

Culture as trigger for sustainability transition in the water domain: the case of the Spanish water policy and the Ebro river basin

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Abstract There is a mounting body of literature dealing generally with the dynamics of transitions of human systems towards sustainability and specifically with the different stages and processes of transitions. However, the question of why transition processes occur in the first place remains largely unexplained. This paper explores the concept of transition triggers, such as culture or material resource scarcity, and provides a theoretical framework to explain the emergence of a transition and its relation to recent developments in Spanish water policy. We adapt the general framework provided by current transition theory and gather empirical evidence and insights from processes occurring within the Spanish policy context and the Ebro river basin in particular. Our results show that the sole existence of biophysical limits to water use or development cannot explain the start of a possible sustainability transition in this domain in Spain. Changes in the existing water policies in the direction of sustainability were not ignited by people directly affected by water scarcities but by a coalition of sensitive agents, mostly from academia, NGOs and local constituencies, who managed to articulate new identities, integrate multiple sources of policy relevant knowledge, and develop new values under the umbrella of the new water culture movement.

Keywords Culture · Sustainability · Transition modelling · Triggers · The new water culture (NWC) movement · Spain and the Ebro river basin

Introduction

Understanding and redirecting the complex dynamics of global change and adapting human systems to sustainability goals constitute some of the most urgent tasks of our times. In the face of this overwhelming challenge, one possible reaction is to believe that such dynamics are so complex and so intractable that nothing can be done to steer them towards a particular or collectively desired pathway. Another possible reaction is that it is pointless to aim at translating such complexity in a manner that it is comprehensible and tractable by the relevant agents in an engaging and transformative mode. However, preventing some of the most harmful and negative effects provoked by the unsustainability of our development is largely dependent on providing a satisfactory, comprehensive, and coherent interpretation of the factors, agents, and constraints involved in the making of our social and ecological fabric; e.g., in the form of a model or a powerful narrative. This paper briefly addresses these questions for the case of water use and policy, and focuses on the role of culture within the Spanish policy context and the Ebro river basin. By doing so, it aims at gaining insights for the development of new methods and tools for the integrated sustainability assessment (ISA) of water. In particular, through ISA (Weaver and Rotmans 2006) we seek to explore alternative paradigms and pathways applicable to understand and support transitions towards sustainability in the water policy domain.

The EU project methods and tools for integrated sustainability assessment (MATISSE <http://www.matisse-project.net>) aims at examining and developing tools and methods to explore alternative policy paradigms capable of supporting transition processes towards sustainability. The core methodology of the MATISSE project is based on a cyclical participatory four-stage process of scoping,

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envisioning, experimenting and learning, which is used heuristically to reframe development issues, explore possible opportunities and pathways for more sustainable development and improve implementation prospects through multi-level, agent-based analyses and assessments (Weaver and Rotmans 2006). From an ISA perspective, we consider that the dynamics of sustainability occur over different scales in time, space, and functions, and that the interactions between both collective and individual agents are the key influences on the dynamics of the system. Within the MATISSE project, a case study was carried out with a focus on the Ebro river basin. Our approach focused on the relationships between agents and their behaviours regarding the use of stocks and flows of water and natural resources. Our general perspective and the development of new methods and tools for ISA are founded on agent-based assessment. Interviews and focus groups were carried out to understand the interests, motives and values that drive agents' behaviours and how behaviours are related to the use and management of water. These were then used to help socio-ecological interactions at river basin scale through computer and gaming modelling tools, which are used as heuristic devices for reflexive learning (further details on the tools and models, Tàbara and Pahl-Wostl 2007; Tàbara et al. 2006; and for the research process, Tàbara et al. 2008 in press). Within this broader case study, this paper emphasises the role played in transition by the production and use of cultural artefacts, such as worldviews, values, and beliefs and new identities of key players, in bringing about transitional changes in policies and power structures with regard to water management in Spain and the Ebro river basin. The study of the new water culture (NWC) movement provides a good example or articulation of such cultural constructs and helps us to understand the role of cultural triggers in sustainability adaptation as well as the relationships between culture, resource transitions and agency.

Our research is based on consultation with local agents as well as on the extensive analysis of documents and secondary sources of information. In particular a total of 24 stakeholders were consulted in three focus groups from November 2005 to March 2007, which added to the frequent formal and informal interactions stakeholders from the Spanish water policy agencies and the Ebro river basin. With regard to meetings, the methodology used aimed at following the process of Integrated Assessment focus groups (IA-FGs, Kasemir et al. 2003; Hare et al. 2006). This methodology intends to integrate insights from science, policy making and the public to help framing in a socially and ecologically robust way the nature of the unsustainability problems of the system of reference at stake. The first meeting was held at the premises of the Ebro river basin authority (CHE, Confederación Hidrográfica del Ebro) in November 2005 with nine stakeholders, three

researchers and one organisation assistant. The second meeting was held at the premises of the NWC Foundation in March 2006 with nine stakeholders and three researchers; and the third meeting was held at the premises of the NWC Foundation in March 2007 and had six stakeholders and six researchers (for a detailed account on the research process followed see Tàbara et al. 2008 in press).

The paper is structured as follows. First, we introduce briefly the concept of transition and look at some of its origins in the early interpretations of systems theory applied to human-environment interactions in the 1970s. Our use of the concept is in line with the work now being carried out within the EU project MATISSE and mostly follows and adapts the general framework provided by authors such as Jan Rotmans (Rotmans et al. 2001, Rotmans 2005) and Geels (2002, 2005; Geels and Schot 2007). Second, our discussion focuses on the triggers of transition, mostly by assuming that two main broad classes of causes may ignite a transition in the first place: biophysical triggers or socio-cultural ones. Third, we explore the historical water policy context in Spain and gather empirical evidence from Spain and in particular from the Ebro river basin to see whether physical scarcity or socio-cultural processes have been the most determinant factors influencing the beginning of a transition within the Spanish water use and policy. Our analysis focuses on the role played by the NWC movement which managed to mobilize crucial cultural resources, to create new identities among different constituencies (and also between previously conflicting interests), and to prevent some of the most widely perceived unsustainable outcomes of the previous national water plan. Next, we provide a theoretical framework aimed at interpreting the different agents and elements that have interacted in such situation. In the discussion, we look at the issues of collaboration and coalition formation as a basis for the sustainability transitions, assessing the potentials and the limitations of such structural change for the case of Spain and the Ebro river basin. Our conclusion focuses on the question whether biophysical resource pressures are sufficient to trigger a transition in this domain and on the role played by agency in consciously reshaping and reconstructing those cultural artefacts in a social learning mode.

