

CHAPTER 3

PARTICIPATORY GIS

3.1 Introduction

“P-GIS (Participatory Geographical Information System) is a participatory approach to spatial planning and spatial information and communications management. It is knowledge based concept in which ideas and mental map are developed for better study and analysis of an area. P-GIS is the concept of using geo-information science in broad-based and public participatory processes” (Follosco, 2005). In present day situation Community based mapping such as P-GIS (Participatory GIS) and PP-GIS (Public Participatory GIS) are used by research scholars to establish a relationship between land use and community knowledge. From the ancient time, community using the resources present in their area. But with the help of technology scholars transform this idea and developed 2D, 3D maps and models.

3.2 Concept

A description of P-GIS concept was put forwarded by Rambaldi et al. (2004). In this concept Rambaldi said P-GIS “is the result of a spontaneous merger of Participatory Learning and Action (PLA) methods with GIT&S. P-GIS practice is based on using geo-spatial information management tools including sketch map, aerial photographs, satellite imagery, Global Positioning System (GPS) and Geographic Information System (GIS) to represent people’s spatial knowledge” (Rambaldi et al. 2004). P-GIS combine Participatory Learning and Action (PLA) methods with Geographic Information Systems (GIS). Participatory GIS (P-GIS) is a useful method under GIS which is based on people’s perceptions and ideas of local areas where they live. Participant observation, for many years, has been a hallmark of both anthropological and sociological studies. In recent years, the field of education has seen an increase in the number of qualitative studies that include participant observation as a way to collect information (Kawulich, 2005). McCall stresses that “participation is the essence of participatory mapping and participatory GIS. As such, it is more fundamental than ‘the Map’ or ‘the GIS’” (McCall, 2002). Similarly, Alcorn (2000) asserts that the goad of mapping is not necessarily to produce a map, but can be a platform for political action. She pointed out that for local communities, “mapping can help sustain common property governance institutions to control ecology degradation, and community-based mapping can help

indigenous peoples assert their rights” over their territory and resources. McCall makes a similar observation where he says P-GIS provides a framework for legal, political and administrative (Planning) legitimacy, as with P-GIS/P-maps when used for registering and legalizing customary land or neighborhood claims. P-GIS is capable of systematically identifying and representing the rights of people to their land and land resources, in terms of ownership, access, use and management (McCall, 2002).

3.3 Definition

Arnstein (Schlossberg, 2005) define Citizen Participation as “the redistribution of power that enables the have not citizens, presently excluded from the political and economic processes, to be deliberately included in the future”.

Real participation is achieved by properly identifying stakeholders; define by Groenendijk (2003) as “all actors or groups that affect and/or are affected by the policies, decisions and actions of a project”.

In other words, P-GIS is a community based information which are created and converted into digital form. The mapping and modeling developed by focus group discussion and community involvement leads to a new concept “P-GIS”.

3.4 Participatory-GIS

P-GIS is the concept of using geo-information science in broad-based and public participatory processes (Follosco, 2005). This models and mapping are further used in resource management. People use simple and effective method based on their knowledge to manage the resource utilization. The traditional view of GIS as an elite technology that is only useful for high level management planning and understandable to the technology-trained has changed (Follosco, 2005).

P-GIS emerge from the rich and diverse experiences in participatory development and is “an attempt to utilize GIS technology in the context of the needs and capabilities of communities that will be involved with, and affected by, development projects and programmes” (Minang, 2003).

P-GIS can be viewed both as a tool and as a framework. For example, village level mapping that is carried out with Global Positioning System (GIS), compasses and

topographic maps makes P-GIS a tool. If it permeates the whole system, for example, the entire planning and implementation process, making it the central element of good governance (McCall, 2002), then it is a framework.

3.5 Public Participatory GIS (PP-GIS)

“Public Participation GIS is synonymous with P-GIS. The term was coined during the International conference on Empowerment, Marginalization and Public Participation GIS in Santa Barbara, California in October 1996” (Follosco, 2005). “Its geographical perspective at that time was North America and its specific purpose was supposed to look at how GIS and GIT could support public participation” (Aberly and Sieber, 2005 in Schlossberg and Shuford, 2005). “It is a platform where use of GIS by the general public and aims at involving citizens in decision-making processes” (Steinmann, 2004). As a result of growing movement of integrating spatial, with public participation, “PP-GIS represents a broad notion that the spatial visualization and analysis capacity inherent to GIS present a unique opportunity for enhanced citizen involvement in public policy and planning issues” (Schlossberg, 2005). It has been said that “the focus of PPGIS remains quite undefined” (Jankowski et. al., 2003; Tulloch, 2003; Shufford, 2005), ranging from issues of “grassroots community engagement” (Craig et al., 2002 and Shuford, 2005).

