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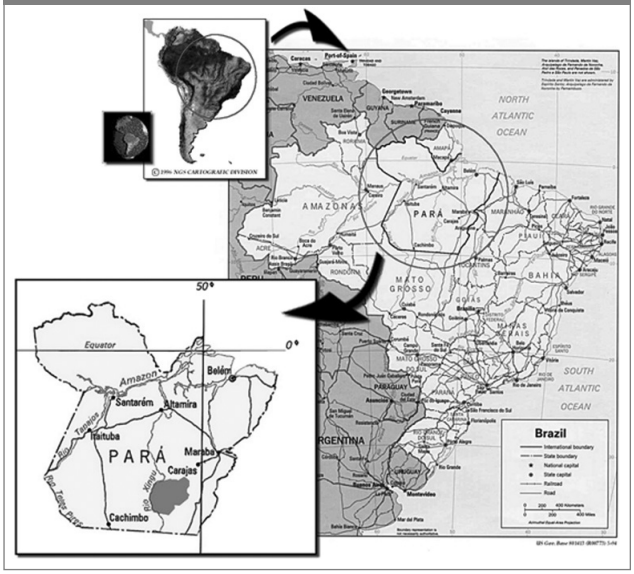
The power of maps: cartography with indigenous people in the Brazilian Amazon

by THE INHABITANTS OF MOIKARAKÔ, PASCALE DE ROBERT, JEAN-FRANÇOIS FAURE and ANNE-ELISABETH LAQUES

Introduction

This article describes work with and by the Kayapó - Mebêngôkre Indians living in Moikarakô, a village of about 220 inhabitants. It is located in the middle of the *Terra Indigena Kayapó* (TIK), an Indian reserve in the south of Pará State in the Brazilian Amazon (Figure 1). The work was part of a collaborative Brazilian-French research programme dealing with social and spatial dynamics in the Brazilian Amazon.[1] The original objective of the study was to show the extent of deforestation around the TIK and to spatialise naturalist knowledge related to gardens and forests around one of the villages of the TIK. However, when the Kayapó realised the power of these documents, they wanted to construct another kind of map representing the whole indigenous territory, and decided to give a political orientation to their cartographic work. In order to address a specific demand from the

Figure 1: Map showing *Terra Indigena Kayapó* (TIK) in the south of Pará State in the Brazilian Amazon



Kayapó people that was not planned in the initial project, we brought in two geographers and an anthropologist to work with us.

[1] The research focuses on the evolution of natural resource exploitation by indigenous communities impacted by new relationships with global society (integration in the market, sedentarisation, etc.). The two programmes 'Mondialisation, mouvements associatifs et développement durable/local en Amazonie' (1999–2003) and 'Áreas protegidas, transformações socioeconômicas e desenvolvimento sustentável na Amazônia'(2004–2006) have been the collaborative work of the Institut de Recherche pour le Développement (IRD) and Universidade Federal do Rio de Janeiro (LAGET/UFRJ).

Box 1: Indigenous territories (ITs) of the Brazilian Amazon

The 1988 Brazilian Constitution recognised historic rights for indigenous people in their traditional territories. Today there are 627 indigenous territories (ITs) in Brazil, covering 12% of the national territory and supporting about 370,000 individuals. The ITs cover 21% of the Amazon. Amerindian peoples have won exclusive use rights over 407 ITs, representing about a million square kilometres, mainly covered by forests.

The ITs are acting as a barrier to frontline deforestation, even more so than other protected areas like National Parks (Nepstad *et al.,* 2006). Most of the Amerindians are still living in the Amazonian forest, using traditional systems of natural resources exploitation adapted to their environment. The changes they are presently experiencing, such as increases in population and sedentarisation, are new challenges for indigenous people. Most of them also have to deal with illegal resource predation in their territories and a lack of State intervention and of basic public services.

In all cases, cultural diversity constitutes a rich potential in order to develop alternatives: there are 220 different indigenous groups speaking 180 different languages in Brazil.

Background

Firstly, it is important to understand the context in which this project took place. To do this, we will present some basic information about the Kayapó People, whose territory is located near the so-called 'deforestation arc' – the frontline of forest destruction (by cutting and fire) in the Amazon (see Box 1). Then, we will describe how the cartographic demands occurred and evolved as the Kayapó began understanding the power of the documents they were creating using satellite imagery. Finally, we will present the cartographic results and new methodological challenges. The conclusion highlights the prospects of pursuing this study further through a comparative project between the Yanomami and Kayapó Peoples.

Which territory for the Kayapó?

