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Article

Public participation and rural management of Brazilian waters: an alternative to the deficit model

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ABSTRACT: The knowledge deficit model with regard to the public has been severely criticized in the sociology of the public perception of science. However, when dealing with public decisions regarding scientific matters, political and scientific institutions insist on defending the deficit model. The idea that only certified experts, or those with vast experience, should have the right to participate in decisions can bring about problems for the future of democracies. Through a type of "topography of ideas," in which some concepts from the social studies of science are used in order to think about these problems, and through the case study of public participation in the elaboration of the proposal of discounts in the fees charged for rural water use in Brazil, we will try to point out an alternative to the deficit model. This alternative includes a "minimum comprehension" of the scientific matters involved in the decision on the part of the participants, using criteria judged by the public itself.

1. Introduction

The centrality of science and technology in the present world increasingly generates a rise in the participation of scientists in public decisions, especially in the resolution of controversies. From the point of view of the social studies of science, this growing participation highlights two problems for the future of democracies. The problem of liberal democracies coexisting and relating to each other, the principle of equality, and the phenomenon of expertise derive from social theory. Inequalities in the participation of specialists and non-specialists end up overpowering citizens' rights, thus making public participation a farce. In this perspective, specialized knowledge is seen as a political threat. Experts are treated as holders of knowledge, conferring upon them a power that is uncontrollable and unobtainable by others. This idea comes from the supposition that the public would not have the capacity to understand some matters and, thus, would not have control over the possible consequences. The second problem derives from normative political theory: the State, supposedly neutral with respect to the different opinions, injures the principle of neutrality of liberal democracy by giving special status to the opinion of experts.

According to Turner,[1] if these two problems are thought of separately, they could be solved through political paths. The democratic lack of control of specialized knowledge could be solved by means of citizens' councils in technology or administrative committees with public participation, as occurs in the majority of democracies of developed countries. The solution to the supposed "public inability" to participate in decisions would be education, which would come to show the importance of public understanding of science for political decisions. Thought of together, however, the two problems bring about a more complex question: if the experts are the beginning of public knowledge, and this knowledge is not superior to the opinion of the lay public, which does not hold an "expert" certificate, the public is, then, not only less competent than the experts, but it is more or less under their cultural or intellectual control.[2]

In this way a problem is designed which persists, or which could persist, even in more participatory and democratic models of political decision. Inevitably, these spaces, which propose the participation of a non-specialized public in political decisions that involve technical and scientific matters, would not resolve the problems generated by the inequalities of knowledge between experts and lay persons. Thus, how would it be possible to think of a model of public participation which manages to escape these problems?

We will attempt, through theoretical review and the study of Brazilian rural water management, to think of possible paths that free us from the model of public knowledge deficit and the accusation of ideologizing on the part of scientists, who have not indicated solutions to the problems which have been brought up.

2. Deficit model and public participation: a topography of ideas

For decades now, scientific and political institutions have reproduced the vision that rejection with regard to normative scientific suppositions about innovations considered to be "good," "valuable" and "safe" is caused by ignorance and by the public being misled in the interpretation of knowledge. This is the so-called model of "public deficit" of knowledge, of resistance, or of public mistrust.

This idea of ignorance or of being misled with regard to science in the refutation of proposals based on scientific knowledge can be considered a flexible construction. It is crucial in invoking aspects of the "rationalization of public deficit" that attempt to explain the origin of failures of scientific policy in obtaining public authority for its commitments made in the name of "science".[3] The official retreat of the public deficit model occurred as a result of the criticism of the social sciences with relation to its lack of evidence, or in the perception of problems that come about when lay knowledge is ignored in the elaboration of public policies. In addition to this, as Felt[4] points out, the quality and quantity of knowledge that people should have for the decision-making process, according to the public deficit model, is a sensitive topic in political terms. In other words, the choice of contents and the depth of knowledge that the lay public should have in order to participate in public decisions can escape from democratic control.

