Mapping Today and the Future: Participatory Mapping and Planning with the Talaandig in Bukidnon, Mindanao, Philippines

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Background

The Indigenous People represent nearly 14% or 12 Million of the country's population.[1] Composed of at least 110 Ethno linguistic groups, they are geographically spread out into the nearly 7,100 islands which comprise the Philippine Archipelago.

Traditionally indigenous communities in the Philippines have close ties to the land and see themselves as part of the whole ecosystem. Their ancestral domain encompasses the areas where they have acted as stewards since time immemorial which includes the forest, rivers, agricultural and coastal areas. Land is not only seen as a means of production and livelihood – for example, hunting and gathering – but also as part of indigenous people's spiritual and cultural traditions. Indigenous Peoples depend on natural resources within traditional territory for daily life, hunting, collecting/gathering, farming, water source, fishing, building materials, medicinal herbs comes from land, forest and rivers or sea.

They are among the poorest and the most disadvantaged social group in the country. Illiteracy, unemployment and incidence of poverty are much higher among them than the rest of the population. IP settlements are remote, without access to basic services, and are characterized by a high incidence of morbidity, mortality and malnutrition.

Most of the Indigenous Peoples depend on traditional swidden agriculture utilizing available upland areas. However, most of these traditional cultivation sites and fallow areas have now been degraded and are further threatened by the influx of migrant farmers who have introduced unsustainable lowland-commercial

[1] Collated data from NCCP, BSO, et.al, 2003

farming practices. Furthermore, most Indigenous Communities do not have legal recognition over their traditional lands, thus limiting their ability to freely conduct their livelihood activities and are denied access to other natural resources in their communities.

Policy Context

The Indigenous Peoples (IP) in the Philippines remain as the most marginalized sector of society. This status continues despite the tremendous inroads achieved by communities, partners and advocates through years of struggle. In 1997, as result vigilance and the sustained advocacy of the IP sector and its partners, the Indigenous Peoples Rights Act (IPRA) was enacted. This provided venues and legal backbone for the recognition of the Traditional Rights of communities over their ancestral domain.

In a nutshell, the IPRA provides for the recognition of the traditional rights of Indigenous Peoples over their ancestral domains through the issuance of Certificates of Ancestral Domain Titles (CADT). It recognizes the rights of ICC's to define their development priorities through their own Ancestral Domain Sustainable Development and Protection Plan (ADSDPP) and exercise management and utilize the natural resources within their traditional territories.

Nine years hence, only 34 Titles covering half a million hectares of land have been awarded to Indigenous Communities. To date, very limited development activities in support of the Ancestral Domain Ancestral Domain Management Plans have been implemented in the IPO areas. Problems in the implementation of the IPRA continue to fester and severely limit the capacity of Indigenous Communities to truly benefit from the mandate of IPRA.

The inability of the Government to fully implement the IPRA in order to address the problems and concerns of the Indigenous Communities is rooted in conflicting policies, capacity gaps and a questionable commitment to empower Indigenous Communities. The urgency of the problem is underscored by overt encouragement on the part of Government of the entry of large-scale commercial investment into traditional lands to install extractive industries which include open-pit mining, palm oil plantations and industrial forest farms.

The Case Study Area

As the second largest island in the Philippine archipelago, Mindanao has a third of the country's land resources and nearly half of its fishery yield. With a

population of 15 Million, it holds 25% of the Philippine population. It is also home to a quarter of the nation's indigenous or *lumad* peoples who comprise 16% of Mindanao's population. Overwhelming landlessness in the midst of vast natural resources and the highest military expenditure in the country however, mark Mindanao's landscape. The control of land and other natural resources is largely limited to the economic and political elite, while the greater majority of its population remains mired in extreme poverty lacking access to basic services and livelihood opportunities.

Despite its natural resources, Mindanao remains the poorest part of the Philippines. Seventeen of its twenty-four Provinces rank among the poorest in the country and 72% of the Island's 437 municipalities belong to 4th or 5ths class LGUs. Around 37% of Mindanao's Population was estimated to live below the poverty threshold in 1999 and over half the children below the age of 12 live in these households.

