WATER SOCIETIES IN THE ITAJAI BASIN: COMMUNITY MANAGEMENT AND THE NATIONAL WATER RESOURCES POLICY

SOCIEDADES DE ÁGUA NA BACIA DO ITAJAÍ: GESTÃO COMUNITÁRIA E A POLÍTICA NACIONAL DE RECURSOS HÍDRICOS

SOCIEDADES DE AGUA EN LA CUENCA DEL ITAJAÍ: GESTIÓN COMUNITARIA Y LA POLÍTICA NACIONAL DE RECURSOS HÍDRICOS

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DOI: 10.54899/dcs.v22i84.3589
Recibido: 15/10/2025 | Aceptado: 17/10/2025 | Publicación en línea: 06/11/2025.

ABSTRACT

This article analyzes the *water societies* of the Itajaí River basin as a counterpoint to Garrett Hardin's "*tragedy of the commons"* (1968). Formed by rice farmers, these associations - known as *"ditch societies*" - have been managing communal irrigation systems for over a century, preventing the degradation of the resource through collective rules, shared maintenance and social sanctions, in line with Elinor Ostrom's (1990) theory on the governance of common-use resources. The study highlights a revealing conflict: when the National Water Resources Policy (Law 9.433/1997) proposed charging for water use, the rice farmers defended their traditional systems, exposing tensions between technical models and community practices. The case of the Itajaí basin reformulates Hardin's dilemma, showing that the sustainability of shared resources depends not on nationalization or privatization, but on legitimized local institutions capable of adaptive co-management.

Keywords: Water Societies. Natural Resources In Common Use. Water Resources. Basin Committees. Water Resources Management. Community Management.

RESUMO

Este artigo analisa as *sociedades de água* da bacia do rio Itajaí como um contraponto à "*tragédia dos comuns"* de Garrett Hardin (1968). Formadas por produtores de arroz, essas associações gerenciam sistemas de irrigação comunais há mais de um século, evitando a degradação do recurso por meio de regras coletivas, manutenção compartilhada e sanções sociais, alinhando-se à teoria de Elinor Ostrom (1990) sobre governança de recursos de uso comum. O estudo destaca um conflito revelador: quando a Política Nacional de Recursos Hídricos (Lei 9.433/1997) propôs a cobrança pelo uso da água, os rizicultores defenderam seus sistemas tradicionais, expondo tensões entre modelos técnicos e práticas comunitárias. O caso da bacia do Itajaí reformula o dilema de Hardin, mostrando que a sustentabilidade de recursos compartilhados depende não de

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estatização ou privatização, mas de instituições locais legitimadas e capazes de cogestão adaptativa.

Palavras-chave: Sociedades de Água. Recursos de uso Comum. Recursos Hídricos. Comitê de Bacia. Gestão de Recursos Hídricos. Gestão Comunitária.

RESUMEN

Este artículo analiza las sociedades hídricas de la cuenca del río Itajaí como contrapunto a la "tragedia de los comunes" de Garrett Hardin (1968). Formadas por arroceros, estas asociaciones —conocidas como "sociedades de zanja"— han gestionado sistemas de riego comunitarios durante más de un siglo, previniendo la degradación de los recursos mediante normas colectivas, mantenimiento compartido y sanciones sociales, en consonancia con la teoría de Elinor Ostrom (1990) sobre la gobernanza de los recursos comunes. El estudio destaca un conflicto revelador: cuando la Política Nacional de Recursos Hídricos (Ley 9.433/1997) propuso el cobro por el uso del agua, los arroceros defendieron sus sistemas tradicionales, exponiendo las tensiones entre los modelos técnicos y las prácticas comunitarias. El caso de la cuenca del Itajaí reformula el dilema de Hardin, mostrando que la sostenibilidad de los recursos compartidos no depende de la nacionalización ni la privatización, sino de instituciones locales legítimas capaces de una cogestión adaptativa.

Palabras clave: Sociedades de Agua. Recursos Comunes. Recursos Hídricos. Comité de Cuenca. Gestión de Recursos Hídricos. Gestión Comunitaria.