Transition theory

Transition theory is becoming one of the most relevant approaches to understand and support the management of societal adaptation to sustainability at different levels (e.g., see O'Riordan and Voisey 1998). Some of the ideas coming from this perspective have their origin in the early systems interpretations of social development, which can be found in the work of authors such as Kenneth Boulding

(1975) or Erich Jantsch (1975). According to Jantsch, human societies go through a consecutive series of stages that comprise radical organisational changes or mutations that relate to the capacity of these systems to produce entropy that is, to introduce energy and systemic change in an innovative and self-creating way. Dissipative structures, such as human systems, go through different stages of order through fluctuation, from a given stage of complexity to another with a higher level of complexity and capacity to produce entropy (Figs. 1, 2).

More recently, and according to a general framework provided by Jan Rotmans, Frank Geels and others (Rotmans 2005; Rotmans et al. 2001; Geels 2005, 2002; Geels and Schot 2007) the concept of transition has been reinterpreted. In general terms a transition can be understood as the process of change of a system from one stage of dynamic equilibrium to another. Although such a pattern of evolution is non-linear and influenced by a multitude of interlinked forces, according to Rotmans (2005) four different stages can be identified in a transition: (1) predevelopment, (2) take-off, (3) acceleration, and (4) stabilisation (Fig. 3). In the predevelopment stage, the existing regimes and power status quo do not visibly change, while after the take-off a quick process of societal change starts until another situation is reached in which the speed of change and innovation decreases again. Transitions are stimulated either by endogenous or exogenous forces but are usually the result of coalition forces between agents, which create “niches” of regimes and organisation patterns that are alternative to those currently dominant and which are able finally to overthrow the dominant regime. Transition can be monitored and assessed by a set of system indicators. In the predevelopment phase, these indicators change only marginally. In the take-off and acceleration phase, the indicators change with increasing speed. In the stabilization phase, a new equilibrium is reached. Transition takes place at the micro-level, meso-level and macro-level. The macro-level is defined by changes in the macro economy, politics, population

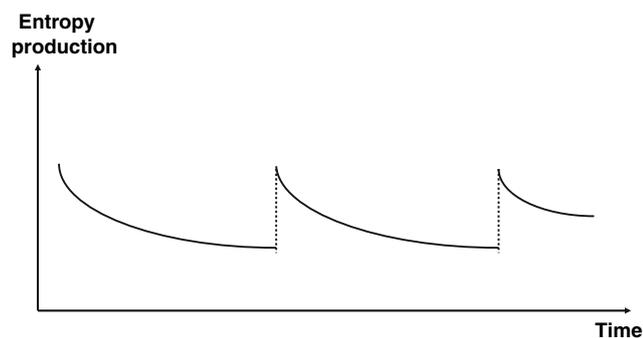


Fig. 1 Societal change as a series of orders through fluctuation (from Jantsch 1975, cf. Milbrath 1989)

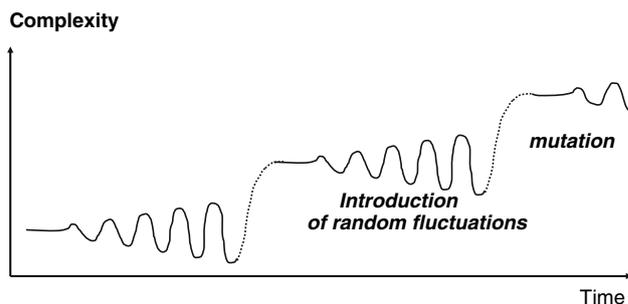


Fig. 2 Societal change as a series of orders through fluctuation (from Jantsch 1975, cf. Milbrath 1989)

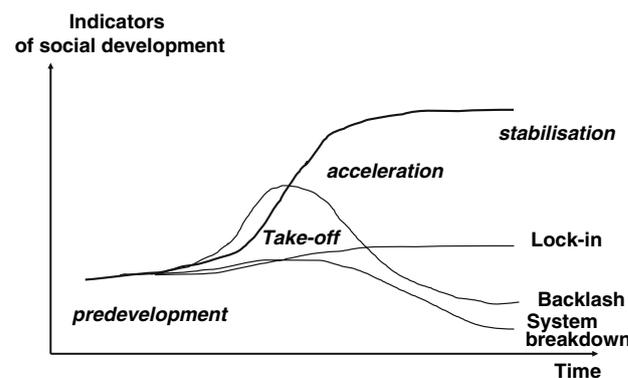


Fig. 3 Stages and possible pathways of transitions. (Rotmans et al. 2001; Rotmans 2005)

dynamics, natural environment, culture and worldviews. The meso-level is defined by changes of patterns of institutions, rules and norms of social and economic activities. At the micro-level changes involving individual actors, alternative technologies and local practices are distinguished (Geels 2002; Van der Brugge et al. 2005).

Hence, in the predevelopment phase, the regime often seeks to maintain the existing social norms, beliefs and practices. The take-off phase starts when developments take place mostly at the micro- and macro-level. Changes at the macro-level, such as change in worldviews or macro policies reinforce certain innovations at the micro-level such as policy or technology. During the interactions between the micro- and the macro-level (the period between pre-development and take-off), different developments and perspectives take place in parallel and unite to form a consistent and stronger emerging paradigm. This appears as a polarization between the existing and the emerging paradigm. At this point, the regime tries to integrate innovations to avoid or end the polarization at the micro-level. This is a crucial period since the uncertainties and risks of chaos are high. There is a need for feedbacks from the integration practices and experiences at the micro-level for the regime to maintain itself or to go into further

innovations. The lack of such feedback can cause a drawback or a lock-in situation. Then, the acceleration phase constitutes the period in which enabling flows of capital; knowledge and technology are provided increasingly, providing for the next level—of stabilization—to be reached, with another regime and a new understanding of norms and common practices. The regime changes as a result of self-evaluation in response to pressures from the micro-level on the macro-level and pressure from the macro-level on the micro-level. During the stabilization period, the new regime slows down the acceleration of changes triggered by pressures between micro- and macro-levels by showing resistance to competing innovations and developments (Geels 2002; Van der Brugge 2005).

