

PRA Application for Rural Road Development: A Case Study

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Abstract—The case study outlined in the paper focuses on addressing rural development challenges in typical specific locations of Bangladesh, namely Gangachara and Kaonia in the Rangpur district, situated northern part of the country. It emphasizes the pivotal role of roads in transforming the socio-economic pattern of these rural communities. A range of sophisticated methodologies, including Venn diagrams involving peoples concern, then participatory mapping, focus groups, key informant interviews, and seasonality/seasonal calendars, are done. These procedures collectively collaborate the umbrella of Participatory Reflection and Action (PRA) techniques. This intentional selection of diverse techniques aims to comprehensively engage the local community in the planning and implementation stages of rural road developments. The importance is on understanding the intricate nuances of transportation needs within these communities.

One of the vital parts of the study is the active involvement of a wide array of stakeholders. This includes not only local government representatives but also non-governmental organizations, potential donors, and the community members themselves. In short it can be said concerns from people of all walks of life of that locality have participation in this regard. The rationale behind this multi-stakeholder engagement is to ensure a holistic and inclusive decision-making process. The community is provided with a platform to actively participate in evaluating and interpreting the collected data.

The study places a significant emphasis on collaboration in decision-making. This involves not only sharing the findings with the community but also fostering a dialogue that allows community members to contribute their insights and perspectives. This collaborative approach is instrumental in crafting a comprehensive road development plan that not only addresses the immediate needs of the community but aligns with their long-term objectives and aspirations.

The study emphasises the transformative power of involving the community in rural development projects. By actively engaging community members in decision-making processes, the resulting road development plan is not just a product of external decisions but is shaped by the actual needs and desires of the people living in these rural areas. This approach goes beyond mere infrastructure development; it facilitates the creation of sustainable solutions that resonate with the community's unique context.

A key takeaway from the study is the importance of finding a delicate balance between social objectives and practical considerations. The road development plan is not formulated in isolation but takes into account the feasibility of implementation and the availability of resources. This practical approach ensures that the proposed solutions are not only desirable but also achievable within the given constraints.

The study's findings serve as a valuable guide for policymakers, development organizations, and practitioners involved in rural development projects. The standardized methodology presented in the case study, coupled with tangible outcomes, offers a roadmap for implementing similar participatory approaches in rural road construction projects. This guidance is not just theoretical but is grounded in the successful application of these methodologies in real-world scenarios.

In summary, the case study provides a detailed and comprehensive exploration of how Participatory Reflection and Action techniques, coupled with extensive stakeholder engagement, can lead to transformative and sustainable rural development. It goes beyond the theoretical framework, offering practical insights that can be replicated and adapted in diverse contexts, thereby contributing to more inclusive and community-driven development initiatives.

Keywords: PRA, Rural Road, Engaging Community, Sustainable, Policymaker.

I. INTRODUCTION

The Over ten crore people live in rural areas in Bangladesh; however, they are connected to the last transport network link. This considerable population has essential needs such as education, primary health care, water supply, local markets as well as economic opportunities. But it is not possible to fulfil this demand all the time because of the permanent or seasonal absence of road access. A good quality, well-maintained and regular transport access throughout the year will be the only way to ensure these necessary facilities. Although good quality, experienced supervision, good workmanship, and work methods are important nevertheless, proper planning is required. Most of the time, appropriate development is absent because of the participation of local people. Then various problems arise due to the unavailability of land, soil even technical problems for drainage systems. For whom development works, development activities should be conducted through their active participation at every stage of development so that development is sustainable. We can solve this very easily through Participatory Reflection and Action (PRA).

II. BACKGROUND

The phrase "participatory research" is used broadly to refer to different kinds and degrees of local control and involvement during the study process. This includes a variety of techniques, instruments, and strategies, such as farmer participatory research, participatory action research, and participatory reflection and action (PRA/PAR). [1]

There may be a practical justification for using participatory research, with the goal of encouraging community involvement to increase the study's applicability to nearby communities. For example, this could entail creating farming technologies that are appropriate to the region and its demands, or it could entail increasing the rate and scope of new method and technology adoption. [1]

The goal of empowerment or social transformation is another reason to use participatory research methods. This aims to improve the ability of local communities to do research, make decisions, and manage of nearby resources. The ultimate objective is to boost communities' capacity to act independently and raise awareness of the options that are available (Ashby 1996:16–17). [2] It's important to remember that participatory research frequently has both empowering and utilitarian uses.

Many researchers used Reflection and Action (PRA) techniques in Bangladesh and abroad in different cases such as drinking water problem solution, Arsenic problem solution, and women empowerment implement in rural polies etc. These methods or techniques are more applicable in the third word densely populated country because here geography as well as population impacts hugely. [3-7]

III. STUDY AREA

The study are is selected two loacations more specifically two proporsed network. One is named 'Anur Bazar to Chillnanir Bazar Road GPS via Bacharkura Bridge Road' and another is 'Anur Bazar to Chillnanir Bazar Road'. This two locations are on Rangpur district in Rangpur division. The length of Anur Bazar to Chillnanir Bazar Road is 2610 meter. It is located in Hargacha Union in Kaunia upazila. The name of the village is Chor Nazirdar and Pollimari. The second road is also in a typical similar location.