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INTRODUCTION

Water, as a renewable natural resource for common use, is at the center of complex disputes and institutional arrangements. Its appropriation - whether for domestic, agricultural, industrial or energy purposes - involves not only technical and scientific issues, but also social, political and cultural dynamics that define who accesses, controls and manages this essential resource.

Traditionally, debates on water governance have oscillated between two extremes: nationalization, which advocates coercive public control, and privatization, which relies on the market to regulate its use. These two possibilities: nationalization or privatization, were already indicated by Garret Hartin, in order to avoid the *"tragedy of the commons"*. (Hardin, 1968).

This dichotomy, however, has been questioned by theorists such as Elinor Ostrom, Daniel Browley, Ronald J. Oakerson, Henry Ollagnon, Jacques Weber, Olivier Godard, Fikret Berkes,

Paulo Henrique Freire Vieira, among others, who developed the theory of common-use resources and demonstrated the viability of community management systems, capable of avoiding the "*tragedy of the commons"* (Hardin, 1968) through local institutions based on cooperation, shared norms and oversight mechanisms. (Ostrom, 1997), (Vieira, 1997). (Berkes, 1999).

It is in this context that the *water societies* of the Itajaí river basin in Santa Catarina, southern Brazil, emerge as a paradigm case. Formed by irrigated rice producers, these associations - also known as *"ditch societies*" - have been organized for over a century to collectively manage the water diverted from rivers and distributed through common ditches.

This model, inherited from Italian immigrants in the 19th century, challenges the notion that common-use resources are doomed to exhaustion without state or commercial intervention. On the contrary: these societies operate under internal rules that balance equitable access, shared maintenance and sanctions for transgressors, exemplifying the principles of the theory of common-use resources (Ostrom, 1990).

This article analyzes how these *water societies* are articulated as patrimonial management systems, where water is treated as a collective good, but not an open one (Ollagnon, 1997). Their functioning - often informal and invisible to government bodies - gained visibility during the conflicts surrounding the implementation of the National Water Resources Policy (Law 9.433/97) in the Itajaí basin, especially in the discussion about charging for water use.

The resistance of the rice farmers revealed not only a clash between different logics (economic rationality, traditional and technical management), but also the power of local arrangements to influence public policies on a broader scale.

By examining this case, we seek to contribute to three interconnected debates: i) The effectiveness of the theory of common use resources in modern agricultural contexts, where productive pressure often threatens sustainability; ii) The interface between community management and public policies, highlighting the challenges of trans-scalar articulation between local systems and national legal frameworks; iii) The potential of patrimonial management of natural resources as an alternative to the state-market dichotomy, especially in river basins with histories of traditional occupation.

Based on documentary research, interviews and field surveys, the article demonstrates that the Itajaí *water societies* not only avoided the tragedy of the commons, but also offer lessons for water resource governance in other regions. Their resilience - even in the face of droughts and conflicts - reinforces the urgency of policies that recognize and integrate local knowledge,

building bridges between academic theory and the social practices that have ensured the survival of communities and ecosystems for generations.

RICE FARMERS' WATER SOCIETIES

The water societies of the Itajaí basin are unique institutional arrangements in which irrigated rice producers organize themselves collectively to manage water collection and distribution systems through community ditches. Alternatively known as "ditch associations" or "ditch societies", these organizations represent a traditional model of water resource governance that dates back to the process of Italian colonization in the region, starting in 1875.

The system emerged as an adaptation to local conditions by Italian immigrants settled in the towns of Ascurra, Rodeio, Rio dos Cedros and Gaspar. Initially practicing rainfed rice cultivation, these farmers encountered low productivity and pest infestation, which led them to adopt an irrigation system similar to the one used in their regions of origin in northern Italy, particularly in Lombardy and Veneto (Berri, 1993).

The answer was to develop a community system based on the collective construction of irrigation ditches, which involved damming the main watercourse, building secondary canals along the hillsides, and a gravity distribution system to the properties. To do this, the main stakeholders were brought together, the feasibility of the project was discussed and, once approved, a society was formed. Once this was done, the main river was dammed in its upper part, diverting part of its waters through the canal built close to the base of the hillsides, flowing at a higher level than the rice fields, in order to facilitate their irrigation (Berri, 1993).

