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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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Methods and Tools for
Integrated Sustainability Assessment



Series Editors

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MATISSE (Methods and Tools for Integrated Sustainability Assessment) aims to achieve a step-wise advance in the science and application of Integrated Sustainability Assessment (ISA) of EU policies. In order to reach this objective the core activity of the MATISSE project is to improve the tools available for conducting Integrated Sustainability Assessments.

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The MATISSE Working Papers can be downloaded at <http://www.matisse-project.net/>.

Preface

About the MATISSE project

The MATISSE (Methods and Tools for Integrated Sustainability Assessment) project is funded by the European Commission, DG Research, within the 6th Framework Programme. The project is interested in the role that Integrated Sustainability Assessment (ISA) could play in the process of developing and implementing policies capable of addressing persistent problems of unsustainable development and supporting transitions to a more sustainable future in Europe. The core activity of MATISSE is to develop, test and demonstrate new and improved methods and tools for conducting ISA.

This work is carried out through developing and applying a conceptual framework for ISA, looking at the linkages to other sustainability assessment processes, linking existing tools to make them more useable for ISA, developing new tools to address transitions to sustainable development and applying the new and improved tools within an ISA process through a series of case studies.

The extent to which the case studies are carrying out a complete ISA for their area of focus varies between attempts to cover all phases of an ISA process to partial implementation of the process. Equally, different case studies are oriented to developing and testing tools and approaches to some, but not all, of the methodological challenges of ISA. The case studies are complementary, however, and the set of cases offers the opportunity to address a wide range of methodological challenges and to explore linkages between cases. An evaluation of practical experiences with ISA implementation in the case studies will provide guidance on the further improvement of methods and tools. Results will also contribute to more informed policy advice.

What is ISA?

Within the MATISSE project, Integrated Sustainability Assessment (ISA) has been defined as a cyclical, participatory process of scoping, envisioning, experimenting, and learning through which a shared interpretation of sustainability for a specific context is developed and applied in an integrated manner, in order to explore solutions to persistent problems of unsustainable development. ISA is conceptualised as a complement to other forms of sustainability assessment, such as Sustainability Impact Assessment, Integrated Assessment and Regulatory Impact Assessment. Whereas these other forms of assessment fulfil the pragmatic need for *ex ante* screening of incremental sectoral policies that are developed within the prevailing policy regime, ISA is conceptualised as a support to longer-term and more strategic policy processes, where the objective is to explore persistent problems of unsustainable development that have a systemic pathology and possible solutions to these. ISA is therefore oriented toward supporting the development of cross-sectoral policies that specifically address sustainable development and at exploring enabling policy regimes and institutional arrangements.

MATISSE Working Papers

Matisse Working Papers are interim reports of project activities that are published in order to illustrate ongoing work and some provisional conclusions, as well as providing the opportunity for discussion of the approaches taken by the project and interim results. This discussion should be both within the project and between project members and the broader scientific and policy communities. Readers are encouraged to contact the authors to discuss the content of MATISSE Working Papers.

Jill Jäger and Paul Weaver
Editors of the MATISSE Working Paper Series

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.

Keywords: Culture, Sustainability, Transition modelling, Triggers, The New Water Culture (NWC) movement, Spain and the Ebro river basin.

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CULTURE AS TRIGGER FOR SUSTAINABILITY TRANSITION IN THE WATER DOMAIN. THE CASE OF THE SPANISH WATER POLICY AND THE EBRO RIVER BASIN

1. 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 2005) we seek to explore alternative paradigms and pathways applicable to understand and support the transition toward sustainability in the water policy domain.