The Kayapó call themselves Mebêngôkre, meaning the 'people of the water hole'. Most of them are living in ecosystems of dense tropical forests on both banks of the Xingu River. They practise slash and burn agriculture, hunting and fishing. The villages usually have between 100 and 1000 inhabitants and tend to be politically autonomous from one another. The population consists almost exclusively of Amerindians, with the exception of a few teachers and nurses. Mebêngôkre-Kayapó are well-known for their political activism, their knowledge of their own environment, their body-painting skills and their feather-based artwork.

Box 2: Deforestation in the Amazon

Deforestation is continuing. Last year, between August 2003 and August 2004, an area of 26.130 km^2 was deforested in the Brazilian Amazon. The two States with the highest deforestation rates are Pará State and Mato Grosso State, also the biggest soybean producer. At present, the total amount of deforested lands in the Brazilian Amazon is up to 680.000 km^2, representing 17% of its total forest cover.

The Kayapó had little contact with the rest of Brazilian society until the construction of inland Amazonian roads in the 1970s. These roads cut across their traditional territory and attracted migrants and gold miners to the region. Even though the Kayapó people are not very numerous (about 7300 individuals today) they became famous in the 1980s because of their very efficient fight for their territories and rights (Turner, 1999).

Their protests were reported in the international media and accelerated the process of recognition for their ITs. Nevertheless, the *Terra Indigena Kayapó* continues to be invaded today, especially for illegal logging of mahogany (*Swietenia macrophylla*), one of the most valuable timber species of the world.

There are many different areas in the seven ITs inhabited by Kayapó, in both Pará State and Mato Grosso State. Most of them were legally registered between 1980 and 1990. Our work is concentrated in one of the most important ITs: the *Terra Indígena Kayapó* (TIK), which has eight principal villages. It covers 32.840 km^2 of tropical forest, located near a very active agricultural front: the south Pará State deforestation arc.

An indigenous territory surrounded by grasslands

Using satellite imagery, we can easily observe the progress of deforestation around the Kayapó IT (see Figure 3 and Box 2). In the North and the East, the Kayapó IT is completely surrounded by vast grasslands belonging to big ranches, the *fazendas*, and smaller grassland areas planted by migrants. These migrants come from others regions of the country, longing for better living conditions in the Amazon. Conflicts over land appropriation are extremely violent to the north-west of the Kayapó reserve, and have intensified on a recent deforestation front. This is a classic scenario, and explains why the IT now resembles a forest island in a sea of grasslands.

Most of the relations the Kayapó have with the regional society are concentrated in the cities bordering the TIK. Inside their territory, they also maintain spodaric relationships with loggers or miners and a continued contact with missionaries (Catholics and Protestants), NGOs and public institutions (e.g.

Fundação Nacional do Índio, FUNAI). As the pressure on land grows, control and management over the land becomes more and more fundamental. It is in this particular context that our cartographic experience takes place.

How the people of Moikarakô became cartographers

One more scientist in the village...

When the anthropologist came to the village for the first time, the people of Moikarakô had already had some experience with scientists (biological research). So before authorising the new research to begin in 1999, they proposed a deal. They stated: 'We'll teach you our "culture" but we also want to learn about yours'. One way that this was done was to bring the village some books, papers and maps, and these were presented to everybody in the *ngob*, a collective house in the centre of the village.

As there are very few and imprecise maps of the region, we used satellite imagery of the *Terra Indigena Kayapó* , with closeup images of their village. We used four images from Landsat 7 satellite data sets in the mapping of Indian territories.

Women and men in Moikarakô reacted with great interest. They were able to recognise important places and objects on the image: river contours are very easily identified by the people of the forest, who use canoes in many travels. The Kayapó were shocked by the contrast between the forest (shown in green) and the grasslands (shown in pink) surrounding their territory. The external pressure seemed much more threatening when observed on satellite pictures.

For all these reasons, we decided to work with satellite imagery and give a special importance to mapping in the research process. So the project developed directly from the interest demonstrated by the Kayapó .

Mapping our forest

On a village scale, we mapped different categories of vegetation or spaces used or named by the Kayapó. We used a Global Positioning System (GPS) only to collect data on a few strategic points. Men identified, for example, different types of primary and secondary forests. Women had more to say about gardens and domestic spaces. Interactive photo-interpretation was performed with the Kayapó, using the Mebêngôkre classification system, linking colour patches and discontinuities with known vegetation or landscape types.

But this research was suddenly stopped one year later when the Kayapó changed their point of view on participative cartographic work.