The poor in Mindanao are the poorest in the nation. All six regions in Mindanao record higher poverty gap ratios and severity indices than any other part of the country. Social Indicators in Mindanao have always lagged behind the national averages because of low public investment and the continuing civil strife.

Portulin, Bukidnon

Portulin is one of the nineteen barangays of the municipality of Pangantucan in the province of Bukidnon in the southern part of the Philippines also known as Mindanao. It is composed of six villages namely, Mapayag, Bolohon, San Vicente, Lower Sinasaan, Kauswagan and Ootah. Portulin is approximately fourteen kilometres from the municipality of Pangantucan. From the town a thirty-minute ride on a motorcycle will bring you to heart of the place.

The Barangay is bounded in the north by the municipality of Lantapan and in the south by the Barangay of New Eden, Pangantucan, while on the east by the municipality of Maramag and in the west by the Barangay of Concepcion, Pangantucan. Portulin is situated in the northern part of the municipality with an elevation of approximately 1,200 meters above sea level, while Pangantucan lies at the southwestern part of Bukidnon, and is situated about 75 kilometers south of Malaybalay the capital city of the province. Cagayan de Oro City is about 166 kilometers away. The area can be located at geographic coordinates 4° 22'33.36"N (Latitude) and 128° 21'58.70"E (Longitude). There are several major rivers in the place such as Bagik-ikan river, Ootah river and Dumagook river that flows from northern towards southern part of the community.

Rolling hills and mountains surround Portulin and plains are rare. The mountains are home to rich flora and fauna. There are also log-over areas or secondary forest. The proximity of the place to the mountains of Kalatungan, Kilakiron, Ootah, Hangaron, Tamaing, Kata-kata makes the climate of the place cool and pleasant. The ancestral domain of the Talaandig is covering approximately 6,500 hectares that includes the Mt. Kalatungan. The famous mountain is approximately 2,894 meters above sea level making it one of the two highest peaks in the southern part of the province.

The total land area is 4,267.50 hectares. It has three classifications of soil. These are clay, which measures 85.94% from the total land area, sandy which is 2.03% and sandy clay which measures 12.016%. From the total land area 1,462.50 hectares is classified as alienable and disposable land and the remaining 2,805.00 hectares is classified as timberland that is included in the Talaandig Ancestral Domain. The claimed area measures 6,679.83 hectares including the Kalatungan Range.

Local Issues

Similar to other IP communities in Mindanao, the Talaandig people of Portulin are beset by many problems that affect their day-to-day living. However, a series of incidents in the year 1997 posed the biggest challenge to the community and their survival as an Indigenous Community.

The year 1997 ushered the most difficult times for the Talaandig indigenous community of Portulin. This was the year that a long drought struck the area. The community suffered from hunger, scarcity of food and sickness. Crops in the farm were destroyed leaving the tribe in hunger. They survived by gathering whatever is left in the forest such as rattan and hunting wildlife. Whatever is accumulated was bartered with rice or corn grits from people in the lowland**.** They were forced to consume "*lab-o*" a poisonous plant that can be made edible when dried and soaked with water overnight. It is cooked and filled with water as soup.

It was during this crisis that a miner visited the neighbouring Barangay of Dagolos, La Roxas, Maramag, looking for indicator stones that determine the presence of precious minerals in the are. Eventually the tribe was convinced to help find these indicator stones. Later, upon scrutiny and testing of the materials that were gathered, it was determined that a substantial section the mountain within the ancestral domain was blessed with precious minerals, the community later gave in to the unrelenting convincing done by the Gold prospectors thus, the decision to conduct mining activity was settled.

Mining operations started in May 1998. The first ones were implemented by Visayan and Igorot migrants financed by Ex-Mayor Fernando Gascon, Mayor Antonio Garces and CENRO officials. Workers from the neighbouring places of Gango, Don Carlos, and Pangantucan soon arrived. Others to follow came from the cities of Cagayan de Oro, Cotabato and Davao. An estimated fifteen persons owned three to four tunnels.