Figure 1 shows the Ekotar Bazar - Pollimari GPS via Bacharkura Bridge Road on Google earth view.



Figure 1 Ekotar Bazar - Pollimari GPS via Bacharkura Bridge Road

Figure 2 shows the Anur Bazar to Chillnanir Bazar Road GPS on Google earth view.

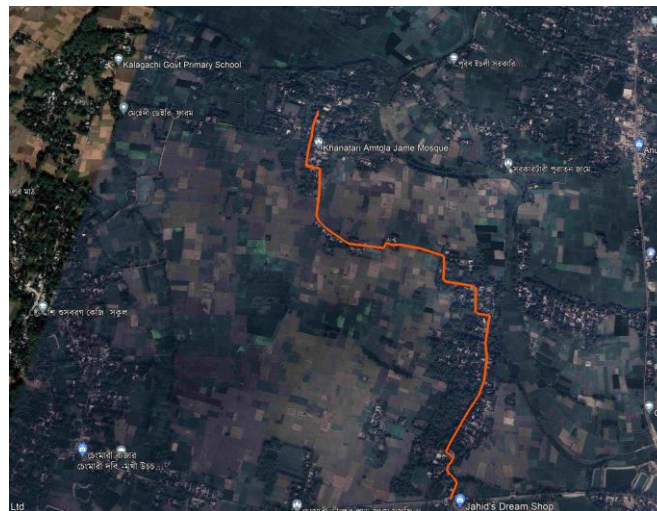


Figure 2- Anur Bazar to Chillnanir Bazar Road

IV. METHODOLOGY

IV.I. INTRODUCTION

Participatory Reflection and Action (PRA) is an application for communication and transfer of knowledge. So, it can be call as learning process too. It is firmly anchored on the principle of ‘seeing is believing’ and ‘learning by doing’. This study implemented PRA in some phases. The team for PRA work was selected in consultation with the PMU, PROVATi3, LGED. The selected Roads were in Gangachara & Kaonia which situated in Rangpur district of Bangladesh. The distance of Gangachara & Kaonia are 14.8 km and 19.8 km respectively from Rangpur town.

Mr Enamul Huda, trainer of PRA techniques was present with this study. The team walked along with different stakeholders and villagers, observed while walking and noted the information. Interaction were initiated from the semi-structured questionnaires and then branched as per need. The given information was verified with discussion.

Table 1: Rationale for using PRA method

Subject	We	People
Past history of the area	We don't know	People know
Real problems of the area and their root causes	We don't know	People know
Resources and potential of the area	We don't know	People know
Social behavior of the area, customs and policies	We don't know	People know
Regional conflicts and power circles	We don't know	People know
Social status of the people	We don't know	People know
Area communication system	We don't know	People know
Reasons why a project has failed in the past	We don't know	People know

Several PRA tools are available for data collection, however a few of these are included which will be used in road development at the village level. These are Rapport building, Mapping, Seasonal calendar, Venn diagram and Matrix: Ranking/Scoring.

IV.II. RAPPORT BUILDING

This is the stage before using other methods. After going to the area, the first task of the team should be to establish the action in earnest with the people. Many people do not take it well when talking about work at first. Doubts, questions and comments will be expressed among the people.

Establishing good rapport speeds up work and makes work easier. People of different professions and groups (30-35 people) living in the proposed project area invited for discussion.

On the day of initiation of the project formulation process, the participants are asked to sit in a circle at first, thanking them for being on time and informing them of the topic and purpose of today's discussion. The date, day, time and place of the next meeting are decided after discussion with the people of the project area. At least 30-35 people representing different types of people are requested to be present for the discussion along with Chairman-Member of the Union Parishad and dignitaries of the area. The time and place of the meeting was informed and requested to be present. In this study this is done by upazilla LGED office specially livelihood officers. All participants were listed in a table with age, gender, occupation and mobile number.



