ETHNOCARTOGRAPHY APPLIED TO ENVIRONMENTAL ISSUES

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The paper presents the experience of introducing cartography and the proposal of a local Agenda 21 to native environmental agents and teachers from indigenous lands, in the State of Acre, located at the Brazilian Amazon Region. Between 2002 and 2004 several workshops coordinated by the author, were organized to present mapping techniques and products, remote sensing images and GPS technology to native representatives from several ethnic groups. These activities took place at villages and at the Education Centre of CPI (Comissão-Pró Índio do Acre), a Brazilian non government organization which has developed several projects related to indigenous people and their lands, in the last 25 years. Initial results of the work developed during 2004 are presented in this paper, some cartographic materials produced by Indians are included as illustrations and future research suggested.

Figure 1 – Agenda 21 front cover drawn by Kaxinawa Indians at CPI – Acre

INTRODUCTION

There are in Brazil over 350,000 Indians (around 2% of Brazilian population) living in villages. Brazil's area is 851,196,500 hectares and 12.26% of all Brazilian lands are reserved for Indian people, divided in more than 560 areas. Contemporary indigenous peoples are scattered throughout the Brazilian territory, 60% of Indian territories are located in the Legal Amazon area, representing 98.75% of all Indian lands in this country. The remaining 1.25% are scattered throughout the nation, and it host the remaining 40% of the Indian population.

There are 210 Indian nations in Brazil already contacted today, who live in thousands of villages throughout the country, speaking 170 native tongues. Despite contacts with segments of Brazilian society, most of these peoples uphold their own identity, establish themselves as groups of differentiated ethnicity and carry their own culture and traditions (for more information see the URL: www.socioambiental.org). Indigenous communities live in collective lands, federally declared for their own exclusive use. These indigenous lands have different degrees of recognition by the state. Some are demarcated and have been notarized. Others are in their recognition stage and there are also indigenous areas without any regularization whatsoever. Most of these lands, however, are invaded by prospectors, mining concerns, loggers or squatters. Roads, highways, and transmission lines, areas flooded by hydroelectric power plants, cross either that or them [ISA, 2000].

Nowdays it has been relevant for indigenous populations to learn and work with maps and graphic language. First of all to know their territories and protect lands, second to help them in managing the environment, planning the use of land, cultivate species and above all, to preserve their identity. Digital technologies such as remote sensing images, GPS, computers and Internet has helped to get knowledge they need and to map past, present and future, their memories, visions, history and ancient culture. In this way, their Agenda 21 helping in reaching sustentability, conservation of

natural resources and the survival of the Indian. It is a challenge to include ethnocartography and geography to overcome social and environmental problems, finding new ways to live in a world of diversity. As other special needs users, native people encounter cartography is diverse ways, requiring different approaches [Almeida, 1999, 2001]. These experiences have allowed the consideration of both applied and theoretical issues, including cultural and social contexts as proposed by Harley since 15 years ago.

TEACHING GEOGRAPHY THROUGH MAPPING EXPERIENCES

In Brazil, most Indian lands have bilingual teachers and schools. There is a national curriculum for indigenous education with rules, techniques and contents adapted to their needs. These guidelines are published in a book with the suggested curriculum with several disciplines, including geography and cartography (MEC, 1998). The organization called *Comissão Pró-Índio do Acre*-CPI is responsible for the oldest and most unique project related to indigenous education. They already prepared eight geography textbooks and published the Indian Geographic Atlas of Acre (Figure 3 – Atlas from the State of Acre) with maps drawn by Indian teachers, and organized by Gavazzi and Rezende [1996, 1998]. Maps can be seen in most of their textbooks. These actions transformed their knowledge and, after having mainly an oral tradition, those books and their teachers brought new dimensions to their lives.

The author was responsible for 8 courses related to cartography and geography, in the period of 2000-2004 Some examples of activities developed during classes are: 1.What is Geography and what is a map? Answer through text and drawings; 2.Learning basic concepts – scale, location, orientation and graphic symbols; 3.Mapping natural resources and environmental management actions; 4.Outline of the Indian land geography using text and graphic representations.