This method of cultivation was introduced to the region by the Italian immigrant João Mondini, originally from the region of Verona, who settled in Ascurra, on plot 41 of the Guaricanas colonial line, where he sowed the first crops, first on dry land and then on irrigated rice paddies. The irrigation techniques were adapted from a method widely used in the Lombardy region of northern Italy, where water was also used communally.

Considering the real benefits that these water channels brought to rice cultivation, their construction quickly spread throughout the Itajaí Valley region. Large ditches were built with hand tools and at the expense of the partners. To bring water to the rice fields, siding or dams were built in the rivers, ditches were opened, resulting in an irrigation system shared by several families and managed communally through water societies, also called 'ditch societies', 'company

ditch', 'ditch association' or 'ditch gang', among other names (Liberato, 2004).

The implementation of water resources policy in the Itajaí River Basin, which began with the creation of the Itajaí Committee in 1997 and its Water Agency in 2001, led to the discussion of a model for charging for water use, which was presented at public assemblies and hearings from 2002 onwards. The main rural user in quantitative terms, the rice sector, was the one that reacted most to this discussion.

The mobilization of farmers against the charging proposal put forward by the Itajaí Committee was publicly triggered on March 26, 2002, when a meeting was held to present the charging model. This meeting was attended not only by representatives of the three agricultural sectors invited: rice farmers, fish farmers and pig farmers, but also by caravans of farmers from all corners of the basin.

The meeting was attended by 104 farmers, most of them irrigators and rice producers, who resoundingly opposed the proposal to charge for water use, and explained to those present how they made community use of water, through water societies.

FROM THE WATER SOCIETIES TO THE BASIN COMMITTEE

Following the reaction of rice farmers and fish farmers to the model of charging for water use, the Itajaí Committee, with the support of the Environmental Research Institute of the Regional University of Blumenau (IPA/Furb), began to carry out a survey and social, technical and economic studies on the *"ditch societies"*, developed by Maçaneiro (2003), Locatelli (2003), Liberato (2004) and Scolaro (2006).

It was found that ditch associations are present in 23 of the 47 municipalities in the Itajaí river basin area. A total of 123 active groups were registered, totaling 926 rice farmers involved in the collective supply system known as *water societies.*

Some of these *water societies* have been legally established, with well-defined rules and norms, while others, which account for 68% of the total (Scolaro, 2006), still exist informally, with rules and norms respected and consolidated through the practice and customs of everyday farming. Some charge fees, production quotas or provide services to maintain the system, with subtle differences between the 'communities' of the Upper, Middle and Lower Valley. The oldest record in the region's historiographical literature is that of the opening of the canal in the secondary ditch of São Pedrinho, in Rodeio, in 1912 (Liberato, 2004).

Gaspar and Pouso Redondo are the municipalities with the largest number of registered ditch associations: 17 and 18 groups, respectively. Even in municipalities where the area under cultivation is less than 100 hectares, such as Blumenau, Ibirama and Presidente Getúlio, there are also active groups.

The area under irrigated rice in the Itajaí basin was 27,439 ha in the 2004/05 harvest (Instituto Cepa, 2006). Across the basin, around 5,000ha were under collective water management, approximately 20% of the total area irrigated by rice farming.

Most of the rice farmers who use ditch associations are small producers. The average area irrigated by these groups is 40.38 hectares and the average area per member is 5.36 hectares (Maçaneiro, 2003).

Therefore, there is a possible weakness in relation to charging for the use of water and, in these cases, the charges could be different from those applied to rice farmers who use an individual supply system (Scolaro, 2006).

If ditch associations were considered as users, the registration of water users in the rice sector would be simplified: instead of 3.300 individual registrations, we would have 2.497 registrations. As well as making it easier to register users, it will also make it easier to implement licensing.

It is much easier to control the volume of water distributed to a ditch association than it is to control the volume distributed individually to each member. As a result, the ditch association, in turn, will be responsible for passing on and distributing the water internally, as it has already been doing.

Although they use various forms of regulation to maintain their ditches, for 44% of the associations all the members take part in cleaning them together. Maintenance costs are generally shared equally between all members. When it comes to supplying the courts, the groups proceed in two different ways: either each member has water coming directly from the main ditch, or the main ditch is the one that runs through the association's courts. For 85% of the ditch associations, the first method is adopted.