Discussion on Anur Bazar to Chillar Bazar Road

Discussion on Ekotar Bazar to Pollimari GPS Road

Figure 3: The purpose of coming is well described

IV.III. MAPPING

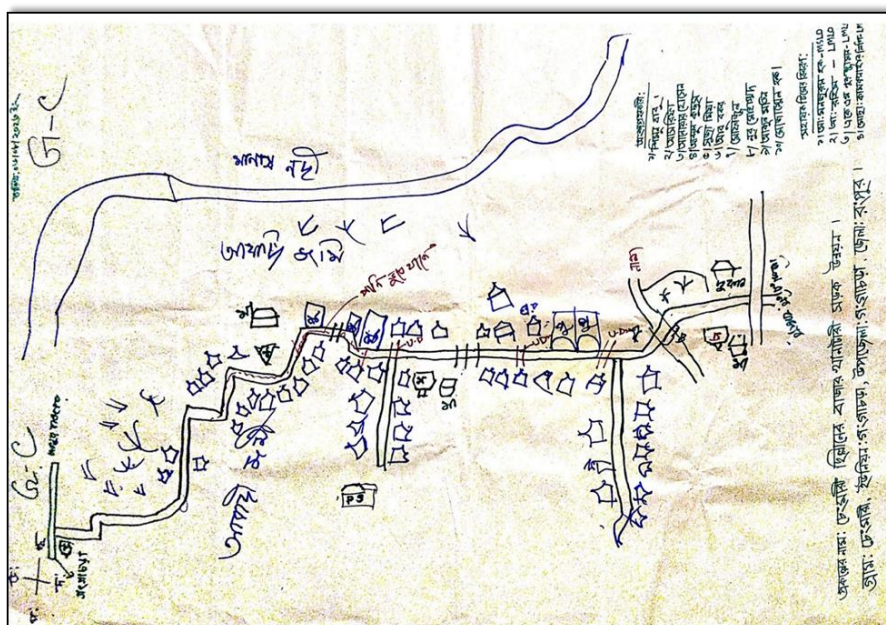
Perhaps the most popular method in PRA is mapping. For various, in statistic, it is the same with PRA itself. The concentration here is on the social infrastructure: roads, drainage systems, etc. This map is different from other regular maps in significant ways. For one, it is prepared by native people and not by specialists. For another, it is not drawn to scale. It represents what the native people believe to be appropriate and essential for them. Thus, it mirrors their views of the communal dimensions with their certainty with the high degree of genuineness.

The participants were asked to draw a side view of the road with the proposed road on the ground through discussion. When the drawing is finished, it is asked to show what problems there are currently on the road; For example, roadside ponds/canals, houses, trees, electric poles, agricultural/non-agricultural land and potholes, broken areas, drains/culverts, waterlogging etc. are asked to be shown in the images. Lastly, they are asked to draw the side view of the road with the proposed road drawn on the ground on a large brown paper. The note taker writes down the problems, risks and challenges mentioned by the participants.

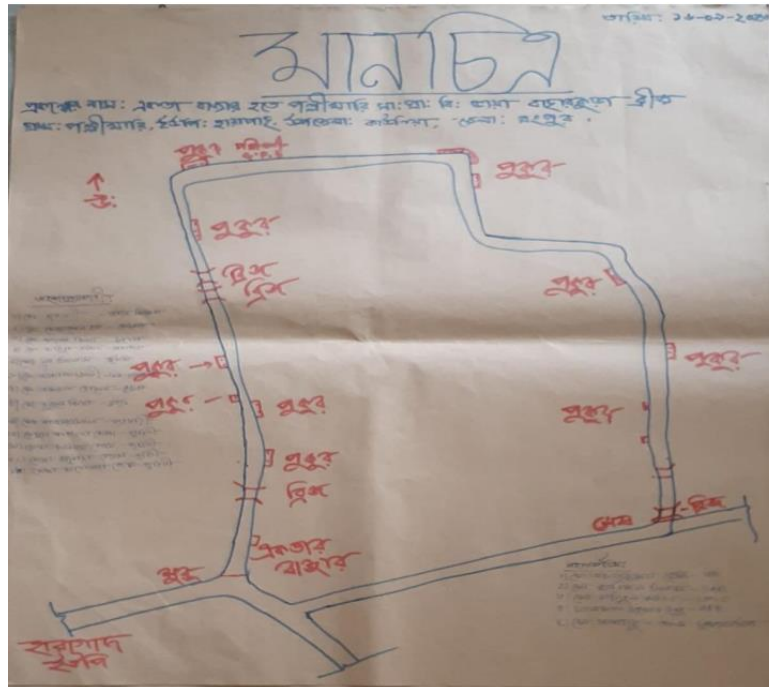
The support team seeks public opinion on the proposed project through interaction with the general public.

For example;

- How important is the project to the people of this area? If the road is built, what will be the benefits of the people?
- Will the necessary space be available to build the road? Some will express reluctance to give land whether?
- If someone expresses unwillingness to give land, can the local people convince him?
- Will the required soil be available for road construction?
- Will the beneficiary people provide necessary assistance/cooperation during road construction?