Figure 2 – Drawings made to learn compass directions

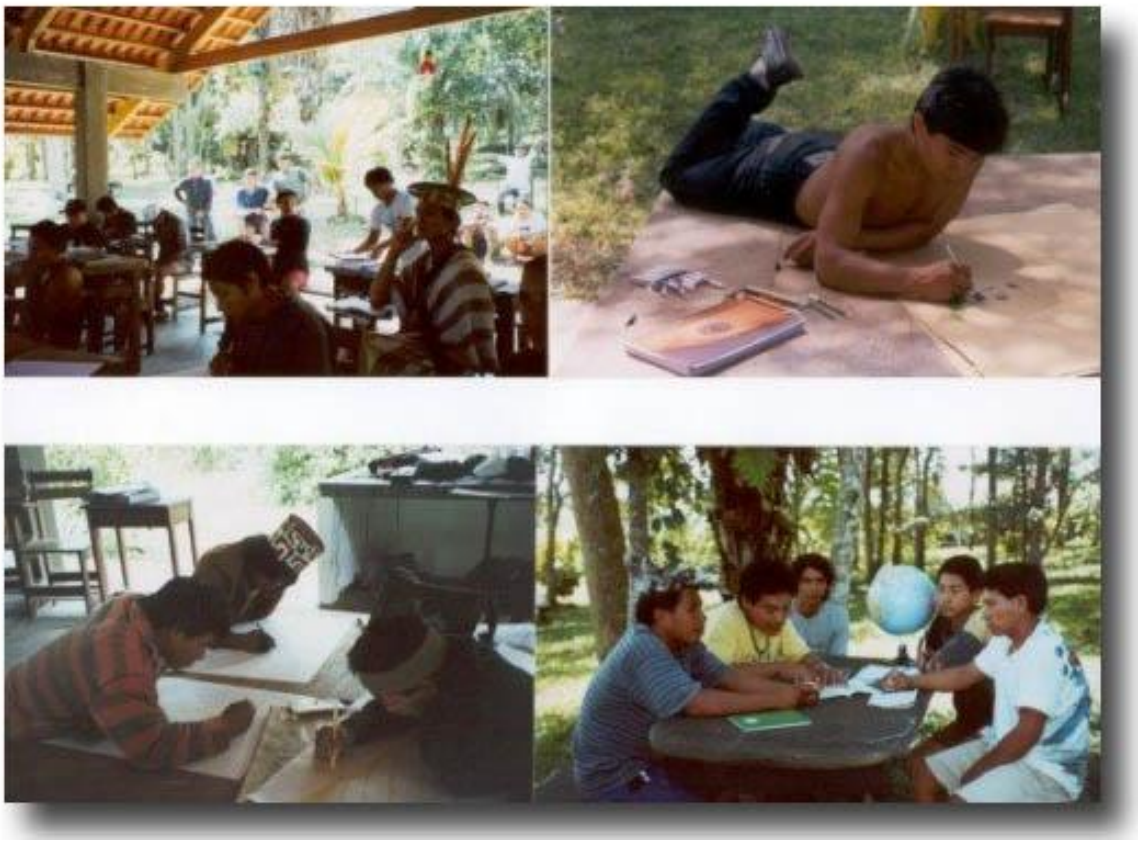

Figure 3 - Geography lessons and mapping activities in CPI – Acre Center for Education

ETHNOCARTOGRAPHY AND AGENDA 21 FOR INDIAN LANDS

In one of the workshops, the main goal was to learn, discuss and design the Agenda 21, based on their own knowledge and local experience. The participants were a group of 40 Brazilian native environmental agents who work in their lands in such tasks as organic agriculture, water resources management, pollution assessment, biodiversity protection, environmental education. Because they are bilingual, with Portuguese being a second language, there was a need for teaching many words and basic concepts prior to the design of an Agenda 21, as suggested in the Rio 1992 World Summit, in Brazil and in the 2002 Johannesburg Conference, in South Africa. These indigenous groups had been introduced to cartography in previous courses and they have a good understanding the graphic language which is nowadays part of their work.

