

TERRITORIALITY AND GEOCARTOGRAPHICAL ANALYSIS: SCALES OF INTERPRETATION AS A TOOL FOR THE UNDERSTANDING OF WATER RESOURCES MANAGEMENT CONFLICTS

Gisele Girardi
gisele7628@click21.com.br

Laura Mariano Quarentei
lauraquarentei@hotmail.com

Universidade Federal do Espírito Santo
Departamento de Geografia
CCHN, Av. Fernando Ferrari, 514, Goiabeiras. Vitória/ES - CEP 29075-910

Abstract

This paper presents a proposal, based on geocartography, for the understanding of water use conflicts and for the mitigation of water resources management problems resultant from these conflicts. The development is based in the results of prior investigations that show the water use conflicts as an obstacle for the politics of water resources management in Brazil. This can be justified because, although the water laws in Brazil bring as a basis the decentralized and participative management, with “down to top” directives and large participation of the users, there are evidences of resistance by the users in participate of the management projects. Along the development of works in the Sossego river hydrographic basin, in Itarana municipality, Espírito Santo state, Brazil, this reality has been confirmed. It was also possible to identify that the resistance of the local population to the management projects is justified because of divergences about the meanings of water and management when talking about local population, public politics and managers. Certainly the politics and management proposals are explicit in the Brazilian water laws itself, as well as in the directives proposed from the laws objectives, and point to the preservation and sustainability of the use of an economic and environmentally valuable resource. However in what concerns the hydrographic basins populations, more specifically in the rural regions, the meanings of water and its use, as well as the meaning of your preservation, did not converge with the environmental and economical logic of the state. This divergence, usually treated as a water use and management conflict, characterize an obstacle for the management because the resistance of local groups in participate mine the basis of management in the country, which is supposed to be decentralized and participative. Prior works reveal that the resistance is real and, in the case of Sossego river hydrographic basin, results of different and complicated conflicts that include familiar inheritances questions, municipality politics questions and even differences in the land use objectives by the rural producers. Starting from this information, is proposed a geocartographycal

analysis of this reality as a way to understand the basis of the conflicts and, in this way, minimize the effects over the management. The objective is to know the local values and meanings of water uses and water management using different spatial materializations of the basin. It means to make a spatial reading of the conflict from the different uses, occupations and population characteristics distributed along the basin territory. The analysis starts from the delimitation of different territorialities of the hydrographic basin, using spatial coherence cutouts according to the distinct uses, occupations and population characteristics. The spatial coherence cutouts enable different interpretation scales of the reality, making easy to understand the conflicts and to map the different territorialities. In this way, it allows the spatial readings of these territorialities, revealing the sources of the resistance and of the management conflicts.

The reading of the relations between the local values and the resistance or not in participate in the management can validate the geocartographycal analysis as an interesting tool for the management. By the other hand the use of interpretation scales and territorialities readings by the geocartography is a relevant proposal to revise the cartographic practices and uses that condition Cartesian readings of the space, even in situations where it does not permit relevant analysis.

Introduction

Since 1997, with the approval of the law 9.433 (BRASIL, 1997) establishing the Water Resources Brazilian National Politics and creating the Brazilian National System for Water Resources Management, the government is showing its concerns in develop a specific way for the management of water resources in the country. This management, although is focused in the preservation and sustainability, doesn't treat only about the resources rationing and redistribution of its uses, but also in valorizing the social control and rationality of its utilization, according to the Water National Agency (ANA, 2007). So, the environment planning assumes, with the valorization of the water resources, an inedited political, analytical and executive cutout with important consequences in the water resources management and focused also in the conflicts generated by the water demand.

Between these consequences can be emphasized the adoption of the hydrographic basin as the territorial unit to implement the Water Resources National Politics, the attribution of common responsibilities to all the Country States and also the effort in integrate geo(hydro)referenced information through the Water Resources Information National System, allowing wide and non-restricted access to the data bases interesting for the management and encouraging, consequently, the use of Specialized Systems of Water Resources Management that host these data bases and create the possibility of decision making supports.