Anur Bazar to Chillar Bazar Road



Ekotar Bazar to Pollimari GPS Road

Figure 4: Mapping for proposed road

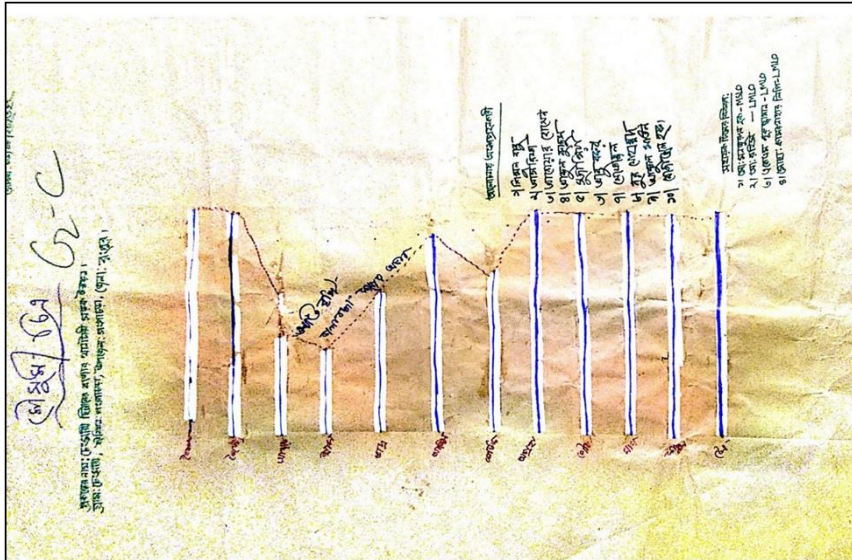
IV.IV. SEASONALITY/SEASONAL CALENDAR

Seasonal diagram is also called periodic schedule, seasonal movement sketch and seasonal investigation. Seasonal diagram is one of the standard PRA methods that has been used for chronological study across yearly phases, with months or seasons as the elementary unit of investigation. It replicates the insights of the native people concerning seasonal differences on a wide range of substances. Seasonal diagrams, however, are not based on numbers, though they may be triangulated against minor or main data in order to validate the information produced.

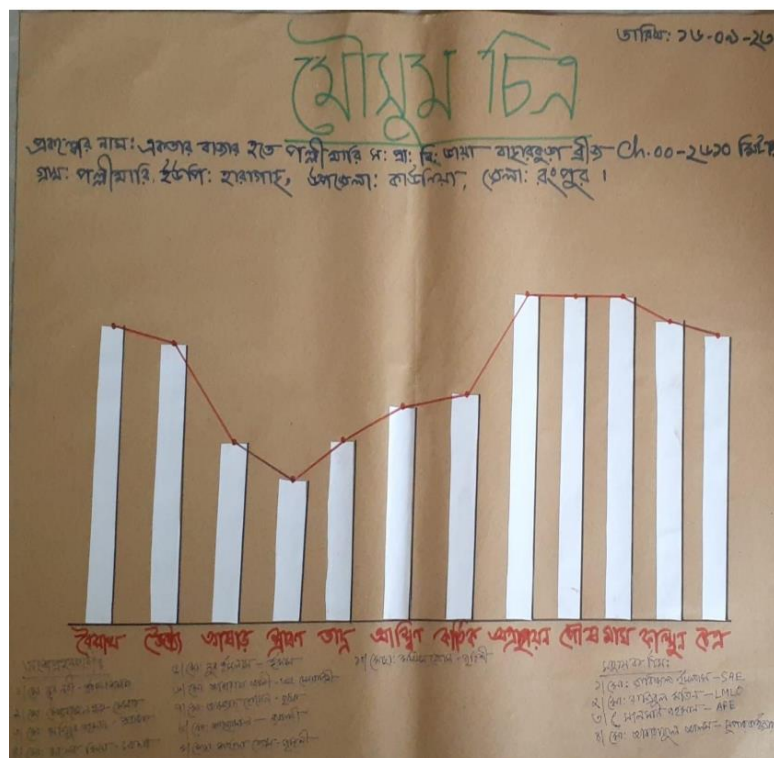
Seasons are a fundamental portion of people's lives and employ a significant influence upon the livelihood of the native people, predominantly in rural areas. Seasonal diagrams have been used to explore what happens during the year and when. Quantification and representation of the degree of the numerous activities enhances to their utility and productivity.

Seasonal diagram benefits to detect heavy workload times, phases of relative ease, credit crunch, illnesses, food safety, income availability etc. It has proved to be useful in project planning, i.e., when to implement various activities. It has been used to categorise times of stress and to plan for when involvement is most essential. With a seasonal diagram it is probable to recognise and investigate the livelihood pattern through the year. The key strength of seasonal analysis is that it portrays a variety of things and their degrees, which assistances in understanding how these things are related to and impact one another. These relationships can be quite revealing.

For this study, the participants were asked to write the names of the 12 months in Bengali by drawing 12 dots on the bottom of a large brown paper. This time, the participants were given 12 narrow (large and small) white paper and asked to put the whole big white paper in the month which is completely suitable for road traffic and to put the smallest white paper in the month which is completely unsuitable for movement. After that, it is asked to put the remaining white paper in the remaining 10 months considering the suitability and non-usefulness of road traffic. When placement is complete, all white paper heads are asked to be added by drawing drip lines with red ink. This time, the reason for the month in which movement is more difficult is asked and the note taker writes it down. Similarly, it is said to say why it is suitable or unsuitable for movement in other months with more or less consideration.