Using his own way to describe reflexivity, which differs from that used in social constructivism in the sociology of science, Wynne[5] defines the concept as a process of identification, critical examination, and pre-analytical suppositions that construct the commitment of knowledge. For Wynne, in the sociology of the public understanding of science, the public is usually seen as incapable of critical reflection with regard to epistemological controversies and their relationship with knowledge. Through the review of the bibliography and case studies on the public perception of science, he defends that this view of the public as irreflexive, which is common in science, exposes the irreflexivity of scientific constructions on how the public deals with scientific knowledge. This because, on the other hand, the reflexive capacity of the public in relation to scientific knowledge has been systematically underestimated through the defense of the model of public knowledge deficit, which has turned out to be "more of an ideological construction than a truly scientific model".[6] In this perspective, the public has proven to be more reflective in its appropriation of knowledge in the resolution of practical situations than scientists have in the use of science by the public.

In public decisions, the authority of scientific experts, or cognitive authority, can been seen as corporative. Scientists possess authority when they speak as representatives of science. Public judgment is of science as a corporate phenomenon. In other words, scientists speak in the name of science. The political concept of authority, constructed through legitimation, as well as the authority of certain types of scientific experts can, in some cases, be analogous. In order to discuss these concepts, Turner[7] cites the example of the legitimation of the cognitive authority of physicists, a paradigmatic case of Mertonian cognitive authority, in order to affirm that it is a type of authority which passes through a process of democratic legitimization by the public, in a similar fashion to other processes of political legitimization. With this, he proposes a typology to examine the differences in the processes of legitimation among different types of experts, having as a basis the comparison between the physicists' "ideal" type of expertise and the experts, or the "cultural expert", as described by Habermas. In the latter case, contrary to that which happens with physicists, the authority of the expert that backs political decisions frequently does not go through any type of democratic process of legitimation.

For Weber,[8] conceptually there are three "ideal types" of domination and, as a result, of legitimacy. The first is called "patrimonialist", exercised by the patriarch or lord of the land, by means of the authority of the "eternal past". In other words, this type is because of customs sanctified by immemorial validity and by habit. The second is "charismatic power". This is legitimated by the strictly personal devotion and confidence placed in an individual, because of his prodigious traits, heroism, or other characteristics that make him a leader. The third is "rational power", or bureaucratic rational power, which imposes itself through "legality." This is based on rationally established rules, through the belief in the validity of a

legal statue, or through positive competence, as is observed in the case of the "servant of the State." In all three cases, there is, as a last resort, an ethos which substantiates the legitimacy of domination.

In Turner's analysis,[9] this ethos, in cases of traditional and rational authorities, can be interpreted as indirect. Charismatic authority, however, implies an ethos, a set of direct rules. Turner considers cognitive authority to be analogous with charismatic authority, given that there is a belief that scientists possess a special cognitive power.

With legitimacy being a basic presupposition for the status of authority, or of expert, Turner[10] develops a list with five types of expertise. These types vary according to the process of legitimation of the specialist's knowledge. The objective of the typology is not the creation of a taxonomy of experts in and of itself, but rather the discussion of the different processes of legitimation and the political implications of the different experts from North America and from the majority of industrialized countries. Later on we will see that this typology allows for an evaluation of the changes which took place in the democratization process of water management in Brazil.

In the typology proposed by Turner, the Type I expert would be that described by Merton (with regard to physicists), whose expertise is broadly accepted by the non-specialized public outside of the institutional context. For this reason, this expert has democratic legitimacy constructed in a way similar to that which occurs in the construction of political authority.

Theologians, in spite of having authority as specialists, possess legitimacy only within one sector of society. Thus they do not go through the same process of democratic legitimation as physicists. These are Type II experts. With the separation of church and state – a characteristic of modern western societies – theologians are no longer the exclusive contributors in political decisions. These decisions have come to be more closely related with scientific consultants.

In contrast to the first two types of experts, which go through a process of legitimation in pre-established audiences, Type III experts create their own followers. Best-selling authors (of self-help books, for example) and massage therapists are examples of this third type.

The fourth type of expert is composed of actors funded directly or indirectly by the State, through foundations and philanthropic institutions, when they speak as experts in order to convince the public and impede a determined action or political choice. Some leaders of North American NGOs and social movements are examples of Type IV experts.

The Type V expert, fruit of the historical development of the fourth type, is the specialist who acts directly in conjunction with the public administration. Many times this type is unknown to the broader public. The relationship between scientific consultants and public decision-makers and the conflicts of interest are not widely recognized or disclosed. Many decisions are made with the assistance and technical legitimation of experts who are unknown to journalists or the public, thus making any type of democratic control impossible.

