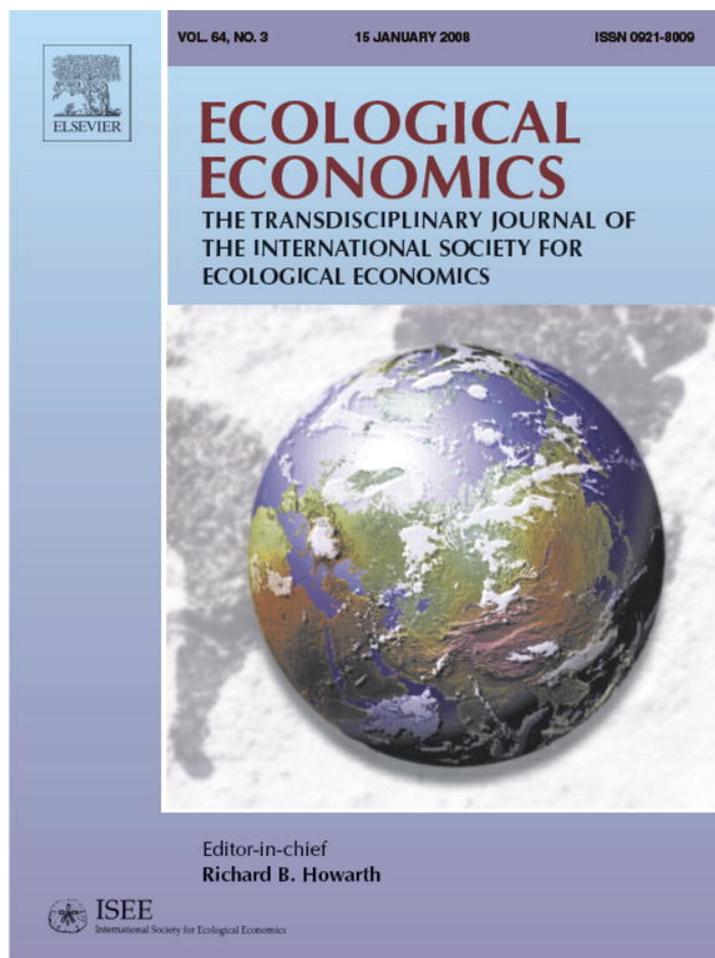


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METHODS

The importance of social learning and culture for sustainable water management

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ABSTRACT

Currently water resources management is undergoing a major paradigm shift. Water resources management has a strong engineering tradition based on controlling environmental problems with technical solutions. The management of risks relied on the ability to predict extremes and limit their impact with technical means such as dikes, dams and reservoirs. In this paradigm, belief systems, human attitudes and collective behaviours are perceived as external boundary conditions and not as integral part of management. However, the situation has started to change dramatically. Over the past years, integrated water resources management has become the reigning paradigm. The importance of governance and cultural adaptation has become a major issue of concern. At the same time, there is a paucity of adequate scientific concepts that would allow addressing these issues. This paper introduces a concept for social learning developed in the European project HarmoniCOP and discusses its implications for the cultural and institutional context of water resources management. It aims to contribute to the new paradigm of integrated resource management by discussing the importance of processes of culture and social learning for environmental resources management, in general, and water resources management, in particular.

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1. Introduction

Contemporary problems in water resources management and resources management in general, are characterized by increasing complexity. Uncertainties due to climate and global change and changing socio-economic conditions provide new challenges that cannot be tackled within the established management paradigm which relies on a command and control approach. In this paradigm, regulatory authorities implement technical (often end-of-pipe) solutions to narrowly

defined environmental problems based on expert advice. Presently there is a growing awareness, in particular in developed countries, of the need for integrated approaches that simultaneously take a whole range of trade-offs into account and that involve stakeholders in the whole management process.

The need for a paradigm shift in water management has been advocated by a couple of voices over the last decade (Cortner and Moote, 1994; Ward, 1995; Gleick, 2000; Pahl-Wostl, 2002, 2007a). Although they focus on different topics of

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water management, they clearly agree on some elements of the new paradigm:

- participatory management and collaborative decision making,
- increased integration of issues and sectors,
- management of problem sources not effects,
- decentralized and more flexible management approaches,
- more attention to human behaviour by “soft” measures,
- include environment explicitly in management goals,
- open and shared information sources (including linking science and decision making),
- iterative learning cycles.