Cartography had a key role in this process and all participants were asked to draw environment maps of their lands and to write an assessment of critical problems faced by the community. Each proposed agenda was taken back to their villages to be analysed by the community and their leaders. In 2003, during one of the courses, they discussed and drew three maps, representing the past, the present and the future of their lands. The contribution of cartography was discussed and summarized, focusing its relevance to environment management and protection of their territory against invasions.

Experiences collected during courses given in Rio Branco, State of Acre, to Indian teachers and environmental agents allowed the author to review the initial results gathered previously. The performance of the several participating groups went far beyond the expectations. Several results were gather and themes were defined for further research (Almeida 2001):

1.Functions of a map for indigenous people, based on their answers: expressions of art; location and orientation; support to travel in space; definition of Indian lands and their borders; natural resources inventory and management; environment assessment and protection; awareness and actions towards nature preservation, and education.

2.Issues related to gender and age, making connections with map functions. The need for cartography and the ability to draw maps together with the knowledge of space varies greatly between sexes and ages, as culture and ancient costumes

define their tasks. Just men can hunt and enter the forest, so they know the land very well, all rivers and geographical features. For women, maps have the function of presenting the geographical space they do not know, same as for the visually impaired, maps can bring reality to their eyes, while for men, they are graphic representations of mental images and thus abstractions of real space.

3.Communication and cognitive issues can give the theoretical framework for the evaluation of indigenous people as mapmakers and users, providing evidence and practical examples of whole cartographic process. Usually special needs users are very good to achieve those results, as they do not fit the conventional procedures and rules.

4. Ways to introduce digital technologies such as GIS, remote sensing, and digital cartography in the training courses for Indian environmental agents. They are in charge of promoting sustainability of their natural resources, in a time of population growth and constant invasion of their lands. Satellite images and digital maps can help them in this task of controlling remote areas.

Previous work done by the author [Vasconcellos, 96, 99, 2000, 2001] summarizes applied research and the evaluation of maps as a means of communication. Conventional approaches and previous studies on cartographic design such as presented by Wood & Keeler [1996] do not fully apply to special needs cartography, particularly indigenous users. Space perception and mental maps have been discussed inside cartography for many years (e.g. Fremont, 1973; Gould, 1974; Tuan, 1975; Downs & Stea, 1977; André, 1989; Bailly, 1989). These studies on cognitive issues related to mapping can be applied to research on special needs users; the same for more recent articles developed within cartographic visualization, as it is the case of Peterson [1994].

Most native people transform mental images of their space in very interesting graphic representations, and their maps depict not only places, but also history, culture, memories and visions. There are other users with special needs, as slow learners and physically impaired people, who could be addressed by cartographers in the future. They always require cartographic training and availability of maps with special features, in terms of design and production.