Because they have direct or indirect funding from the State and take part actively in the realm of political decisions (contrary to self-help authors and religious figures), these two latter types of experts (Types IV and V) can, according to Turner, cause more problems for the democratic process, given that they do not go through democratic audiences of public legitimization.

Collins and Evans[11] propose to advance the analysis of Type I expertise, given that they consider Turner's Type I expert an unresolved problem in the social studies of science. These authors propose a normative theory of expertise and of experience, based on three other categories of expertise: "non-expertise", "interactional expertise" and "contributive expertise." Using the idea of the scientific community as a core set, Collins and Evans affirm that the expertise conferred by theology and by astrology, for example, are discontinuous with the contributive expertise of the core set in the area of scientific study involved in a determined discussion, whereas the expertise of non-certified persons can, in some cases, be considered continuous. In order to illustrate this, they cite the example studied by Brian Wynne of sheep farmer participation in determining measures to be adopted after the Chernobyl accident. According to the typology proposed by Collins and Evans, the sheep farmers fit into the model of contributive expertise, given that they could, in this case, contribute in an even more precise way than scientists involved in the matter in order to determine the time it would take for the environment to be clear of radiation after the nuclear accident.

In the attempt to delineate the limits of legitimation of contributions in public decisions, Collins and Evans raise two forms of judgment. The first is the judgment of what types of experience are relevant to

the decision. The second form of judgment is discriminatory ability, which consists of the capability of distinguishing the possible contributions of the actor (expert) in the decision of the matter.[12]

Within this classification, interactional expertise is the result of the immersion of an individual in the linguistic culture of a determined group of specialists, without the individual necessarily belonging to said group. This ability is related to knowledge acquired through contact with scientists, or with a determined social group, that can result, for example, in an individual who is able to pass as a specialist in an area of knowledge. In reality, this individual is not a specialist, but he or she has had ample contact with the language.[13] Interactional expertise is related to the fundamental ability to intermediate public participation in scientific matters: translation. If the ability to translate different languages consists of more than having multiple interactional expertises, then it is necessary to have the abilities of journalist, professor, and writer.[14]

3. Hydrographic basin committees and public participation

In the region of Campinas, in the state of São Paulo, Brazil, the mobilization of the civil society in the defense of hydric resources resulted in the creation of the Intermunicipal Consortium of Hydrographic Basins of the Piracicaba, Capivari and Jundiai Rivers (PCJ Consortium) in 1989. Made up of water users and municipal governments of the region, the PCJ Consortium demanded the improvement of environmental quality and the increase of public participation in decisions, through legal and institutional changes in water management. This increase in public participation began to take place in 1991 with the creation of the State Committee for Hydrographic Basins of the Piracicaba, Capivari and Jundiai Rivers (PCJ Committee), the first in the state of São Paulo. The main responsibilities of the basin committees are to establish values to be charged for water use in the region and to elaborate basin plans that point out ways in which funds raised should be spent.

Figure 1. State Map of São Paulo with its main hydrographic basins.[15]

The hydrographic basin committees call for a tripartite constitution, with representation from users (industries, farmers and water-treatment companies, who all use water commercially), public authorities (municipal governments, state and federal hydric resource organs and companies) and organized civil society (universities, research centers, NGOs and associations).

Within the management model proposed in Brazil, the improvement in the conditions of hydric resources and the "rational use" of water involve changes in habits. These changes require "educational" or "scientific communication" processes for users as well as for members of the committees. Committee decisions, almost without exception, involve technical matters which are difficult for non-specialists to comprehend. This creates difficulties for the effective participation of society in general, users, and even specialists from areas that are not directly related to the decision in question. Within the committees, this often ends up brings about the defense of views that are similar to the model of public deficit of knowledge, with a logic that places the quantity of technical knowledge as directly proportional to the quality of participation.

However, our case study of the elaboration of discounts in the fee for rural water use shows that, with a minimum of information and sufficient knowledge to contribute to the debate, rational discussion is possible.

