quality factor

Each of the above factors has two quantifications in them.

- The weight factor assigned to the parameters (N, T, S)
- The weights assigned to each of these parameters based on their significance to the access problem (w1, w2, w3)

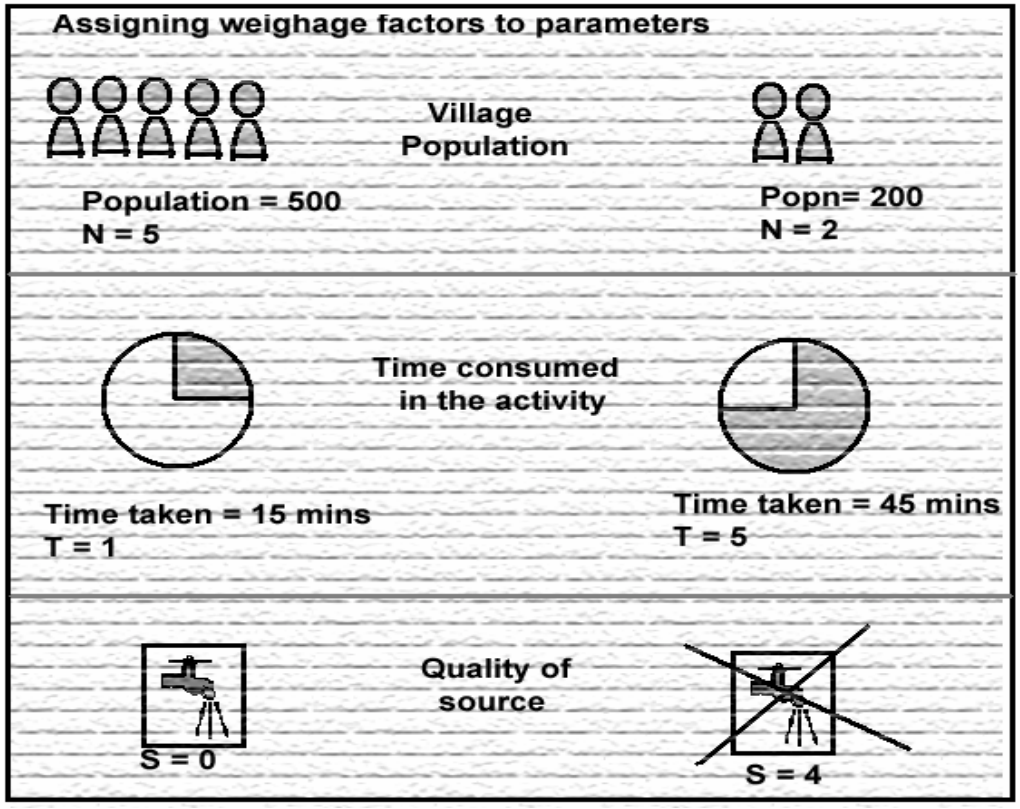

Figure 4.2 Assigning weight factors to Parameters

4.1.1. Population Parameter

This is the number of households that need access to a certain service/facility. If the population is high then the weight factor is higher. These weight factors for different parameters have been assigned a value between 0 and 5, the rating increases with the difficulty in accessibility. For instance, a village with a population of 500 will have a weight factor (N) = 5, whereas a village with a population of 100 will have a lower weight factor, say N=1.

4.1.2. Time Parameter

This is the amount of time it takes to reach the service/facility. The weight factor for this parameter is again assigned values between 0 and 5. If the time consumed is more then the weight factor will be higher. For instance, assume that the time consumed to travel to the nearest water source for village A is 20 minutes and village B is 40 minutes. Village B should get a higher weight factor (say 5) and village B should be assigned a smaller value (say 2) depending on the difficulty in accessing the source.

4.1.3. Quality Parameter

This parameter enables us to incorporate qualitative considerations into the calculation of Accessibility indicators. Again, weight factors are formulated for this parameter in a range of 1 to 5. More the difficulty, higher is the rating. For instance, assume that in village A: source of water is from a well or a natural reservoir near the village and in village B: there is no source of water available then the weight factors for the quality parameter will be 5 and 0 respectively.

The process of assigning weight factors to these parameters can be further explained with the following example. Assuming accessibility indicators to be access to potable water facilities, education and health facilities, the assignment of weight factors can be done as follows:

4.1.3.1 Access to potable water

Parameter 1: No. of households in the village (N)

No. of Households	Weightage factor (N)
Less than 50	1
50-100	2
100-200	3
200-300	4
300 and above	5

Parameter 2: Total Time spent in collecting water
T = Time for the trip x Frequency
(Frequency – No. of visits to the water source per day)

Travel time	Weightage factor(TT)
Less than 30 mins	0
30 mins-60 mins	2
1 Hr - 2 Hrs	3
2 Hrs - 3 Hrs	4
Above 3 Hrs	5

Parameter 3: Source of potable water(S)

Type of Source	Weightage factor(S)
Tube well, Tap water	0
River,Lake or Well	3
Potable water not available	5