Transitions can fail or succeed. After the take-off phase, emerging regimes can either overtake the old ones or not. In the case that the whole system is not capable of adapting to the changing external conditions e.g., by replacing the dominant regime by a new one, or by obtaining inputs from another system, the system may finally collapse (for the limits of general theories on social change see Boudon 1986). In the past, transitions have occurred, for instance, with the end of the ancient regime, the emergence of the industrial society or more recently, with the democratisation of Eastern Europe. In the same guise, at present we are witnessing large-scale transformations that can be understood as transitions in societies such as China or India, while in others like in some African countries, attempts to reach stabilization seem to fail. This is why a key assumption of transition management is that transitions can be influenced by public policy and management in order to avoid system breakdown (Fig. 3).

In short, one of the underlying ideas of transitions is that the management of societal change towards a new situation, which can be identified and understood as better adapted to the external conditions and to the needs and goals of those who constitute that society, cannot be achieved by chance or by attempting to do everything at the same time. Specific tools and methods e.g., aimed at providing focused learning experiments, as well as collective visions, and networks of action need to be developed (Rotmans 2006). Such new tools may be used to transfer knowledge and influence the policy and power structure processes at the multiple levels of action. Lessons may be drawn from actions taken by niche agents, who may possibly succeed in replacing the dominant regime.

Biophysical versus cultural triggers in sustainability transition

In this paper, we understand culture as the dynamic and historical ensemble of socially constructed symbols, beliefs

and values, as well as capacities for perception and awareness that agents of a given community use to convey sense to their actions. These constructs include identities, language, manners, traditions, and implicit norms, ideals, and day-to-day expectations. Culture provides individuals not only with meaning and cosmic order but also with capacities for reflectivity about their own realities. Cultural systems are always limited systems, insofar as rationalities and values are limited to contextual situations, knowledge and experiences. Culture can be understood as a completely independent and autonomous system influencing social structures, power regimes and individual practices; or as the opposite, as a dependent system of the latter. In this paper, we understand that culture is both: to some extent, external to agents' behaviours and social structures, but which at the same time and as a system of references which can partly be modified in an active and conscious way by particular agents and organisations (For a discussion on the notion of culture in resource management and its role in social learning, see Pahl-Woslt et al. 2007). However, the purpose of this paper is neither trying to provide a "correct" definition of culture, nor to argue whether culture is in harmony, independent or in conflict with nature. Our aim is rather more limited to define culture in a way, which is operational enough as to make it possible to understand how our theoretical framework has been used for the analysis of the possible recent transition in the water management in Spain.

Although there is a considerable amount of literature focusing on the dynamics of transition and in particular, on the different stages and processes of transition, not much empirical research has been carried out to answer the questions about why and how such transitions occur in the first place. There are two main extreme interpretations: realist and social-constructivist (Fig. 4). These provide completely different responses to these questions. A typical ecological realist view would propose that it is the increase in natural scarcities that creates the necessary thrust for change and innovation while those defending the autonomy of culture in social evolution would take the biophysical constraints as irrelevant.

From a realist point of view, the need for cultural innovation, social learning and structural change increases as the system, or parts of it, approach a threshold of

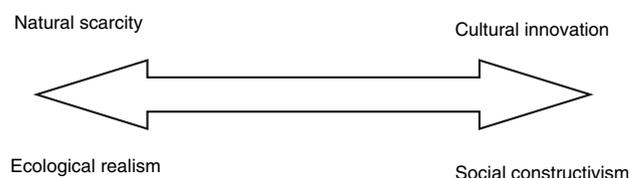


Fig. 4 Two opposing interpretation of transitions triggers

maximum growth in which some of its activities can no longer be carried out. In this interpretation, biophysical constraints will trigger a transition. Also, a given resource threshold may affect different agents and activities in different ways and therefore, agents involved in some activities may be “forced” to innovate and start a transition faster than others. For instance, farmers are key agents in the structure and dynamics of the water system. In the absence of institutional constraints that prevent change for other reasons, it makes sense to expect that innovation will take place in this sector more quickly than in others. “Protected” agents—that is, those which behaviours are not really affected by changes in the external conditions due to particular institutional arrangements or because their dominant position in the existing regime—may be less motivated to change their practices. The same may be true for those who still are too small in size or too far away from meeting the threshold. Then according to this perspective, the growth and “speed” of the system (e.g., speed defined by the rate of growth, quantified either in monetary or physical terms) are crucial for the underlying transition dynamics. In the model developed within the water case study of MATISSE, called the World Cellular Model, growth can be easily conceptualised by the amount of water resources used by the different agents of reference. This includes also the water stocks and flows that return to the rest of the system and that can potentially be used by other agents (for further details Tàbara et al. 2006; Tàbara and Palh-Woslt 2007).