An interesting point of this process is that the proposal and the national politics for water resources management, which has consequences in State and local scales (having the hydrographic basin limits as a basis), demand participative and multidisciplinary

management, as well as the convergence of interested agents in specific action organisms. The participative and multidisciplinary management, as well as the interested organisms, are a significant indication that this management will depend on agents with a profile that doesn't match with a specific kind of manager. The water resources management in the country will be done by agents with different profiles of formation, knowledge and experiences (QUARENTEI, 2006).

This condition itself represents a challenge to the management because shows a significant change of old practices that answers to the centralized control of politics by the State. In the same way there's the valorization of structuring actions of management that looks for quali-quantitative objectives in water resources that presuppose the valorization of structural investments in place of social insertion programs in the management process.

However if we take the water as a component of the geographical space, being your way of life circulation, modeling agent of natural landscapes, natural good from which human groups has organized and organize their social practices and water resource as it is inserted in the production and is endowed of economical value (FÖEGGER, 2002), the structuring actions characterize an obstacle because prioritize actions related with the water as a value inside the of the State. The socio cultural values of the water as a natural good and way of life circulation are neglected and consequently also the disposition to participate of the population that have relation with the water in a different sense than the economical value considered by the State.

These different perspectives of relations with the water have singular importance in the discussion presented in this paper. From these perspectives are developed the fundamental elements that characterize the management builder through the instruments and fundamentals of the law. Also the management obstacles (treated here as conflicts), that reveal a distance between the politics of management and the social dynamics around the water.

Construction of the problem

The water management in Brazil, nowadays, discloses a complex group, in construction, of structural and non-structural proposals that is being drawn since the middle of the 80's. These proposals, many of them already transformed in actions, have, just as happens with the water approach, a much closer relation with practical, the objective aimed by the law, in spite of broader and subjective practices related to fundamental questions of the law about the articulation between different social actors for the water management (Quarentei, 2008).

The way that the Brazilian institutional model of water management followed, until now, makes real, in practice, the valorization of management instruments. To follow this way it has limited the lines of direction of the law. The structural actions, the ones that "requires construction of structures to obtain control of the water flow and quality,

as the construction of dams and ducts, construction of water treatment stations, etc.” (Campos, 2003) are more usual than the non-structural as occupation zoning projects, encouragement of the hydrographic basin population to join the basin committee and studies to identify and understand wastes, for example.

The valorization of structural actions, until now, reflects the difficulties of realize the law fundamentals in respect with the participation and decentralization of the management. There's incentive to participate aiming to collectively construct demands and local practices (decentralization) which is closed to the water politics demands. However, in practice, these two fundamentals indicate management conflicts, revealing divergences between the local and the politics. This conflict by the water use is not a objective phenomenon, related with an inadequate use, but the inadequate use is reflection of much more complex conflicts and related not only with the water as an scarce good, but as a good and a natural agent that has a close relation with the man, being a part of the life logic, of use and transformation of human groups (Quarentei, 2008; Girardi, 2008).

Through the Sossego River hydrographic basin investigation experience became evident that the valorization of structural projects seems to reflect the difficulty of make effective the essence of the water law, specially the participation and decentralization. Those difficulties shows that the law's essence are put against the water management activities and from this reality results conflicts that take a central position in water management because they are product of the difficulty in make effective the local community participation as a participative agent.

In such case, conflicts take place as an obstacle to the insertion of the local in the water politics logic, but in the same time, they are an important tool to visualize the divergences between the various scales of poverties that are part of water resources management.

From this consideration was developed the project “*Conflict map of water use as a support tool to the water resources management: methodological study applied to the hydrographic basin of Sossego river, Itarana/ES*” (Girardi and Quarentei, 2008), which had the objective of create a map of conflicts for the water use in that basin. Based on this project were developed the discussion here presented.

The proposal to develop the conflict map of water use in the hydrographic basin of Sossego river, in Itarana/ES, as pilot project, aimed to allow the analysis of the spatial dynamics in that territory, the development of a methodology and data collection, understanding that these instruments could have significant participation in the development of tools for the water management in the region. However, if in the beginning the project brought as a main goal the creation of the conflict map of water use, subordinated to a theory and a methodology which would guide the definition of its information and format, throughout the research activities some daily complexities were revealed that made impracticable the conclusion of this map.

