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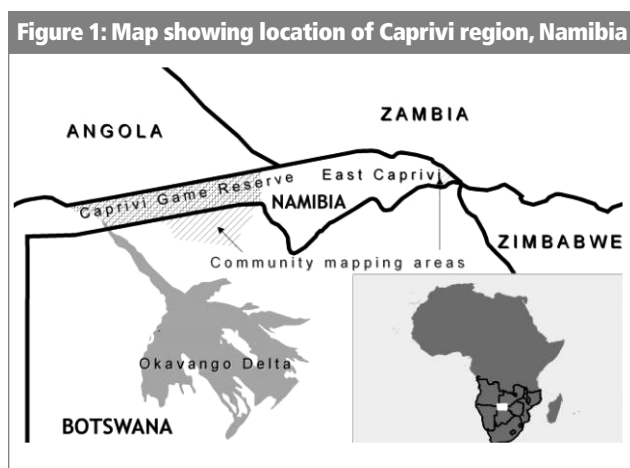
Land and natural resource mapping by San communities and NGOs: experiences from Namibia

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Introduction

In Caprivi, a region in northeastern Namibia, which borders in the south with Botswana (Figure 1), a partnership between the Namibian NGO, Integrated Rural Development and Nature Conservation (IRDNC), the international NGO Conservation International (CI), and local communities has been developed. This has resulted in the evolution of a Participatory Geographic Information Systems (PGIS) mapping method. This is coming to be known as Participatory Orthophoto¹ Mapping.

This method is being used to promote community-based natural resource management (CBNRM) on communal land. It uses information obtained from village mapping workshops to produce computer-generated maps. Although participatory methods – including mapping – are not new to Namibian CBNRM, NGO facilitation and technical expertise have allowed hand drawn maps to be imported into Geographic Information Systems (GIS) in a cost effective way, with many potential uses.



Participatory mapping has been used in southern African CBNRM projects to empower local people to articulate their spatial thinking, and to make decisions about managing natural resources in a sustainable way. In all participatory mapping contexts, however, the implications of such activities are social and political as well as environmental. This participatory orthophoto mapping method (Box 1) was first developed and used by IRDNC in East Caprivi.

¹ An orthophoto is a uniform-scale photograph or photographic map. Since an orthophoto has a uniform scale, it is possible to measure directly on it like other maps. An orthophoto may serve as a base map onto which other map information may be overlaid (Source: U.S. Geological Survey).

Box 1: Summary of generic Participatory Orthophoto Mapping procedure

- An orthophoto base map is prepared that shows important local features such as villages, schools, water points and place names (GPS used to locate features).
- A series of mapping workshops are held in villages where local people build up a map of their area on the ground. This is then carefully recorded by a few individuals onto paper for ease of transfer onto the orthophoto base map. This is the 'participatory' aspect of the mapping. Local people decide what is important to them, not outsiders.
- On the same day as each workshop, data from the particular village area is transferred on to the orthophoto base map as accurately as possible. Examples of the kind of data shown are farmland areas or veld food gathering areas.
- Data from the orthophoto base map is digitised (sometime tracing overlays are used to help simplify the digitising process).
- GIS maps are produced from the layers of data digitised e.g. a map to show farmland areas.

IRDNC is now using this method to assist local communities residing in a national park, commonly known as West Caprivi, to map out important socio-historical data and livelihood activities. West Caprivi differs from East Caprivi in that the land is state owned and regulated. It also differs in terms of the ethnicity of its residents. The majority of the residents of West Caprivi belong to a marginalised San group, the Khwe, whilst the minority are Hambukushu. Through this mapping project, which is still in its early stages, IRDNC aims to foster collaborative decision-making and community-based conservation in West Caprivi.

In the complex setting of West Caprivi uncertainty surrounds mapping activities. Whilst many Khwe people consider mapping as a means to secure their rights within the park, some government authorities perceive mapping as a means to improve regulation.

This article looks at the implications of producing land and natural resource use and distribution maps in this area through a participatory process. The mapping is intended to serve a dual purpose. IRDNC aims to strengthen Khwe rights in the area by documenting socio-historical data, and also aims to assist the residents' Trust in their management of natural resources. This article also draws on comparable experiences of mapping projects facilitated by the Kuru Family of Organisations (KFO) among San Peoples in neighbouring northern Botswana.