4. Public participation and expertises in rural water charges

In an attempt to make the system of charging for water adequate to the reality of rural users, the PCJ Committee established a fee discount for agricultural use (initially 90%). Those in opposition to this sector considered this to be a lobbying effort on the part of the rural sector. However, with a charge for commercial water use, farmers would have a significantly higher increase in production cost than other sectors and this would be passed on to the end user.

In this controversy, the Rural Technical Chamber (Rural TC) – one of the committee's eleven consultative organs for technical and scientific matters – passed the initial proposal of parameters for discounts in plenary sessions of the PCJ Committees, in 2007. This was done based on negotiations among the participants, with the degree of environmental impact specific to farming activities serving as a technical basis. The lesser the water impact of the farming activity, the greater the discount in the fee for water use. In spite of this technical and scientific nature of the decisions of the Rural TC, the committee consists of representatives of the three segments of society. The Rural Discount Coefficient (Rural K) was developed according to parameters established in the process of political negotiation among the differing participant actors. Since the definition of rural charges also involved the committee's evaluation of the proposal, it was negotiated with those representing actors who were not a part of the Rural TC. These actors also seek backing in the authority conferred by the use of scientific rationalities and knowledge, thus demonstrating even more the importance of relations between the communication of science and participation in water management.

Three positions regarding the rural charge are defended in the committees. Represented by the non-rural user sector, the environmentalist sector and some scientists, those opposed to the rural discount consider that the full charge for agricultural water use would be the only form of ending waste and generating enough resources for water management, given that agriculture is the largest consumer. Among farmers, discounted fees are defended, thus justifying the investment of more resources in the rural sector, minimizing use conflicts, and guaranteeing usage rights. There is also the more radical stance of some farmers who oppose any type of rural charge for water use. The main argument here is the increase in the price of food production, alleging that in-depth scientific studies about such a fee's social and economic impacts on agricultural activity are necessary before beginning discussions about this possibility. The discourses of defense of these three positions seek backing through the reconstruction of scientific knowledge.

Thinking about the perspective of Collins and Evans,[16] it is possible to visualize a contributive expertise of the "core set" in the construction of the proposal. This is represented by a Rural TC member's postdoctoral research in the field of water and soil engineering.[17] This research has as its main objective the development of the Rural K. The contributive expertise of the farmers was made possible by allowing representatives of the agricultural sector to participate in the Rural TC. The interactional expertise, on the other hand, which can be seen as a science communications facilitator, was also present in the elaboration of the rural discount for the charge of water. Some Rural TC members who are from rural unions, for example, have greater fluency with the technical terms of agronomic engineering. They also dialogue

easily with farmers, who are less familiar with formal language in the areas of irrigation and economics. In the Rural TC meetings, it was found that there were actors with multiple interactional expertises – with broad abilities in technical language regarding engineering as well as in "farmer" language – who proved to be fundamental in favoring a minimal understanding for democratic debate.

The limits of the legitimation of contributions in the decisions about rural charges in the case studied were successful, in part, in the two forms of judgment proposed by Collins and Evans. The first – the judgment of what types of experience would be relevant for the decision – occurred with the PCJ Committee allowing farmers and agronomic engineers with specific experience in the area of water and soil engineering to participate in the elaboration of the proposal. This opened up debate between experts from the area's core set and the main contributive experts – in this case, the farmers. The second form of judgment proposed by Collins and Evans – the discriminatory ability or the ability to distinguish the possible contributions of the actor (expert) to the decision in question – also worked in a way that can be considered satisfactory. The dynamic of the decision-making meetings and the mixed nature of the Rural TC makeup (with representatives from the three segments that constitute the committee) allow an opening for debate and participation by different actors and interests in the judgment of possible controversies.

Through the analytical perspective of Turner's typology,[18] the possible problems of the lack of democratic control caused by Type IV and Type V experts are, in part, minimized by some particularities of the Rural TC makeup and of the new forms of decision-making made possible by the management model through Hydrographic Basin Committees. The repeated attempts to allow the non-specialized public to at least understand the minimum decision-making aspects allowed for a greater opening for debate, as compared to the forms of decision that occurred in the management model previous to the Committee.