Datu Johnny Guina a community elder and the local owner of the parcel of the land where the mining operated, was offered a ten percent share of the profit in every tunnel**.** Due to the pressing situation, Datu Johny accepted the offer. As an initial budget for a month's operation, Guina received from the financier an amount of two thousand five hundred pesos a week for one and half month. It was intended for the food of the workers and of his family. Representative from the Ayala Corporation a mining investor, visited Portulin to make initial assessment on the prospect of mining operation in the area.

A month later, the Department of Environment and Natural Resources (DENR) of Cagayan de Oro City and Malaybalay, Bukidnon learned about the mining activity. On 22 June 1998, officials of the said agency convened a meeting in Barangay Portulin and told the people to submit necessary requirements to legalize small-scale mining concessions. In response, the Local Government without consulting the Talaandig community, initiated a move to formally reclassify Portulin as a mineral reservation through a local legislation and declare its as an area for exclusively for commercial exploitation investments in Gold and other precious mineral extraction.

Unregulated, illegal logging activities became soon rampant as more gold prospectors required timber to shore-up the ever-growing number of tunnels that were dug-up. New migrant families required land to settle-on, soon conflicts arose as land grabbing and encroachment to traditionally owned lands became common. The unabated influx of mineworkers into Portulin also caused stress to the environment as migrants harvested more than what the local natural resources could provide. In less than two years several creeks were observed to have dried up while the natural forest line moved farther away from the village.

The new economic activity also worsened the land tenure situation of the Talaandig people. Not used to handling money and lacking the necessary skills to handle an enterprise, by 1999 nearly 21 Talaandig families were already deep in debt and had mortgaged their landholdings to migrant families. The damage brought about by the Gold rush affected not only the environment and tenurial situation of the Talaandig but also had a profound impact on their ability to exercise traditional practices and culture. The sacred grounds which they had maintained through the years were not spared by prospectors as tunnels were dug within and around their cemeteries and ritual areas. Areas of the spirit forests

which had been off-limits to human activity became open access areas and were soon logged over.

With the worsening situation, the Talaandig community soon found themselves in the brink of losing everything they had. In just a few years their survival was now at risk. Frequent visits to the local DENR office and the Local Government officials yielded negative results. Clearly a strategy to communicate the demands and needs of the Talaandig community was needed.

Community Responses

In August 1998, Datu Guina decided to meet with the staff of the Philippine Association for Intercultural Development, Inc. (PAFID)[2] who were assigned in Bukidnon to assist IP communities in the province. A dialogue was convened by the PAFID- Mindanao exactly a week after the first meeting. Several families representing various clans attended the activity. Through a film showing, the mining issue was discussed and the advantages and disadvantages of mining operations were emphasized. Some people maintained that the mining operation has offered them a solution to their difficult situation, while others started to wonder on the wisdom of continuing an enterprise that has now brought about changes in their environment.

Series of consultations followed until the people decided to cease their small-scale mining operations and instead pursue their struggle for land security. An informal group was formed to initiate the processing of claims over ancestral lands. In August, the Portulin Tribal Association (PTA) was formally organized. And on 14 September 1998, the PTA, composed of seventy-eight (78) family-members, was officially registered at the Securities and Exchange Commission (SEC).

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[2] PAFID is a social development organization which has been assisting Philippine indigenous communities secure or recover traditional lands and waters since 1967. It forms institutional partnerships with indigenous communities to secure legal ownership over ancestral domains and to shape Government policy over indigenous peoples' issues. PAFID works exclusively with the indigenous peoples' sector, specifically upon written or signed requests for assistance from indigenous communities or their representatives.

PAFID and its partner indigenous communities have pioneered the use of community forest lease contracts and stewardship agreements, the development of social forestry instruments in the Philippines, and the formulation of ancestral domain bills to counter the wholesale dispossession of indigenous communities and their marginalization from natural resource use planning, disposition and management. PAFID is also a pioneer in the development of community mapping as a means to empower indigenous communities to engage or negotiate with Government. Since 1989 PAFID and its partners have surveyed and mapped a total of 1,195,935 hectares of ancestral domains in the Philippines.