Most recent analyses emphasize that effective governance based on principles of equity, efficiency and diverse knowledge integration is as important for dealing with water resource management problems as technological solutions (GWP-TEC, 2000, 2004). Culture is advocated as crucial to understand barriers to the adoption of technologies and new management strategies and a successful exchange of experience between developed and developing countries. This reflects a shift in emphasis from focusing on “hard” technology based centralized approaches to a “soft” path in water management embracing participatory approaches and delivering diverse water services matched to the user’s needs (Gleick, 2003; Pahl-Wostl, 2007a; SIWI, 2005).

As defined by the dialogue on effective water governance (Roger and Hall, 2002), water governance refers to the range of political, social, economic and administrative systems that are in place to regulate the development and management of water resources and the provisions of water services at different levels of society. One important aspect of governance is the role of “institutions”: the formal and informal rules that provide the framework for the behaviour of human beings. Formal institutions include laws and regulations, formal organizational structures and formal procedures. Informal institutions refer to socially shared rules and norms that have developed in social practice. A strong interdependence and synergies between formal and informal institutions is an emergent feature of more collaborative governance styles and is particularly important for understanding institutional change and transitions towards more adaptive water management regimes (Pahl-Wostl, 2002, 2007a; Pahl-Wostl et al., 2005). Participatory processes may be formalized, but more importantly they play a key role in informal institutional settings and are often nuclei for social learning and institutional change.

Another key concept in the emerging new management paradigm is social learning. Social learning in river basin management refers to the capacity of different authorities, experts, interest groups and the public to manage their river basins effectively. Effective river basin management requires collective action and the resolution of conflicts. This in turn requires that people learn about their interdependence and differences and learn to deal with them constructively. Social learning refers to this learning process and to the resulting increased management capacity. Social learning implies a change in governance style towards more collaboration and a different role of information as a means to support communication instead of just providing expert advice. This reflects

the insight that management cannot be based on optimizing in a predictable environment but requires many instances of learning in a fast changing world.

The new water management paradigm currently under consideration also reflects a new understanding of the relationship between human activities and the environment. One could argue that these changes in perception can be interpreted as signs for a more fundamental cultural change regarding the awareness of complexity and leadership styles (Pahl-Wostl, 2007b).

The argument of the paper is organized around the following two questions addressing the relationship between culture and social learning:

- How do cultural differences influence social learning?
- How can social learning lead to a transformation of culture?

To address these two questions, the paper is structured as follows. A concept for social learning and a conceptualization for culture are introduced. These concepts lay the foundation for exploring the relationship between culture and social learning – the influence of culture on social learning and vice versa – using examples from river basin management.

2. Social learning

The notion of social learning has been used in quite different contexts. The work of Bandura (1971) on social learning refers to individual learning based on observation of others and their social interactions within a group e.g. through imitation of role models. It assumes an iterative feedback between the learners and their environment, the learner changing the environment, and these changes affecting the learner.

Because of its focus on the individual, Bandura’s work is of limited value for understanding resources management. In the EU project HarmoniCOP (<http://www.harmonicop.info>) we adopted a broader concept for social learning in the context of river basin management influenced by authors like Wenger (1998). Social learning in this concept refers to the growing capacity of social entities to perform common tasks related with a river basin. It refers to both the learning process and to its outcome. In the following we summarize the key elements of the social learning concept which is elaborated in more detail in Pahl-Wostl et al. (2007).

Of major interest in this respect is the concept of “communities of practice” developed by Wenger (1998) emphasizing learning as participation in groups of people who engage in a process of collective learning in a shared domain of human endeavour. Such interactions are influenced by and may change social structure. At the same time the individual gains experience situated in the context of the group. Such learning processes confirm and shape the identity of the individual in its social surroundings. They confirm and change social practice and the associated interpretation of the environment. Communities of practice require a clear objective and they continuously redefine themselves by processes of participation (e.g. membership, acting) and reification (e.g. forms, documents, instruments). Communities of practice develop an identity of their own that is distinct from the individuals participating in them.