Figure 5 provides a simplified illustration of the role of biophysical thresholds in social adaptation following a realist approach. The system, or parts of it, can either adapt or fail whenever any (of potentially several different) thresholds in the availability of natural resources are encountered. Before threshold 1, there is no real need for structural or systemic innovation and the system can continue growing and acting as before, or else can avoid the threshold, for example by reducing its size or changing the number and/or type of activities it carries out. It can also keep its size in line within its maximum threshold in a new equilibrium situation. However, between thresholds 1 and 2 the need for innovation increases; some of the activities and the regime rules of the old system survive, but others disappear along with some of the agents who had been active in those activities. At threshold 3, most of the dominant structure and activities that defined but also constrained the development and growth of the old system have been replaced, hence allowing the system to surpass the old thresholds, and a new stabilisation stage emerges. The different pathways may also be influenced by different policy interventions, oriented towards one or the other direction. In the case of processes occurring in water-use and policy in Spain, measures aimed at continuing with the

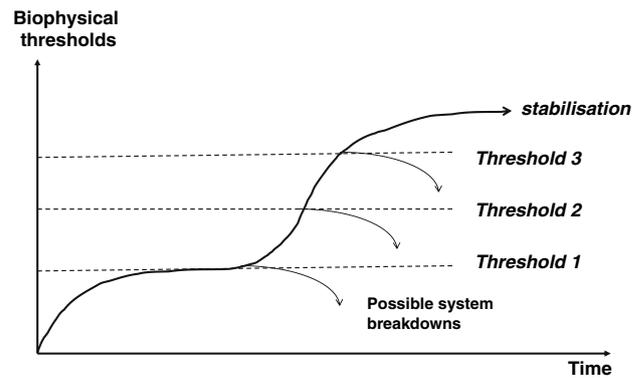


Fig. 5 System adaptation pace and natural thresholds for water use. A realist perspective. Thresholds are always related to agents capacities for transformation to change their own activities

dominant regime may correspond to the “old water culture”, while the “New Water Culture” policies can be understood as directed to avoid and reduce the size and proximity of the system to the existing thresholds.

This notwithstanding, thresholds relating to the use of natural resources by human systems are always relational; that is, they depend on a multitude of cultural, organisational and technological factors which may have little correlation with absolute and physical resource scarcity. This does not mean that physical scarcity is only a social construct, but that those “objective” thresholds can be “put away” (temporarily or rather permanently) by technological and organisational innovation, hence allowing greater availability of natural resources or reducing the need for the use of such resources in absolute terms. From a realist perspective, in the absence of major technological shifts and breakthroughs, continued growth of the system cannot be sustained in the long term and therefore a new take-off situation is not really feasible, unless directed to reduce the size and the impact derived from human activities on the biophysical system. Social constructivists, on the other hand, would think that culture, human ingenuity and knowledge will possibly be able to overcome all biophysical constraints thus allowing humans systems to expand infinitely.

Culture is arguably the most important mediating mechanism that links us not only with other human beings, but also with the rest of nature of which we are part and within which we live. Different cultures may respond to different cultural motives that drive their actions in distinctive ways. For instance, and following Douglas and Wildasky (1982) and Thompson et al. (1990), hierarchical cultures may react rapidly to a lack of order, communitarian cultures to a perceived unfairness, while individualist cultures may respond to a threat to their freedom. More particularly, three types of cultural visions on the relationship between the humans and nature can be

distinguished. First, the “mastery over nature”, where all natural resources should be put into use for humans; second “harmony with nature” in which no real distinction between humans and nature can be made; and third, the “subjugation to nature” where people perceive that nothing can be done to control nature. In other words, different cultures pose different concerns to their cultural communities, and in this way the contextual conditions may threaten or satisfy such concerns that may or may not motivate action (see also Hoekstra 1998).

In addition, culture may also make a transition occur faster or slower. On the one hand, some cultures may facilitate the acceleration of change and innovation by providing a set of flexible norms and rules to their regimes to ensure a more adaptive setting for agents’ behaviours. On the other hand, this greater flexibility does not guarantee automatically that sustainability goals may be incorporated in the transition. Indeed, a society can accelerate towards system breakdown if the necessary corrective institutions are not put in place in time.

New water culture movement in Spain. Understanding the role of culture in the transition for sustainability in the water domain

A brief account of the evolution of Spanish water policy

The policy debate on what to do with water resources in Spain has historically been influenced by the strong differences in the temporal and spatial distribution of the availability of water resources in the country. In Spain, precipitation shows a high inter-annual and intra-annual variability and it tends to decrease from the humid North-West (around 1,200 mm per year) to the arid South-East (300 mm or less). This results in water resources that, albeit comparable to European average quantities are highly unreliable. Only 8% of total water resources are available naturally at any moment with this figure decreasing to a mere 0.5% in the driest Mediterranean basins. For this reason, river flow regulation through the construction of dams and reservoirs has been a cornerstone of Spanish water policy since the early twentieth century to the point that today Spain is one of the countries in the world with the largest number of reservoirs per million people. The large amount of dams in Spain are the consequence of a “hydraulic paradigm” which conceived water resource management in terms of maximization of water supply and creation of irrigation fields. Water management has traditionally been linked to agrarian policy, which was seen (and to some extent partly still is in some ground) as a good economic policy practice.

By the end of the nineteenth century, a policy movement known as “regeneracionismo” intended to boost economic activity by a focus on building large hydrologic infrastructures and supporting land use transformation. This was linked to the fact that Spain had lost the greater part of its former colonies in Latin America and therefore, its domestic economy was largely depended on its own agriculture. With the 1902 Plan of the Hydraulic Works by Joaquín Costa and Macías Picavea, the dream of changing the misery and the destiny of the precipitation-dependent Spanish agriculture was prevalent within this movement which marked the first three decades of the twentieth century (Swyngedouw 1999).

Costa described the water situation of Spain as naturally distributed in an unbalanced way and proposed the redistribution of water from zones of abundance to those of deficit through systems of dams and canals. He declared the state to be responsible for hydraulic constructions since “neither the big landowners nor the small ones had the motivation or the resources to invest in more efficient technologies” (Saurí and del Moral 2001). This started a period during which, through construction of many dams and canals and through water transfers, the amount of irrigated land in the country more than doubled. For Costa, the major motivation behind this movement was a land reform that enabled small landowners to be an alternative to big landowners, who had dominated Spanish agriculture up until that time. This economic development was strengthened by social development as well through education of the small farmers at schools opened in rural areas (Torrecilla and Martínez-Gil 2005). The first autonomous river basin authority of the world, the Ebro Confederation, was also founded in this period. However, the movement could not reach the level of impact that it proposed and resulted in social conflicts and polarisation within society (Swyngedouw 2005).