PAFID today is engaged in the development of indigenous social organizations and community organizing, ancestral domain management planning, community-based natural resources management, community mapping or cultural mapping, agro-forestry, potable water systems, radio communication networks, technical services, policy advocacy and others. Over forty percent of PAFID staff are themselves members of indigenous communities, and several are second or third generation descendants of community partners and advocates who had lobbied for ancestral land claims, and won.

The PAFID then initiated community consultative meetings and provided orientations regarding the Indigenous People's Rights Act (RA 8371) of 1997. Extensively discussed were the rights and responsibilities of Indigenous Communities over ancestral domains and the processes for the application of a Certificate of Ancestral Domain Title (CADT).

Defining the territory and identifying the resources

One of the major obstacles that faced the Talaandig community was the lack of up to date and accurate data on the extents of their traditional territory and the resources therein. All locally available maps and information were produced by outsiders who were even able to reach the place and thus were very inaccurate not acceptable to the Talaandig community. Other sources of information were all dated and can no longer be effectively used as inputs for community planning and to identify the markers of the extents of the ancestral domain of the Talaandig community. Furthermore, available maps did not contain critical socio-cultural data which were very important to the local community as these described the traditional uses, rules and values of the resources in the area.

In view of this limitations, it was decided that various methodologies and tools of a Participatory Geographic Information System (PGIS) shall be utilized. These PGIS tools and methodologies will ensure that the community shall full control and participate in the generation, analysis and interpretation of spatial data that shall then be used to accomplish a community resource Ancestral Domain Management Plan and establish the basis of an application for a Certificate of Ancestral Domain Title. (CADT).

While members of the community have had experiences in the past in the usage of paper maps they showed a high degree of resistance to the use of these. It was later learned that their inability to comprehend paper maps were exploited by outsiders who manufactured maps that redrew boundaries resulting to the loss of traditionally owned lands. Furthermore, their ability to fully comprehend the information as well as provide new data to the map was very limited as the flat paper maps offered very little cognitive data to the Talaandig which they can use as mental landmarks.

Thus, 3-Dimensional model was determined to be the most appropriate tool to facilitate community planning and the identification of the Ancestral Domain boundary. To enable a ground truthing of the data that shall be generated, on-ground marking of specific features were to be taken using Global Positioning System (GPS) handheld rovers.

The 3D-Modelling Process

P3DM is a relatively new communicative facilitation method conceived to support collaborative processes related mainly to resource use and tenure and aimed at facilitating grassroots participation in problem analysis and decision-making.

P3DM integrates people's knowledge and spatial information (contour lines) to produce stand-alone scale relief models that have proved to be user-friendly and relatively accurate data storage and analysis devices and at the same time excellent communication media.

Participatory 3D modelling works best when used jointly with Global Positioning Systems (GPS) and Geographic Information Systems (GIS) in a Participatory GIS (PGIS) context

Participatory 3D models are manufactured at village level based on the merger of traditional spatial information (elevation contours) and peoples' spatial knowledge (cognitive maps). Elevation contours are used as templates for cutting out sheets of carton board of a given thickness (i.e. expressing the vertical scale). Cut-out sheets are progressively superimposed to build the relief.

Based on their spatial cognition, informants depict land use and cover and other features on the model by the use of pushpins (points), yarns (lines) and paint (polygons). Once the model is completed a scaled grid is applied to transpose spatial and georeferenced data into GIS. The grid offers on one hand the opportunity for adding geocoded data generated by GPS readings or obtained from secondary sources to the model, and on the other hand to take approximate coordinates on the model and verify these on the ground by means of GPS readings. This is extremely useful when models are used to support boundary negotiations.