The social learning process takes place in a natural/technical and a social (institutional, cultural) context. Also in the process natural/technical and social aspects are always present. In the process, *social involvement* (interaction) is as important as *content management* (e.g. the analysis of problems and development of solutions). In fact, the two cannot be separated: what is seen as a problem, what information is exchanged, which solutions are developed and chosen is in fact the result of social interaction. The concept used in this context enabling social learning is that of *relational practices*: shared task-centred practices among different actors that allow interacting in a reciprocal way and/or reflecting on the interactions among the actors.

The *outcomes* of the management process do not only include *technical qualities*, such as an improved state of the environment, but also *relational qualities*, such as an improved capability of the actors in a basin to solve conflicts and come to cooperative agreements. The outcomes feed back into the context and may result in a better mutual tuning of the governance structure and the state of the natural environment.

Social learning is an iterative and ongoing process that comprises several loops and enhances the flexibility of the socio-ecological system to respond to change. The governance context is shaped both by cultural factors and macro-economic and regulatory frameworks and may be subject to change during multi-scale social learning processes.

“Culture” is part of the social context of social learning. As such, the cultural characteristics in a river basin influence social learning. Through its feedback loop, social learning in turn influences these characteristics. But what do we mean by “culture”?

3. A conceptualization of culture

“Culture” is a term with many different meanings, connotations and scientific and social uses. “Culture” is derived from the Latin verb *colere*, which means to cultivate land or, in a metaphor, cultivation of the mind (Goudsblom, 1980). Culture often perceived to be opposed to nature, to the wilderness and to barbarism, has thereby derived positive connotations, has been used to refer to human achievements (especially intellectual and cultural ones) and became synonymous with civilization. Moreover, the concept is used as a defining characteristic of national or ethnic identity and to emphasize or create differences with other groups and homogeneity in one's own group (cf. van Binsbergen, 1999).

A classical overview of theories of culture was provided by Keesing (1974). He distinguishes between culture as an ideational system and culture as an integrated adaptive socio-cultural system (most classical anthropological theories and schools). In the first case, culture is ultimately in the head of a collective mind and it only refers to perceptions, beliefs, norms and values. Culture in this sense can be used to explain social practices. Culture as an integrated system integrates the social practices in the concept. It emphasizes the interrelation between ideas and practices.

Culture as ideational system often explains culture in terms of early socialization in childhood and at school (e.g. Hofstede, 2003) or, in some social discourses, in terms of

ethnic or religious background. Culture in this view is at the same time an individual and a social phenomenon. It resides in the minds of the members of a specific group, who are supposed to share similar beliefs etc. Culture is often supposed to be very stable, both at the individual and social level, internally consistent and exclusive: every person is supposed to have only one fundamental (usually national, ethnic or religious) culture. Culture as an integrated system, on the other hand, is a characteristic of a group, which may be much smaller than society as a whole. It is enacted (reflected) in the interactions within this group context, rather than engrained in the minds of its members. Each group develops its own culture as a result of the social interaction of its members and shared experiences. Since people can participate in different groups, they can also participate in different cultures.

The point is not which is the one and only true concept of culture, but how a certain concept helps people to understand and if necessary (e.g. as a result of a decision stemming from a social learning process), eventually to intervene in a social system. These “strategic” considerations are even more important since the culture concept and cultural theories became an important (and popular) source of inspiration for management and organizational theories since the beginning of the 1980s (Allaire and Firsirotu, 1984; Smircich, 1983).

3.1. Cultural theories

Several authors have developed encompassing characterizations of culture (Kluckhohn & Strodtbeck, 1961; Thompson et al., 1990; Trompenaars & Hampden-Turner, 1993; Hofstede, 2003). Both Hofstede's and Thompson's concepts have been used in environmental management and integrated assessment to capture the influence of cultural perspectives on, for example, management practices or the shaping of expectations of future developments or even the development of integrated simulation models (Patel and Stel, 2004; Van Asselt and Rotmans, 2002).

The different dimensions of Hofstede's framework refer to differences in risk aversion, degree of social orientation, hierarchies and governance by formal rules that are all highly relevant for understanding governance styles and management practices. The four major dimensions are:

Power Distance Index (PDI) focuses on the degree of equality, or inequality, between people in a country's society. A High PDI indicates that inequalities of power and wealth have been allowed to grow within the society. A Low PDI ranking indicates the society de-emphasizing the differences between citizen's power and wealth.