4.1.3.2 Access to Educational facilities

Parameter 1: No. of households in the village (N)

No. of Households	Weightage factor (N)
Less than 50	1
50-100	2
100-200	3
200-300	4
300 and above	5

Parameter 2: Total time for reaching school (TT)

Total time	Weightage factor(TT)
Less than 10 mins	0
10 mins-20 mins	2
20 mins-30 mins	3
30 mins-60 mins	4
Above 1 Hr	5

Parameter 3: Teachers to classroom ratio (TC)

Teacher/Class room	Weightage factor (TC)
More than 1	0
Equal to 1	3
Less than 1	5

4.1.3.3 Access to health facilities

Parameter 1: No. of households in the village (N)

No. of Households	Weightage factor (N)
Less than 50	1
50-100	2
100-200	3
200-300	4
300 and above	5

Parameter 2: Total time for trip to health care facility (TT)

Total time	Weightage factor(TT)
Less than 10 mins	0
10 mins-20 mins	2
20 mins-30 mins	3
30 mins-60 mins	4
Above 1 Hr	5

Parameter 3: Availability of basic services (BS)

Access to doctor & medicine	Weightage factor(BS)
Doctor & medicine available day and night	0
Doctor & medicine available only duing the day	3
No doctor available	5

4.2 Assigning Weights

In each of the above factors, the value is calculated by assigning weights to the importance of the parameter in solving the problem. The weights are determined at the panchayat samiti level, using a participatory approach. The panchayat representatives and other representatives are invited for a discussion. In a sectoral basis, they are asked to voice their opinions on the weights that each parameter

should be assigned in their respective villages. These values are tabulated as w1, w2 and w3. After this, the average of these weights is taken for calculating of the priority indices.

Weights	Panchayat - 1			Panchayat - 2			Panchayat - 3		
	Water	School	Health	Water	School	Health	Water	School	Health
W 1	4.0	0.5	8.0	2.52	3.5	1.0	2.0	3.5	2.0
W 2	4.0	1.5	1.5	2.5	3.5	3.0	3.0	3.5	2.0
W 3	2.0	8.0	0.5	5.0	3.0	6.0	5.0	3.0	6.0

Sample calculation for finding the mean:

$$\text{Mean for } W_1 = \frac{4 + 2.52 + 2}{3} = 2.84$$

Similarly mean weights are calculated for all the sectors and tabulated as shown below:

Mean	Water	Education	Health
W 1	2.84	2.50	1.34
W 2	3.16	2.83	2.00
W 3	4.00	4.67	6.66

The next step is to calculate the priority indices for the villages in a sector-wise basis.

Calculation of Sector Priority Index

Sector Priority Index = **(W1 x N) + (W2 x T) + (W3 x S)**

Summation of the product of Parameter weightage factors and Mean Weights.

To explain this step let us consider 4 villages under a panchayat and calculate the Priority indices for Health, education and Drinking Water sector. The outcome of this step is a sector priority list for each village. The village with the highest Priority index in each sector is considered most affected by the problem.

Drinking water facilities:

Water Priority Index (WPI) = (N x w1) + (TT x w2) + (S x w3) [4.1]

Village	N	W_1	T	W_2	S	W_3	WPI
Village A	2	2.84	5	3.16	3	4.00	33.48
Village B	3	2.84	2	3.16	1	4.00	18.84
Village C	3	2.84	3	3.16	3	4.00	30.00

Educational Facilities:

Educational Priority Index (EPI) = (N x w1) + (TT x w2) + (TC x w3) [4.2]

Village	N	W_1	TT	W_2	TC	W_3	EPI
Village A	2	2.50	2	2.84	5	4.67	34.03
Village B	3	2.50	2	2.84	5	4.67	36.53
Village C	5	2.50	2	2.84	5	4.67	41.53

Health facilities:

Health Priority Index (HPI) = (N x w1) + (TT x w2) + (BS x w3) [4.3]

Village	N	W_1	TT	W_2	BS	W_3	HPI
Village A	2	1.34	2	2.00	3	6.66	26.66
Village B	3	1.34	4	2.00	3	6.66	32.00
Village C	3	1.34	2	2.00	3	6.66	28.00

4.3 Identification of Interventions

In each sector, the panchayat with the highest priority index in that sector is considered to be the most affected by the accessibility problem. Once the priority index is arrived at, the following important questions need to be answered so as to identify the possible interventions. For instance, in the case of accessibility problems related to drinking water the likely questions and solutions will be:

What should be done?

Improve access to drinking water facilities in the village.

Where should it be done?

The parameter that has the highest partial fraction contributes the most to the problem. An intervention has to be made there.

What should be done?

An intervention can be either a transport intervention or a non-transport intervention.

Non transport Intervention – Digging a well

Transport Intervention – Providing a means of transport for the Villagers (mechanical / animal drawn)

PROJECT PREPARATION T-3

The T-3 Phase of the IRAP methodology discusses the various projects that can be implemented to improve accessibility in the affected villages with a view to best project is select. The various steps involved in T-3 shown in Fig 5.1 are discussed in this chapter.