P3DM brings GIS potentials closer to rural communities and bridges the gap existing between externally supported GIS and capacities found among marginalised, isolated, and frequently natural resource-dependent communities.[3]

Building the 3D model

[3] Giacomo Rambaldi, www.iapad.org. (2004)

A preparatory planning meeting and consultation was conduced. The main objectives were to 1) determine the actual extents of the management area and traditional territory of the Talaandig community, 2) identify the participants and their roles in the scheduled Participatory Mapping and Planning activity, and 3)

With the information gathered in the preparatory consultation, a base map of the traditional territory was produced at 1:5,000 scale. Using Corel Photopaint, 1:50,000 contour maps were stitched and enlarged. There were later printed in a wide-format plotter to produce the main base map to be used in the P3DM activity.

A 7-day community workshop was conducted where a 1:5,000 model of the extents of the Talaandig traditional territory was constructed by the participants. The total area covered was 6,679.83 hectares. Crepe rubber sole (rubber filling in most shoes) was the main material used to construct the 3D model. A carbon paper as large as the source map is assembled. Contour intervals at every 20 meters were traced from the base map beginning at the lowest elevation to the highest. Using the base map and the carbon paper the single contour lines are outlined on crepe rubber sole boards. Single contour lines are then cut out. These were later cut into layers and assembled. After assembly, the contour layers were glued together. Each layer is pasted on the top of the previous one maintaining appropriate geo-references.

Upon the completion of the 3D-model, community key resource persons and informants were tasked to locate and name in sequential order: water courses, mountain peaks, islets, roads, trails, social infrastructures and other landmarks they use to orient themselves when moving around within their domains. Critical socio-cultural information were also gathered and located in the 3D-model. Land use and cover were outlined
Resource persons were designated by the community to identify the extents of land uses by the use of colored yarns or colored marking pens. Vegetation types, land use, and other aspects that they consider relevant to their domains were then defined

The location of various important geographical features such as houses, ritual areas, graveyards, resource gathering areas, trap setting areas were identified using pushpins. Other features are outlined as polygons using paint or colored marking pens. The data gathering stage was done in public with ample time given to the participants. Everyone was encouraged to provide their own inputs to facilitate participation from the various interest groups in the community.

Upon validation of all the data that was generated. The Talaandig community finalized all the information on the 3D-model and created their own

legend as a summary of the map they then used acrylic paint to finalize all the details in the 3D-model.

Participatory Planning using the 3D-model

The information generated in the 3D-model is by itself already suitable to use for basic community planning and analysis, in fact most of the planning was already conducted using the model. Since the model was done to scale, measurements could already be made by the community. Using a grid with 2cm drawn in a plastic sheet, closed polygons representing areas of land-uses and extents of boundaries are easily measured and approximated. Roadways, trails and riverine systems were measured using a string. Areas where there have been environmental stress and degradation were marked with distinct colors (usually red or black) and marked as close polygons for easy measurement. With the 3D-model the community was able to come up with enough information that allowed them to quantify the area of their ancestral domain, the extents of environmental degradation, the frequency and incidence of migrant incursion and more importantly have an up to date knowledge of what was happening within their territory.

With the critical information at hand on the current state of their resources, the Talaandig people were encouraged to plan for the future and define the development and conservation priorities of the community. A workshop was again convened to define a map for the future. Utilizing the same model, a clear plastic sheet was placed on top of the model, control points were drawn on the sheet using the immovable geographical markers such as mountain peaks, riverbeds and permanent trails. These control points are critical in ensuring a accurate overlay of data in the map. Using the knowledge gained from the previous exercise where the current situation of the community was put into the 3D model, the key informants and resource persons were then asked to identify future areas for agricultural expansion, areas to be reserved for housing, sections of the forest to be declared as community conservation areas and areas that shall be left to naturally regenerate.

Ground Truthing

In order to add an additional layer of technical efficiency to the data generated in the 3D-model, ground truthing of specific control points identified in the 3D model was undertaken. Several boundary markers of the Ancestral Domain boundary were identified, these were usually permanent geographical features

such as ridges, caves, roadways and peaks. A basic GPS instrumentation training for selected community members was conducted where the basic operations and components of a Trimble GeoExplorer handheld rover was discussed.