Anur Bazar to Chillar Bazar Road



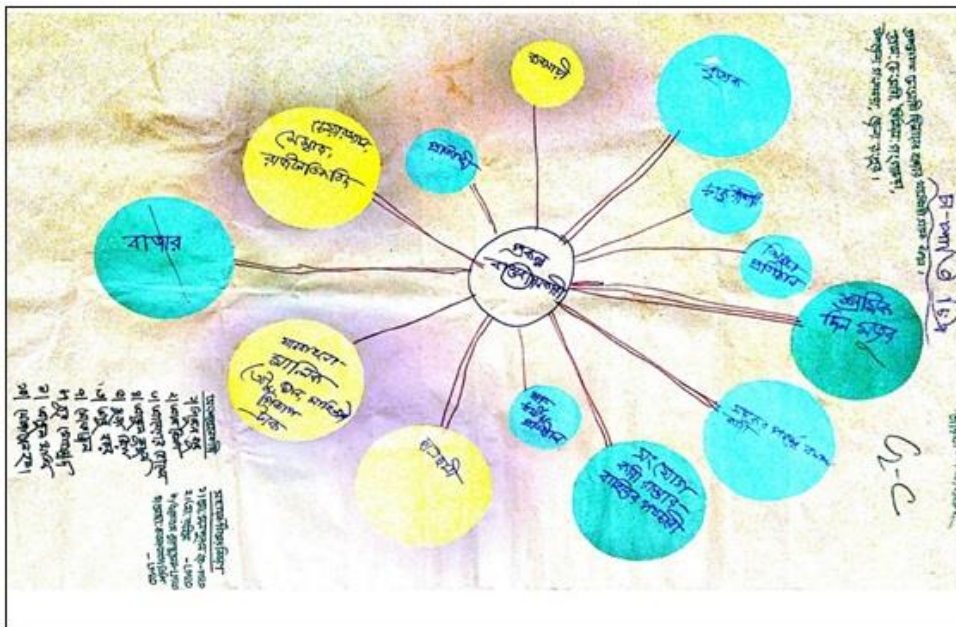
Ekotar Bazar to Pollimari GPS Road

Figure 5: Seasonality

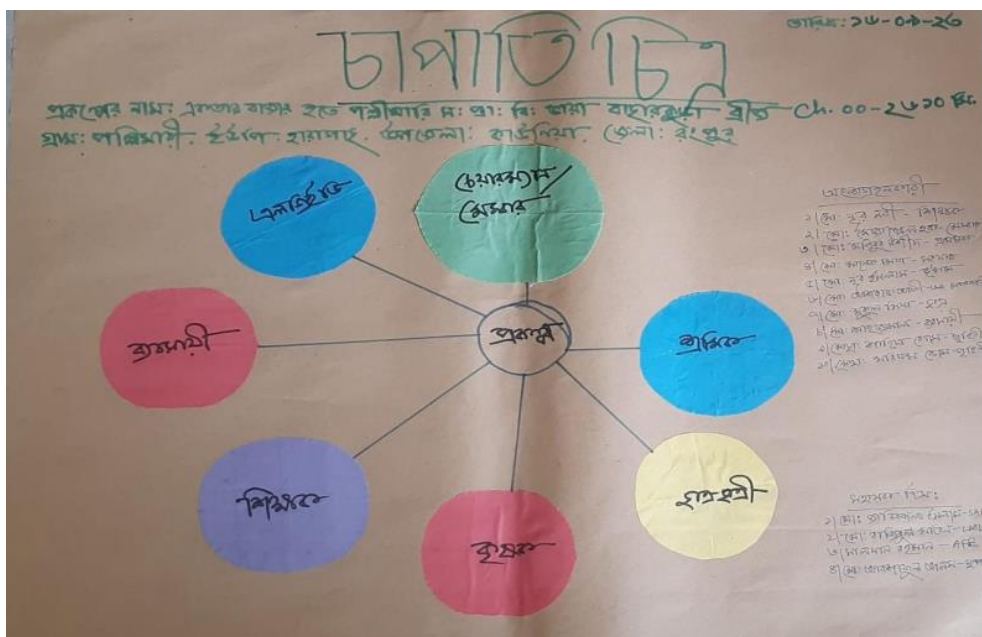
IV.V. VEN DIAGRAM

In PRA technique, Venn diagram is used to see and analyse the presence of different institutions, organizations, groups and individuals in a particular village and their influence and interaction in the village. Venn diagram is also used to study how much an organization or system is interacting, helping or co-operating with a village for a particular system such as, agricultural practice and earning of livelihood. In this paper, Ven Diagram is used to find out the area's power and interaction for road construction.