This happened because the generation of maps in conventional Cartesian molds concerning the water use conflict was not possible. The work should focus in a methodological study and this indicated challenges regarding the production technique of maps of this nature. Thus, the main goal was changed to the production of a work that could give visibility for the actions and its consequences in the landscape, the scales and multiterritorialities that characterize the hydrographic basin of Sossego river.

This work was based not only in the information of the theme and the area of study, but also in theoretical discussions based on three conceptual axes: map, territory and conflict, as well as the analytical option of considering the space as an hybrid of object systems (landscape) and action systems (society), formulated by Milton Santos (SANTOS, 1997).

In the current perspective of understanding the geographic space beyond that one strictly limited by a Cartesian system, which is a relevant theoretical challenge for the cartography (Câmera et al, 2000), we understand that the problems faced during the execution of the research indicates to more significant advances, from the theoretical and conceptual point of view, than the ones initially proposed. In such way we consider the importance of this research, therefore being the thematic of water resources wide and complex, it contributes with the visibility of this complexity from a graphical instrument of methodological character, considering the multiterritorialities (Haesbaert, 2006) as the base for understand the eclosion of water use conflicts. This allows future investigations as well as subsidies the elaboration of public politics related to water management.

The geocartographical analysis is an option for the understanding of the geographic space as proposed here because it is a field of research that emphasizes the development and use of cartographic resources for the understanding and knowledge creation about the territory driven by the logic of geographic analysis, what means to consider the operating forces in the space organization, from natural environment or even from the social processes, in its different scales.

So, the hydrographic basin is not conceived only as a natural cutout, as the drained territory, but as a cutout of diverse social, political, economical and natural dynamics, including its original occupation and historical processes, until the current economical; and social dynamics in different scales (local, regional and global). The understanding of the multiplicity and the dynamics of the socially used territory allows the qualified insertion of the agents in the water resources management.

In the hydrographic basin of Sossego river case, means to say that beyond of a draining basin, it is the place Sossego, that can be treated as a group of families, producers, communities living in the same place and dispute practices, uses, spaces, each one looking for to attend its own interests in a constant dispute. It can also be treated as a pilot project of water management related with the diverse municipal, state and federal

socio-environmental politics. So, it is a social territory, politically used and conditioned, revealing its constant dynamics.

The issue of geocartographical analysis in the understanding of Sossego socio-political dynamics is relevant because when prioritizing the problems reading and later the creation of cartographic images to represent them, allows the visualization of the basin as a group of situations and processes, preventing generalized conceptions. So, it includes the multiple dynamics of varied processes that compose and coexist in the basin, which is in this way a draining basin, politic territory, social place, etc.

The validation of geocartographical analysis is done by the cartographical theories, basically from Salichtchev (1983), related to the cartography as an interface science, as a cognitive model, from Harley (1989, 1990, 1991) related to maps as cultural products, as power exercises and to the ethical responsibility of mapping, and from Crampton & Krygier (2006) related to the critical cartography. We can deal with the idea of these authors especially when they argue that the critical cartography “keeps as focus the substantive relations between the maps as methods and the diverse (and frequently incommensurable) concepts and theories in geography” (Crampton & Krygier, 2006:21).

In this direction, it is proposed the construction of a conceptual model to visualize the issues of water resources management in its different scales. The cartographic material to support that model comprehend not only the maps elaborated to communicate some information, but also a collection of information organized in form of graphs, tables, maps, images and sketches that allow the mapping of the multiplicity. Based in results of previous researches (Girardi, 2008; Quarentei, 2008), we already have as an initial proposal the identification of territorialities in the Sossego basin, through these resources that are a theoretical and methodological option for the conflicts understanding.

Territorialities and scales of analysis

Taken as a territory, limited by the watersheds, the basin refers just to the logic of water as an agent that shapes the land. Taking the water as a social good, the hydrographic basin's limit takes another scale, just as when the water is considered an economic resource. Thus, when we think the hydrographic basin territory taken as the natural territory, we exclude the spatial organization of that place as a used territory and therefore consequence of its social group's dynamics. Santos (2005) says that “it is the use of the territory, and not it territory in itself exactly, that it makes of it the object of the social analysis.”