On-ground marking of all the selected ancestral domain boundary markers that were pre-selected in the 3D model was conducted. Areas identified for reforestation and the protected forest line were also marked on the ground. With the GPS a more accurate measurement of the boundaries among the clans was also facilitated. This was very important as it would lay the basis for the disposition of management responsibilities among the various clans within Portulin.

The accuracy of the GPS has inherent errors deliberately produced by the Department of National Defense of the United States of America otherwise known as selective availability. Furthermore other factors such as atmospheric condition and Positional Dilution of Precision or PDOP also affect the accuracy of the GPS limiting it to at least +- 5-15 ,meters circular error probable (CEP). In order to offset this error, differential correction was conducted using GPS data gathered from a base station. With the DGPS process the error was reduced to at least +- 2-5 meters (CEP). The GPS positions provided the much needed technical confirmation of the data generated from the 3D, moreover this would be very important in the transposition of the data into a formal GIS.[4]

Transposing the Community Generated Data into a GIS

The data that was generated by the community using the 3D model had by all accounts been very useful in helping facilitate a participatory land-use plan and enabled the community to determine the extents of their territorial boundary and the state of the natural resources within their domain. The whole exercise had brought about a sense of empowerment among the Talaandig as they were able to fully comprehend the state of their environment as well as define from their own perspective their vision for the future. However, to fully achieve the goals set at the start of the exercise, this community generated geographic information had to be communicated to other stakeholders and more importantly to Government and policymakers.

Thus the need to transpose the data into a formal GIS had to be undertaken. There are two ways to digitize the data of a 3D-model into a GIS. These are, direct tracing of the 3D-information into a clear plastic sheet. In this case all information represented by lines, points and polygons are traced using color-coded permanent marking pens. Control points such as top peaks and river bends are indicated in

[4] Trimble Field Manual, 1998

the plastic sheets. These are then used as control markers once the plastic sheet is digitized in a digitizing table.

The second methodology involves the use of a digital camera. his technique involves moving the camera at a set distance from an object, such as the 3-D Model, to capture it in sections. Each picture should be shot perpendicularly to the model surface.

A high-resolution digital camera is placed on a tripod at 4-m distance from the base of the tilted model. Lines are drawn perpendicular to the model's horizontal plane on the floor at 40 cm intervals. A reference line is added at the end of the orthogonal lines to serve as guide in moving the camera from one position to the following one. The focal length is then adjusted to capture an area of approximately 40 cm x 50 cm. The camera is set to the maximum resolution (e.g. 2272 x 1704 pixels) and compression capacity. This setting will provide high quality images of approximately 2 MB each.

The number of images that can be stored on the Compact Flashcard depends on its storage capacity. A standard CF-32M card may contain up to 14 images shot at these high quality settings. The digital pictures are downloaded into the PC and are digitized on-screen.[5]

In Portulin, the community decided to utilize the plastic sheet method for practical reasons, 1st it is cheaper because there is no need for a digital camera, it is done in a participatory manner and it allows for the conduct of thematic mapping using multiple layers and themes such as past, present and future land-uses.

The digitization of the Portulin data was done using the Cartalynx software. Cartalynx is a data management software developed by the Clark University as a complimentary software for various GIS applications requiring data management and digitization. Calrk labs developed Cartalynx a cheap alternative for development institutions with high requirements in data management. The PAFID was part of the initial group of Beta-testers during the development of Cartalynx.

The map lay-out and data structuring of the Portulin 3D was done using ArcView 8.1 ver. Software. PAFID had been able to secure ArcVie and ArcGIS from the ESRI as part of a software grant that was award to the PAFID.

In the transposition of data, it is important to understand that the data as generated and presented by the community should not be diluted. Extra care should be done to ensure that all of the information as coded in the 3D model should be accurately represented in the digitization and consequent lay-out of the

[5] Rambaldi, Giacomo: Participatory 3D Modelling, Guiding Principles, 2002

final map. To minimize the potential errors in digitization, the cartographer tasked to digitize the Portulin data was part of the team that helped the community in tracing the 3D-model data into the clear plastic sheets. Thus, the special codes and colors used to indicate the various land uses and geographical features in the 3D-model were clearly understood at the time of digitization.