Finally, those who are distant and less committed - why they are distant and less committed to the project implementation (problem) and how they can be brought closer or ways to bring them closer (solution).



Anur Bazar to Chillar Bazar Road



Ekotar Bazar to Pollimari GPS Road

Figure 6: Ven Diagram

IV.VI. PREFERENCE RANKING AND SCORING

Often it is required to investigate the choices on the basis of several principles. Matrix Scoring/Ranking can serve as effective tool for the purpose. To identify the species preferences of the villagers in terms of usefulness. This is the process of ranking a certain number of items on the basis of certain criteria and thereby identifying the priority of the villagers.

This method is used for priority basis ranking of road construction problems that can be found from other techniques. Not only that, possible solutions have also been found through discussion with the people.

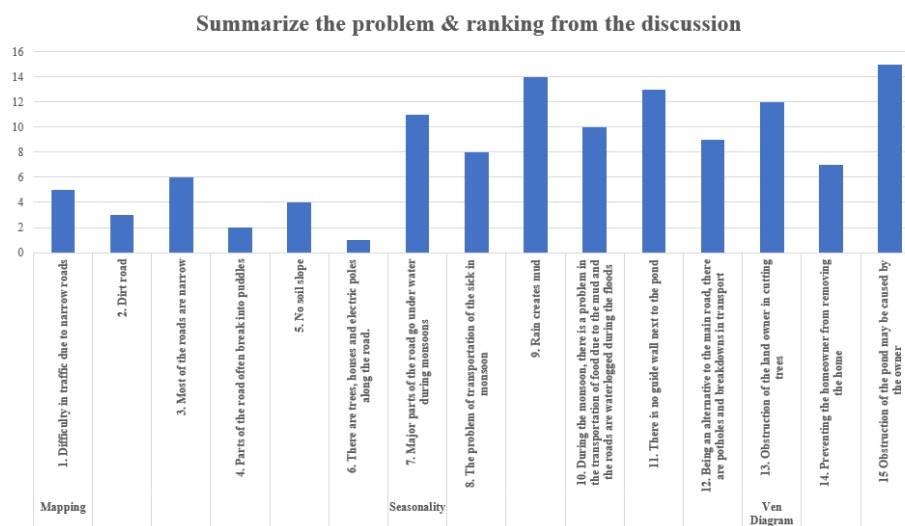


Figure 6 (a)

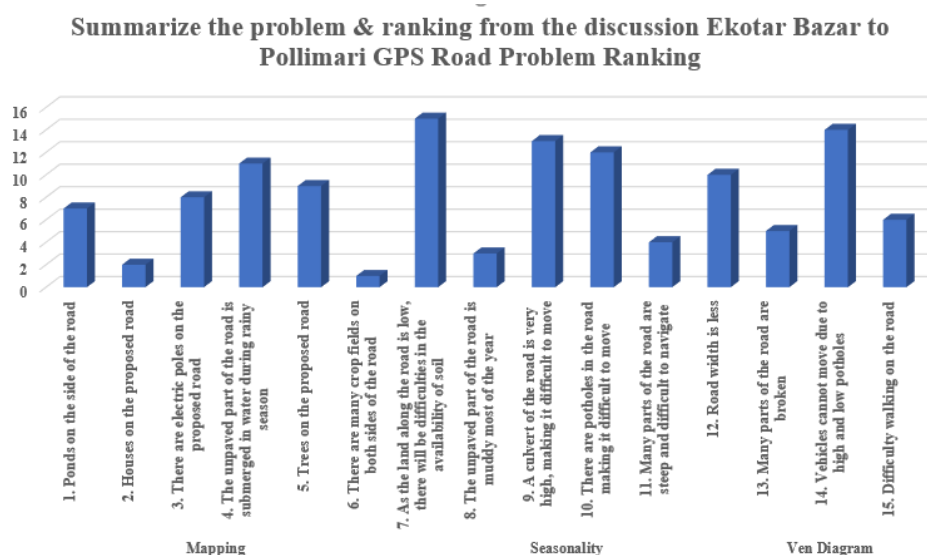


Figure 6 (b)

Figure 6: Preference Ranking and Scoring

V. RESULTS

V.I. SUMMARIZE THE SOLUTION FROM THE DISCUSSION

FROM ANUR BAZAR TO CHILLAR BAZAR ROAD

Many problems are identified. Such as, ponds on the side of the roads, houses on the proposed road, electric poles on the proposed roads, unpaved part of the road is submerged in water during rainy season, trees on the proposed road, many crop fields on both sides of the road, land along the road is low, there will be difficulties in the availability of soil, unpaved part of the road is muddy most of the year, culvert of the road is very high, making it difficult to move, potholes in the road making it difficult to move, Many parts of the road are steep and difficult to navigate, road width is less, broken roads, difficulty in walking etc. The solution of this problem is be Protection of slope; removal of houses and electric poles, cutting trees, improvement of drainage and pavement, slope stabilization, increasing road height in required places etc.

