



# USER MANUAL FOR AMENITIES PLANNING TOOL OF BHUVAN PANCHAYAT PORTAL

## SPACE BASED INFORMATION SUPPORT FOR DECENTRALIZED PLANNING UPDATE (SISDP - U)

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## **Document Summary**

Amenities planning using GIS involves the process of analyzing existing assets and identifying gaps in various categories such as health facilities, education facilities, sanitation, road connectivity, and more. This planning process can be further enhanced by incorporating GIS-based Multi-Criteria Decision Analysis (MCDA). These assets are evaluated to determine deficiencies and plan for their improvement. The first step in amenities planning is data collection, which involves gathering information about existing facilities, infrastructure, and relevant socio-economic data. Spatial data integration is then carried out by integrating collected data into a GIS platform. This enables spatial analysis and visualization of amenities.

Gap analysis is performed to compare the existing amenities with desired standards or benchmarks. By analyzing the spatial distribution and coverage of existing facilities, deficiencies or gaps can be identified in each asset category. This analysis provides valuable insights into areas that require improvement. The amenities data is taken from the SISDP database of assets collected under EPRIS Project.

For more comprehensive planning, MCDA techniques can be applied. MCDA assigns weights to different criteria such as population density, accessibility, and socio-economic factors, allowing the prioritization of areas for development. This enables decision-makers to determine which gaps should be addressed first. Suitability analysis plays a crucial role in the planning process. It helps identify suitable locations for new amenities based on the established criteria and weights. Factors such as proximity to existing infrastructure, population density, accessibility, land availability, and environmental considerations are taken into account. Once the analysis is complete, a comprehensive plan for addressing the identified gaps is developed. This includes determining the number and locations of new facilities, designing infrastructure networks, and allocating resources for implementation. GIS is utilized to visualize the proposed plan and effectively communicate it to stakeholders. Monitoring and evaluation are essential for tracking the progress of amenities planning implementation. Regular updates to the GIS database ensures that new facilities, infrastructure changes, and evolving socio-economic conditions are incorporated into the planning process. Throughout the process, it is important to collaborate with experts, stakeholders, and local authorities to gather input and ensure that the plan aligns with the specific needs and context of the study area. This collaborative approach increases the likelihood of successful implementation and improved amenities for the community.



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## 1. Introduction

### 1.1 Background

Space-based Information Support for Decentralized Planning Update Project is a comprehensive initiative designed to empower Panchayati Raj Institutions by equipping them with updated spatial information at 1:10K scale in addition to the asset information collected within the project. By integrating spatial data into the planning process, this project aims to enable decentralized spatial planning in Gram Panchayat areas.

To effectively achieve decentralized spatial planning, the project recognizes the need for a webbased tool specifically tailored for gram panchayat development planning(GPDP). This tool will serve as a vital resource for Panchayati Raj Institutions(PRI), allowing them to access and utilize spatial information in their decision-making processes. Through the tool, Panchayati Raj Institutions will be able to analyze and interpret spatial data to formulate effective development plans that address the specific needs and challenges of their respective areas.

In order to enhance the overall efficiency of the planning process, the project has organized frontline departments into key sectors, such as education, healthcare, and infrastructure. This sector-based approach ensures a systematic and integrated planning framework, allowing for better coordination and alignment of efforts among different departments. By streamlining the planning process and fostering collaboration between departments, the project aims to optimize resource allocation and achieve more effective and sustainable development outcomes.

Ultimately, the project aims to facilitate inclusive and participatory planning processes that cater to the unique needs and aspirations of the Gram Panchayat areas.

To create the decentralized amenities planning module for the SISDP-Update project, several considerations were taken into account:

- 1. Designing a schema for all civic amenities to ensure easy interpretation.
- 2. Incorporating additional modules to enhance utility.
- 3. Ensuring technical guidelines and methodology align for scalability across the country.
- 4. Integrating gap analysis and priority schema into the planning process.
- 5. Grouping semantically similar amenities that require similar planning approaches.
- 6. Maintaining flexibility to meet development needs using nationally consistent databases and adhering to rural development guidelines.