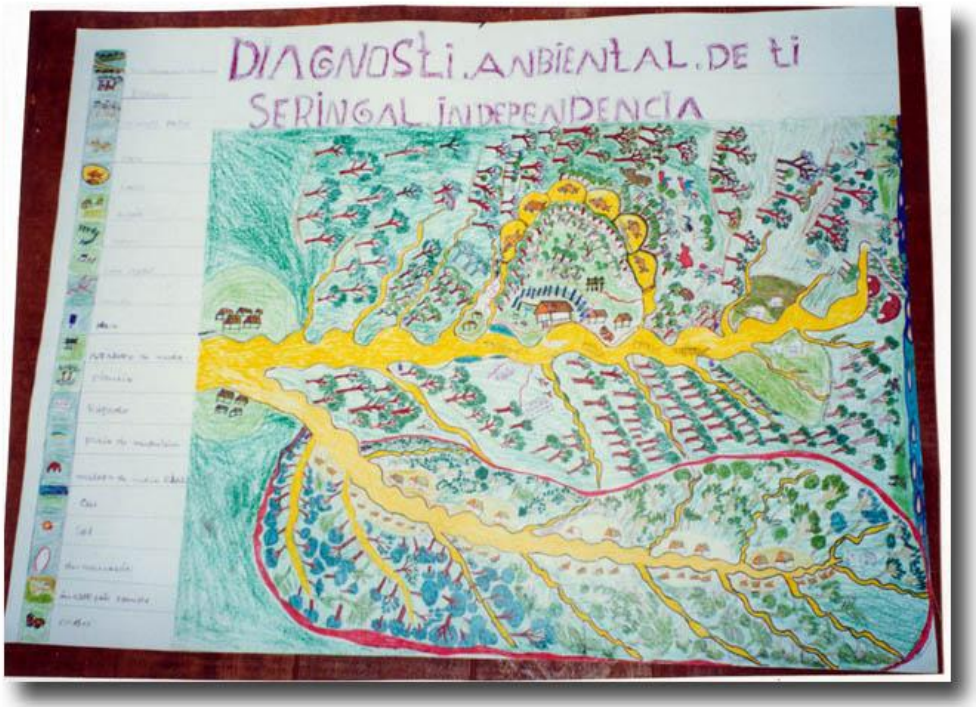

Figure 4 – Environmental Management Map showing Indian Land and its resources and problems, Comissão Pró-Índio do Acre/CPI

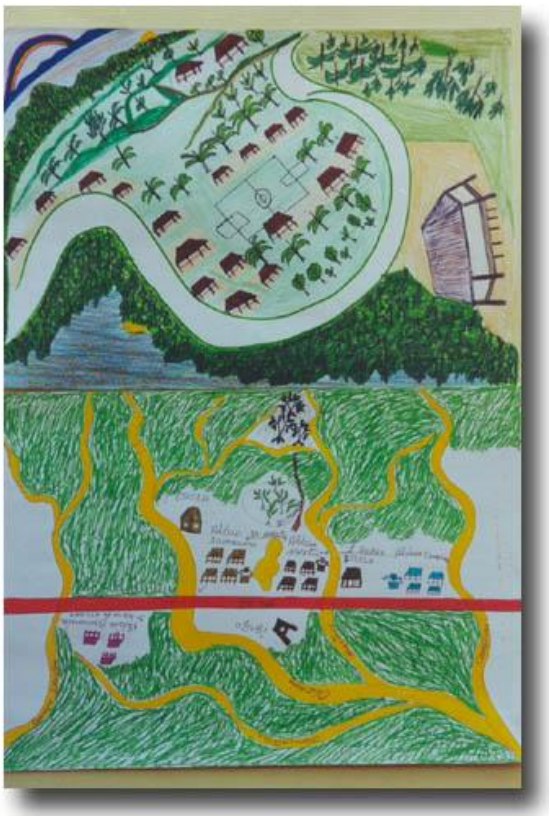

Figure 5 – Map of Ashaninka Indian Land, produce during classes, CPI-Acre.

In Setember 2001, at the same time when it was taking place the Summit Rio+10, in Johanesburg, South Africa, was starting a course for Environmental Agents in Brazil, organized by CPI-Acre. For this reason, the author chose Agenda 21 as the theme for the week of geography, particularly the role of Cartography. It was given a summary of previous meetings in Stokholm - 1971 and Rio - 1991, as well as introduced main goals and its relation to the Brazilian Indian lands in the Amazon. Also some key concepts, such as sustainable development were presented and discussed. During the week a video was taken and produced about the Agenda 21 in their lands.

Figure 6 – Agenda 21 drawings done by Environmental Agents during courses - CPI-ACRE, 2002

Among proposals for 2004-2006, environment management actions were outlined, with a strong emphasis on mapping techniques and graphic representations in general; remote sensing images and GPS were included. During exercises

proposed in the 2004 courses, Indians were asked to produce 3 maps from different periods of time, representing past as their memories, present as reality and future as their dreams. In groups of 5 to 6 people, they produced maps, text and drawings and presented at the last day of the week. Results were outstanding and maps were images of their collective memories and dreams.