After almost two and a half years of work, and as a result of the discussions and research, a discount proposal for rural charges was presented to the Rural TC members. In the formal presentation of the Rural K to the Rural TC members, the economic impacts of charges were simulated, in absolute terms, with values, in Brazilian reais, that would be paid for a determined quantity of water consumed, as well as in relative terms, with the value, in terms of percentage, that a charge would represent for the total rural production cost. A comparison was also shown with the percentage that the charge represents in other sectors of water users. In this way, even if a considerable group of people who are members of the Rural TC did not understand the reasons and the scientific arguments that served as a basis for the proposal's technical elaboration, the practical impacts of the water charge for farmers through the use of the Rural K were communicated in a way that allowed the minimum understanding necessary for public participation.

The existence of this minimum understanding necessary was evident when, upon finishing the presentation of the proposal in the meeting, two farmers with little experience in participating in the Rural TC were questioned as to whether they had understood the proposal. One of them responded, "We really don't understand very well how these calculations were done; it would be helpful if a written text were elaborated, so that we could take a calmer look at the proposal". A more experienced representative from the rural union questioned, "But, how much you are going to spend on water, sir, how much your water bill would be at the end of the month, according to the proposal, you understood clearly, is that correct?" The response was direct and categorical. "Perfectly, we understand this enough to pass this proposal," responded the farmer.

Using Turner's typology to establish a comparison, Type V experts contributed to and legitimized decisions exclusively in the old management model. These experts were unknown to the public and they acted in a way so as not to allow any type of democratic control. Using our case study – the establishing of a rural charge – as a reference, we observed a clear advance in the democratic process, keeping in mind that the decisions which are currently made are done so with the participation of Type I experts, who go through pre-established audiences of democratic legitimation. Type V experts (who now perhaps do not fit into this classification because of circumstances) are called on to contribute because of their knowledge of the topic and, in some cases, to carry out the decisions that were made together with representatives of different segments of society.

5. Final considerations

Using our case study and Wynne's definition,[19] it is possible to affirm that the reflexivity of scientists about the "lay" appropriation of scientific knowledge, as well as the recognition of the value of public, non-specialized participation in political decisions that involve technical matters, proved to be

fundamental for the democratic process. In this way, the forms of judgment of the legitimacy of actor participation proposed by Collins and Evans, through the use of Turner's typology, also proved to be useful for the creation of more democratic models of decision-making.

The greater opening for debate which was brought about by the hydrographic basin committees became apparent when the experts who contributed to public decisions regarding waters, together with the State, began to negotiate with other actors, other experts and new interests in public decisions. New types of experts emerged, bringing about greater diversity for the debate of water use and thus strengthening public participation in decisions. We attempted to show that institutional changes in this context that have taken place in recent years can be an inspiration for a new phase of democracy in Brazil, with greater public participation in political decisions, even those which involve complex technical and scientific problems.

One of the questions that remains would seem to be that of how to deal with the inequality of knowledge between the lay public and specialists. The work of the Rural Technical Chamber, in the determination of fees charged for water use, points out possibilities for overcoming part of the problem. In spite of the fact that the communication of technical matters occurs in an incomplete way in this context, the attempts for minimal understanding of the necessary aspects for participation in the controversies on the part of the public contributed in a significant way to broadening the debate. It is exactly this minimum amount of knowledge necessary for participation that we defend as an alternative to the deficit model.

However, in order for the necessary minimum not to create the risk of hiding scientific and technical aspects which are fundamental to democratic debate, the differing interests which are at stake also need to be represented in decisions by specialists. In addition to this, the judgment and the final say on the quantity of knowledge necessary and the right moment for decision should be of the non-specialized public, as observed in the example of the Rural TC. In this way, the deficit model can be surpassed. The hierarchy between public and specialist can be replaced by cooperation. Knowledge is no longer exclusively possessed by rivals of the public – it is also possessed by the public's allies.

Translated by Robert Gartner

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[14] Ibidem.
[15] http://www.rededasaguas.org.br/comite/comite_04.asp
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[17] This research by Rogério Teixeira da Silva has the development of the Rural K as its main objective. The study is carried out at the Luiz de Queiroz College of Agriculture (ESALQ), with financing from The State of São Paulo Research Foundation (FAPESP).
[18] Ibidem.
[19] Ibidem.

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