The Kayapo meet to discuss the mapping processes

Photo: Pascale de Robert

Mapping our land

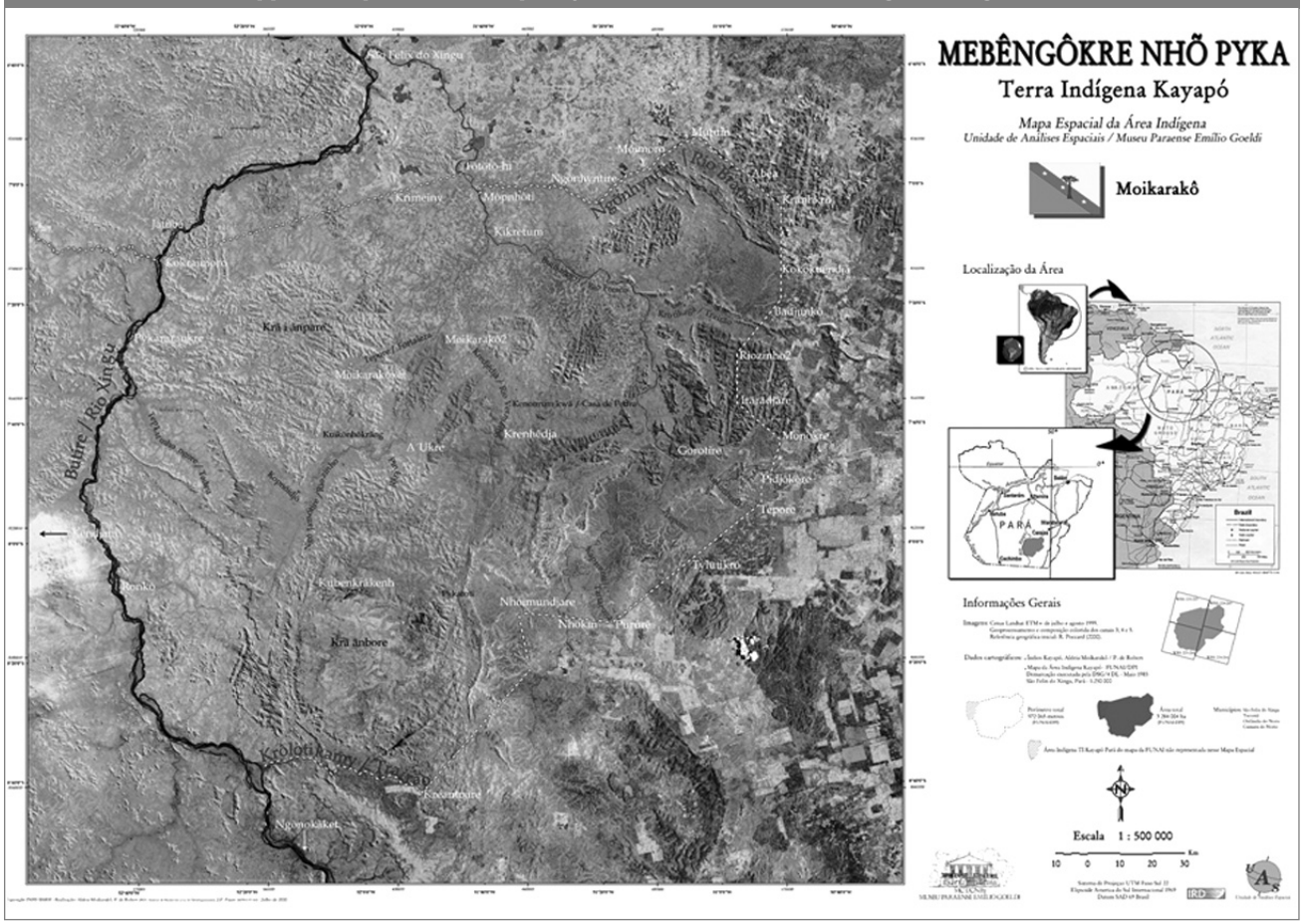
During a traditional celebration where people from many villages came to Moikarakô, the Kayapó decided we had to stop mapping the forest. At this time, in 2000, they had many reasons to feel insecure and suspicious of non-Indian society (illegal sale of their land, a malaria epidemic, logging activities, Brazil 500th anniversary festivities...). Understanding the power of maps, they chose to give a political orientation to their geographical activity. The new map should represent all the Kayapó villages and the correct limits of the reserve – but not the botanic knowledge of the Kayapó People.

As researchers, we had to change our initial project objectives and timelines. What this in fact meant, was that the Kayapó had appropriated the project for themselves. During this inter-village reunion and later, as they had various opportunities to meet with each other, Kayapó leaders (adult men) reformulated a demand for the production of a political map that could give to the Mebêngôkre people's territorial identity and recognition.