In societies with a large PDI one expects the development of transparency and trust to be quite difficult. High power societies typically work with nepotism and bilateral deals. Social learning and institutional change may involve shifts in power relationships. The resistance to change can be expected to be higher if powerful groups are in danger of losing their influence and if a change will result in an overall change in the structure of the society — e.g. from a more egalitarian society towards more pronounced power relationships and vice versa. One would expect more pronounced use of power frames where disputants in a conflict typically emphasize power

differences such as different levels of expertise or the possibility of enforcement of decisions by individual groups.

Individualism (IDV) focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. A High Individualism ranking indicates that individuality and individual rights are paramount within the society. A Low Individualism ranking typifies societies of a more collectivist nature with close ties between individuals.

A high degree of individualism influences the strength of group identities. In societies with low individualism the importance of group identities and group frames is more pronounced. An individual perceives herself largely as part of a group. In such cases there will be a major difference of social learning within and between groups. Whereas the former is facilitated the latter has to overcome group identities. Individuals serving as boundary spanners become of particular importance. In general one can expect that in collective societies social learning will more easily lead to an acceptance of shared goals. However, socially shared perceptions may also be quite difficult to overcome.

Masculinity (MAS) focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power. A High MAS indicates a high degree of assertiveness and competitiveness. A Low MAS indicates a lower degree of assertiveness and competition of both men and women, but especially of men.

In very “masculine” social contexts, assertiveness, status and competition are expected to play an important role. This makes social learning more difficult and has obvious implications for the design and facilitation of participatory processes.

Uncertainty Avoidance Index (UAI) focuses on the level of tolerance for uncertainty and ambiguity within the society. A High UAI characterizes a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty. A Low UAI characterizes a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.

Societies with a low UAI are more innovative and willing to take individual risks. Societies with a high UAI would emphasise formal institutions and governmental intervention. In such societies social learning and change are quite difficult since change and innovation are perceived as risks rather than opportunities. At the same time such societies may strongly support a precautionary principle as normative approach in environmental protection.

A couple of empirical investigations seem to confirm that Hofstede's dimensions correlate with the observed cross-cultural differences in behaviour. The preference for equitable versus equal allocation of rewards could be linked to Hofstede's power distance index in a review of numerous studies on that theme (Fischer and Smith, 2003). *Elfenbein and Ambady (2003)* analyzed numerous investigations of the relationship between Hofstede's dimensions and the ability to recognise emotions. They showed that empirical evidence for linking cultural profiles with absolute levels of emotion recognition accuracy was weak. However, they found an increase in the cultural distance between different groups to be associated with greater discrepancy in the degree of

emotion recognition accuracy in inter-group communication. This would support the use of the Hofstede dimensions to characterize the proximity of different cultural groups to better understand barriers to inter-group communication rather than assuming that specific cultural profiles are linked to specific behavioural patterns.

However, another major contribution to understand cultural traits, cultural theory (Thompson et al., 1990), argues in favour of linking specific cultural profiles to individual perceptions. Cultural theory distinguishes four perspectives from which people perceive the world and behave in it: the hierarchist, the egalitarian, the individualist, and the fatalist. These types are derived from two common social dimensions: one that measures social restrictions on individual autonomy (“grid”) and one that signifies solidarity versus egocentrism (“group”). One can note obvious similarities between the attributes used by Hofstede. However, in contrast to Hofstede, cultural theory defines logical coherent perspectives rather than independent dimensions of analysis. Each of these perspectives is also linked to a view on nature and attitude towards risk.

Individualists define roles as little as possible and oppose authority that would undermine their freedom. They think that Nature is very robust and will recover from any human impact. They want to regulate the environment as little as possible. They are risk seeking.

Egalitarians emphasize equality, solidarity and collective benefits. They deny status and hierarchies. They believe that ecosystems are exceedingly fragile. They are risk averse and favour a concerted grassroots effort.

Hierarchists live in a social environment with strong rules and clear group boundaries. Governmental control should be strong. They think that Nature is stable within certain discoverable limits. They want to regulate the environment from the top down with the help of experts' authority. Risks are perceived as being controllable.

Fatalists think that Nature is capricious and has no clear principles. They want to defect first. A large number of fatalists would render social learning quite difficult and the attitude towards nature would be characterized by indifference and opportunism. Fatalists may easily be used by those who want to exercise power and need support.