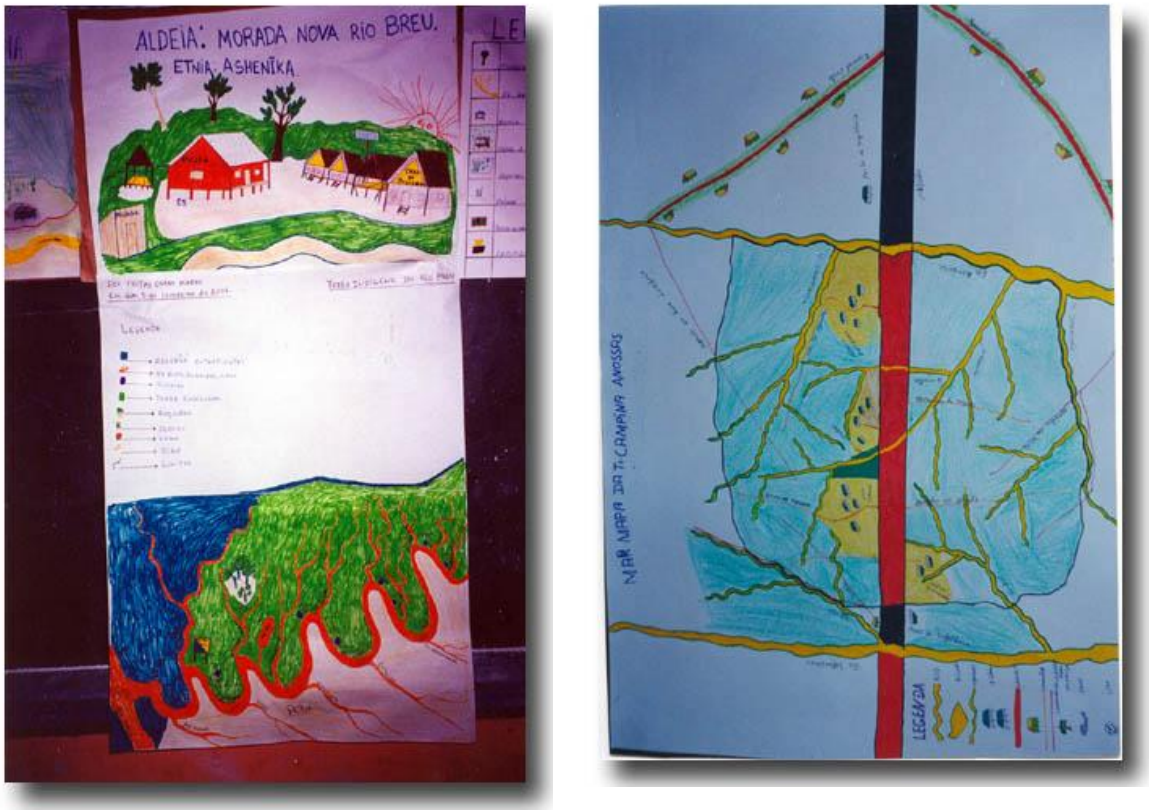

Figure 7 – Examples of Maps made by Indian people, at the CPI – Acre Education Center

They always enjoy to work with maps, they see many relevant applications and results and, each time more, they want to learn and practice cartography. As an Indian teacher called Raimunda said during an evaluation of a mapping activity: "*Lots of thinking... Other people's dreams are reality. Like a photo, while looking at a map, we could travel in the other person's mind. Each one of us have a dream! "*

FINAL REMARKS: Towards new approaches and a multicultural cartography

Cartography can play an important role in their survival, helping to define the land and to protect borders. Indians populations usually evaluate our maps as incomplete representations of their space, missing important features and details. Historical landmarks, which are gone for decades might be included in a map, they create cartographic conventions which make sense to their culture, such as depicting all rivers in yellow.