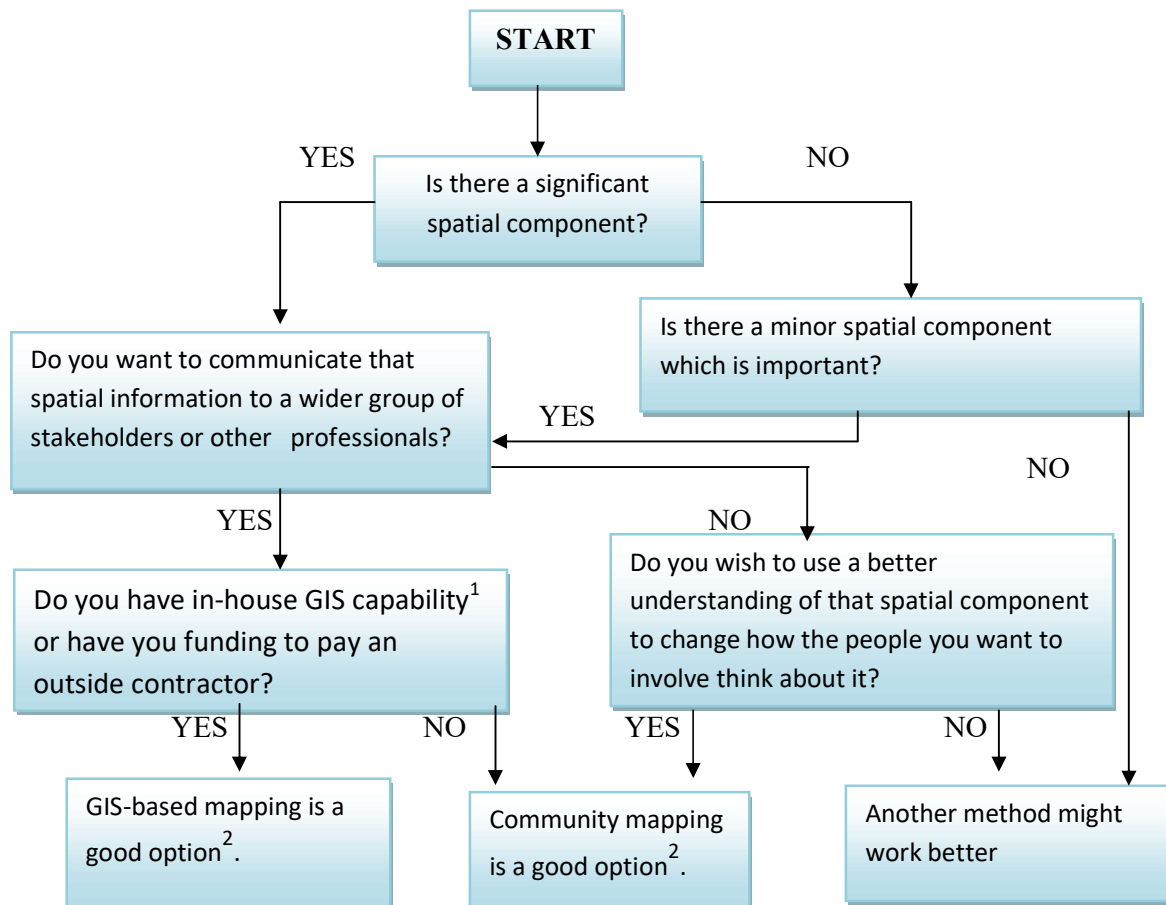
3.6 Guide to Participatory-GIS

“Participatory-GIS is a practice of gathering data using traditional methods such as interviews, questions, focus groups, all using some form of paper maps to allow participants to record spatial details” (Forrester and Cinderby, 2014).

Participatory-GIS is an essential tool in developing general idea about the local area based on local people idea. “The key to Participatory approaches is that they should be geared as much as possible towards allowing ordinary stake-holders (the participants) to contribute to the design of the strategy or scheme on as equal footing with involved ‘experts’ whether they be scientific experts or policy experts” (Forrester and Cinderby, 2014).

Participatory mapping can be prepared with the involvement of community and that’s maps can be referred to as community mapping. The information will be more if the involvement of people is more. So it is necessary to interview each and every person present in the area to develop an accurate map with lots of information.

“There are few factors to consider before deciding whether or not to use community mapping (including any form of Geographic Information System).



Note:

1. If we are uncertain whether or not we have the in-house capability, or whether or not available free-to-use packages (such as Goggle Earth) will meet our requirements, then we should use this guide.

2. If we came down the right-hand route where the spatial component is minor but important then we should consider using another method alongside the mapping.”

Fig 3.1: Processes involved in P-GIS (After Forrester and Cinderby, 2014)

3.7 Methods for carrying out P-GIS

3.7.1 Moving from Paper to Digital

Visiting field and collecting data can be summarized on paper with pen and pencil. “Once we have collected P-GIS mapping information at the ‘focus group’, the next stage in the P-GIS process is to convert this into a digital (Computer) map from the process of digitization” (Forrester and Cinderby, 2014). The maps drawn on paper can be scanned or a picture can be clicked to upload in computer to georeference in digitization. After preparation of P-GIS maps it can be compared with Google Earth maps.