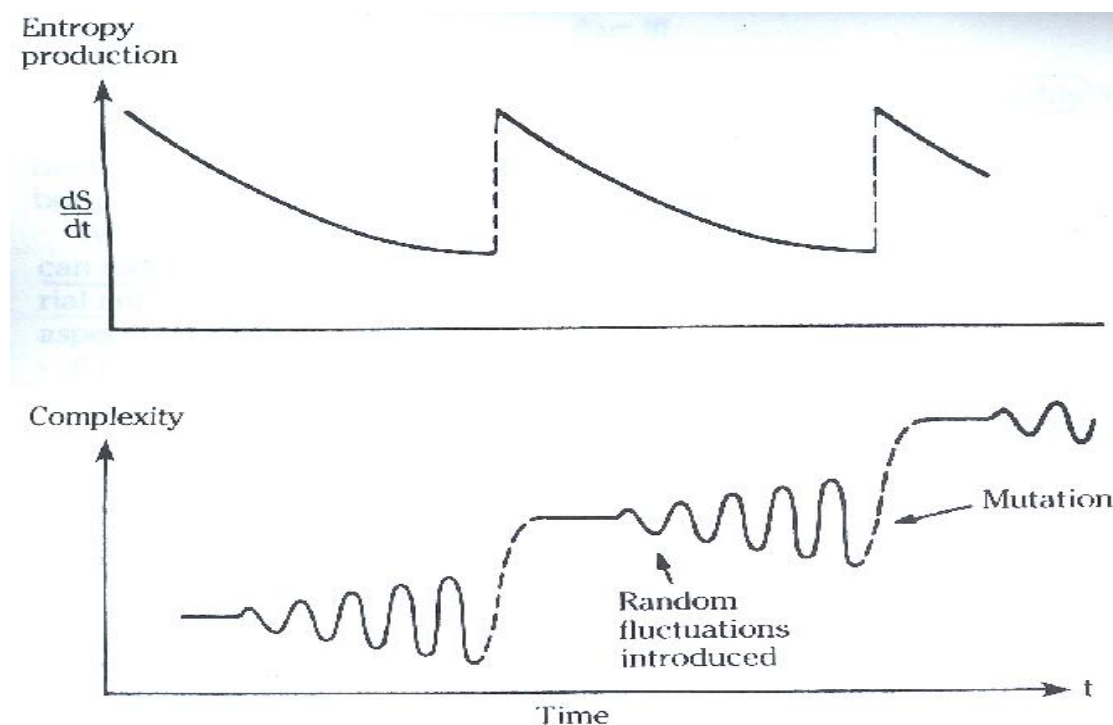
The EU project MATISSE (*Methods and Tools for Integrated Sustainability Assessment* www.matisse-project.net) aims at examining and developing tools and methods to explore alternative policy paradigms capable of supporting transition processes towards sustainability. The core methodology of the MATISSE project is based on a cyclical participatory four-stage process of scoping, 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 2005). From an ISA perspective we consider that the dynamics of sustainability occur over different scales in time, space, and function, 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 is being carried out with a focus on the Ebro river basin. Our approach focuses on the relationships between agents and their behaviours regarding the use of stocks and flows of water and natural resources. Therefore, our general perspective and the development of new methods and tools for ISA is founded on *agent-based assessment*. Interviews and focus groups are being 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 are then being represented through computer modelling tools, which are used as heuristic devices for reflexive learning (urther details in Tàbara et al., 2006a, 2006b; Tàbara, Walman et al. 2006). 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 of key players, to see to which extent these have brought 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.

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 (2001, 2005) and Frank Geels (2002, 2005). 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. In particular, we gather empirical evidence 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 domain. Our conclusion provides a general framework to interpret the different elements that interact in such an evolving domain together with the potentials and the limitations of such structural change for the case of Spain and the Ebro river basin.

2. Transition theory

Transition theory is becoming one of the most relevant approaches to understand and support the management of societal adaptation towards sustainability. 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 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 (Figure 1 & 2).



Figures 1 & 2. Societal Change as a series of orders through fluctuation (from E. Jantsch 1975, cf. Milbrath 1989).

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) the concept of transition has been reinterpreted. In general terms a transition can simply 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: i) predevelopment, ii) take-off, iii) acceleration, and iv) stabilisation (Figure 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 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).