Brazilian Indians are a unique group to work with cartography for many reasons, one is related to the remarkable knowledge of their environment. An interesting feature which can be observed in maps and written texts, is their ability of mixing science, art and magic, knowledge and intuition, facts and visions. They see time and space in much closer connections than us and they were very pleased to hear about the history of cartography. Perhaps they kept a form of wisdom and open mind, which we lost so long ago.

Cartography faces great challenges at the beginning of this millenium, mainly related to innovative methods and technologies, and the emergence of new map producers and users driven by a variety of needs and interests. Different views were introduced to the discipline, e.g. Harley & Woodward [1987], Harley [1989, 1990], Turnbull [1989] and Woodward & Lewis [1998], arousing interest in maps from all cultures, including historical maps. All the technological innovations with theoretical framework brought important changes to the field of cartography with different procedures and new terms such as visualization and GIS. These changes have broaden the concept of mapping as discussed by cartographers during the last fifteen years [Taylor 1991, 1996; Wood, 1992; Hall, 1992; Kanakubo 1993; MacEachren & Taylor, 94; Dorling & Fairbairn, 1997]. A book on cybercartography has been written under the coordination of

Fraser Taylor in Canada, there is actually a new world for cartographers to map, many virtual spaces to represent in graphic form, digital or conventional.

Cartography has to move beyond the digital technologies of the information era. It has to pay more attention to subjectivity, cultural diversity and the social context as Harley [1989, 1990] argued. Not enough research has been done on those topics. Cartography remains with the challenge of increasing the use of maps in society, accepting new producers and users, and offering training to improve their cartographic knowledge, mainly in developing nations and places with pressing problems such as environment and social issues, themes brought by the author in previous publications. Cartographers have to step into the future to produce and use maps in new ways. Ethnocartography can be an example of these approaches because indigenous people need cartography to survive in the 21st century, to protect their territories and the environment in general. Maps can gain different meanings such as expressions of art, visions of their past and future.

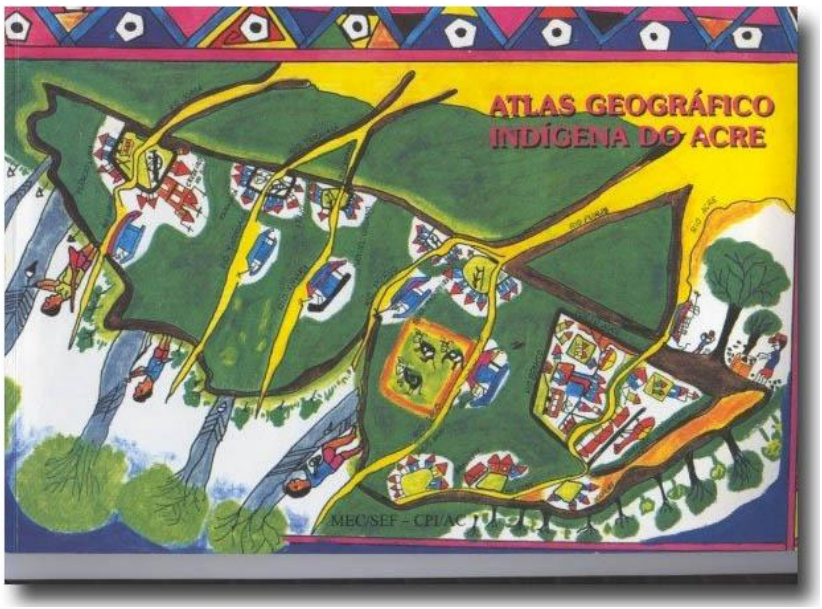

Figure 8 – Cover of the Atlas Geográfico Indígena do Acre, CPI-Acre (Gavazzi, R.A. & Rezende M.S. org. 1996;1998)

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