3.7.2 Using Outside GIS Helps

“Although many people regularly use all kinds of computer software packages, they still may think that GIS needs specialist skills and expertise to gain the most benefits from using them and ensuring that the information generated is correct” (Forrester and Cinderby, 2014). Now a day almost all the educational institutions are preparing digital maps. But it is necessary to have expertise to develop maps so that the accuracy should be correct. If an outsider will prepare a map then he/she needs good guidance from the local people to prepare the map. Another thing is to remember that a GIS operator should not rely on Google Earth for further exploration.

3.8 The Difference between P-GIS and other forms of GIS

“P-GIS should be described as ‘qualitative data’ as it is based on people’s knowledge, opinions and perceptions. Also the location and boundaries of areas that people draw on the community maps may be of varying accuracy levels” (Forrester and Cinderby, 2014). Participatory GIS shows the changes occurred in recent years because of the fresh information collected from the local people. Also the point, line and polygons which are drawn on a map for digitization are more accurate.

“GIS are not well designed to automatically cope with such uncertainties and fuzziness. To use this data most effectively requires a dialogue between the participant, meeting facilitator and GIS operator. This dialogue can confirm or improve the robustness of the Participatory-GIS data and highlight the confidence with which the data can be used for further analysis” (Forrester and Cinderby, 2014). Thus, GIS generate spatial data from

quantitative results. Here data analysis depends on the secondary sources like remote sensing data and satellite imagery.

3.9 Types and Components of P-GIS

“Participation happens at different levels and can be categorized into degrees of intensity. A typology of participation or the ladder as developed by Pimbert and Perry (1999) in their discussion of the importance of the communities in conservation can be applied to P-GIS (IAPAD 2005c). This typology reflects the levels at which P-GIS can take place, from peoples passive recipients of information with no contribution whatsoever to empowerment to taking the lead for decision making and action” (Follosco, 2005).

Table 3.1: Types and components of P-GIS

Typology	Component of each type
Passive Participation	People participation by being told what is going to happen or what has already happened. It is unilateral announcement by an administration or by project management people; people’s responses are not taken into account. The information being shared belongs only to external professionals.
Participation is information giving	People participate by answering questions posted by extractive researchers and project managers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research or project design are neither shared nor checked for accuracy.
Participatory by conclusion	People participate by being consulted, and external agents listen to view. These external agents define both problems and conclusion and solutions, and may modify these in the light of people’s responses. Such a consultative process does not concede any

	share in decision-making and professionals are under no obligation to take onboard people's views.
Participation for material incentives	People participate by providing resources, for example, labour, in return food, cash, or other material incentives. Much in-situ research and bio-prospecting falls in this category, as rural people provide the resources but are not involved in the experimentation of the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
Functional Participation	People participate by forming groups to meet pre-determined objectives related to the project, which can be involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at the early stage of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
Interactive Participation	People participate in joint analysis, which lead to action plans and the formation of new local groups or the strengthening of existing ones. It leads to involve interdisciplinary methodologies that seek multiple perspectives and makes use of systematic and structured learning processes. these groups take control over local decisions, and so people have a stake in maintaining structures

	or practices.
Self-mobilization	People participate by taking initiatives independent of external institutions to change systems. Such self initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power

Source: (After Follosco, 2005)

3.10 Process

To conduct a survey and develop maps on the basis of local ideas and knowledge, following steps can be used-

1. Conduct of a community meeting to introduce the goal of mapping and to identify what information will be collected and mapped.
2. From the meeting, a participatory sketch map was produced by the community showing their customary land area as reference for the field mapping survey and scaled community map to be produced.
3. Household survey should be conducted to collect other datum like literacy rate, age-sex ratio, land use and production, and also resource utilization.
4. After successfully map drawn on paper with the help of community people, later the drawn map should be converted to digital image by scanning or clicking photo.
5. On the basis of following data and maps interpretation should be made.
6. Necessary condition and solution for the relative problem should be suggested to community.

In developing a mental maps focus groups, individual interviews, leaflet drops (for covering a wide area such as a whole neighborhood), on-street-intercept interview, poster session, transect walk, town meeting and electronic media are the very important parts of Participatory-GIS (Follosco, 2005). Without these things the survey and map development is not possible. It is because map making is based on knowledge of local people. The mental

map may vary in the case of senior citizen, farmer, children, women self-worker etc. For example- a farmer can provide information regarding the cultivated area and soil characteristics; a woman can provide information about the forest fuel and vegetables she collects from forest; children can provide information about the playing ground and swimming pond where they go for playing and swimming etc.; a senior most person can provide the information and significance of the places and the changes occurred over time. So, from individual information maps can be developed for better understanding of the area.