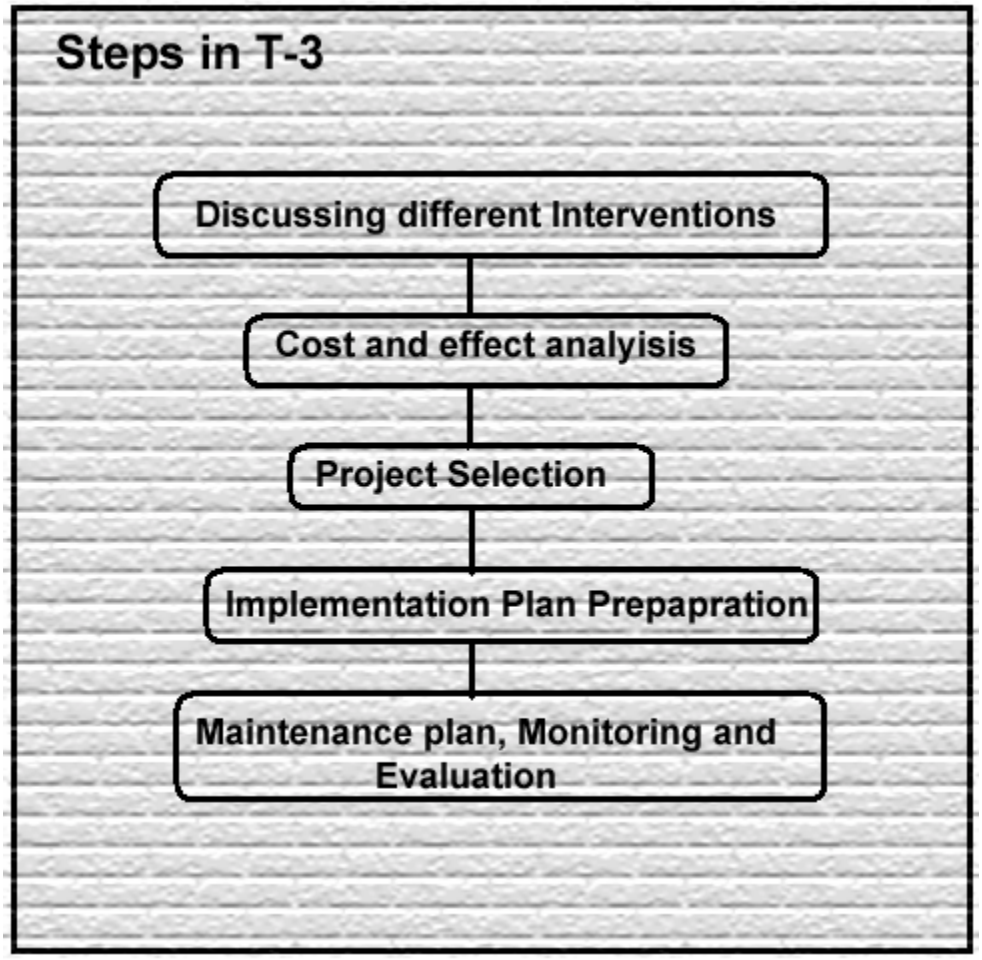

Figure 5.1 Steps in Project Preparation

5.1 Project Ideas at Village Level

The Gram Sabha and the forum will brainstorm the possible interventions to improve access in the priority villages. This is to encourage a participatory approach among the beneficiaries and make them responsible for their development. All the representatives should be allowed to express their ideas in the forum. There might be conflict among the forum members. Through a process of discussions and voting, the local planners will select those projects it would consider feasible. It is important that the forum members should be fully informed about the significance of the Indicators, Accessibility maps and the Priority lists.

Plate No.: 7 Training of the Villagers on the Quantification of Accessibility, mapping and for the Identification of Alternative Projects

5.2 Preparing Cost-Estimates

The planners need to come up with a rough estimate of the cost of the projects. These estimates are called "Eye Cost Estimates" and are based on cost of projects already undertaken and completed. While dealing with past estimates, it is necessary to look into the "Inflation Factor" to come up with a rough estimate of the present cost. The cost estimates help the planners to have an idea of the amount of money that would be required for the intervention. The Eye Cost Estimate should be compared with the funds available with the panchayat. If the project is too expensive and is beyond the financial limits of the Gram Panchayat, it can be forwarded to the higher institutional level of the PRIs. The Eye Cost estimation will be further used in analyzing the project effects in terms of cost-effectiveness.

5.3 Estimating Project Effects

Estimation of the effects that an intended Intervention would result in, is an important and challenging task for the planning team. The objective of this step is to evaluate the changes in the Accessibility Indicators, assuming that the

Intervention has been made and calculating partial fractions for the interventions. By simulating this, the effectiveness of the Intervention can be deduced.

The effects assessment should be made on two grounds.

- Effect assessment of Non-transport Intervention.
- Effect assessment of transport Intervention.

