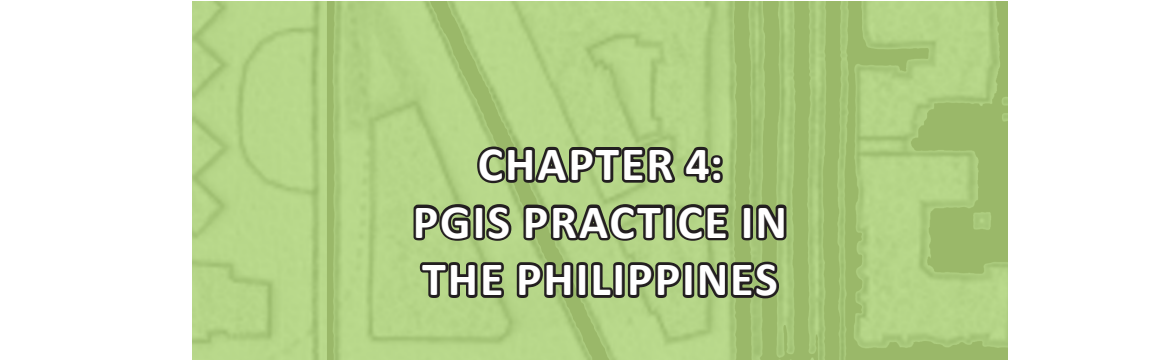


CHAPTER 4: PGIS PRACTICE IN THE PHILIPPINES





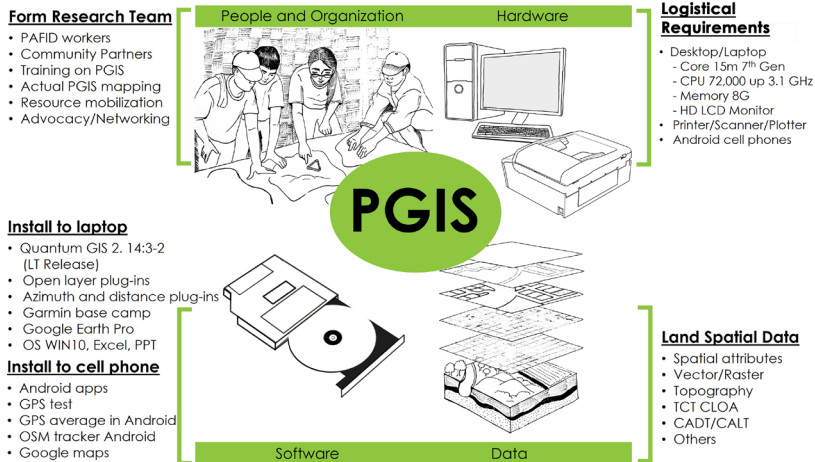
CHAPTER 4: PGIS PRACTICE IN THE PHILIPPINES

In this chapter, the practical application of Participatory Geographic Information System (PGIS) will be discussed within the context of PAFID field experiences in the Philippines. For over two decades, PAFID is a CSO engaged in community development work, of which community mapping is an essential strategy to defend the land rights and assert the right to self-determination and autonomy of the indigenous communities in the Philippines.

PGIS is the spontaneous merger of participatory learning and action methods with geographic information technologies that combine a range of geospatial information management tools and methods to represent peoples' spatial knowledge of the communities they live in (Zingapan, 2017). Essentially, PGIS is a fusion of participatory mapping technique and GIS technology for the production of evidenced based digital maps, useful for land rights advocacy and for sustainable planning and management of natural resources.

A. PGIS Components and Requirements

Basically, PGIS has four interrelated components to function effectively and efficiently. Based on PAFID field experience, it is imperative to conduct social preparation and fulfill the technical requirements of the project prior to PGIS mapping, as shown on the following page.



At the onset, social preparation must be undertaken by the local CSOs and support groups advocating for land rights as preconditions for PGIS mapping. In practice, community development protocol requires PAFID workers to:

- (a) Conduct courtesy calls to local government officials and respected community leaders where community mapping will be conducted;
- (b) Organize community consultations attended by the different stakeholders to understand the problems, issues, and needs of the community. It is important that the community is the owner of the data which will be gathered. As such, the following questions must be answered during multi-stakeholder consultation:
 - What are some of the most important land-related issues that affect the communities?
 - What is the purpose of the community activity?
 - Who do we want to show it to?
 - Who will conduct the participatory mapping?
 - Who will select and decide on the sources of information to be gathered?

- Who controls and uses the results of the mapping activities?
- Where do we conduct the community mapping?
- What are the spatial extents and limits of the participatory mapping exercise?