Free access to water prevails in the basin, but this system of appropriation can be considered a form of community water management. In general, water is abundant and there is no need to control distribution very strictly.

Although only 19% of the associations have some kind of regulation method, controlled irrigation affects 35% of the total area irrigated by ditch associations and 33% of the rice farmers

who adopt the collective system in the basin. The existence of control methods is related to the large areas irrigated by the groups and the large number of members who benefit from them. Therefore, if controlled access works well in these cases, we can assume that the use of control methods in smaller associations will also be valid.

Conflicts between members can be considered isolated events in ditch associations. Approximately 70% of ditch associations claim not to experience conflicts over water use. For those that claim to have minor conflicts, what often leads to discussions is the misuse of water or the lack of it in times of drought.

As these groups act informally, they need to be mobilized to organize formally. Through formalization, ditch associations become recognized by government bodies and the local community. This makes it easier, for example, to obtain lines of credit and agricultural incentives. In addition, the formalized ditch association is now considered a water user, guaranteeing the legitimacy of the adoption of collective granting (Scolaro, 2006).

THE GASPAR WATER COMPANIES

In the two ditch societies studied in Gaspar, one in the locality of Gasparinho Quadro, on the right bank of the Itajaí-Açu River, and the other on the borders of the localities of Morro Grande and Arraial, on the left bank of the Itajaí-Açu River, the biggest differences are in the ways of collecting water, starting with the diversion dam. The Gasparinho Quadro company is certainly one of the oldest in the Itajaí Valley that is still active. Its ditch began to be built in 1920 and its first deed is from 1927. A Society Morro Grande/Arraial company is from the same period.

In the Gasparinho-Quadro society, made up of eight members, the water from the Ribeirão Gasparinho-Quadro is diverted by rock siding into a master ditch and from there distributed first to the blocks closest to the siding. When these bloc

ks are full, the water flows through smaller ditches made of rammed earth to the next blocks, until it reaches the last farmer. This irrigation system is characterized by a single inlet and a single outlet. It takes an average of 10 days for the water to reach the last member. This *'water time'* is one of the factors that limits the number of members. As the planting is done by everyone at the same time, in order to rationalize the use of water and other inputs such as herbicides, fertilizers, urea, and even the work of maintaining the ditch, a longer time to distribute the water to a larger number of members would make production unfeasible.

In the Arraial ditch company, made up of nine members, the water from the Ribeirão Arraial is diverted through a reinforced concrete siding into a master ditch from which each member takes their share directly. The water is diverted from the master ditch, which passes in front of each partner's property, into a main channel on their property. This main channel takes the water to the smaller ditches formed by taipas, which distribute the water to the blocks. This system is characterized by a single entrance, but each farmer has his own channel to return the water to the stream. One of the factors that limits the number of members in this case is the amount of water consumed by each farmer and the capacity of the ditch to drain.

From an organizational point of view, the interdependence between the members is greater in the Gasparinho society system, since the farmer at the bottom depends directly on the management done by the farmer at the top, or the so-called *'water man'*, who in some cases is hired by the farmers together and works on all the blocks.

While in Arraial the amount of water in each field is controlled by a spillway and managed by the farmer within his blocks, in Gasparinho the water intake is controlled manually from the beginning of the field until it leaves and enters the next block. In this case, the water level is controlled according to the plant's needs and relies on the experience of the so-called *'water man'*.

The water level in the ditches is maintained throughout the rice cycle. The water inlet doesn't change much, except in times of heavy rain, when the inlet is closed to prevent damage to the crop. This does not mean that all this water is actually being used to grow the rice. What is needed is used and the excess is returned to the ditch or directly to the stream, becoming effluent and carrying traces of pesticides and nutrients.

In the Morro Grande/Arraial ditch company, each water partner has a masonry spillway with a single water inlet, the width of which is proportional to the irrigated area of each property. As a result, there are nine flumes along the main ditch. One of them was inactive in November 2002, as the owner who has the concession was using his rice fields for grazing, but intended to use them in the future.