In this perspective the idea of natural hydrographic basin is dismantled and we can add other ideas or contents, as historical occupation standards, use of the land. On the other

hand, dismantling the natural cutout of the hydrographic basin, we have to think about and propose other approaches for the basin.

The notion of territoriality (Haesbaert, 2006; Castro, 2005) can guide proposals less strict than a pure territory, including dynamic of a territorialized space of multiple, concomitant, concrete and symbolic forms. In the case of Sossego basin and the focus of this work, the related dynamics is from the Brazilian Water Resources Politics and its insertion in the Sossego basin through the Sossego Project.

Haesbaert (2006) shows that currently the territoriality notion encloses “multiple scales and new forms of territorial joint”, related to the “boiling of experiences diversity and reconstructions of the space in course”.

Castro (2005) presents a space cutter by social relations and its interests, result of territorialized politics phenomenon which characterizes differentiated territories since the politic actions defines different levels of questions and space experiences. Castro (2005) and Haesbaert (2004) present the multiplicity of links with the territory as a reference for the territorial analysis in the current logic. Considered here as territoriality, these links are taken to understand its resultant dynamics, that is, the logic of a specific spatial organization, its conflicts, transformations and change resistances.

As an experience, the territoriality makes easier the understanding of lived and used territory, different from a notion of the territory itself, taken as institutional, the notion of territoriality drive us to a territory as a material and symbolic base of the social groups. Thus, more than a cutout, it starts from an approach of territory as a result of the sum of diverse links, of diverse natures and scopes with the inhabited and/or used space.

From this perspective the approach of the used territory brings the diverse experiences of the current reality, of new spatial and time experiences, new ideas of movement and transformation. The territory does not need, necessarily, to be taken as contiguous territory, with fixed limits and mathematically defined spread, but can be treated as used territory, taken as a logical resultant of diverse experiences and result of actions and influences in diverse scales.

If necessary to reconstruct the notion of the Sossego river hydrographic basin unit, this reconstruction can start from the individual and group experiences of the Sossego producers, what is more than the Sossego hydrographic basin, the place Sossego is a group of territorialities conditioned by symbolic, economic and politic experiences and meanings. These reveal a spatial logic specific from that place, which is not alone but the sum of influences and experiences from other scales.

The notion of scale significantly influences the notion of the territory and the territoriality. To think about different scales of analysis for a determined territorial unit does not mean to propose numerical scales more or less spread, but to propose coherence cutouts (Castro, 2005), what means, to use appropriate cutouts to the

phenomena intended to be analyzed. The challenge of understanding the territorialities brings the proposal of using coherence scales (or interpretation). If the territorialities are a result of the lived territory and not only of the delimited territory, if they result from the sum of diverse processes and dynamics, the coherence cutouts can facilitate the reading of this sum.

There are many actors involved in these processes. They represent political, social, economic and/or environmental interests, in various scales (local, regional, global) and scopes (public, private), that means forces of influence in the constant basin transformation process. For example, the water politics represents a national project, the different land uses represent the local economic interests, the Sossego Project shows regional interests. All of them unroll in the dynamics of the Sossego river hydrographic basin.

The coherence cutouts make possible the visualization of those forces and interests because in the coherent cutout perspective each force or interest is taken like a territoriality those results of means and relations from and between those actors.

Some researches developed in Sossego (Girardi and Quarentei, 2008) had pointed that the territorialities can justify conflicts because they are results of the perspectives that are different in each scale and scope. If there is incoherence between those scales and scopes, there are potential conflicts. From this perspective conflicts are more than a simple product of water resources management and local uses differences.

The relevance in understanding territorialities is justified because they are described from the multiplicity and, in this way, show that the hydrographic basin shape is not necessarily the ideal limit to understand the various dynamics that are part of the water resources management.

Discuss the relevance that the hydrographic basin limits has in the governmental politics bring another perspective to see this cutout. Consequently, demands another options to represent and understand this. Many times the territorialities that are results of local dynamics are neglected because the maps, researches and actions give priority to the national politics proposes.

Territorialities consent a new perspective to see and understand the multiplicity that represents an option to include various cutouts in the same water management basic territory. Those cutouts can show different forms of territory appropriation and domination that co-exist in the same place.