(Source: PAFID)

- (c) Community profiling and interviewing to get primary and secondary data for the project study;
- (d) Formation of a local research team composed of CSO workers and representatives of the basic sectors, such as IPs and other stakeholders, who are willing to attend the Basic Orientation and Skills Training on PGIS; and,
- (e) Community planning and resource mobilization to provide administrative and logistical support to fulfill the technical requirements of the project, such as securing hardware and software requirements (i.e., desktop computers, laptops, personal cellphones, printers, scanners, and plotter, among others).

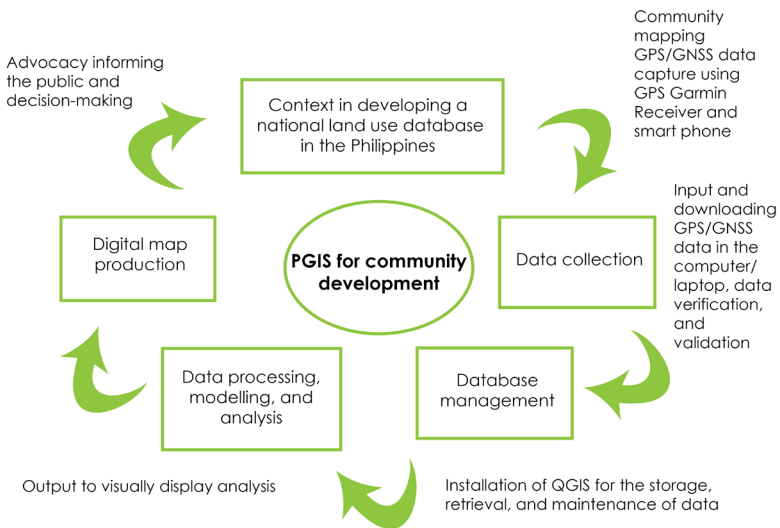
B. PGIS Operational Framework

Basically, PGIS mapping is anchored on the need to develop a National Digital Land Use Database in the Philippines that will address critical gaps in generating accurate maps useful for land rights advocacy, and for sustainable use and management of natural resources.

PGIS requires community consultations participated in by different stakeholders to identify the problems, issues, and needs of the community. Thereafter, recruitment and training of local researchers on PGIS will commence, followed by community planning and logistical preparation to comply with the technical requirements of the PGIS process.

The local research team will conduct community profiling, interviewing, and actual field survey to capture GPS/GNSS raw data using GPS Garmin receiver, e-tablets or mobile phones. Once all the spatial data have been collected, computerized mapping using a desktop or a laptop will ensue to input or download the GPS/GNSS data to a computer or USB.

In practice, the PGIS along with Quantum GIS (QGIS) software will be used for data storage, retrieval, manipulation, data modeling, and analysis for digital map production useful for advocacy and for other purposes, to improve the situation of IPs and disadvantaged groups as shown below.



Source: PGIS Training for ILC Partners in the Philippines jointly organized by PAFID and ANGO (April 2017).

Essentially, PGIS is a system used for data collection, data management, processing, and analysis of spatial data to develop accurate digital maps for the empowerment of grassroots communities. Users of this PGIS manual need to understand

the definitions and interrelationships of the following technical terms:

Data Capture means that data are obtained and gathered from their source, either from a document (i.e. questionnaire) or from an input device (i.e. GPS Garmin receiver, e-tablets and mobile phones, heat sensor, or scanner). Two of its important activities are:

- (a) Verification - the process of checking that the data have been correctly entered into the computer; and
- (b) Validation - which takes place before the processing stage and is used to double-check the accuracy of data through double entry and proofreading.

Data Input refers to the creation of digital spatial data. It is the process of feeding data into a desktop computer or laptop for downloading, saving, and data processing.

Database Management refers to unique issues in the maintenance of spatial data, such as checking for errors or level of accuracy; storing data; retrieving data; and metadata. Data management is one of the key issues in determining the usability of spatial data. The installation and application of QGIS software has been used by PAFID for this purpose.

Data Processing is the restructuring of data to increase their usefulness and add values for a particular purpose. It involves calculation, analysis, comparison, data manipulation, sorting, searching, and transformation of data. Some of its important functions are summarizing, computing averages, graphing, creating charts, and visualizing data.

Data Analysis is answering questions that may not be explicitly stated in the data.



Data Output refers to the method used to visually display analysis performed using QGIS. Data Output can take many forms such as text, sound, tables of data, graphs, commands, etc. Depending on the form of output required, the data can be transmitted by a range of devices for presentation:

Digital Map Production is a graphic representation or scale model of spatial concepts. It is a means for conveying geographic information;

Charts are pie charts, histograms (bar charts), line charts, and pictures;

Directions show the users how to get from one place to another; and,

3D diagrams and movies for power point presentations intended for advocacy and land use planning. ■

BOX 3. Reclaiming Ancestral Domains in the Philippines thru PGIS

Introduction/Context

Indigenous peoples in the Philippines belong to the poorest of the poor, having been deprived for the longest time of legal recognition of their territories. Yet, there is a legal framework in place that recognizes the rights of indigenous peoples.