The water level in the main spillway, the concrete dam, is controlled with wooden planks positioned at the mouth of the bypass pipe. Each year, two partners take turns controlling the level and must be vigilant on thunderstorm days, as the sluice gates must be raised to allow the river to flow and maintain the water level in the main ditch.

In Gaspar's two ditch companies, the rules are similar. The cleaning and maintenance of the ditch is carried out by all the members, either as a joint effort or in hourly scales, and the costs

of pipes and tractor hours, when necessary, are shared between all the members.

The costs of maintaining the ditch and the company are apportioned as they arise, whether maintenance or bureaucratic services. There is no president or general coordinator of the ditch, but each year two people are in charge of coordinating the activities. The choice is consensual and voluntary. The ditch company is not registered as a civil society organization, but only has a land and water concession contract between the partners.

THE WATER SOCIETIES OF MIRIM-DOCE

Mirim Doce is a small town in the Upper Itajaí Valley, located in the Itajaí do Oeste River sub-basin. The two main rivers that cut through the town are the Taió River and the Mirim River. The municipality was politically emancipated in 1991, when it was separated from Taió. It has 2,753 inhabitants and its economic base is agriculture. Irrigated rice accounts for 80% of rural production, with a planted area of 2,700 hectares and 140 active producers (IBGE, 2000).

During the timber cycle, at the end of the 19th century and the beginning of the century20, a he town of Mirim Doce was a storage and distribution point for logs. These logs were then transported along the rivers to Rio do Sul, where they were processed at the largest timber mill in the Upper Valley at the time, and exported via the port of Itajaí. At the time, the town was known as Depósito. Then came the cassava cycle and later the tobacco cycle. Irrigated rice cultivation began around 1950.

In the *water societies* of Rio Mirim, Morro do Caeté, Campinas, Volta Grande and Pinhalzinho, it was found that the ways of appropriating water are similar to those in Gaspar, so we will point out the main differences here so as not to make the work repetitive. In Mirim Doce there is also another component that contributes to the institutional strengthening of rice farmers. In addition to the ditch societies, they are also associated with grain storage societies and thus also have some control over the marketing of the product.

The Pinhalzinho ditch company is certainly one of the largest in the Itajaí Valley. It has 35 members who collect water from the Taió River through a master ditch13 quilômetros long. From the master ditch, built at1957, a , water is distributed to the members through *'holes'*, as the local farmers call the water spillway, for each member. There are 175 *boreholes* in all, with an average distribution of five *boreholes* per member. The *'hole'* is five inches in diameter and in the past was made out of a wooden board, but recently it has been made out of a metal plate to

avoid changes in diameter by the members.

In some cases, the water derived from the master ditch is distributed directly to the partners through the *'borehole'*. When the member's property is far from the main ditch, a secondary ditch takes the water to his *'furo'*, or rather, his spillway. Other farmers still depend on the water used by the farmers above. In other words, the water enters through the spillway of member "A", who is upstream of the ditch, fills all of his fields and the surplus spills over to the field of farmer "B", who has no direct access to the main ditch and is located downstream.

As the ditch is very long and the number of members large, water control is strict. Each member can only use the amount of water defined in the collective agreement, which is based on the area planted. The average used by the farmers is a water table of 5 a10 centímetros water in the blocks after sowing, which represents an average consumption of 1.5 thousand m^3/ha/month, or a flow rate of 0.50 l/s, according to calculations made by the farmers themselves. When the field is full, the farmer is obliged to close the borehole and let the water pass through to the other members. Each member has their own overflow channel, through which they return the water to the master ditch or to the river.

The company's main cost is maintaining the ditch, and there is a bank of working hours for this purpose. If a member can't work on the ditch for the set number of hours, he pays a fee to the company. If he works overtime, he receives the amount for the hours worked. Water flows uninterruptedly through the ditch, even when it is not being used for farming. This helps maintain the ditch, the farmers claim. Each farmer also pays an annual fee to the society. The money raised is used to buy pipes and materials used to maintain the ditch. The amount of the fee is set each year, according to the investments to be made in the ditch.