In contrast to Hofstede's approach, cultural theory has been used to characterize different groups in civil society rather than national cultures. Empirical evidence showed that individuals hardly ever confirm with one cultural type but behave differently according to the social context and the role they adopt (*Jaeger et al., 1998*). It can only explain some 5–10% of differences in risk perception (*Sjöberg, 2000*). Cultural theory has been applied to interpret different perspectives in water management, as shown in the work of *Hoekstra (1998)* and *Hoekstra et al. (1997)*.

To describe and compare different national or religious cultures at large scale it can be useful to use terminologies and concepts as developed in these general approaches making reference to dimensions that can be generalised. They can also be useful to understand barriers to social learning inherent in the political culture (*Patel and Stel, 2004*). However, to analyse the implications of cultural frameworks on social learning in a specific setting a context-sensitive approach should be employed.

3.2. Culture as a context dependent system

As an alternative approach to describing culture by a few generalised dimensions and ideal-types of cultural groups that can be applied in all contexts, one may hold the assumption that culture is entirely context and situation specific. In each social context culture can develop and different people active in different social contexts can participate in different cultures at the same time. Hence, culture is always “enacted”. We adopt here the approach that culture is a context dependent system with shared symbols and meanings, norms and expectations. This is why we advocate for a ‘bottom-up’, inductive and context-based approach to the study of culture that can shed light on the role of social learning, rather than focusing on a universal deductive grid that is to be applied to all different social contexts.

Culture applies always to groups — the behaviour of individuals does not constitute a culture. One can summarize all cultural elements under the umbrella of a cultural framework (Markus and Kitayama, 1997). A cultural framework comprises ideas and ideals (values, attitudes, beliefs, norms) and traditions and institutionalized social practices (e.g. behavioural rituals, language, rules, legal practices) that codify and objectify these ideas and ideals. Hence one can draw parallels to Wenger’s communities of practice. Cultural frameworks refer to more long-lasting enduring frames of large collectives of societal groups. What is important to point out is that cultural frames become manifest in norms, routines and social practices and are more than simply cognitive structures, ideas and ideals.

Leung et al. (2002) characterized culture frameworks by a set of beliefs about oneself, the social and physical environment, or the spiritual world. They are in the form of assertion about the relationship between two entities or concepts. Example:

Value/Attitude: — Environmental protection is good. // Making much money is good.

Normative Belief: Everyone should consume less to protect the environment.

Generalized Belief: Less consumption helps to protect the environment

A normative belief links a certain action with a value judgement. A generalized belief links an action with an effect without including a value judgement as well. Beliefs of this kind can be very strong and constitute an impediment to learning and change. Hence, any process of social learning must support the recognition and communication of individual and collective beliefs and must, in particular make normative assumptions and cultural constructs transparent.

To do so it is important to avoid stereotyping the multiplicity cultural forms a priori and reducing them to a pre-selected classification. In this conception, culture can only be described a posteriori – that is after the bottom-up analysis of the context at hand – and only in terms of the main components present in all types of cultures. In this respect, culture can be understood as a set of perceptual abilities, norms, values and frames which are typical modes of acting that characterize specific groups and that are enacted in social practices. Tàbara et al. (2004) defined the conceptual and methodological approach of *cultural framework analysis* as a

coherent system of reference elements relative to the way of recognising, rationalising, evaluating and prescribing given phenomena of social (or socio-environmental) reality in such a way that they become significant and memorable for the different social actors at stake. The origins of this methodological development can be found in the works of the dramaturgical sociologist Erving Goffman (1974) who saw frames as scheme devises who allow ‘actors’ to interpret their ‘roles’ in society so that reality becomes meaningful (see also Entman, 1993). An analysis of cultural frames has also been used to understand environmental issues, such as the communication of nuclear power in the USA (Gamsom and Modigliani, 1989), climate change (Trumbo, 1995; Mcright and Dunlap, 2000) and other global environmental risk issues (Schreurs et al., 2001). A general common trait of these studies is that they are based on the empirical content analysis of texts such as written media or policy statements. This departs from the assumption that verbal language and written sources of texts are often key sources to understand how culture is produced and reproduced in a context of action.