5.3.1 Sample calculations on improving accessibility to Water

Sample calculations for improving the accessibility to water have been taken from the pilot study carried out in Jakhode Panchayat. For a village, namely Bishanpura the various parameters required for the calculation of Water Priority Index (WPI) were as follows:

Number of Households in the village	180
Time taken for water collection per trip	15min
Average number of trips needed per day for water collection	15
Source of water	Well

The weight factors for Number of households (N), Travel time (TT) and Type of source (S) were 3, 5 and 3 respectively (refer to subsection 4.1). The corresponding weights on N, TT and S were 2.84, 3.16 and 4 (the procedure has been discussed in sub-section 4.2). The WPI value was then calculated using Eq. 4.1 as:

$$\begin{aligned} WPI &= (3 \times 2.84) + (5 \times 3.16) + (3 \times 4) \\ &= 8.52 + 15.8 + 12 \\ &= 36.32 \end{aligned}$$

The number of households in a village is considered as a parameter for prioritization and cannot be used for improving the accessibility level in a village. Thus the only two parameters that can be used are the travel time and the quality of water. Score on travel time is very high (5) and the score on quality of water is 3. There is enough scope to improve the scores on both the parameters. Let it be considered that a number of alternative proposals are floated and after deliberations the following alternatives are considered feasible:

- Encourage the villagers to use animal drawn vehicles;
- Construct a tank by the side of the well with a number of taps so that waiting time for collection of water is reduced.
- Provide a new bore well and a tank with a number of taps

Now each of these alternatives is to be analyzed in detail in the forum and a rough estimate on cost will also be worked out. For example, in a particular case study it is found that very few households are having animal drawn or motorized vehicles.

Those who have any vehicle will prefer to use them for transporting goods in bulks to the nearest town or the market. It may also be agreed upon that the use of vehicles is an individual household decision and the planners do not have any say in this matter. Also it may be felt that getting loans for purchasing animals and animal-drawn vehicles from banks is also not possible. Considering these factors this alternative may be discarded altogether.

The next alternative i.e., the construction of a tank with tap connections by the side of the existing well is found to be feasible and it is roughly estimated to cost about Rs.70000 including the cost of pump, tank and electricity connection. This investment will certainly improve the collection time for water and it is estimated that the score on collection time will become 3 against the present value of 5. With this improvement the Priority Index for water for the village will be 30. This option may be named as Feasible Alternative-1.

The last option (Feasible Alternative-2) of providing a bore well will cost about Rs.270000 including the construction of a tank with tap facilities. This will not only reduce the water collection time, but also will improve the quality of water used by the villagers. With the addition of this facility it is expected to reduce the average water collection time substantially as there will be two sources in the same village. It is agreed upon by all that the score on water collection time will become 2 against the present value of 5. Since the quality index for water from bore well is 0, the Water Priority Index will become 14.84. The first feasible alternative reduces the Priority Index value by 17.4% and the second alternative reduces it by 59%.

To help in decision making, two more parameters, namely Investment per1 % decrease (ID) in WPI and investment per household may also be calculated. Investment per 1% decrease in WPI is calculated by dividing the total investment in rupees required for the project by the percentage decrease in WPI value. The value of investment in rupees per household (IH) is calculated by dividing the total investment required in rupees for implementing a project by the number of households expected to get benefit from the project.

It may be noted that the final decision for selecting the possible alternative will depend on the funds available and these parameters are expected to help the decision makers in making decisions. From the Table 5.1 it is very clear that the second alternative should be preferred. But the decision will depend on the availability of fund. In the absence of sufficient funds, the first alternative will partially improve the accessibility level for water.

Table 5.1 Comparison of Alternative Solutions for Improving Access to Water

Feasible Alternatives	New WPI value	% decrease in WPI value	Total investment in Rs.	Investment per 1% decrease in WPI (ID)	Investment in Rs. Per household (IH)
1	30.00	17.4	70000	4023	389
2	14.84	59.1	270000	4569	1500

5.3.2. Sample Calculations for improving accessibility to Education

For the pilot study in Rajasthan, only accessibility to primary school was considered for detailed analysis. In the recent times, the Government of Rajasthan has put substantial emphasis on primary education and thus to have one school in each village has become the norm and thus the study does not show very long travel times in any of the villages.

Sample calculations for improving the accessibility to primary school has been taken from the pilot study for village Jakhode. The various parameters required for the calculation of Education Priority Index (EPI) were as follows:

Number of households in the village	700
Average walking distance to school	12min
Number of students in the school	150
Number of classes (up to standard)	5
Number of teachers in the school	4

The weight factors for Number of households (N), Travel time (TT) and Teacher-student ratio (TC) were 5, 2 and 5 respectively (refer to subsection 4.1). The corresponding weights of N, TT and TC were 2.50, 2.84 and 4.67 (refer to sub-section 4.2). The Education Priority Index was then calculated using Eq. 4.2.

$$EPI = 5 \times 2.50 + 2 \times 2.84 + 5 \times 4.67 = 41.53$$

The number of households in a village is considered as a parameter for prioritization and cannot be used for improving the accessibility level in a village. Thus the only two parameters that can be used are the travel time and the teacher student ratio. Score on travel time was not very high (2) as the school was located with in the village and thus there was limited scope to improve on travel time. The score on the teacher student ratio was very high (5), which meant that sufficient number of teachers were not available in the school.