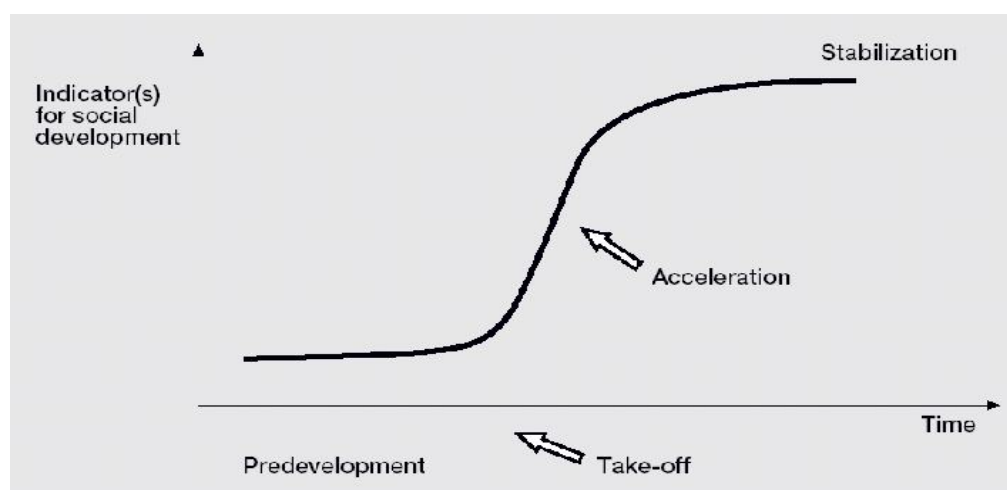


Figure 3. Stages in a human system's transition (Rotmans, 2001)

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). 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 (Figure 4).

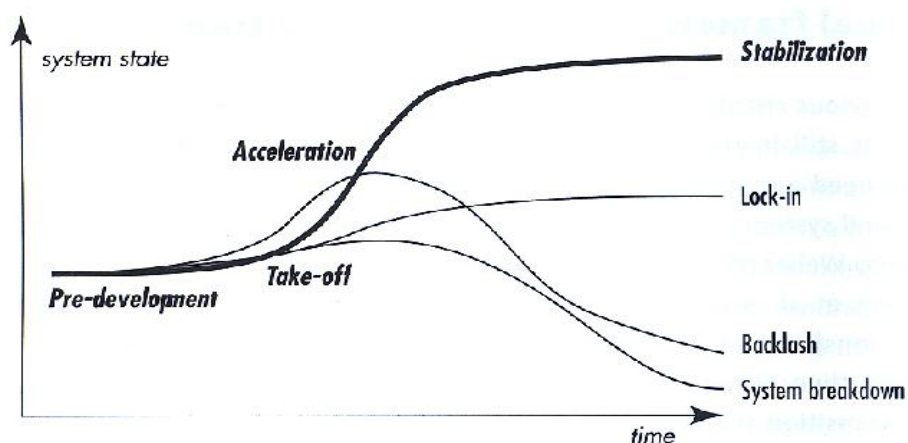


Figure 4. Possible pathways of transitions. (Rotmans, 2005)

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 eventually succeed in replacing the dominant regime.

3. Ecological versus cultural triggers in sustainability transition

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 (figure 5). 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 ecological constraints as irrelevant:



Figure 5: Two opposing interpretation of transitions triggers.

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 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 or those who are relatively smaller or who are further away from meeting the threshold may be less motivated to change their practices. 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 our case, which concentrates on the analysis of the water domain, growth can be easily conceptualised by the amount of water resources used by the different agents of the system.

Figure 6 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 threshold 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 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.