During the first years of the Second Republic (1931–1936), the 1933 Plan of Hydraulic Works was developed by Manuel Lorenzo Pardo, whose personal mission was to work against the unequal access to water between the Spanish river basins, seen as a kind of “natural injustice” to the Spanish people. State intervention then was seen as a way to correct spatially this “mistake” in the distribution of water. To some extent, in its early stage the “regeneracionismo” could be seen as a transitional niche aimed at reforming the existing regime. As a result of the new policies growing number of small landowners were empowered and emerged in places that were dominated by large landowners. However, and given a period of conflicts and polarization, which included the Spanish civil war (1936–1939), and the beginning of a period of four decades under the dictatorship of Franco, the *regeneracionismo* movement started to evolve into a one-dimensional

technological approach, with the progressive social components of it being eroded rapidly. Further, the new movement was not really capable of changing the existing regime but on the contrary it helped to sustain the new authoritarian emerging state. As a matter of fact, “irrigation was envisaged as the means to create an expanding class of small farmers without jeopardising the interests of large landowners who were among the main supporters of the military revolt of 1936” (Sauri and Del Moral 2001). It was precisely during the dictatorship that the hydraulic paradigm grew even faster with the construction of some 400 dams leaving the country with the one of the highest number of dams per capita in the world. During this period, river basin confederations that had been founded on local and regional principles and which were originally locally managed and participative, were gradually replaced by a more centralist national vision. They were abolished in 1942 and replaced by technocratic-bureaucratic organisations responsible for carrying out hydraulic works under a nation-building perspective (Swyngedouw 2005). Thus, the river basin confederations became technical organisations allocated by central *Dirección General de Obras Hidráulicas* (DGOH), which are now financed and directed by the central Spanish Administration. During this time, the DGOH became an extremely powerful state agency, which had close associations with engineering, construction, cement, and electricity companies (Swyngedouw 2005), all directly interested in increasing the number of hydraulic infrastructures. Dams were the symbol of the demonstration of state power over nature, the victory of national technology and of public funding, for the progress of Spanish agriculture and industry (Torrecilla and Martínez-Gil 2005; Getches 2003).

With the end of the Franco dictatorship, Spanish democracy emerged and took a new route towards the European Union. The Spanish Water Act of 1985 focused on the need to create water plans on both a basin and the national level with the Ministry of Public Works collaborating with other ministerial bodies according to the needs of the concerned regions (Sauri and del Moral 2001). However, the 1985 Act did not go further than repeating the old hydraulic paradigm. Again, expressions such as “hydrologic unbalanced condition” of the country, distinguishing between “deficit” and “surplus” river basins, or the recourse to the “general” and “national interest” for the purpose of justifying once more the construction of more dams and river diversions were used (Torrecilla and Martínez-Gil 2005; see also Embid 2002). The role of large irrigator farmers in liaison with the existing river basin authorities had been crucial in defending the old water paradigm and becoming a major resistance to change (Llamas 2003). Once again, the existing water regime remained mostly intact.

The emergence of the NWC movement

The National Hydrological Plan (NHP) of 1993, prepared in line with the philosophy the 1985 Act, proposed to divert more rivers and the construction of more dams. For decades, a growing concern was trickling down by local populations including many people that had to flee their flooded towns. Scientists, NGOs and regional authorities increasingly began to question the adequacy of those policies and of the hydraulic paradigm in general both socially and in environmental terms. In 1995, the association of people affected by big reservoirs (COAGRET) was founded with the support of two environmental associations, the confederation of organisations for environmental protection (CODA) and Greenpeace. COAGRET managed to unite concerned citizens affected directly or indirectly by the construction of dams, together with a number of diverse environmental associations and experts in water and land use management. The outcome of those discussions and of the alternative ideas that came out aimed at modifying the existing water management regime and was published under the motto of “the New Water Culture”. That was the first time this phrase was used¹.

The association of people affected by big reservoirs gave mounting courage and voice to those threatened by the new hydraulic constructions as proposed by the National Water Plan of 1993. Among the new civic organisations that started during that time, a new platform was established in 1996 to defend the Mallos river basin in the town of Riglos, against the proposal of the *Confederación Hidrográfica del Ebro* (Ebro river basin authority). This platform highlighted the great potential of the area for eco-tourism and was the basis for a protest in 1997 in the small village of Aragon of Beceite, again, to protect the village and the other villages around against the machines sent by the Hydraulic Confederation of Ebro. The concept of the NWC and the new identities that were emerging around it began to gain increasing attention and to have significant impact across different sectors of society.

By 1998 the debates of the first Iberian congress of management and planning of waters held in Zaragoza made

¹ According to one of our consulted stakeholders who participated actively in the making of the NWC movement, three main periods can be distinguished in the articulation of such movement. The first, almost at the end of the dictatorship was characterised by some failed attempts so carry out some water transfers in the Ebro river basin and spans from 1973 to 1989. The second period, from 1989 to 1995 entails the formalisation of the movement in a more decisive and effective way. The third, from 1995 to the present, has been characterised by an increasing role in policy making and the need to develop specific proposals and alternatives to the previous dominant water practices. However, we understand that the transition may have started when such coalition of groups was actually articulated in a more formal and extensive way.

clear the need for a more professional non-profit organisation that would deal with water policy issues in a scientific manner and at the same time would support public debate beyond the academia circles. This organisation would be called “the New Water Culture Foundation” and organised a couple of congresses aimed at redirecting change in the Spanish water policy with special emphasis on the NHP that proposed some 120 dams and diversions from the Ebro river to southern parts of Spain. The conclusion was that the NHP was actually violating the spatial solidarity between Spanish regions, had no solid proposals on water demand management, omitted a rigorous assessment of environmental impacts, and did not make economic sense due to its speculative contradictory economic figures and numbers.