### **1.2 Overview of Amenities Planning**

The amenities planning envisages to provide all its panchayat level planners for preparing inputs for GP development planning like – Existing assets in GP, GAP analysis of assets developed in the GP for different sectors which includes available versus required assets and also essential and overall development indices. Apart from this, a prioritization map based on village profile and population and distance etc. is presented to enable the user to select a panchayat effectively. Along with this Planning tool for education and health facilities at GP level are also provided for efficient decision making. The following diagram (Figure 1) shows various levels of planning and the facilities provided thereof for supporting the decision making.



Figure 1. Amenities planning process block diagram as envisaged in Bhuvan Panchayat Portal

### **1.3 Proposed amenities**

In Bhuvan Panchayats, a total of 272 assets have been identified and categorized into approximately 67 asset groups. Among these assets, there are several assets that fall under the category of natural resources. Apart from these natural resources, there are civic amenities with

10 main categories and 44 subcategories, totaling to 201 assets that can be effectively planned through amenities planning.

To enhance the planning process for these amenities, various tools and data sources can be utilized. This includes leveraging spatial layers, census data, and other management information system (MIS) data. Additionally, field data collected through the Bhuvan Panchayats asset mapping mobile app and the NIC mobile app can contribute to a more comprehensive and accurate planning approach.

By incorporating these spatial layers, census data, MIS data, and field data, the planning of amenities within the identified asset categories can be carried out in a more efficient and effective manner. This integrated approach ensures that the planning process is well-informed and takes into account the available resources and information for optimal decision-making.

GAP analysis can be done at three levels i.e., District, block and panchayat. Also, Gap is seen for entire subclass together like education facilities, health facilities etc.

## 2. Outcomes

### 2.1 Web application

In Bhuvan Panchayat Portal Menu, Click Planning tools -> Click Amenities Planning



Figure 2. Link to Amenities Planning in Bhuvan Panchayat Portal

You can also open it directly on Firefox using the following URL

#### https://bhuvan-rcc.nrsc.gov.in/sisdpu/

The web application has provision to select

- Asset type from list of Assets
- Display asset map for selected asset type and selected District
- Prioritization Map display based on population, distance, region, or combination of all
- Gap analysis and Prioritization Report (GAPR) Download for District
- Gap analysis and Prioritization Report (GAPR) Download for Taluk
- Gap analysis and Prioritization Report (GAPR) Download for Panchayat
- Get Suitable locations for selected panchayat and selected asset based on multicriteria decision analysis on the GIS layers.
- Print Report using Print map option with suitable sites selected.
- User Uploading of Panchayat Amenities shapefile in the following format <u>https://bhuvan-rcc.nrsc.gov.in/sisdpu/Amenities\_Shapefile\_format.pdf</u>
- Gap analysis and Prioritization Report (GAPR) Download for Panchayat based on user's uploaded assets

In the Left Panel in Amenities Planning portal Go to Plan an Amenity. Select Theme-> Amenities Planning



Figure 3. Graphical User Interface(GUI) for Amenities Planning

lan an Amenity		Educational Assets
		Primary School
Theme:		Middle School
Amenities Planning ~		Health Assets
Category:		Sub Health Center
Educational Assets ~		Women & Child Health Center
Educational Assets		Anganwadi Center
Health Assets		Dispensary

Figure 4. List of Assets which can be planned in Bhuvan Panchayat under Education and Health facilities

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### Select Category -> Schools and Sub category -> Primary School

Figure 5 Selection of Asset Category and Sub Category

The web application showcase the existing assets, generates asset Gap analysis and Prioritization report and also does the site suitability analysis. The Asset Gap Analysis and Prioritization report highlights, the asset required, assets available and percentage completed in both data and pictorial format along with Prioritization based on Population, Region Profile and Panchayat Profile.

Select State-> Maharashtra, District-> Yavatmal. Currently, this module runs on the asset data collected in the EPRIS Project.

Now after selecting District, you can now view the district amenity map by checking the District amenity map checkbox. The total number of amenities in the district is also shown along with map. If you click on an amenity on the map, it will show a popup with minimum amenity details.



Figure 6. Available Primary school assets mapped using BP Asset mapping Yavatmal District, Maharashtra

In the Left Panel, Now select the Block-> Maregaon. Now after selecting the block, you can now view the Panchayat wise priority map for the selected block by checking the Panchayat wise Prioritization map checkbox. The prioritization choropleth along legend is also added. This map is a priority choropleth drawn only for panchayats where amenities are not present. If you click on the prioritization map, it will show a popup with priority criteria details as well as location details as shown below. Example shows a population of GP 2309, Plain region, Interior Village.