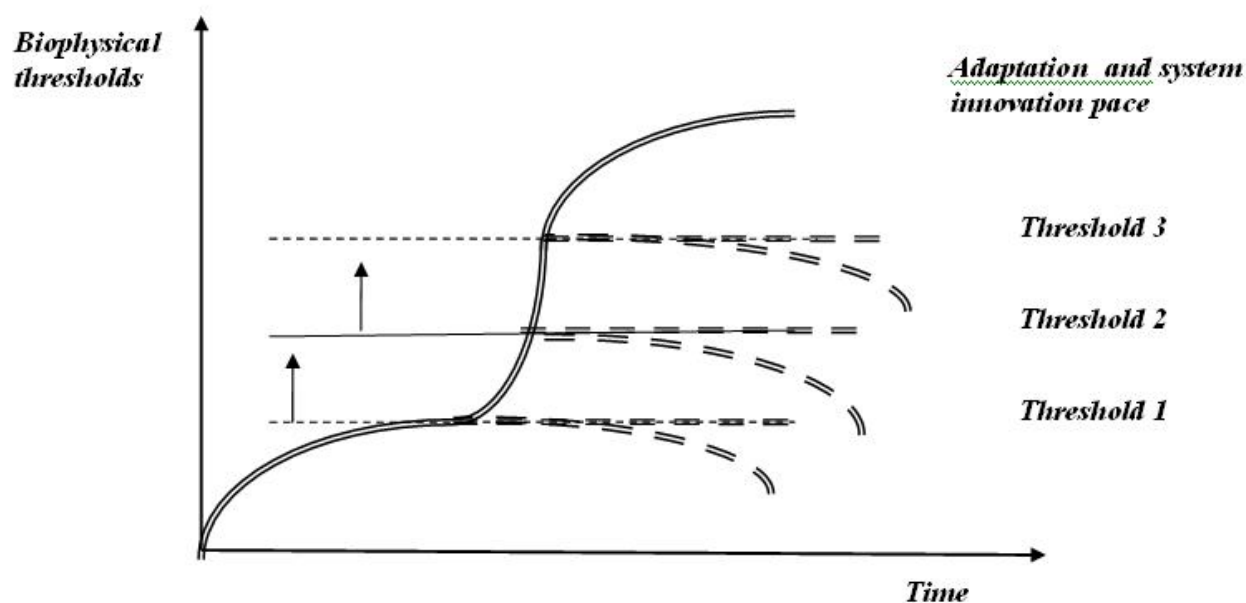


Figure 6. System adaptation pace and natural thresholds for water use. A realist perspective. Thresholds are always related to agents and their activities.

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 eventually be able to overcome all biophysical constraints thus allowing humans systems to expand infinitely.

The role of culture as a trigger for transition therefore needs to be analysed. 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. In fact, and from a sustainability perspective, culture *is* nature as much as nature is culture, as both cannot be separated and largely depend on the constant reproduction of each other. Furthermore, different cultures may respond to different cultural motives that drive their actions in distinctive ways. For instance, and following Douglas & 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 freedom¹. 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.

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

4.1. A brief account of the evolution of Spanish water policy

The debate on the water situation in Spain has historically been around the temporal and spatial unevenness in the distribution of water. This unevenness, having been the major influence that shaped the way water was perceived by the society and policy makers, has been the main reason for the battle between humans and nature with development through dominating rivers. By the end of the 19th Century, regeneration of the country, which already had lost the greater part of its colonies and whose domestic economy largely depended on agriculture, was seen to depend heavily (if not entirely) upon irrigation. 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 appearing as the ‘regeneracionismo’ movement that marked the first three decades of the 20th century (Swyngedoun 1999).

Costa described the water situation of Spain as naturally distributed in an unbalanced way and proposed the re-distribution 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). The regenerationism of the country begun a period during

¹ More generally, and following Kluckhohn and Strodtbeck (1961), all cultures must find solutions to the following broad set of questions: 1. What is the character of innate human nature? (human nature orientation); 2. What is the relation of humans to nature and supernature? (human–nature orientation); 3. What is the temporal focus on human life? (time orientation); 4. What is the modality of human activity? (activity orientation); 5. What is the modality of a human’s relationship to other humans? (relational orientation).