FROM EKOTAR BAZAR TO POLLIMARI GPS ROAD

The problems From Ekotar Bazar to Pollimari GPS Road are almost same as the problems stated from Anur Bazar to Chillar Bazar Road. Some exceptions are such as, a culvert of the road is very high which makes it difficult to move, again there are potholes in the road making it difficult to move and many parts of the road are steep and difficult to navigate. For these cases the road should be raised about 18 inches, the road should be levelled and paved with soil filling and road must be paved.

V.II. PARTICIPATORY PLANNING

As the solutions are originates from the participation of the local community the probable solution of the problems are also engaged with the local people. For every problem, a target was set. Then probable time period was fixed to achieve the targets. Then the process was summarized in short in the following table. The the responsibility of the total process was showed in the frame of male or female. Some responsibilities are imposed on male and some are on female. Some responsibility was imposed on both.

Table 2(a) Anur Bazar to Chillar Bazar Road

Job Description	Target	Days	Materials/Assistance Required	Process	Responsibility	
					People	Project
Move the house by negotiating with the house owners	12 Houses	30 Days	Entertainment	Negotiate with owner and local residents to remove trees and houses	✓	
With the owners of the trees	50 Trees	30 Days	Entertainment	Discussion with the owner of the tree and local	✓	

Negotiating removal of trees				residents		
Remove electrical poles	4 Electric Poles	90 Days	Application Letter	Contact electricity office to remove electric poles	✓	✓
Collection of soil to widen and raise the road	As per requirement	90 Days	People & Entertainment	Discussions with owners of roadside land	✓	✓
The banks of the ponds on the side of the road are obstructed and filled with soil	4 Ponds	90 Days	People & Entertainment	Negotiations with pond owners and use of government allocations	✓	✓
Construction of drains or culverts	5 Nos	90 Days	Necessary goods	Inclusion in the estimation of options		✓
Road paving	3500 m	365 Days	Necessary goods	Involvement in project estimation		✓

Table 2(b) Ekotar Bazar to Pollimari GPS Road

Job Description	Target	Days	Materials/Assistance Required	Process	Responsibility	
					People	Project
Construction of guide wall and protection wall next to the pond	317 m	120 Days	Necessary goods, labor and money	Through tender process of works by the project and discussion with pond owner	✓	✓
Move the house to the side of the road.	50 houses	90 days	Entertainment and Motivation	Talks with house owners and local people	✓	
Remove electrical poles	4 Electric Poles	60 Days	Application Letter for removal	Contact nearest electricity office to remove electric poles	✓	✓
raise & paving the road	2610 m	365 Days	Materials, labor and money needed to pave roads	Work tenders shall be processed by the project and		✓

				negotiations with the land owner for the removal of soil from roadside land.		
Trees along the road should be cut	205 nos Trees	60 Days	Entertainment	Through discussion with the people of the area and the project officers with the owner of the tree.	✓	
Availability of land on both sides of the road	2610 m	60 Days	Entertainment	By negotiating with the land owner on both sides of the road.	✓	✓
Construction of culvert	6 meter	150 Days	Necessary goods, labor and money	Through tender process for culvert construction works		✓

V.III. PARTICIPATORY MONITORING

For monitoring purpose targets were set. For moving the house across the road, 12 houses were targeted during the running of the work on-site inspection and people and the project both will be responsible for this. In case of cutting trees on the side of the road about 50 trees were set to remove during the running of the work on-site inspection and people and the project both will be responsible for this. There is a problem on the bank of the pond. For this the bank of the pond is built and filled with soil 4 ponds were selected for monitor. Four electric poles are to remove. This need to monitor during the running of the work

on-site inspection. For raising the road with soil as needed, construction of five drains or culverts on roads and paving the road within 365 days monitor should be maintained during the running of the work on-site inspection and both people and project should be responsible for this. The case is almost same for Ekotar Bazar to Pollimari GPS Road. All these information are summarized in the following table.

Table 3 (a) Anur Bazar to Chillar Bazar Road

Subject of Monitoring	Target	Time of Monitor	Monitor Procedure	Responsibility	
				People	Project
1. Move the house across the road	12 houses	During the running of the work	On-site inspection	✓	✓
2. Cutting trees on the side of the road	50 trees	During the running of the work	On-site inspection	✓	✓
3. The bank of the pond is built and filled with soil	04 ponds	During the running of the work	On-site inspection	✓	✓
4. Remove power poles	4 electric poles	During the running of the work	On-site inspection		✓
5. Raising the road with soil	as needed	During the running of the work	On-site inspection	✓	✓
6. Construction of drains or	05 Nos	During the running of	On-site inspection		✓

culverts on roads		the work			
7. Paving the road	365 days	During the running of the work	On-site inspection		✓