The representatives of the villagers and the local government representatives and officials were asked to suggest measures so that the accessibility to primary school

could be improved in the village. While a number of suggestions were made, such as provision of water supply, separate toilet facilities for girls and boys, play ground, finally it was suggested that the increase in the number of teachers was the most urgent need. The school has up to Class V and has 175 students with only 3 teachers to teach. It was felt that to manage five classes there should be at least 5 teachers. In that case the score on quality will be 3.

With the other parameters remaining as they were, the EPI index for Jakhode would be 32.19.

Since the teachers are recruited by the state government and there was shortage of teachers in almost all the schools, it may not be possible to recruit 2 teachers immediately. If one new teacher in recruited, the EPI will remain the same as the scoring pattern was decided on the basis that each school should have at least the same number of teachers as the number of classes. In case it is possible to have 6 or more number of teachers, the EPI index would be 18.18. Average cost of recruiting a teacher was found to be Rs.60000 per annum and accordingly the percentage decrease in EPI for unit investment (ID) and the investment per household (IH) were calculated (Table 5.2).

Table 5.2: Comparison of Alternative Solutions for Improving Access to Primary School

Feasible Alternatives	New EPI value	% decrease in EPI value	Total investment in Rs.	Investment in Rs. per 1% decrease in EPI (ID)	Investment in Rs. Per household (IH)
1	32.19	22.5	1 20000	5333	172
2	18.18	56.22	1 80000	3202	257

5.3.3 Sample Calculation for improving accessibility to Medical Facilities

For this study only accessibility to primary medical centre was considered for detailed analysis. Government of Rajasthan has a plan to provide a medical centre in each Panchayat. Even though the government has almost achieved the target, in most of the cases the facilities provided in them are highly inadequate. Very often the villagers complain about non-availability of doctors, nurses, medicines and other basic facilities. This forces them to go to the nearest town for receiving even minor medical care.

Sample calculations for improving the accessibility to Medical facilities has been taken from the pilot study for village Jakhode. The various parameters required for the calculation of Health Priority Index (HPI) were as follows:

Number of households in the village	700
Average travel time to receive health care	90min
Availability of basic services	Doctors and medicine available only during day time

The weight factors for Number of households (N), Travel time (TT) and Availability of basic services (BS) were 5, 5 and 3 respectively (refer to subsection 4.1). The corresponding weights of N, TT and TC were 1.34, 2.00 and 6.66 (refer to sub-section 4.2). The Health Priority Index was then calculated using Eq. 4.3.

HPI = 5 x 1.34 + 5 x2.00 + 3 x 6.66 = 36.68

Since the population can not play a role in improving accessibility, it was decided to find out ways to improve on the travel time and the quality of service. Score on travel time was very high (5) as the villagers travel to Surajgarh (7 km) for medical care. It may be interesting to note that there is a health centre in Jakhode, but the villagers do not consider it as a facility as the basic minimum services are absent there. They complained that the doctor was not available most of the time. A nurse was there, but in absence of basic facilities and medicines she was of no use to the villagers. The score on the quality of service was also not highly satisfactory (3) at the medical facilities in Surajgarh.

The representatives of the villagers and the local government representatives and officials were asked to suggest measures so that the accessibility to health care could be improved in the village. Apparently they were not at all hopeful that the services at the existing health centre could be improved because they thought that no doctor would like to live in a remote place like Jakhode.

However, it was agreed upon that a proper health centre at Jakhode would not only serve the population in Jakhode village, but all the villages in the Panchayat would get direct benefit (Alternative 1). A very rough estimate from a recent survey showed that the total investment for improving the existing health centre to a reasonable level was Rs. 0.6 million. It was assumed that the doctor, compounder and nurse would be employed by the Government. This would improve the score on the quality of service from 3 to 0. Average time of travel from all the villages in the Panchayat including Jakhod to the health centre may be roughly considered between 10 and 20 minutes, which will change the score on travel time from 5 to 2. Thus the new Priority Index for Health services calculated using Equation 4.3 would become 10.7. For calculating IH value the total number of households of all the villages in the Panchayat (1395) was considered as it was felt that all of them would get benefit if the facilities and services of the medical centre were improved in Jakhod. However, to get the full benefit, the roads connecting Jakhod and the other villages need to be improved and better public transport services would have to be provided.

Most of the villagers present in the meeting also suggested another alternative (Alternative-2) for improving access to medical facilities. It was felt that if frequent transport services were available for making trips to Surajgarh, it would not only solve the medical problem, but also would provide access to other facilities and services. All the public transport services in the locality are being provided by the private operators. Their main objective is to make as much profit as possible and thus would not run services unless there is sufficient demand. Thus under the existing situation, the villagers did not consider it feasible that the transport services to Surajgarh could be improved. The concept of community owned transport services was also floated and discussed, but the villagers felt that it was not a feasible alternative.