Community-based natural resource management in Namibia and West Caprivi

Since 1990, Namibia's CBNRM programme has grown into a

Box 2: Conservancies in Namibia

A 'conservancy' in the communal land tenure areas of Namibia is a common property resource management institution. It consists of a self-defined community, within a defined geographical area, that jointly manages, conserves and uses wildlife and other resources.

significant national rural development movement. It aims to return to communal area residents ownership and control of resources, and rights to share and/or receive benefits. For wildlife and tourism, the conservancy system (Box 2) has provided the necessary supportive legal framework.

The history of participatory mapping in the CBNRM programme and in Caprivi

Within this CBNRM programme, West Caprivi presents a particularly complex case. The area's unique social, political and economic history has made the local Khwe people one of the most marginalised minority groups in Namibia. Like other San groups, Khwe people stand out because of their extreme poverty, political alienation, and a variety of social, educational and health problems. Suffering from displacement, repeated experiences of war, unrest and stigmatisation, the Khwe have struggled for recognition and autonomy from the state and other ethnic groups. Today, a significant portion of their historical territory lies within the boundaries of the West Caprivi Game Reserve, which was declared a park in 1963. Because this area is a protected area, rather than a communal land, the Khwe have been unable to form a conservancy. IRDNC has promoted CBNRM in West Caprivi, and a residents' Trust has been created, representing both the Khwe majority (80%) and the Hambukushu minority (20%). But so far, the residents have derived limited benefits from CBNRM. The Khwe in particular often feel somewhat disillusioned and marginalised by other more powerful actors. The broader backdrop to the mapping plan shows overlapping interests in land, natural resources and Khwe indigenous knowledge. Interested groups include: NGOs and government agencies involved in CBNRM and Transboundary Natural Resource Management; Khwe people concerned about their visibility and self-determination; and entities such as the Kuru Family of Organisations, which openly supports San Peoples' causes.

Local activities and aspirations of Khwe people have shaped the emergence of mapping in West Caprivi. Khwe representatives have often talked about mapping their territory to record historical names and features in order to share their fast-disappearing knowledge with younger generations. By proving their historical occupation and detailed spatial

Members of the West Caprivi residents' Trust learn about maps made by Khwe people in Botswana



Photo: Richard Diggle, IRDNC.

Participatory Orthophoto mapping in action: Conservancy members copying their ground map onto paper ready to be transferred to the orthophoto base map



Photo: Sandra Slater-Jones

knowledge of their customary territory, Khwe representatives have also sought to strengthen the position of their traditional leadership in their struggle for recognition by the State as a Traditional Authority.

Recently, there has been increased use of GIS in CBNRM at the national level. To acquire regional overviews of wildlife densities and human-animal conflict, and to promote conservancies as resource management institutions, the national CBNRM programme has worked with IRDNC. The programme collects and manages data, primarily on wildlife, but also on existing human settlements and infrastructure. Incorporated into a single national GIS, this data is accessible to the Ministry of Environment and Tourism (MET), all service providers, and local rural representatives. It is used for management planning and collaborative decision-making. Such planning includes land-use zoning, and sharing information with potential investors such as tourism operators or trophy hunters. In Caprivi, from IRDNC's perspective, the intended primary beneficiaries and users of GIS maps are the area's residents.

IRDNC developed its PGIS methodology with the strong support of the Mapping and Natural Resource Information Unit (MIU) in the Namibia Nature Foundation, an NGO based in the capital, Windhoek. This facility houses the databases, promotes the use of GIS and provides training and backup facilities for NGOs that assist emerging conservancies with land use planning. The unit maintains a system called Conservancy Information (COINFO). This allows spatial and other data to be centrally updated and used in the countries' far-flung regions. The MIU provides services to collect and digitise baseline data (i.e. boundaries, roads, tracks, boreholes,

and topographical features) in community conservation areas.

Producing maps through Participatory GIS

The early stages of the PGIS mapping in West Caprivi took place as a collaborative exercise between Park residents and authorities, in so far as data were generated jointly through GPS supported fieldwork. Hand drawn maps were upgraded into a GIS through geo-referencing map data using Participatory Orthophoto Mapping.

Using GPS point data to produce a specially prepared orthophoto base map, this method ensures visualisation and recording of indigenous spatial knowledge in cost and time effective ways. This ideally maximises the participation of local people in data gathering and recollection, and builds on synergies deriving from the input of GIS expertise by local NGO staff. The maps, once completed, are intended to assist local communities with a range of management decisions, as they have in East Caprivi, and to facilitate communication about land use amongst community members and between communities and outsiders. For example, locally generated maps can assist communities in interacting with private sector tourism operators and in making decisions on the allocation and maintenance of tourism sites, hunting, cropping and grazing areas.