Table 3(b) Ekotar Bazar to Pollimari GPS Road

Subject of Monitoring	Target	Time of Monitor	Monitor Procedure	Responsibility	
				Prople	Project
Construction of guide wall and protection wall next to the pond	317 m	During the running of the work	On-site inspection	✓	✓
Move the house to the side of the road.	50 houses	During the running of the work	On-site inspection	✓	✓
Remove electrical poles	4 Electric Poles	During the running of the work	On-site inspection		✓
Raise & paving the road	2610 m	During the running of the work	On-site inspection		✓
Trees along the road should be cut	205 nos Trees	During the running of the work	On-site inspection	✓	✓
Construction of culvert	6 m	During the running of the work	On-site inspection		✓

VI. CONCLUSIONS

Road construction estimation improves greatly from Participatory Reflection and Action (PRA), which also promotes community expertise and engagement. Locals can learn about partnership dynamics and road control through PRA. Additionally, the need of community involvement in decision-making is emphasized, especially when it comes to choosing the route of the road and solving construction-related issues. By identifying susceptible locations and aiding in the calculation of preventative measures, PRA makes it easier to accurately evaluate the state of roads in various seasons. The technique aids in determining the road's maximum flood level and helps with the strategic planning of its construction. Crucially, local engagement ensures the longevity of the road by assisting in identifying the need for vital amenities like drains and bridges. PRA also shows the locations of important buildings along the route, like marketplaces and schools, having an impact on how road safety measures are planned. Moreover, the approach makes it easier to have pre-discussions about the site and soil conditions for enlarging roads, which helps to obtain local approval before proceeding. PRA's inclusive strategy also includes assessing whether or not to remove buildings along the road, such as residences and trees. Finally, the procedure debunks myths regarding the responsibilities of LGED offices and contractors, promoting community comprehension and assistance amid diverse obstacles in road construction.

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Appendix

Table 1A: Possible Solution from Discussion Anur Bazar to Chillar Bazar Road

Problems	Possible Solution	Responsibility	
		People	Project
1. Difficulty in traffic due to narrow roads	The road should be widened	✓	✓
2. dirt road	The road must be paved		✓
3. Most of the roads are narrow	The bank of the pond should be blocked		✓
4. Parts of the road often break into puddles	The road must be paved	✓	✓
5. No soil slope	Soil slope should be given	✓	✓
6. There are trees, houses and electric poles along the road.	Arrangements should be made to cut trees with the help of the influential.	✓	✓
7. Major parts of the road go under water during monsoons	The road should be raised about 18 inches	✓	✓
8. The problem of transportation in monsoon	Water drainage should be arranged	✓	✓

9. Rain creates mud	The road must be paved		✓
10. During the monsoon, there is a problem in the transportation of food due to the mud and the roads are waterlogged during the floods	The road must be paved		✓
11. There is no guide wall next to the pond	Pond side guide wall and slope protection should be done	✓	✓
12. There are potholes and breakdowns in transport	The road must be paved		✓
13. Obstruction of the land owner in cutting trees	Need to be resolved through discussion with the beneficiaries with a combination of public representatives/project representatives or both	✓	✓
14. Preventing the homeowner from removing the home	Need to be resolved through discussion with the beneficiaries with a combination of public representatives/project representatives or both	✓	✓
15. Obstruction of the pond may be caused by the owner	Need to be resolved through discussion with the beneficiaries with a combination of public representatives/project representatives or both	✓	✓

Table 1B: Possible Solution From Discussion Ekotar Bazar to Pollimari GPS Road

Problems	Possible Solution From Discussion Ekotar Bazar to Pollimari GPS Road	Responsibility	
		People	Project
1. Ponds on the side of the road	Pond side guide wall and slope protection should be done	✓	✓
2. Houses on the proposed road	The house should be moved from the street by negotiation with the owner of the house	✓	✓
3. There are electric poles on the proposed road	The electric poles should be moved through discussion with local rural electricity office	✓	✓
4. The unpaved part of the road is submerged in water during rainy season	The road should be raised and paved.	✓	✓
5. Trees on the proposed road	Cut trees through discussion.	✓	✓
6. There are many crop fields on both sides of the road	Negotiate with the land owner to agree to leave space for the road.	✓	✓

7. As the land along the road is low, there will be difficulties in the availability of soil	Negotiate with the land owner to ensure availability of soil for road and inform about the benefits of the road.	✓	✓
8. The unpaved part of the road is muddy most of the year	The road should be raised and paved.		✓
9. A culvert of the road is very high, making it difficult to move	The problem will be solved if the road is raised and filled with soil		✓
10. There are potholes in the road making it difficult to move	The road must be paved		✓
11. Many parts of the road are steep and difficult to navigate	The road should be leveled and paved with soil filling	✓	✓
12. Road width is less	The road should be filled and widened.	✓	✓
13. Many parts of the road are broken	The entire part of the road should be filled with soil and paved		✓
14. Vehicles cannot move due to high and low potholes	The road must be paved		✓
15. Difficulty walking on the road	The road must be paved		✓