Figure 7. Panchayat wise Prioritisation map for Primary school asset in Maregaon Block, Yavatmal District, Maharashtra

Next, We can also see the Gap analysis and Prioritization report. This report shows the Gaps / Adequacy of the amenities at each level – District, Block and Panchayats. This is generated at all three levels summarizing assets requirement based on it's level of planning. Apart from this, the available versus required assets are also plotted in graphical format as bar charts. Additionally the overall asset development index and Essential asset development index are calculated based on weightage based criteria as per the necessity of the asset. Finally the Prioritization map for the GP's not having the selected asset is shown along with the prioritization ranking table. It is a seven Page report as shown below in Fig - 8-14.



Figure 8. Asset gap analysis report -District Panchayat(DP) Level Educational Assets & Requirement Matrix – Example of Akapur Gram Panchayat, Maregaon Block, Yavatmal district



Figure 9. Asset gap analysis report -District Panchayat(DP) Overall educational assets Profile – Example of Akapur Gram Panchayat, Maregaon Block, Yavatmal district

DISTRICT: Yavatmal			
BLOCK: Maregaon			
Chinchonibotoni, Chopan, Dando Guarala, Hatwanjari, Hiwaramaja Kolgaon, Kosara, Kotharla, Kuml	Panchayats - Akapur, Apti, Arjun dgaon, Devhala, Dongargaon, Ga ara, Hiwari, Jalka, Kanada, Karanv oha, Machindra, Mahisdodka, Maj vangi, Shivnala, Shivnidhobi, Sind	degaon, Ghodadara, Ghoguldar vadi, Kegaon, Kegaon (Mardi), I ara, Mangrul, Mardi, Maregaon,	a, Godhani, Gondguranda, Khairgaon, Khandani, Kinhala,
Maregaon @78,713	¥40.09		88.614
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-			
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🏥 Total Literate 🔒	Total Working Population	省 Cultivators	Main Working Population
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Maregaon LAND USE/CO [Scale 1:10,000 ; SIS-DP] Agriculture Land 625 s Forest 134 sq km (169 Wastelands 68 sq km Water Body 27 sq km	q km (72%) 6) 8%)		
Built Up 11 sq km (1%	)		

Figure 10. Asset gap analysis report -Block Panchayat(BP) Level Educational Assets & Requirement Matrix- Example of Akapur Gram Panchayat, Maregaon Block, Yavatmal district

		Report: Educa		
DISTRICT: Yavatma		·		
BLOCK: Maregaon	ai			
GRAM PANCHAYAT	T: Akapur			
VILLAGEs: 2 Villages -	Akapur, Net			
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補許 Total Populatio	on 🕴 Male Population	🛉 🛛 Female Popula	tion 👬 Children Populatio	on 0-6
📲 🛛 Total Literate	🛔 🛛 Total Working Populat	tion 🔏 Cultivators	A Main Washing Da	nulation.
. Total Literate	I total working Populat		🍒 - Main Working Po	pulation
Gram Panchay	at Level Education A	ssets & Requirem	nent Matrix:	
ASSET CODE	ASSET NAME	Popu /Asset (Às per RAD guidelines)		uired)
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Figure 11. Asset gap analysis report -GP Level Educational Assets & Requirements Matrix – Example of Akapur Gram Panchayat, Maregaon Bock, Yavatmal district



Figure 12. Asset gap analysis report -Assets available versus required in graphical format along with Overall asset development index including assets of all levels(DP, BP,GP) for entire Yavatmal District



Figure 13. Asset gap analysis report -Overall and Essential Asset Development Index for Education assets at district, block and GP Level – Example of Akapur Gram Panchayat, Maregaon Block, Yavatmal district



Figure 14. Asset gap analysis report -Prioritization of primary school development for GP's not having Primary schools – Example of Akapur Gram Panchayat, Maregaon Block, Yavatmal district

Once, it is decided to go for a Panchayat for development of Primary school from above inputs, you can Select a Panchayat. Now after selecting the Panchayat, you can now view the Suitability map for the selected Panchayat by clicking on the Panchayat wise Suitability map button. The suitable sites are shown as polygons along with legend. If you click on the suitable area, it will show a popup displaying the decision criteria undertaken by the module for arriving at this suitable area.