The methodology for West Caprivi builds on village mapping workshops and field data collection to collate and visualise indigenous spatial knowledge, including local names, natural resources that residents depend on for their livelihoods (e.g. grazing, farmlands and useful wild plants), distribution of wildlife, and migration routes. To ensure that

Table 1: Mapping Activities and Outcomes since 2003

Year	Activity	Material Outputs	Outcomes
2003	PRA entry-level field assessment in East Caprivi to start a new transboundary conservation project.	Hand-drawn maps of the area rich in detail but indecipherable to outsiders.	Decision to create geo-referenced maps to share with outsiders. 'Participatory Orthophoto Method' is developed.
2004	Geo-reference hand-drawn maps of two conservancies in East Caprivi.	Computer-generated maps showing local place-names and local resource use.	Conservancy land zoning for wildlife and tourism.
2005	As above in two additional conservancies in East Caprivi.	As above.	Conservancy land use and management planning.
2006	Building on plans made in 2004-05, geo-referenced over 200 water pans, collected local place-names, and documented resource use in West Caprivi. Four village workshops held. GIS maps in preparation.	(Future) As above.	(Intended) Co-management of Park with government authorities.

information contained in maps is inclusive and comprehensive, widespread representation of age and gender has been encouraged. But the equal participation of women remains a challenge due to cultural norms whereby meetings and workshops tend to be seen as a male domain.

During on-site mapping exercises, residents are first invited to draw a map of the local area and its natural resources on the ground. The activity is facilitated through the use of visual aids such as animal figures, which are placed on the ground map to represent wildlife distribution.

Once natural resources have been spatially represented on the ground map, this information is simultaneously copied onto paper. At the end of the day, data from these maps are painstakingly transferred by community participants onto a specially prepared orthophoto base map marked with previously geo-referenced point data (e.g. village names, schools, shops or, in the case of West Caprivi, water pans) to help orientation. Standardised colour coding is used to promote accurate data visualisation.

Depending on the size of the area, a series of workshops are held to compose the whole area as a mosaic on the base map. These workshops take at least one day each and have so far taken place in each of the four major settlements. Far more time-consuming has been the geo-referencing (using a GPS) of approximately 200 water pans throughout the park by IRDNC and knowledgeable community representatives. In the absence of roads, the geo-referencing of just three pans may take a whole day. Tracing paper overlays are produced from these base maps

Box 3: Participatory Mapping among San People in neighbouring Botswana

The complexity of the West Caprivi case resonates with experience of mapping in the NG13 and NG1 areas in northern Botswana. The Kuru Family of Organisations has recognised that maps can be powerful tools for protecting heritage, making land claims, and fostering community development.

As with oral history collection, the process of mapping has brought about many intangible benefits, including inter-generational reconciliation, cultural empowerment, and psychosocial progression. The documentation of culture (dancing, healing practices, story-telling) and cultural knowledge about nature, including through mapping, is a crucial tool for development.

by NGO staff, and are taken away, to be later digitised on screen for the final map production. Whilst some decentralised GIS expertise has been developed at the NGO level, technical backup is still needed from the Mapping and Information Unit, and shortages of expertise at NGO level may hinder wider use of the procedure.

Lessons learnt

The mapping project spans a three-year period but is very much a part-time activity. (see Table 1). The main constraint to making faster progress is lack of availability of technical GIS expertise. The long-term plan is to produce maps for all of the conservancies in Caprivi.

Ideally, the mapping method will ensure optimal participation to record Khwe indigenous knowledge to a level of detail not previously achieved. For example, water pans are

very important features in the Khwe landscape, and the georeferencing of 200 pans, based especially on elderly people's knowledge, is unprecedented. This information will ideally benefit both Khwe communities and Park authorities in natural resource co-management. A significant number of management activities in the Park are already carried out by community members, in collaboration with the Ministry of Environment and Tourism (MET). Most prominent are the thirty Community Game Guards, most of whom are Khwe, who are active in anti-poaching, confiscation of illegal weapons, and wildlife monitoring.

Participatory mapping in West Caprivi is taking place in a complex setting. What became clear in the early planning stages was that different parties with interests in West Caprivi – namely the Khwe communities, the residents' Trust, MET, and IRDNC – had different expectations from the process. Although the different groups shared some interests, e.g. seeing maps as a CBNRM tool for communication, negotiation and joint management, their expectations diverged in other respects. Khwe understandings and expectations of mapping, in the early stages of the process, appeared to be quite different from those of MET. For Khwe, mapping represents an opportunity to affirm their identity, assert ownership of land, enhance visibility and challenge inequality. On the other hand, some MET representatives expected mapping outcomes to include increased surveillance and monitoring of the Park with regard to both human and wildlife activity.