Community Validation and submission of the Map

Upon completion and lay-out of the Portulin map, a General Assembly was conducted to ensure the validity and accuracy of the data as digitized in the map compared to the data that was generated in the 3D-model. A full community endorsement was given to the final map as an accurate representation of their area and was then approved for dissemination to the other stakeholders, Government and policy makers.

With the community assent, copies of the map were attached to the official documents and Ancestral Domain Management Plan of the Talaandig in Portulin. These were formally submitted to the Department of Environment and Natural Resources, The Local Government of Pangantucan, Bukidnon, the Office of the House of Representatives in the Philippines and the United Nations Development Program (UNDP) and the National Commission on Indigenous Peoples.

Results/Conclusion

The PGIS process that the Talaandig community of Portulin undertook has resulted into the empowerment of the community. It enabled them to identify the extents of their territory, through a participatory process where many were involved helped them generate a Community Ancestral Domain Management Plan which identified their priorities in development and the conservation of their resources. More importantly, the process allowed them to communicate to the outside world, policy makers and other stakeholders their situation and vision for development.

The accuracy and comprehensive nature of the spatial data that the Talaandig generated and put into a GIS enabled them to dialogue and negotiate with the Government on an equal basis. Whereas before, it was only the Government which had the sole capacity to generate, analyze and interpret spatial data often resulting into inaccurate and anti-IP policies, the PGIS process provided an opportunity to the Talaandig to come-up with their own unique view of the spatial reality in their community. Furthermore, the PGIS process provided a scientific and technical basis to their traditional knowledge and local resource management activities. Whereas before, their traditional systems of resource management were simply dismissed as mere superstition lacking in any technical

merit, the PGIS process has allowed the community to discuss their traditional systems to policymakers in a more objective manner.

The Ancestral Domain Ancestral Domain Management Plan which resulted from the PGIS process has since been acknowledged by various groups, most prominent of which are the United Nations Development Program-Small Grants FUND and the SEA Regional Network on Indigenous Peoples (RNIP) which has provided funding to conservation and livelihood activities that were identified in the Plan. Currently, the Talaandig people through the Portulin Tribal Association have utilized funds from the UNDP and RNIP to establish a nursery for reforesting species, family orchards planted with citrus and other long-term crops while family vegetable farms have also been established to support the short-term needs of the community.[6]

The 3D-model has also provided the community with a dynamic tool which they can continually use to monitor changes in their community and environment. With the methods that they learned, the 3D model is now also being used as an educational tool for the younger generation as well as to inform visitors of the rules and regulations in the various zones of the ancestral domain. Developments and changes in the spatial data of the area can easily be documented by the community and sent to the PAFID for digitization and layering to the Portulin database if required by the community.

The Government on the other hand, has agreed to start negotiations for the possible crafting of a Collaborative Ancestral Domain Management Plan between the Talaandig and the Protected Areas and Wildlife Bureau using the identified Community conservation sites as a starting point for the negotiations. With the identification of the extents of the traditional territory, a fully accomplished application for a Certificate of Ancestral Domain Title (CADT) has also been formally submitted to the National Commission on Indigenous Peoples (NCIP).

[6] Portulin Tribal Association, Ancestral Domain Management Plan, 2001

Acronyms Used

CENRO	Community Environment and Natural Resource Officer
PAFID	Philippine Association For Intercultural Development, Inc.
PGIS	Participatory Geographic Information System
3D	Three Dimension
NCIP	National Commission on Indigenous Peoples
GIS	Geographic Information System
GPS	Global Positioning System
DGPS	Differential Global Positioning System
CADT	Certificate of Ancestral Domain Title
SEA	South East Asia
PTA	Portulin Tribal Association
LGU	Local Government Unit
ICC	Indigenous Cultural Community
IP	Indigenous Peoples