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, who proposed fighting against the unequal access to water between the river basins, a “natural injustice”, using State power. Managing water was seen to be an issue of correction of its naturally and spatially erratic distribution. At the end of this era of conflicts and polarization, which included the Spanish civil war (1936-1939), and by the beginning of a period of four decades under the dictatorship of Franco, the *regeneracionismo* movement started to evolve into a one-dimensional technological process with the progressive social development aspect of it being eroded rapidly. The conflicts that were considered to be the results of the empowerment of the small landowners triggered by social development projects were taken as an excuse to secure the interests of the traditional large land owners and “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). This was the period during which the seeds of the hydraulic paradigm grew fast with the construction of some 400 dams leaving the country with the highest number of dams per capita in the world.

During this period the country, which had earlier become an example to other countries, was facing not only negative environmental impacts, but also social impacts. Its river basin confederations that had been founded on local/regional principles and were originally locally-managed, democratic, collective and participative, were gradually replaced by a centralist national vision. They were abolished entirely in 1942 and replaced by a technocratic-bureaucratic organisation responsible only for carrying out national hydraulic works (Swyngedouw, 2005).

The river basin confederations became technical organisations allocated by central Dirección General de Obras Hidráulicas (DGOH) that now they are financed and directed by the central Spanish Administration. During this time DGOF became an extremely powerful state organ that had close associations with engineering offices, construction, cement, and electricity companies etc. (Swyngedouw, 2005), who had a direct interest in increasing the number of hydraulic constructions. Networks of canals and dams were parallel with the networks of interests. Dams were the symbol of the power of humans over nature, the proof of technology and public funding, agricultural and industrial progress and economic development of those times (Torrecilla and Martínez-Gil, 2005; Getches 2003). In other words human organisation was believed to have succeeded in the face of the discrimination of nature that had been the barrier to national economic success.

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 (Saurí and del Moral 2001). The 1985 Act did not go further than repeating the old hydraulic paradigm with the well-known expressions such as “hydrologic unbalanced condition” of the country, “deficitary” and “excedentary” river basins, “general” or “national interest” to justify once more the construction of more dams and river diversions (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).

The National Water Plan (NWP) of 1993, prepared in line with this Act, proposed the construction of new river diversions and dams. For decades the civil rights of a growing number of inhabitants in the flooded valleys, increasing water pollution that affected public health, decreasing wetlands and biodiversity etc. had become a common concern of both the public and scientists. With this historical

background, the year 1995 can be taken as the beginning of the take-off phase of the transition of the water system in Spain; a year in which 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 stimulated concerned citizens affected directly or indirectly by the construction of dams, environmental groups and scientists to take action and start discussing the cumulative social, cultural and ecological impact of the hydraulic paradigm of the 20th century. The outcome of this discussion of alternative ideas for better management of water resources was published under the title ‘the New Culture of Water’, which was the first time that this phrase was used².

COAGRET gave courage and hope to those threatened by hydraulic constructions proposed by the National Water Plan. Among the movements that began, a platform was established in 1996 for defending the Mallos River basin in Riglos against the activities of Hydrological Confederation of Ebro. This platform highlighted the great potential of the area for eco-tourism and was the basis for the protest in 1997 from Beceite, a small village of Aragon, to protect the village and the other villages around against the machines sent by the Hydraulic Confederation of Ebro. The concept of the New Water Culture was gaining increasing attention and beginning to have significant effects on different sectors of society.

4.2. The emergence of the New Water Movement

In 1998 the reflection and debates of the 1st Iberian Congress of Management and Planning of Waters held in Zaragoza brought out the need for a non-profit organisation that would deal with issues related to water policy in a scientific manner but which at the same time would allow to create a public debate that would go beyond the academia circles. This organisation would be called the New Water Culture Foundation. The NWCF organised couple of congresses that pointed to the need for a 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 violating the spatial solidarity of regions, had no proposal on demand management, lacked an environmental dimension and did not make economic sense due to its speculative contradictory economic figures and numbers.