The Pinhalzinho ditch company is coordinated by three farmers who take turns at the job each harvest. In the 2002/2003 harvest, the coordinators were farmers Hernandes Altino de França, José Adecir Bonim, and Augusto Kestring. The coordinators are chosen at a general assembly held twice a year. At the beginning of the rice water cycle and at the end of the harvest.

The Pinhalzinho ditch company became one of the largest in the Itajaí Valley in three stages. Initially, in 1957, five kilometers of ditch were built by 12 partners. In the 1970s, another four kilometers were extended and the last four kilometers were built in 1982. It can be seen from this that control over access to water and participation in the society is a little more flexible than in Gaspar, but it has also reached its limit and no more members are accepted.

The ditch society in Volta Grande, a neighbor of Pinhalzinho, works on a similar system,

only it's a little smaller. The master ditch was built in 1960, is five kilometers long, has 115 boreholes and 15 members. The farmers who participate in these two societies are also members of the Cereal Storage Society of Pinhalzinho/Volta Grande. This company has two silos for storing rice and 91 members. Farmers from other ditch companies in the city and some farmers from Taió and Rio do Campo, neighboring municipalities, also participate in this storage company.

Another peculiar feature of these ditch societies is that this water connection, provided by the transposition of water directly from one block to another, has led to the members also joining together to buy the inputs used in rice production. In this way, they established a fee of 6% of the value of production as each farmer's contribution to society. This amount is used to maintain the ditch, but also to buy fertilizers, herbicides and pesticides in general. The amount of inputs used by the farmer at the bottom is always less than that used by the farmer at the top, but as the farmer at the bottom benefits from this, they all pay the same rate.

We can see that unity and mutual aid between the farmers of Mirim-Doce is greater than in other ditch societies in the basin we studied. This is due to several factors. In addition to the water component, one of the factors is that the municipality is located between mountains, isolated in the middle of the Taió River and Mirim River valleys, and far from the larger municipalities in the Upper Valley, such as Rio do Sul and Taió.

AGRONOMICA'S WATER COMPANIES

The municipality of Agronômica boasts the highest rice yield per hectare in the world: an average of 220 bags/ha. In 2002 this mark was surpassed with a production of 238 bags/ha. This represents an average yield of 12 tons/ha. The local microclimate and soil fertility are factors that contribute to this high rate of productivity, but local farmers and Epagri technicians also attach great importance to the physical and chemical characteristics of the water, such as oxygenation, temperature and nutrients, as well as water management.

In Agronômica, we interviewed farmers who are part of four ditch societies, but we're only going to talk about two of them, as they have very different characteristics to those presented above. In the ditch societies of Rio Mosquito and the one in the city center, the water for the rice fields is collected using pumps. As the slope of the stream is very high, the forced collection by pumps proved to be more efficient than the construction of siding. A very high and strong siding

would be needed to withstand the force of the water from the rugged Trombudo River.

Forced water collection using pumps entails a series of techniques that are different from the method of collecting water by drift and gravity, and which will have a decisive influence on the behavior of the farmers and the institutional arrangements of the ditch societies. Since electricity is used to pump water to the main ditch or to the fields, there is a permanent cost that has to be shared between the members. The pumps also need to be maintained from time to time, which entails other costs.

We noticed that, depending on the location of the property and the physical conditions of the land, farmers prefer to collect water individually. This happens when the property is located close to the river and when the planted area is no more than5 hectares . As the majority of farmers in Agronômica do not plant more than10 hectares , most of them prefer to use water individually.

The need for association is usually conditioned by the canal passing through more than one property. In these cases, the water is pumped into a main canal, or a master ditch, as they call it, and then distributed to the members. Societies where the water is pumped have generally fewer members and a smaller irrigated area than ditch societies where the water is gravity-fed.

Water use is more rational and the rules are also stricter in ditch societies where water is pumped. Evidence of access, access control and exclusion is also very strict, i.e. these societies are more closed. The number of members is hardly more than five and the irrigated area hardly exceeds20 hectares . In order to save electricity and rationalize labor time spent on water management, pumping is always done at night. To fill an area of 15 hectares, such as the Agronomy Center's ditch society, water needs to be pumped for 12 days. This procedure can be done up to five times during a harvest.