In the year 2000, the Platform for the defence of the River Ebro was formed against the NHP and its negative impacts that this federation of organisations foresaw on the Autonomous Communities of the river basin². Since one-third of the financial support for the NHP was expected to be provided by the EU, the Platform decided to try to cut this support by convincing the EU that the Project would be disastrous both from a socio-economic and from an environmental point of view. National Water Plan was approved in July 2001 and planned to divert of the Ebro river and to build pipes to transport water through 900 km of pipes. In 2002, the Platform organized an international demonstration from Spain to Brussels called the Blue March. At the end of two intense years of international campaigns that gained notorious support from international media and managed to organise large demonstrations all over the country, the EU decided to withdraw its financial support for the NHP in 2004. Shortly after, the new Spanish government which came into office declared their intention to withdraw the plan, although only the most controversial parts of it, which related to the building of dams and water transfers, such as the one on the Ebro river basin. In June 2004 the NWP was derogated and the new government responsible for this decision stated that a multiple matrix of economic, social, and ecological costs and benefits had been taken into account. As alternative, a new plan called AGUA (*Actuaciones para la Gestión y la Utilización del Agua*—interventions for water management and use) was approved, emphasizing the increase of water re-use, modernization of irrigated areas, desalinisation, and the beginning of the implementation of demand management policies. AGUA is now being implemented and has entailed the end of some of the previous plans for building

some of the larger new dams and water transfers. It also planned to build desalination plants that would reduce the need of water from the Ebro river basin in 145 Hm³ of water per year and with a total of 621 Hm³ of water in the whole country. It was also argued that the new plan would need less energy, provide more water at better prices, would help to prevent the erosion and degradation of the Ebro delta, considered as one of the most important biodiversity and RAMSAR areas of the Mediterranean.

Using the theoretical framework provided by the transition theory as depicted in Fig. 3 we can say that the predevelopment stage comprises a period that includes the late nineteenth century and the whole twentieth century. Such period is characterised by a particular policy conception, which regards water mostly as a resource for growth that needs to be brought to production by any possible means available. However, in Spain, at the end of the twentieth century, new cultural conceptions started to take shape and question some of the conceptions, taken for granted, about water mainly or only as an economic resource. The new policy oriented discourses shift the language from the need to manage “water” to the need to “manage rivers and landscapes”. Such cultural shift is epitomised by one of the most popular mottos used in demonstrations against the NWP in the Ebro river basin: “The river is life”.

The take-off stage may have started when new social movements such as COAGRET, the platform of the defence of the Ebro and then the NWC foundation were founded. These organisations managed to create neat identities that helped to mobilize social resources of many kinds. Now, the “New Water Culture” was developing a language and specific proposals on its own, based on managing demand, working at river basin level, encouraging public participation and de-centralisation, avoiding inter-basin water transfers, focusing on river restoration, and promoting saving and reutilisation of water together with alternative technologies of water (including desalination), as well as of delivering economic responsibilities. But most importantly, it was its focus on public education and awareness, civic science and research, as well as communication and agent engagement that distinguished their proposals³. Such language, in which different sectors of society could mirror their own demands, could clearly be opposed to that of the “Old Water Culture”, still obsessed to carry on with the goal of providing more water supply and building more water infrastructure as a response to economic demands and corporate interests. Whereas the “Old Water Culture” was still preoccupied to use and understand water as a key component that would serve to

² Within the Ebro river basin, there are seven autonomous communities—each with their own Parliament-, 17 province governments, and 1,624 town councils plus numerous different supra- and inter county administrations.

³ For the NWC Foundation web page see <http://www.unizar.es/fnca/index3.php?id=1&pag=11>.

the aims of nation-state building, mostly following an agrarian and rural philosophy that was also gaining support from local regime supporters in the tourism sector, the NWC worked in a completely different string. Indeed, the NWC movement contributed to increase the complexity of the landscape that would conform the agents' and possible users of water—including the environment itself—and made possible the emergence and popularisation on new discourses and cultural frameworks such that of sustainability within the water domain (see Pahl-Woslt et al. 2007, Tàbara and Pahl-Woslt 2007). The NWC movement called for accountability and participation in a policy area previously dominated solely by expert and bureaucratic decisions—or as the NWC denounced, also by corruption.

However, as we can see in this research, the reason why those movements appeared in the first place was not directly related to water or resource scarcity. It was the perception of the socio-economic injustices and of the possible impacts on the environment in rural communities which together with an empowering narrative provided by academia and intellectually concerned people triggered the need to form a large coalition of groups to challenge the existing resource science and policy paradigm. To some extent, the NWC movement was ahead of some of the ideas and developments that were to come into legislation with the EU Water Framework Directive (Directive 2000/60/CE) and its transposition to the Spanish legislation in 2003 also managed to influence some of their neighbouring countries by promoting the European Declaration for a NWC⁴.

An interpretative framework

The main goal of this paper is to provide a theoretical framework aimed at helping the interpretation of the complexity of agents' strategies and of the structural factors influencing a societal transition toward more sustainable pathways of development, using the Spanish and the Ebro river basin contexts as illustrations. Figure 6 provides such a framework. It suggests that for a successful transition to start occurring, agents need to operate at the three levels of action: by promoting new ethos and individual water practices, by creating new institutional arrangements in market, political and knowledge institutions, and at the same time, by articulating changes and mobilising resources at the macro cultural level. It is precisely at the level of culture where the main thrust for mobilisation occurs, and not in the level of resource constraints, given that, as it is often the case, those who suffer

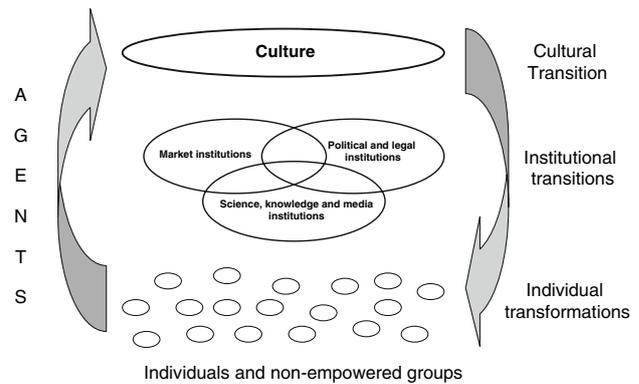


Fig. 6 Transition agents operate at different levels of action

the main resource constraint are not empowered enough as to provoke decisive change at the institutional level where main structural decisions are taken.