In 2000 the Platform for the Defense of the River Ebro was formed against the NWP and its envisaged impact on society, economy and ecology in both Aragon and Catalonia. 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 an ecological perspective if it were implemented. In 2002 the Platform organized the Blue March from Spain to Brussels to make international demonstrations. At the end of two years of international campaigns, support from international media and demonstrations all over the country, the EU suspended its financial support for the NWP in 2004. The new Spanish government that came into office shortly afterward declared their intent to abolish the plan, as they had promised before the election.

The snowball effect of the NWC movement can be better understood, if the pre-development phase that reflects the last century of Spain is taken into account. In this phase the meaning of the river was reduced to being just water whose distribution was perceived to be wrong and naturally discriminative. This created more discrimination and conflicts among society while attempts were made to correct this natural discrimination using centrally-directed technocratic prescriptions. One can see that with the start of post-colonial period, Spain replaced its local perception of water with a national dream of domination of its

² According to one of our consulted stakeholders who participated actively in the making of the New Water Culture 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.

rivers, which reduced the more holistic understanding of water management that existed formerly to a one-dimensional understanding based on quantitatively balancing water supply and demand. For decades increasing numbers of people with growing concerns could not find a strong organised voice due to the lack of democracy and transparency in the actions of the State, while socio-environmental impacts were approaching flexible thresholds, degrading the quality of environment as well as its quantity. It is a clear example for understanding how cultural framing of an issue can restrict or close down the nature and quality of the development solutions that are available.

As Spain became a member of the EU and its networks of information started to become more transparent and more open to participation from the public, growing local concerns that triggered protests and conflicts became connected to regional and global issues with the expertise of scientists through NGOs, such as the COAGRET and NWC foundation, which have been the key actors in the transition towards a new water culture. It was again socio-economic injustice rather than the scarcity of water that triggered a large coalition of groups to organise their opposition in parallel to the transition in the water policy. The EU Water Framework Directive (Directive 2000/60/CE) and its transposition to the Spanish legislation in 2003 is one of the most important developments, which looks at river basins as ecological entities as well as flows of water and hydroelectricity. This view coincides with the basic concepts of the New Water Culture. At an international level the NWC movement also influenced the European Declaration for a New Water Culture, which calls for a new and more holistic understanding of waters and rivers all around Europe.

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 NWP 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 the protection and restoration of riverine ecosystems and in terms of pricing it emphasizes water tariffs according to real costs obtaining and treatment water. While the NHP had its focus on water supply, AGUA proposed measures of demand management through optimization of infrastructures, water treatment, reuse of water, and desalination. In all this reframing process, the NWC Foundation played a also 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.

The analysis of the stakeholders' interviews and workshops held in the Ebro River Basin, together with the examination of the historical and current sources of information about the Spanish case has made clear that sustainability is a process entailing a large degree of empowerment and coordination between different agents at different scales. An emerging diagnosis of unsustainability is that it results from failure of agents to collaborate to a collective goal and, by extension, that sustainability in the domain of water management requires conscious collaboration between agents working at different levels with the overall goal to reduce their impacts on aquatic systems and on other agents. In a fragmented world in which actors pursue their interests and benefits in an uncoordinated, exploitative and short-sighted manner, sustainability is simply not possible. In this alternative vision of collaboration, stakeholders underline how multi-scale, multi-domain and multi-time problems need to be incorporated into the assessment and policy processes aimed at the transition towards water sustainability. All in all, our research is still in an early stage of assessing the extent to which the NWC movement has indeed trickled down to affect in a transitional way the whole social structure and individual behaviours with regard to water use and policy in Spain. Evidence, however, suggests that the 'take-off' stage has already been surpassed, but also that ultimate success may depend on building stronger coalitions with parallel developments and innovative niches of action in other domains that are also testing pathways towards sustainability (e.g., a 'New Energy Culture' movement, which also claims to be gaining public recognition).