THE NATIONAL WATER RESOURCES POLICY

What was at stake during the research that served as the basis for this article were the controversies surrounding the interfaces of water resource management in the Itajaí basin, involving the risks of adapting a local and traditional system of community water management to a vision of scientific management, based on international principles conformed in the National Water Resources Policy, Law 9.433/97. At the confluence of these transformations, some conflicts have emerged, such as the movement against charging for water use, motivated mainly by the feeling of interference by a public policy in a community management system for rice

farmers.

A series of factors can be identified as responsible for the rural sector's negative reaction to the charging model presented. Firstly, we would like to highlight the warning from the consultant responsible for drawing it up, engineer Christoph Platzer, from the German Agency for Technical Cooperation (GTZ). He warned everyone that the model for agriculture was made using a very small and inaccurate database.

The emergence of this conflict marked the beginning of effective water resource management in the basin. The discussion about charging for water use mobilized the local community to participate more actively in the Itajaí Committee. The Itajaí Committee was able to manage the conflict well, as it assimilated the criticism and resistance and, when it realized that the legal instruments for the application of granting and charging for water use were still stalled in the state and federal executive spheres, and that politicians could take advantage of the conflict, it strategically withdrew the issue from the agenda. To mitigate the effects of the mobilization against charging, the strategy was to discuss water policy for the basin. At that time, the Itajaí Committee showed flexibility and resilience and returned to the path of hydro-politics.

At this juncture, the experience of the discussion around the proposal to charge for water use in the Itajaí River basin, and the emergence of 'water associations' as actors, serves as an indication that the involvement of society in consultation and decision-making processes is the most appropriate alternative for legitimizing the process of implementing the National Water Resources Policy in the country, and ensuring that it is in fact participatory and decentralized, recognizing the traditional systems of water use and management.

This experience also demonstrates that, from an institutional point of view, the capacity to promote trans-scalar articulations (Berkes, 1999) and the flexibility of a trans-scalar institution, such as a basin committee, are fundamental to its success in implementing integrated water resources management.

The proposal of decentralization, integration, participation and sustainability cannot just remain on paper. What gives legitimacy to a law or a public policy is its practice. Technocratic outbursts need to be controlled and policies discussed from the perspective of negotiating assets. Even if, in order to do so, experts and laypeople, technicians and politicians, the public and the private have to *'face off'* in the arenas of the basin committees, these new forums for conflicts and negotiations that lie between politics and sub-politics (Beck, 1999).

Despite the possibilities for institutional articulation at various scales, the participation of local systems of communal appropriation, and the proposal for decentralized management embedded in the current National Water Resources Policy, the articulations and proposals for changes in the community system of rice farmers must take into account the worldview or social representations of these farmers regarding the subject, appropriation rights, institutional arrangements and the policy itself.

We can see that the Itajaí Committee has been working in this direction and, despite the noise generated by the initial conflict over the proposal to charge for water use, the current moves are towards promoting adaptive co-management, which also takes into account the interactions between social and natural systems, through a more flexible management system that is able to deal with socio-environmental disturbances.

In proposing a new regulation of water use for rice farmers, the Itajaí Committee has touched on a sacred area, where there were already consolidated rules and norms, which justifies the irrigators' reaction to the Committee's proposals.

By considering water companies as users, the registration of water users in the rice sector was simplified. As well as making it easier to register users, it has also made it easier to implement licensing. It has also become easier to control the volume of water distributed to a ditch association than to control the volume distributed individually to each member. As a result, the ditch association, in turn, would be responsible for passing on and distributing the water internally, as it already does. However, this proposal has so far not gone ahead and the Itajaí Committee has stopped discussing the allocation and charging for water use, at least in the participatory way it had been doing.

As far as sustainability is concerned, despite the highly mechanized method of cultivation and within a market logic, most rice producers in the Itajaí basin appropriate water communally, through water societies, and we can consider that agricultural culture is based on a principle of collective action, aimed at maintaining the activity.

From the point of view of collective action, both in *water societies* and in *'grain storage societies' or production cooperatives*, water management, access to information and the market are functions that need coordination and collective action, given their indivisibility and strategic nature, similar to the examples cited by Elinor Ostrom in northern Italy, Tibet and Vietnam.