Our model underlines the importance of particular institutional developments that are needed to happen at the meso level so as to make effective cultural transitions that may be taking place both at the macro and at the individual level. The NWC movement was eventually able to influence some policy instance that in turn created new business and market opportunities in the development of water technologies, mainly desalination. But at the same time, while the NWC movement can be understood, using the transition language, as a “niche” development, on the other hand, we find some key “regime agents” which operates at the policy meso level within the Spanish water which still constrains the possible transition in this domain: the powerful “Confederaciones Hidrográficas” (River basin authorities). No substantial change in this domain can be done without a deep transformation in such institutions, many of which still retain many of inertias and managerial styles of the past. Critics about the NWC movement now argue that while their activities managed to stop some of the worst possible outcomes of the business-as-usual water resource policies, it did not managed to provoke a deep transformation of those river basin authorities, thus limiting the scope and effect of the transition.

Reality, of course, is always far more complex. The aim of modelling transition processes is to help providing a coherent, knowledge-rich, but also simplified and policy-relevant narrative about the multiple factors that possibly intervene in the making of large-scale societal and technological changes. Modelling can also help exploring and specify possible futures that, for reasons of precaution, possible outcomes cannot be waited to happen to start assessing their adequacy. These respond not only to different causes but also produce different or opposed effects at different spatial and temporal scales. The different results of agents' activities are not necessarily interlinked

⁴ See <http://www.unizar.es/fnca/euwater/index2.php?x=1&idioma=en> for the content, process and history of this declaration.

or in modulation with those occurring at the meso or macro levels.⁵

Looking more closely at a particular location like the Ebro river basin and in particular the delta area, one could observe that it was the “threat” posed in 2001 by the NWP which helped to consolidate new cultural and local identities, such as the one around “Plataforma per a la Defensa del Ebre”, which gathered previously opposing interests. Where some tourism and urban developers had before labelled environmental activists as “Taliban fundamentalists”, the socially constructed threat to their ambitions, desires or lifestyles of a disappearing river—whether it was real or not—made possible the articulation of a network of collaboration between them which, otherwise would have been unlikely to have emerged. In this sense, while the “realism” of the biophysical threat was also mediated by culture and in particular by the media (Tàbara et al. 2004; Palh-Woslt et al. 2007) and “scientists in action” (Latour 1987), it is also true that the real threshold of not having enough water for some existing activities was never met. Indeed, the transfers of water, as proposed by the NWP, never materialised, and therefore, one can say that the organisational and innovation changes that are resulted at the local level in the water domain possibly responded to factors other than biophysical scarcity. An interplay of social forces and coalitions working at different levels, with a prominent role played by the use of cultural mechanisms, identity formation and unification, first sparked off the necessary awareness, strength, and motivation to start the possible Spanish water transition.

The analysis of stakeholders’ interviews and workshops held in the Ebro river basin together with the examination of the historical trends of the Spanish case made clear that advances in the direction of sustainability entail the articulation of processes that can yield opportunities and resources for empowerment and coordination between different concerned agents working at different scales and domains. When asked about the reasons of current persistent problems in the Ebro river basin, our stakeholders argued that unsustainability results from the failure of agents to collaborate together for the development of means to achieve a common goal. In a fragmented context in which actors pursue their interests and benefits in an uncoordinated, exploitative and shortsighted manner,

sustainability is simply not possible. To a large extent, the NWC movement managed to overcome some of the main difficulties related to the lack of cooperation and finally influence some very concrete policy processes that were going to yield very unsustainable results. This suggest that take-off stage had already been reached although, at the same time we are aware that its ultimate success will depend on building stronger coalitions and institutions that include other innovative niches of action in other domains (e.g., a “New Energy Culture” movement, which also claims to be gaining public recognition).

Discussion

The ecological realism approach to transition triggers alone seems insufficient to explain satisfactorily the reasons why transitions started, at least for the case of the management of water resources in Spain. This, however, does not mean that natural scarcities may not play any role at all in stimulating a need for innovation and change, but that the actual innovation and change of a transition is often ignited, driven, and mediated by agents other than those who suffer directly from such biophysical constraints. It is culture, understood as a sensitive, meaningful and active articulation of understandings and awareness of the world around us (and beyond), which creates in some agents the thrust and the urge for collective transformation and cooperation. For the case of the Spanish water policy context, concerned experts, environmentalists and local communities were connected and empowered through the articulation of new cultural strategies and identities bounded together under the umbrella of the NWC movement. Such cultural mobilisation can be seen as the main trigger for sustainability in the recent water policymaking style in Spain. The NWC movement contributed to stop some proposals of the previous regime that were most widely regarded as unsustainable, such as the large scale water transfers from the Ebro to the South for intensive agriculture and large-scale beach tourism developments. The importance of culture was indeed acknowledged by the members of the movement as a key instrumental component that had to be addressed for the success of their claims. The NWC movement, consciously or not, realised that it had to direct its actions to the three levels in which transitions in our interpretative framework seem to occur: the micro-level individuals and groups, the meso-level institutions, and the macro-level—in which culture operates.

Our exploration of the Spanish case revealed that one of the origins of the NWC movement can be found in the network of action created by the CODA, Greenpeace, the COAGRET and other interested agents, such as farmers and

⁵ In the Ebro river basin, there have already been other attempts to move towards sustainability in other policy domains, such as agriculture. These, however, have failed to connect experiences occurring at the individual or micro-level to the higher level of institutional and cultural changes. Apparently, strong market agents operating at the meso level, mostly supermarkets, play a decisive role in preventing organic farmers to sell their products more widely and therefore, to up-scale their activities as to enter into the take-off stage in the sustainability transition.

others coming from academic circles. The NWC Foundation appeared at the time the first Iberian congress on water management and planning was organised in 1998 in Zaragoza. Since then, the number of activities and assessments carried out so far by this movement has been enormous, with a peak of visibility with the withdrawal of the articles of the old NHP of 2001 (see Biswas and Tortajada 2003; Howitt 2003; Arrojo 2003; Estevan and Prat 2006). An open strategy of this movement has been to make water management and planning open to public debate and dialogue, hence allowing for a greater accountability, transparency and democratisation of expert assessments and decisions. Lessons gained from the relative success of agents in the water domain in Spain are being used to increase the chances of successful transition in other policy domains. Just to give an example, the European NWC declaration was signed in 2005 and it is also now increasing receiving attention in many expert and policy circles not only in Europe but also in Latin America (FNCA 2005). Some environmental groups now also use reference to the need to develop a “New Energy Culture” to cope with mounting energy constraints and also climate change.