Thus after long discussions it was concluded that there was just one alternative (Alternative 1) to improve the health care facility and the corresponding feasibility parameters were calculated as shown in Table 5.3.

Table 5.3: Solution for Improving Access to Health Care

Alternatives	New HPI value	% decrease in HPI value	Total investment in Rs.	Investment in Rs. per 1% decrease in HPI (ID)	Investment in Rs. Per household (IH)
1	10.7	72.8	6 00000	8242	430

5.4 Prioritization of Projects at the Panchayat Level

Suitable interventions for the villages with low accessibility levels for different sectors have already been identified as discussed in the previous section. An example for water sector has been shown. There is a need to carry out similar analysis and identification of interventions for other sectors for those villages for which the accessibility indices are low. In this way a number of projects will be identified in a Panchayat. These projects are also to be prioritized. Since the costs and benefits may not always be possible to be expressed in monetary terms, one alternative is to decide based on the ratio between the project cost and the number of persons going to be benefited.

However, this may be used as an indicator only; the final decision will be taken in the discussion among the village representatives, panchayat representatives and officials. Funding available at the Panchayat level is usually limited. Thus the projects, those require huge funding may be identified to be forwarded to the higher level of the Panchayat Raj Institutions. At the end the prioritized projects will be identified in the accessibility map already prepared and put in the Panchayat office. This will make the process completely transparent.

5.5 Location of interventions through Accessibility Maps

It may be noted that a project is not always village-specific. Sometimes it may serve only a part of the population in a village, such as a water point in a large village. Similarly, sometimes it may serve a large population consisting of a number of villages, e.g. health centre or secondary school. In the later cases it is also needed to select a suitable site so that the accessibility in the catchments area is maximized. In the accessibility map the location of all the facilities and the services are shown. It is possible to identify the catchments area of all the facilities based on the acceptable travel time or distance in consultation with the villagers. Thus a rough catchments area boundary may be drawn in a map for a particular sector for the Panchayat.

This map is to be taken to the people of the concerned study area during participatory meetings. This helps to identify the areas not serviced by a particular facility and thus the most suitable location for a new facility may be located such that it may serve the most number of people with a certain level of accessibility.

5.6 Integrating Prioritized Interventions into Existing Development Plans

Information for defining and prioritizing strategies for addressing rural access problems has to be packaged and integrated into an overall plan of action or development plan for the Panchayat. Efforts should be made to integrate the accessibility improvement plans in the existing District level plan. Since IRAP provides multi-sectoral solutions it is possible to extract funding from various sectoral budgets. Moreover the Government of India has various schemes, such as *Sampoorna Grameen Rozgar Yojana (SGRY), Watershed Development Programmes, Central Rural Sanitation Programme (CRSP), Swajaldhara, Accelerated Rural Water Supply Programme (ARWSP)* where the Panchayat Raj Institutions have roles. These schemes should be implemented based on the development plan prepared based on IRAP.

CHAPTER SIX

CONCLUSIONS

The Integrated Rural Accessibility Planning (IRAP) tool has been developed in this study to assist in decision making at the Gram Panchayat level. It is necessary to emphasize here that IRAP is not a planning process on its own. It has been designed to assist 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 provides a foundation for developing the planning capacity at the lower level of the Panchayati Raj Institutions. The participatory approach used in this study helps to bring the community together and makes them responsible for their own development and prosperity. The tool enables them to identify access problems; rank villages based on their accessibility needs and identify interventions to improve the accessibility situations. It also assists in prioritizing the projects. However, the final decision on selecting projects for implementation has to be taken by the Panchayati Raj Institutions through a participatory approach. Keeping in view the budgetary constraints, it may be possible to implement only a few projects at the Panchayat level. It is the responsibility of the planners to convince the funding agencies on the necessity for the interventions and their effectiveness. Also in order to make the tool effective there is a need to integrate the plan developed using it with the District level plans and the sectoral grants received from the Central Government.

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APPENDIX-I

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
ILO ASIST-AP sponsored Pilot Project on IRAP
in
Surajgarh Block, Jhunjhunu District, Rajasthan (India)

Questionnaire for Village Accessibility Study

Date:.....

Village:..... Panchayat: …….. Block: ……

District ……

Note to interviewer: *Collect the data in a meeting where the representatives of all the stakeholders of the village are present. In a separate sheet write down the names of all the persons present with the organizations they represent.*

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1. General Information

1.1 What is the name of the village? …….

1.2 Give the population details of the village.

Population	Number of households	Percentage of Scheduled Caste	Percentage of Scheduled Tribe	Percentage of Other Backward Castes	Others

1.3 Approximately how much percentage of villagers is involved in each of the following professions?

Profession	Percentage of Villagers
Marginal farmer (up to 2.5 acres)	
Small farmer (2.5 to 5 acres)	
Large farmer (over 5 acres)	
Agricultural labourer	
Shop owner	
Businessman	
Contractor	

Petty job	
Teacher	
Service in formal sector	
Service in informal sector	
Unemployed	
Any other	