Figure 15. Selection of Suitable Sites for Primary School – Example of Dongargaon Gram Panchayat, Maregaon block Yavatmal district

Apart from this a Map print is also given to the user in a predefined template for download as PDF.



Figure 16. Print Map Report to print the Suitable Sites map for Primary School – Example of Dongargaon Gram Panchayat, Maregaon Block, Yavatmal district

Additionally, if user has their own asset data collected, it can be uploaded to view GAPR and suitability analysis. This functionality is provided under Upload and Plan section.



Figure 17. Selection of Asset Category and Sub Category

Select State-> Maharashtra, District-> Yavatmal. After selecting District, you can view the district amenity map by checking the District amenity map checkbox. If you click on an amenity on the map, it will show a popup with minimum amenity details.



Figure 17. Asset map for Sub health centre Health Asset for Yavatmal district, Maharashtra



Figure 19. Prioritisation map for Ralegaon Block, Yavatmal District

The Panchayat assets collected by the user can also be uploaded in this module for GAPR and Suitability analysis. The format of file to be uploaded is given below.

- 1. Asset data (Point Features) for your Panchayat should have four files namely .shp,.shx,.qpj and .dbf
- 2. Avoid any special characters in file name
- 3. File size should not exceed 10MB
- 4. Projection should be in World Geodetic System 1984, EPSG:4326
- 5. The file should have the following fields filled in all respects

Field name	Description	Data Type	Sample value
id	Asset ID	character varying(15)	CA0154
username	Username of the person has collected this data	character varying(31)	mrsac
validated	Whether data is validated	character varying(3)	YES
category	Asset Category	character varying	offices
category1	Asset Sub Category	character varying	other offices
bpcategory	Asset name	character varying	other governance assets
gpname	Panchayat name	character varying(100)	Akapur

After preparing the Panchayat asset data in the above format, upload it using browse and upload button in the portal as shown below.

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	,	Navigation - Measurement - Languages - Normal View
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•	t Amenities point shapefile:	Crede
View Shapefile I Browse 5 file		
File uploaded		Upload
	Gap Analysis Report	
	Suitability Map	
	Print Map Clear	Мар

Figure 20. Upload Panchayat Assets using browse and upload button

## 3. Methodology Adopted

The entire amenities planning process is done at three levels.

1. At the district level, a simple Amenities Map for the selected district and amenity is added showing the spatial distribution of the selected amenity in the district and corresponding Gaps/actionable areas therefrom.

- At Block Selection, further a Prioritization map is added showing Panchayat wise choropleth for only those panchayats which are not having the amenity. The Prioritization is based on the Population, Regional Profile and Panchayat Profile Weighted Sum (Refer to Amenities Planning Theoretical Basis Document V2.0 for details). At Block Level, further a GAP Analysis report is given which summarizes the gaps in assets at all three levels – District/Block and Panchayat. The summarization is done for the selected District and block summarizing all panchayat assets for the selected block.
- 3. After understanding the development gaps, further powered by the priority analysis, when a Panchayat is selected for amenity development, a suitability map is shown based on Multicriteria decision analysis using GIS layers for arriving at a suitable location for taking the development activity.

Finally, a Print Map facility is provided to take the report of the above analysis which can be used as a supportive document for GPDP. Figure 1 shows the Flowchart of the entire process flow of Amenities Planning Module.



See Table 1 for the selected Asset categories for Educational and Medical assets and their multiple criteria used for selection of suitable areas for development within the Gram Panchayat.

Category	Sub- category	Distance Criteria	Brief GIS Criteria	Any other Criteria
Educational Facilities	Primary School	Distance to roads and Settlements are given weightage	Landuse Level 4 classes are given weightage	Parcel area from cadastral data can be taken but due to unavailability of data, it is currently not used
Educational Facilities	Middle School	Same as Above	Same as Above	
Medical Facilities	Sub Health Centre	Distance to roads and Settlements are given weightage Refer	Landuse Level 4 classes are given weightage Refer	
	Women And Child Health Centre	Same as Above	Same as Above	
	Aanganwadi Centre	Same as Above	Same as Above	
	Dispensary	Same as Above	Same as Above	

Table 1. MCDA criteria for selecting suitable locations for new developments