Conclusions

Scales of interpretation, coherence cutouts and territorialities are an option to understand the water management conflicts in their various dynamics. They allow identifying and/or justifying phenomenon that can not be apprehend in the draining hydrographic basin limits.

The proposal of the geocartography, in the Sossego river hydrographic experiences, is based in a critical perspective for maps used in the water management practices. The cartographical products used in that management are bound in the hydrographic basin limits and are not able to help in the management and use conflicts visualization.

However there is not a technical propose to the maps making process, the scales of interpretation and coherence cutouts are an option to identify the territorialities that have a relevant influence in the water use and management dynamics.

That scales of interpretation can contribute whit a new perspective to understand the management actor's performance and them relations. They can, also, help to propose new cartographic products or processes that support represent the dynamics of social reproduction in the social space.

Referencies

BRASIL. *PLANO NACIONAL DE RECURSOS HIDRICOS*. Síntese Executiva. Ministério do meio Ambiente. Secretaria de recursos hídricos. MMA: Brasília, 2007.

———. *Lei n. 9.433 de 08 de janeiro de 1997* Institui a Política Nacional de Recursos hídricos, cria o Sistema Nacional de Gerenciamento de Recursos hídricos, regulamenta o inciso XIX do art. 21 da Constituição Federal, e altera o art. 1º da Lei nº. 8.001, de 13 de março de 1990, que modificou a Lei nº. 7.990, de 28 de dezembro de 1989.

CÂMARA, G.; MONTEIRO, A. M.; MEDEIROS, J. S. de. Fundamentos epistemológicos da ciência da geoinformação. In CÂMARA, G. et al (orgs.). *Introdução à ciência da geoinformação*, São José dos Campos, Inpe, 2000. Disponível em www.dpi.inpe.br/gilberto/livro.introd

CAMPOS, Nilson; STUDART, Ticiania. *Gestão das águas*. Princípios e práticas. 2. Ed./ Editado por Nilson Campos e Ticiania Studart. Porto Alegre: ABRH, 2003.

CASTRO, Iná Elias de. *Geografia e Política: territórios, escalas de ação e instituições*. Rio de Janeiro: Bertrand Brasil, 2005.

CRAMPTON, J. W.; KRYGIER, J. An Introduction to Critical Cartography. *ACME: An International E-Journal for Critical Geographies*, 4 (1), 11-33. 2006.

FÖEGER, T. J. Água: um bem social ou um recurso econômico? O caso do assentamento de Joeirana – São Mateus (ES). *Geografares*. Vitória, n. 3, junho de 2002, p 143-150.

GIRARDI, G; QUARENTEI, L. M. *Mapa de conflito de uso como instrumento de apoio a gestão de recursos hídricos: estudo methodologico aplicado à Bacia*

hidrográfica do Córrego do Sossego – Itarana/ Espírito Santo. Relatório de pesquisa. UFES. FAPES, 2008.

HAESBAERT, R. *O mito da desterritorialização: do fim dos territórios às múltiplas territorialidades*, 2006

HARLEY, J. B. A nova história da cartografia. *O Correio da Unesco*, São Paulo, FGV, 19(8):4-9, 1991. (Mapas e Cartógrafos).

_____. J. B. Cartography, ethics and social theory. *Cartographica*, Toronto, 27(2):1- 231, 1990.

_____. J. B. Deconstructing the map. *Cartographica*, Toronto, 26(2):1-20, 1989.

QUARENTEI, L. M. Elementos para discussão do conflito de uso e gestão de recursos hídricos na bacia hidrográfica do Sossego, Itarana/ES. Monografia de conclusão de curso. UFES, 2008.

SALICHTCHEV, K. A. Cartographic communication: a theoretical survey. In: TAYLOR, D. R. F. (ed.). *Graphic communication and design in contemporary cartography*. New York, John Wiley & Sons, 1983. v. II, p.11-36.

SANTOS, M. *A natureza do espaço: técnica e tempo, razão e emoção*. 2. ed. São Paulo : Hucitec, 1997. 308 p.

_____. Milton. *Da totalidade ao lugar*. São Paulo, Editora da USP, 2005.