1.4 Approximately, how much percentage of households own each of the following vehicles?

Type	Percentage of household owning
Bicycle	
Donkey cart	
Camel cart	
Buffalo/ Ox cart	
Two-wheeler	
Jeep/ car	
Any other	

1.5 Is the village directly connected to a Major District Road (MDR), State Highway network (SH)?

[ ] Yes [ ] No

1.5.1 How far is the nearest MDR or SH? …….. Km

1.5.2 How is the village connected with the MDR or SH?

[ ] directly by road [ ] road through other villages

1.5.2.1 Kind of road [ ] Earth [ ] Gravel [ ] Black top [ ] Concrete

1.5.3 Is your village under PMGSY (Prime Minister Gram Sadak Yojana) scheme at present?

[ ] Yes [ ] No

if yes,

1.5.3.1 How is it going to be connected?

[ ] with a village/town/ city [ ] With an existing MDR/SH /NH

1.5.3.2 What is the length of the PMGSY link? …….Km

if no,

1.5.3.3. When do you think, would your village be taken up for connectivity by PMGSY? ……

1.6 How many access roads are there to/from the village? ……

1.6.1 Provide details related to surface of the access road/s and available transport services.

	Road connects	**Length of the road in Km**	**Kind of surface***	**Available public transport modes**	**Cost of travel by various modes to the connected place**		
					Mode: ……	**Mode:** ……..	**Mode:** …….
Access Road 1							
Access Road 2							
Access Road 3							

- *Earth, Gravel, Black top, concrete, combination*

1.6.2 What is the duration of availability of public transport modes in a year?

	Duration of availability of service in a year		
	Mode:	**Mode:**	**Mode:**
Access Road 1			
Access Road 2			
Access Road 3			

1.6.3 How are the conditions of the road/s?

	Condition of the road		
	Good	**Satisfactory**	**Poor**
Access Road 1			
Access Road 2			
Access Road 3			

1.6.4 What are the reasons for poor/ satisfactory condition of the roads? (Please tick the appropriate columns)

	Uneven surface	**Dusty during dry season**	**Muddy and water logged during wet season**	**Depressed wheel path**	**Potholes**	**Any other parameter ……..**
Access Road 1						
Access Road 2						
Access Road 3						

2. Public transportation service survey:

2.1 What are the places frequently visited by the villagers outside the village?

Name of the town/city	**Purpose of travel**	**Distance in km**	**Mode/s used to travel**

2.2.1 Provide the required details related to the existing level of service of public transport.

Name of the town or city	**Dist. To nearest stop**	**Frequency of service**	**Number of transfers if any**	**Total travel time**	**Total travel cost**	**Duration of availability of service in a year**

3. Electricity & Fuel

3.1 How many houses have electricity connection (in percent)? ... .
3.2 On an average, how many hours in a day is power supply available? …..
3.3 Provide the necessary details pertaining to the other fuels used for cooking.

Fuel	No. of households use the fuel	Name of the place from where collected	Distance of the place	Mode used for collection	Total travel time for collection
Kerosene					
Coal					
Cow dung cake					
Firewood					
Gas					
Any other					

4. Water supply

4.1 How many houses have water connection/ water source (in percent)? .....

4.2 How many wells/ tap connections are there for community use? .....

4.2.1 What is the average collection time (round trip)? ……..

If there are no water points/ wells for community use and all the houses do not have water connection/source provide the required details related to the alternative source and mode of fetching water.

4.3.1 Source of water: [ ] Tube well [ ] Deep Well
[ ] Shallow dug well [ ] Lake [ ] Canal

4.3.2 Distance of the most preferred water sources and collection times.

	Source 1	Source 2	Source 3
Distance (km)			
Mode used			
Total collection time (round trip)			
Number of trips per day			

5. Education:

5.1 Primary School:

5.1.1 Is there a Primary School in the village? [ ] Yes [ ] No
5.1.2 If yes, provide the details as asked for.
5.1.2.1 Number of classes offered ……..
5.1.2.2 Number of students in the school: ……..
5.1.2.3 Number of teachers in the school: ……..

5.1.2.4 Existing condition and facilities in the school (Please tick at the appropriate place).

Indicators	Existing condition
Condition of building	Good/ Satisfactory/ Poor
Adequate number of class rooms	Adequate/ Satisfactory/ Inadequate
Teacher student ratio	Adequate/ Satisfactory/ Inadequate
Availability of table, chair, black board and other basic facilities	Adequate/ Satisfactory/ Inadequate
Drinking water and toilet facilities	Adequate/ Satisfactory/ Inadequate
Facilities for extra-curricular activities	Adequate/ Satisfactory/ Inadequate
Library	Good/ Satisfactory/ Poor

5.1.2.5 If you are not satisfied with the existing conditions, please explain the reasons:

Indicators	Reasons for dissatisfaction
Condition of building	
Adequate number of class rooms	
Teacher student ratio	
Availability of table, chair, black board and other basic facilities	
Drinking water and toilet facilities	
Facilities for extra-curricular activities	
Library	