This divergence of expectations was not consciously addressed in the project preparation, and may pose some challenges, for example, ensuring that Khwe expectations of the process are realistic, and ensuring clear communication among stakeholders. Furthermore, maps cannot be integrated into co-management plans until the capacity of the newly formed residents' Association has been strengthened. This in itself is a complex process. The Association Board, comprising ten village representatives, was elected in late 2003 with the aim of creating a legal body to facilitate the return of financial benefits from natural resources to local communities in the park. However, the Association was only officially recognised by MET in February 2006, and the board members still require considerable training, for example, in financial management.

The history of the Khwe, together with local social and political dynamics, makes mapping an appealing prospect for this marginalised group, as revealed by interviews carried out in 2004 and as evidenced by San experiences in Botswana (Box 3). As one Khwe headman stated:

“Participatory mapping in West Caprivi is taking place in a complex setting. What became clear in the early planning stages was that different parties with interests in West Caprivi – namely the Khwe communities, the residents' Trust, the Ministry of Environment and Tourism (MET), and IRDNC – had different expectations from the process”

Our young people will keep this [map] as history. Whenever another community wants to take the land, they can say, no, this land belongs to the Khwe community. This is where the murambas [fossil drainage lines] are, which have been named by our fathers. It will give them power.

To the Khwe, maps are inherently political, revealing West Caprivi's contested power relationships over land, resources and leadership. Mapping constitutes an opportunity for the Khwe to challenge dominant power hierarchies. Indeed, this is evident in the case of Botswana's northern Kalahari, where Khwe attempts to regain control over traditional lands have been bolstered by the inclusion of 'traditional land-use maps' in land-lease applications put forward to Government.

Simultaneously, the maps, drawing substantially on Khwe knowledge, may reveal new information to both the MET authorities and to the Trust about plant and animal resources and where they are harvested. To this extent, MET and the Trust's Community Game Guards may be able to pinpoint these activities and negotiate with Park residents about access to – and use of – resources, and increase anti-poaching activities. For some residents, this regulatory outcome may be perceived as negative, given the widespread poverty in Khwe communities and their reliance on the Park's natural resources for survival. For IRDNC, however, MET's support for the mapping process is noteworthy, and positive in terms of creating viable co-management structures.

Conclusions and ways forward

This paper has considered some of the implications of participatory mapping in West Caprivi, including the opportunities and threats that such mapping may present. In line with other San cases in the region, Khwe understanding of mapping recognises its potential to expose and address the

complex and politicised issues of identity, rights and land.

IRDNC believes that the West Caprivi maps can have multiple applications, including the strengthening of local rights and capacity to manage an environmentally important conservation area. On the one hand, mapping offers the prospect of increased visibility and power for the marginalised Khwe, because maps can serve to capture and operationalise resource rights, as they have done for conservancies on communal land.

At the same time, Khwe expectations may at times differ from those of the residents' Trust, environmental NGOs, or government. One way forward in this respect will be IRDNC's successful facilitation of an interface between different agendas (those of government, NGO, community Association, and other community representatives) in a productive way that will both foster CBNRM goals and improve the socio-economic status of West Caprivi's residents.

Greater communication between different parties will be a requisite part of this process. The existence of maps containing indigenous knowledge will not in itself ensure a positive outcome for local people, as has also been noted by the Kuru Family of Organisations in Botswana (Box 3). This has implications for both the empowerment of local communities such as the Khwe, and the transfer of natural resource management from state to civil society, which is what CBNRM promotes.

PGIS must be practiced in ways that will create positive outcomes for local communities, especially the Khwe. Additional NGO and community-level GIS expertise is sorely needed. However, care must be taken as the involvement of outsider technicians may result in external manipulation of data in ways that may not suit local needs. Furthermore, government recognition of the maps and the information they contain must be encouraged. The power of participatory mapping can only be fully harnessed when an enabling regulatory environment is in place, accompanied by strong institutional support and political will to partner with communities, with the objectives of improving their livelihoods and at the same time ensuring measured and sustainable resource management. Where these conditions are not all present, as is likely, they should remain goals to work towards.

The West Caprivi mapping project has to incorporate the needs and desires of stakeholders having different expectations. IRDNC faces the challenge of facilitating this convergence. A critical examination of the increasing use of GIS in CBNRM, and its potential to democratise resource management, calls for caution as well as celebration. In the case of West Caprivi, as for northern Botswana, clear strategies regarding the use of maps and sound institutional support are needed if positive social, environmental and political outcomes are to be achieved.

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