5. Conclusion

The ecological realism approach to transition triggers alone seems insufficient to explain satisfactorily the reasons why transitions start, at least for the case of water. This, however, does not mean that natural scarcities do 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 understanding and awareness of the world around us (and beyond), which creates in some agents the thrust and the urge for collective transformation and cooperation. That is, a culturally learned and developed concern constitutes the necessary trigger to ignite a transition. This is particularly true for the case of the Spanish water context. Concerned experts together with environmental activists were able to connect a very diverse array of citizen groups and communities through a new cultural identity, called the New Water Culture (NWC). To some degree, eventually, the new movement has been able to influence some of the recent developments of water policy in the country. The role of culture was indeed acknowledged by the relatively small number of actors of the movement as an 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 occur: from the micro level –individuals and groups–, to the meso –institutions–, to the macro level –in which culture operates.

Our exploration of the Spanish case revealed that one of the origins of the New Water Culture movement can be found in the network of action created by the Confederation of Organisations for Environmental Protection (CODA), Greenpeace, the Association of People Affected by Big Reservoirs (COAGRET) and other interested agents, such as farmers and others coming from academic circles. The number of activities and influential assessments carried out far by this movement has been enormous and growing, with a peak of visibility with the withdraw of the articles of the old National Water Plan (NWP) of 2001 (see Biswas, 2003; Howitt, 2003, Arrojo 2003; Estevan & 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 accountancy, transparency and democratisation of usually expert assessment and decisions. However, one can say that by the time the New Water Culture Foundation was established and the first Iberian Congress on Water Management and Planning was organised in 1998 in Zaragoza, the transition in water management in Spain was already entering into a take-off phase. Nevertheless, this movement has also not only been able to acknowledge the key role played by culture but also to connect to and gain from external forces, such as the implementation of the Water Framework Directive, to support their arguments and actions, without which the success of the movement would have been limited

Reality, of course, is always far more complex. The role of the modelling of transition processes is to provide a coherent and relevant simplification of multiple processes that usually respond not only to different causes, but also produce different or opposed effects at different scales. Furthermore, the different outcomes of action are not necessarily interlinked or in modulation with those occurring at the meso or macro levels. Looking more closely at a particular location like the Ebro river basin and in particular the Delta area, one can see that it was the ‘threat’ posed in 2001 by the NWP that helped to consolidate the 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 (Tabara et al. 2004) 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. The transfers of water, as proposed by the NWP, did not materialise, and therefore, one can say that the organisational and innovation changes that are now occurring at the local level in the water domain eventually responded to factors other than ecological 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.

In this sense we understand that ‘culture’ can only become a trigger for a transition to sustainability to the extent that it becomes consciously embedded by agents as part of their larger awareness of the total system in which they operate. Then ‘culture’ becomes action and vice versa. This consciousness among agents of the constraining and enabling capacities of culture to mobilise and to provide meaning to a transition can be seen as part of a larger process of *sustainability learning* (Tàbara, 2002, 2005, 2006). However, a true sustainability learning process can be realised only to the extent that agents are able to affect the content and the processes of powerful institutions and individual practices working also at the meso- and micro- levels. And this, in turn, may also increase the complexity of the whole system.

The goal of this paper has been to provide a theoretical framework aimed at helping the interpretation of the complexity of agents and structural factors influencing societal adaptation and transition toward more sustainable pathways of development, using the Spanish and Ebro river basin contexts as illustrations. Figure 7 provides such a framework. It suggests that for a successful transition, agents need to operate at the three levels of action. While in the Ebro river basin there have already been attempts to move towards sustainability in other domains, such as organic agriculture, many of those involved have failed to connect their experiences to the higher level of institutional and cultural change. This has prevented such agents to enter into the take-off stage and thus they remain unable to challenge the existing regime. In our research we have identified that a key agent operating in the meso level which both prevents the change of the water regime but also can play a crucial role in its transformation in Spain are the current powerful ‘Confederaciones Hidrográficas’ (River basin authorities). No substantial change in this domain can be done without a deep transformation in such institutions, which to a large extent still retain many inertias and managerial styles of the past. However, lessons from the relative success of agents in the water domain in Spain may be taken up to increase the chances of successful transition in other areas, as well as more widely in the general search for development everywhere and in all domains to become more sustainable. Just to give an example, the European New Water Culture Declaration was signed in 2005 and it also now increasing receiving attention in many expert and policy circles not only in Europe but also in Latin America (FNCA, 2005).