These characteristics reveal an organizational pattern, but do not detract from the originality of the water societies of the Itajaí River basin, in terms of formulating their own rules

and technical and institutional solutions for the use and management of water. This condition became evident in the discussion of the proposal to charge for water use, where irrigators pointed out some alternatives to defend themselves against this measure.

FINAL CONSIDERATIONS

The study of water societies in the Itajaí basin reveals a unique institutional arrangement, where community water management, based on traditional practices and norms consolidated by use, demonstrates effectiveness in the sustainability of the resource and in the collective organization of rice farmers. These associations, often invisible to public bodies, emerged as central players during the conflict over the proposal to charge for water use, highlighting the tension between local management systems and centralized public policies.

The analysis of this case in the light of the theory of common use resources (Ostrom, Berkes, Ollagnon) allows us to highlight that water societies operate under principles of collective action and patrimonial management, where water is treated as a common good, but with clear rules for access, monitoring and sanctions. These mechanisms, although informal in many cases, avoid the "tragedy of the commons" (Hardin, 1968) without relying exclusively on nationalization or privatization, corroborating Ostrom's (1990) criticism of Hardin's dichotomous vision.

The trans-scalar articulation (Berkes, 1999) between community management and the National Water Resources Policy (Law 9.433/97) appears to be a promising path. On the one hand, water societies offer an adaptive governance model, with flexible institutions capable of responding to socio-environmental disturbances. On the other hand, by recognizing these practices, the Itajaí Committee has demonstrated the importance of integrating local systems into public policies, avoiding technocratic impositions. The proposal to grant collective concessions to associations, for example, would simplify management and legitimize the existing system, reinforcing the decentralization and participation provided for in the law.

However, challenges remain. The formalization of these associations, without de-characterizing their autonomy, is crucial to guaranteeing access to credits and public policies. In addition, the environmental sustainability of the model depends on maintaining riparian forests and springs, which are often neglected due to production pressure. The Itajaí experience suggests that adaptive co-management - which combines local and scientific knowledge - can balance

economic and ecological interests, as seen in the successful cases in Northern Italy and Vietnam (Ostrom, 1990).

In summary, the water societies of the Itajaí basin not only challenge the notion that common resources require strict external control, but also point to a patrimonial and negotiated model of management, where water is a collective good, but not an open one. The articulation between local and national scales, mediated by flexible institutions such as basin committees, could be the key to fairer and more effective water policies, as long as they respect the institutional arrangements that have already been consolidated.

In light of the concept of practical authority proposed by Abers (2019), we can interpret the trajectory of the Itajaí Committee as an emblematic case of the construction—and subsequent erosion—of institutional legitimacy. In its early years, the Committee managed to establish significant practical authority: it was able to resolve conflicts, mediate diverse interests, and gain recognition as a legitimate decision-making body for users, civil society, and the government. Its actions during the water charge dispute—addressing criticism, suspending the proposal, and opening a space for dialogue with water corporations—exemplify this ability to exercise authority through recognition and effectiveness.

However, with the progressive departure of key actors—both from civil society and from technical and political leaders who had built its credibility—the Committee gradually lost its influence and autonomy. Lacking the practical authority that once characterized it, it has become yet another bureaucratic institution, strongly tied to and subordinate to the Santa Catarina state government, distancing itself from the ideal of participatory and decentralized management enshrined in the National Water Resources Policy.

This trajectory illustrates how the consolidation of new institutions depends not only on legal frameworks but also on the continuous development of recognition and capacity for action—a practical authority that, once lost, can lead to political disempowerment and subordination to sectoral or state interests. The case of the Itajaí Committee thus reinforces the importance of maintaining an ecosystem of diverse actors committed to democratic water management, capable of sustaining hybrid and resilient institutions in the face of changing political and social contexts.

This perspective reinforces the urgency of considering the management of renewable natural resources from an ecology of knowledge, where the dialogue between tradition and innovation builds sustainable paths. As well as from the perspective of institutional intertwining

and the construction of practical authority with creative action between the different scales and spheres of power. (Abers & Keck, 2017).

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