5.1.3 Do the students go to schools outside the village because of poor quality of the village school?

[ ] Yes [ ] No

5.1.4 If yes, provide the details of location of other schools outside the village.

Name of school	Location	Distance	Mode/s used	Travel time	Travel cost

5.2 Secondary School:

5.2.1 Is there a Secondary School in the village [ ] Yes [ ] No

5.2.2 If yes, provide the details as asked for.
5.2.2.1 Number of students in the school: …….

5.2.2.2 Basic amenities available: [ ] Excellent [ ] Good [ ] Fair [ ] Poor

5.2.3 Do the students go to schools outside the village because of poor quality of the village school?

[ ] Yes [ ] No

5.2.4 If yes, provide the details of location of other schools outside the village.

Name of school	**Location**	**Distance**	**Mode/s used**	**Travel time**	**Travel cost**

6. Health Service

6.1 How often do you use the following services (Please tick at the appropriate column)?

Service	**Regularly**	**Occasionally**	**Only on emergency**	**Not at all**
Pharmacy				
Physician				
Health Unit				
Hospital				
Any other				

6.1.1 Provide details of travel characteristics related to these services.

Service	**Location**	**Distance**	**Mode/s used**	**Total travel time**	**Total travel cost**
Pharmacy					
Physician					
Health Unit					
Hospital					
Any other					

6.2 How do you reach these services during emergency medical needs at night?

Service	Location	Distance	Mode/s used	Total travel time	Total travel cost
Hospital					
Health unit					
Physician					
Pharmacy					
Any other					

7. Agriculture and Market

7.1 What is the average distance to field? …….

7.1.1 Provide the details related to travel to the field.

Distance	Modes used	Time taken

7.2 What are the modes used for the transportation of produce from the field?

[ ] Head loading [ ] Donkey cart [ ] Camel cart [ ] Tractor [ ] Truck
[ ] Any other

7.3 What are the sources for the availability of Irrigation water?

[ ] Well [ ] Deep Well [ ] Canal [ ] Rain water [ ] Any other

7.4 What are the dominant cash crops of the village?

[ ] Wheat
[ ] Bajra
[ ] Mastard
[ ] Chana
[ ] Gauar
[ ] Any other
[ ] Moong
[ ] Mooth
[ ] Jaw
[ ] Jawar
[ ] Any other

7.5 Provide the details related to the preferred market places used by the villagers for selling products.

Name	Location	Distance	Modes used	Travel time	Travel cost
1.					
2.					
3.					

Provide details for the availability of fertilisers, pesticides, fodder and other inputs and services.

Name	Location	Distance	Modes used	Travel time	Travel cost
Govt. seed sale centre.					
Private seed sale centre					
Fertilizer					
Pesticide					
Grinding Mill					
Animal feed					
Tools and equipments					
Gramin Bank					
Any other					

8. Sanitation:

8.1 How many solid waste dumps are there in the area? ……..

8.2 Provide details regarding distance and modes used for dumping.

	Distance	Mode used
Dump 1		
Dump 2		
Dump 3		

8.3 Kind of latrines in the households:

Kinds of latrines	Percent of households
Sanitary	
Pit type	
Any other	
No latrine	

9. Provide details related to the Level of Accessibility to other facilities/ services.

Activity	Frequency	Location	Modes used	Distance	Travel time	Travel Cost
Shop						
Recreation						
Religious place						
Telephone						
Post Office						
Police station						
Administration						
Commercial Bank						
Court						

10. Give details about the access related problems in the village.

Sector	Is there an access problem?	If yes, specify the problems	How severe is the problem?
Roads			
Transport service			
Water supply			
Education			
Medical			
Irrigation			
Market			
Bank			
Electricity			
Any other			

11. Rank the priority of three most important projects for the overall development of the village.

- Construction of roads to the nearest town, District Head Quarters
- Transport service to the nearest town/ city or District Head Quarters
- Better educational facilities in the village
- Better medical facilities in the village
- Electricity
- Water supply for household needs
- Water for cultivation
- Any other (please specify)

Priority projects by men:	Priority projects by women:
1.	1.
2.	2.
3.	3.

12. Specify the comments you would like to make on any other aspects that have not been covered in the questionnaire:

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13. Rough sketch of the village boundary with existing roads and activity centres inside and outside the village:

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No. 7 Chris Donnges, *P.K. Pattanaik and John van Rijn, India State of Orissa, Integrated Rural Accessibility Planning Gram Panchayat Level*, ILO ASIST-AP, 2004.

No. 8 ILO ASIST-AP, *Integrated Rural Accessibility Planning (IRAP) - Second Expert Group Meeting*, ILO Bangkok 2001.

No. 9 ILO ASIST-AP, *Integrated Rural Accessibility Planning (IRAP) - Third Expert Group Meeting,* ILO Bangkok 2003.

No. 10 ILO ASIST-AP, *Integrated Rural Accessibility Planning (IRAP) - Fourth Expert Group Meeting,* ILO Bangkok 2004.

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