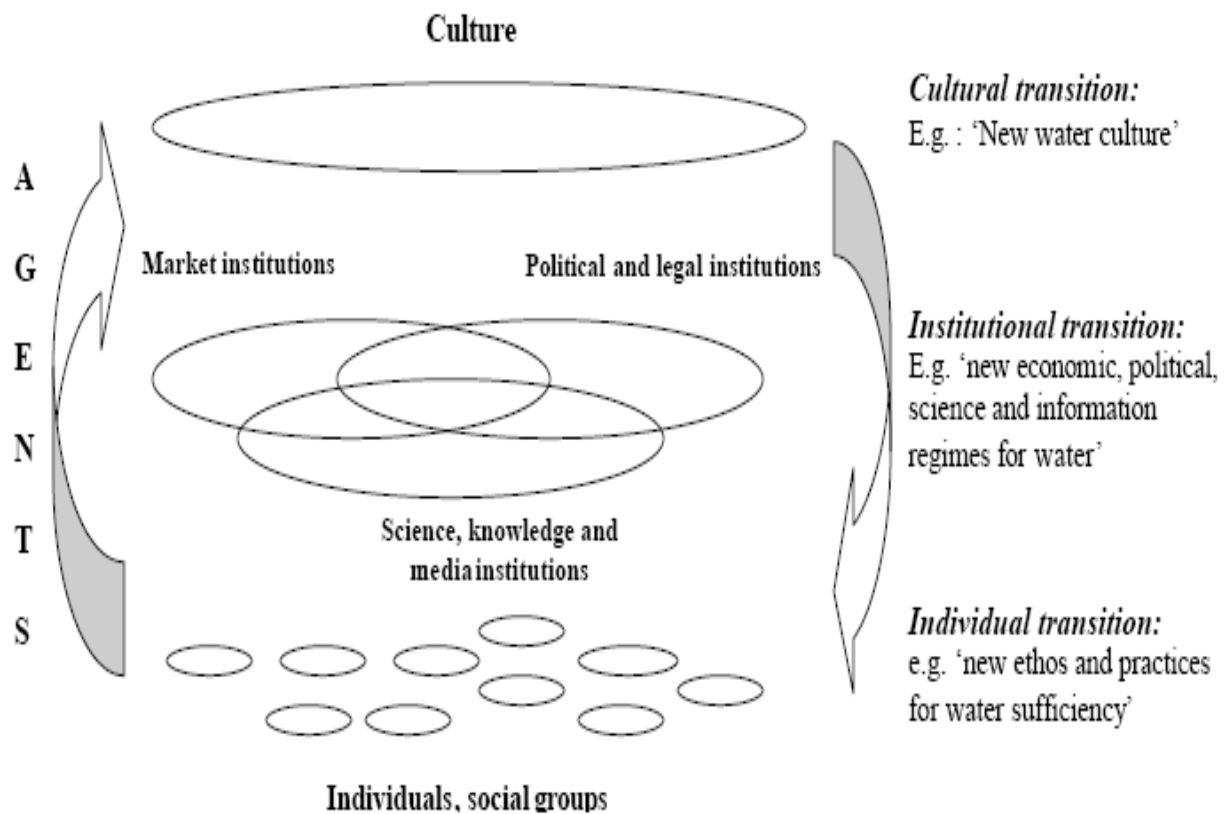


Figure 7. Transition agents operate at different levels of action (Tàbara et. al., 2006a)

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