At this phase of the project, in 2000, appropriation processes of mapping techniques and participation were strengthened. We were still working on transparent images that allowed people who wanted to participate to draw. This step involved the majority of adults, including elders who do not draw, but knew the history of the group better. As the mapping activities restarted, the Indians had re-appropriated the tools introduced by the scientists in order to meet their own objectives.

For many people in Brazil, the Kayapó are still recognised as famous warriors, as they were in the past. Maps have become just one of the new arms they are now using to fight for their people and their territory.

Figure 2: The people of Moikarakô designed their first map in 2001. Their objective was to show it to the outside world, in order to support the political attempts by their leaders to reclaim indigenous rights.



Mebêngôkre nho puka: the map of the Kayapó Indigenous Territory

The people of Moikarakô designed their first map in 2001. Their objective was to show it to the outside world, in order to support the political attempts by their leaders to reclaim indigenous rights (Figure 2). During the second stage, from 2001 to the present day, other maps were created for internal use, essentially for the younger generation, who work and walk less within the landscape than the older generation. Maps were created in order to partially track and transcribe oral history. For example

- a toponymic map entitled 'To know all places of our land'; and
- maps showing the separations and migrations of the Kayapó-Gorotire people.

These maps always used satellite imagery as a base. To accompany the maps, the Kayapó made documents to clearly integrate and show different land uses over time, and Mebêngôkre political histories within the spatial representations of their territory. One of them gives the traditional stories of the migrations and separations of the Mebêngôkre group from the mythical site of Pukatoti to the actual village of Moikarakô.

Another was called 'Walking with the ancestors' and was first drawn to respond to the gap they were observing in regional maps. The IT Kayapó appeared as empty, as a 'virgin space', which might appear as 'natural' to the rest of Brazilian society. The Kayapó understood that, on a map, a lack of place names could be interpreted as a lack of human presence. To fill their maps to show Mebêngôkre occupation, they worked together with elders. The elders were remembering the oral history of the group, while young men were

situating the places and writing them down on the image. The resulting map is like 'virtual trekking' for these young individuals, who now are sedentarised.

Women have not participated as of yet. Usually it is the men who have a more expansive experience of the territory, because their collective hunts mean they live far away in the forest and only move to their wife's village when they marry. In the past, the men also went to tribal wars. But now they have involvement with other, non-Indian people living in the city.

Time and space are not independent dimensions in indigenous representations of the world. For researchers and scientists, the challenge is to find a way to adapt cartographic language in order to better transcribe the indigenous vision of indigenous peoples' territory, space and nature. We aim to create 'moving maps', showing dynamics and integrating changes in space representations, and 'speech maps' because of the importance given to traditional speech by the Kayapó.[2]

The need to exchange cartographic know-how: Kayapó meet the Yanomami

Kayapó leaders brought their maps to the city of Brasilia when they met with officials of FUNAI (Fundação Nacional do Indio), a public Brazilian institution responsible for handling indigenous matters. In the village, they also used maps for their children's education. They were filled with pride when the first map they made was published in a famous French journal, the *Courrier International* (De Robert, Faure & Laques, 2005). Soon, the use of GPS by the Kayapó in their daily activities will make it possible for them to map the main types of geographic objects they recognise.

We would like to conclude by describing a project on which we are presently working.[3] The project is a comparative research initiative between two Brazilian indigenous territories that are very distant and different: the Yanomami Indigenous Territories (State of Roraima, North of Brazil) and the Kayapó IT (State of Pará). These two Indigenous Territories are very large (96.650 km^2 and 32.840 km^2). The two native Indian groups have a common experience of territorial and environmental conflicts, as well as of governmental and non-governmental sustainable development actions.

Principally, the project gives the opportunity for a meaningful interaction between Amerindians who want to share the cartographic knowledge they have developed separately and with different methods and objectives in the last few years. The idea is for them to think together about how to use the technical resources offered by satellite imagery for their common interests, in order to:

- improve their autonomy in terms of mapping techniques;
- improve their territorial management capacity;
- build self-made documents showing social and spatial dynamics within and between the groups;
- produce new types of information for the young and future generations; and
- stimulate dialogue between local populations, institutional and non-governmental actors.

[2] For example, we have used Power Point. It is quite simple to use even if, for the moment, the Kayapó don't have much experience in using computers.

[3] Peuples autochtones et conservation des forêts tropicales: Exemples et points de vue de deux sociétés amérindiennes d'Amazonie brésilienne, Yanomami et Kayapó. Bruce Albert (IRD),François-Michel Le Tourneau (CNRS, IRD), Pascale de Robert (IRD), Anne Elisabeth Laques (IRD, Université d'Avignon). Research Program ATI, IRD, France, 2005-2006.

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