Passed in 1997, Republic Act 8371 or the Indigenous Peoples Rights Act (IPRA) addresses four substantive rights of indigenous people/communities: (i) the right to ancestral domains and lands, (ii) the right to self-governance and empowerment; (iii) the right to cultural integrity; and, (iv) social justice and human rights. The law defines ancestral domains to cover “forests, pastures, residential and agricultural lands, hunting grounds, worship and burial areas, including lands no longer occupied exclusively by indigenous cultural communities, but to which they had traditional access.”

Under the principle of self-determination, IPRA allows indigenous communities to document and delineate their own ancestral domain claims and to formulate their own ancestral domain sustainable development and management plans (ADSDPPs) based on their indigenous knowledge systems and practices.

In this context, many indigenous communities in the Caraga region have been reclaiming and negotiating the legal recognition of their ancestral domains. Yet, the boundaries of their domains had not been properly identified and mapped, causing extreme frustration within the communities whose claims were often questioned as to their legitimacy. Without perimeter maps and community plans, there were other competing claimants over their ancestral lands that include mining, logging, and plantation companies.

Since 1995, the Philippine Association for Intercultural Development (PAFID) has been adopting the use of participatory

three-dimensional mapping (P3DM) as a tool for community development in the Philippines as it relates to indigenous peoples' land rights claim, and to facilitate ancestral domain management planning (ADMP).

PGIS: Marrying Traditional Knowledge and Technical Processes

A 3-D map is a physical model of a place. It uses an appropriate scale that shows the rivers, mountains, and valleys, as well as the location of residential, and cultivated areas, and the resources from which communities derive their livelihoods. It also records indigenous knowledge, beliefs, and practices (i.e., sacred areas, burial sites, etc.), and all those features that have social, cultural, and spiritual significance to the local people.

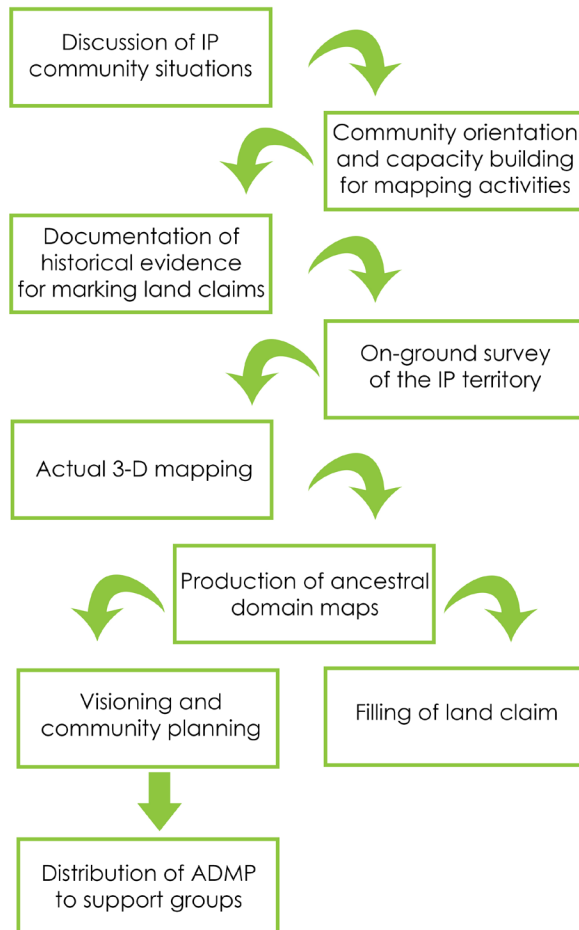
The mapping process relies heavily on the participation of indigenous communities in delineating their own domains based on physical and cultural markers. This establishes the basis for their filing of ancestral domain claims.

With P3DM, the local communities are guided by PAFID fieldworkers to construct a relief model of their ancestral domain; by combining local knowledge with the use of global positioning system/geographic information system (GPS/GIS) technology for data capturing accurate and easily understandable spatial information such as area, location, distance, and land uses; thus providing critical technical inputs in formulating its ancestral domain management plans.

Empowering communities for claim making and domain planning involves several related activities:

- **Discussion of IP community situation.** Fora and community meetings are first organized to discuss the general situation of indigenous peoples and the salient features of the IPRA - e.g., socio-economic and tenurial rights of IP communities; community rights and obligations to protect, utilize, and develop their ancestral domains. Some larger fora may be attended by both tribal leaders and local government officials and may involve up to 300 people.