As argued by Sabatier (1988), policy change can be understood as a learning process result of actions taken by advocacy coalitions. These may come from a variety of positions such as officials, interest group leaders or researchers who share a common belief system, e.g., a set of normative beliefs, problem perception, core values, causal assumptions and a common strategy envisaging innovations over a given period of time. In this way, the advocacy coalition of CODA, Greenpeace, COAGRET and other NGOs resulted in proposing an alternative strategy against the current one of that time which was known as the NHP and which later became the currently approved water plan AGUA. In particular, the programme AGUA proposes the establishment of public water banks to become responsible entities of developing and maintaining historical rights to water through criteria not only of efficiency but also of equity and sustainability. AGUA also aims at contributing to the protection and restoration of riverine ecosystems and in terms of pricing it emphasizes water tariffs according to real costs for obtaining and treating water. Whereas the previous NHP had its focus on water supply, AGUA proposed measures of demand management through optimisation of infrastructures, water treatment, reuse of water, and desalination. In all these reframing processes, the NWC Foundation played a pivotal role in becoming a bridge organisation between Iberian Peninsula and other groups operating in the EU and elsewhere. To a large extent, the movement’s success in this process can be seen as that of being capable of uniting diverse sources of knowledge for sustainability (local/global, expert/non-expert) to affect a particular policy domain.

Our research is based on insights from a variety of different analytical perspectives, mostly cultural analysis, structural social science, modelling and environmental sociology. Our findings question some of the widespread taken for granted assumptions present in current discourses about environmental change. Mainly that biophysical disasters are needed to start learning how to live sustainably or that communities which suffer from resource constraints will simply, because of that, learn to manage to overcome and change their vulnerable situations without first carrying out a conscious mobilisation of new cultural resources. In the case of Spain and in the Ebro river basin in particular, we understood the opposite: it was first a shift in culture and perceptions, and not resource scarcity that triggered the transition process.

Thus, a central goal of this paper has been to underline the role of culture in transitions and in particular with regard to the use of water resources. In our case, modelling has been used to simplify the representation of the dynamics cultural forms and the influence of agents in producing changes in it and in turn, within the policy making process. The present research helped researchers to understand in a theoretical and empirical way interactions and to support other modelling efforts within the EU MATISSE project. If modelling is to be used to support a transition in this domain, it is clear that changing the course of events can only be done through a process of social learning and awareness of the social-ecological system. As we move towards a more integrative river basin management, a better understanding and communication of the influence of cultural perceptions, values and beliefs becomes more relevant. Models can play a role in that. However, most current models tend to focus only on biophysical changes (or take into account only some standard economic trends) and take for granted the influence of cultural constructs. In our context, two ideal types of cultures, the one represented by the “New Water Culture” and the other by the “Old Water Culture” appear to yield very different results in terms of sustainability.

Conclusion

Our analysis of the Spanish case and in particular of the Ebro river basin casts serious doubts on the widespread realist assumption that societal transition towards more adaptive patterns of organisation are triggered by biophysical pressures. In our particular research context, people directly affected by the diminishing availability of water were not the main agents in charge of carrying out the actions that managed stop and reorient some of the most unsustainable practices that were present in the former National Water Plan. Rather, this change was triggered

by a coalition of intellectual and middle class people, mostly from academia, with the support of a number of diverse regional and local groups, who managed to articulate and integrate new identities and new values and to coalesce expert and non-expert knowledge under the NWC movement.

The key role of culture has often been neglected in literature dealing with transitions. Culture has usually been understood as part of the “exogenous landscape” that is external to regimes’ transformations and agents’ behaviours. In contrast, in this paper, we have understood culture and particular cultural change as part of the conscious production of agents resulting from the awareness of the limits and potentialities of their own culture in the processes of social change. In our case study, individuals and groups created and recreated new cultural artefacts and identities and then used them instrumentally to influence and modify existing power arrangements and policies. Within the Spanish context, the content, meaning and uses of culture changed because of agents’ collaborative activities, in what can be seen as an endogenous process of social learning (Pahl-Wostl et al. 2007) or more broadly, as a process of sustainability learning in which agents become aware of the social-ecological system dynamics and learn to anticipate and adapt their behaviours accordingly (Tàbara and Pahl-Wostl 2007). This dynamic understanding of “culture” entails that culture existed insofar as it became action carried out by specific agents in their particular contexts. In the Spanish case, the consciousness among agents of the constraining and enabling capacities of culture to mobilise collective resources was key to their success.

Noteworthy, the NWC movement was not only oriented to mobilise existing cultural resources within Spain but also worked to connect to gain support from external forces and developments, such as the European Water Framework Directive implementation, which somewhat backed up many of their arguments and actions. However, whereas it is likely that without the parallel legislative developments occurring at the EU level the final success of the movement would have been limited in the long term, it cannot be said that the NWC movement was very much influenced by such external context. Both its origins and the strategies developed were mostly an endogenous development.

Finally, and as word of caution, while we believe that culture played a most decisive role in triggering resource a resource transition in the Spanish context, one should also be aware that the recreation of cultural artefacts alone may not be enough to ensure sustainability in the long term. Some critics of the NWC now argue that such movement was only able to readdress some of the worst outcomes of the business-as-usual water policies and only with regard to some particular aspects of it. But the NWC has not able to

develop the necessary encompassing changes in power structures, particularly at the meso level that would make to ensure that the new cultural and policy paradigms developed are to be implemented across the Spanish dominant regimes and institutions in the years to come⁶. Other policy and institutional changes, besides cultural changes and mobilisations, are also required.

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⁶ For a critical account, and the real difficulties to do so, see the documentary *A Contracorriente* by Pons et al (2006).

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