- **Community orientation and capacity building for mapping activities.** In community workshops, PAFID technical staff facilitate sketch-mapping activities to enable communities to identify and determine the coverage of their ancestral domain claims. People recall and write the names of mountains, rivers, sacred areas, and old villages in their indigenous language and provide historical accounts of these. They identify important landmarks such as burial caves, community boundaries, and communal forests, among others. These sketch maps provide the basis for preparing enlarged topographic and base maps that will be used to construct 3-D relief models of their domains.



In preparation for the conduct of on-ground perimeter surveys, PAFID technical staff also conduct a series of community trainings on the use of GPS instruments and other survey equipment. Resource persons often include tribal leaders from other communities who have been previously trained on GPS and have already done perimeter surveys of their own ancestral domains.

Capacity building is also ingrained in actual 3-D mapping and community planning.

- **Documentation of historical evidence for making land claims.** Throughout the mapping process, PAFID staff work closely with the community in gathering evidence to support their ancestral domain claims. These include extensive gathering of documentary and physical evidence, recording of historical and oral accounts, writing affidavits and testimonies of elders, and genealogical profiling. These are compiled into “claim-books,” the set of documents submitted to the National Commission on Indigenous Peoples (NCIP) containing the mandatory requirements needed for IPs to support their claim to their land.

Experience has shown the many difficulties usually encountered during field research. Official statistics regarding tribal communities are neither available nor credible. Often, key informants such as tribal elders are not available or may have moved elsewhere. Local customs may require *baylans* or spiritual masters to conduct certain rituals before they are able to mention names of persons and sacred places or to divulge indigenous systems and practices. Some communities face internal difficulties because of boundary disputes or leadership conflicts. Moreover, in areas such as eastern Mindanao, there are peace and order problems due to the presence of rebel groups and military operations in indigenous community areas.

- **Community on-ground survey of the territory.** Assisted by a PAFID technical team, GPS trained members of the community conduct an on-ground perimeter survey to

delineate the ancestral domain. They take a perimeter walk to mark off the natural boundary lines and cultural markers of the domain. They also take point positions of important geographical features inside the domain. These include the location of barangays, sitios, schools, health centers, markets, bridges, concrete and rough roads, and rivers and streams.

All the data gathered are overlaid on a topographic map. This is then used as the base map for determining the extent of the domain.

- **Actual 3-D mapping.** Using the base map, community members then construct a relief or 3-D map model at the appropriate scale. The youth, women, elders, and leaders are actively engaged in the construction, identification of landmarks, and recollection of historical accounts of old villages, sacred mountains, and rivers. Sketch maps that were previously drawn at the start of the process are used as additional reference for spatial information.

Physical materials used for the actual construction of the 3-D map may vary – from resin to rolls of rubber sheets. The physical work involves preparing the base frame; numbering contour lines on the base map; tracing, cutting, and layering rubber sheets; and coating the model with epoxy and painting it white. Once dried, the community then traces and locates geographical markers and land uses on the map (including sacred sites, forests, indigenous settlements, transient settlers, mountains and rivers, traditional farms, etc.).

Through this process, the 3-D map is able to combine accurate spatial information with community-relevant data. Once finished, the 3-D map is treated as an accomplishment of the whole local community.

The 3-D map serves as a user-friendly technical tool in the effort of indigenous communities to identify the exact extent of their domains, and to help resolve boundary disputes and other long-standing land problems. Communities also use these maps to dialogue with government and corporations and discuss issues related to the entry or continued operation



of mining, logging, and plantation companies within their domains.

- **Production of ancestral domain maps.** Other maps are then produced through data generated from the 3-D map to represent the various land uses and other technical information on hydrology, slope incidence, and tenurial patterns, or to show settlement areas and road networks. Hazard and risk maps, particularly those showing flood- and landslide-prone areas, may also be produced as part of the map series that will be used during the formulation of the ADMP.
- **Visioning and community planning.** The participatory way in which mapping activities are conducted enables the people to see, understand, and better appreciate the land-use situation in their domain. This sets the stage for the community to formulate its domain management plans and priorities, as well as community rules and regulations, based on indigenous resource management systems and practices. The 3-D map serves as the community's guide in formulating its own ADMP.

- **Distribution of ADMP to support groups.** The community may choose to provide a copy of the ADMP to NCIP and LGUs for adoption and integration into municipal development plans and comprehensive land use plans. The community may also opt to look for other sources of funds to implement their ADMP.
- **Filing of land claims.** PAFID assists the community in packaging the documents and maps into a claim folder. The community then submits this claim folder, together with their official letter to NCIP, in their application for ancestral domain claims. ■

Source: De Vera, D. et.al., of PAFID, *Moving up Innovations to Scale*, IFAD (September 2014)