Cultural frameworks provide meaning to the information and are the basis of discourses for collective action. For Show et al. (1992, 1986), the alignment to particular interpretative frames is a condition to mobilisation (Zald and Useem, 1996). However, as indicated by its name, cultural frameworks do not refer so much to the content of messages, but to the ways of selecting, interpreting and presenting such information. A cultural framework contains at least the following elements:

- a) A *perceptivity*: the cultural frameworks select those elements of reality to which attention should be given. In this way they emphasise what is outstanding or important to observe, as well as what should be broadened, reduced, remembered or forgotten from public or individual conscience.
- b) A *rationality*: they provide a structure to evaluate what is logic and illogic, and simultaneously they provide a system of meaning to interpret reality. In this way, a cultural framework makes it possible to *explain* rationally the causes as well as the consequences of a certain phenomenon or process.
- c) A *morality*: they present value judgements about what is morally right or wrong from that selected part of reality.
- d) A *prescriptivity*: they prescribe, implicit or explicit, the desirable and undesirable aspects of possible courses of action, at the same time proposing and structuring prescriptions about how this should be handled in every situation.

Consequently, every cultural framework fulfils four functions: discover (or hide) a given reality, make sense of this reality, provide value judgements, and give recommendations about how to deal with it. The use and application of different cultural frameworks in policy making have therefore different effects on the use of natural resources as they select and structure particular relations between a social community with such natural resources and define them in a specific way according to the situation (e.g. as problematic, dangerous, beneficial or mild). One of the main advantages of the cultural

framework methodology is its flexibility: it does not depart from a given classification of cultures that can be observed in all social contexts—or institutions—but departs from the empirical analysis of a context to devise the different cultures which emerge from their discourses and practices.

A comparative study to analyse the discourses present in the main national press of two water management processes in Spain and Holland (Van Woerden, 2001) serves to illustrate this theoretical approach. In the first case, the process of negotiation of the National Water Plan was examined through the analysis of 275 articles during a period of 11 months before its approval in July 2001¹. In Holland, a total of 240 articles from February 2000 to January 2001 were also examined in relation to a water plan, 'Space for the river', oriented to create emergency river overflow areas. Using standard content analysis techniques (Flick, 2002; Silverman, 2001) a total of twelve distinct cultural frameworks were identified in both contexts and compared. To do so, articles were taken from the main broadsheet papers by selecting a random sample of news that contained communication on these water issues during the same period in the two countries. All articles were emptied in a decoding grid by an interpretative reading of its content and by classifying them according to what cultural framework was used or not used to communicate the message of its author (what was described, what was seen as logical, what was moralised, and what was prescribed). In order to obtain further characterisation of each of the cultural framework present in each of the two countries, key words were selected for each framework and detailed information was gathered on how these narratives used them to refer to others perceptions, logics, moralities and prescriptions. A pilot stage of testing and refining the classification of different cultural frameworks was carried out before entering all the articles in a final analysis grid. As an illustration, Table 1 shows the content of the different cultural frameworks identified in the case of Spain.

Results showed that in Spain, water discourses tended to be mostly around the pivotal frameworks of region–nation, growth, and water scarcity, while in Holland safety and scarcity – not of water but of space – tended to acquire the most prominent place. Some counter-intuitive findings were also found: for instance, that the 'sustainabilist' framework in Spain was used across different actors as a means to gain public support and legitimacy while in Holland, water sustainability discourses were framed as a threat to local demands. Moreover, environmentalists' use of the naturalist framework varied also in their content: while in Spain environmentalists tended to advocate for the 'protection of nature' in Holland they tended to advocate for its 'creation'. Fig. 1 looks more carefully at these results. Such comparison makes it clear that discourses with regard to 'sustainabilism', 'catastrophism', 'Europeanism', the importance of technical expertise, and of local communities together with those references to democracy were more present in Holland than

in Spain in framing issues about water management. By contrast, in Spain water management discussions were more centred around purely naturalist discourses, framed on economic and growth logics, and with greater predominance of frames about the importance of the Nation–State, Autonomous Communities ('territorial') and of legal provisions, showing the ongoing debate which characterise the still uncompleted nation-building regime of Spain affecting also the contents and shape of policies in other fields.

The approach of cultural frameworks helps to tackle the study of the complex issue of culture in different contexts in a flexible way. It can therefore be helpful to analyse the processes of social learning and public participation within the field of water management in river basins in a manner away from a preconceived and rigid interpretation of culture.

In the case of Spain, for instance, Tàbara et al. (2004) found out that the sustainability framework gained prominence along the whole period of negotiation of the National Water Plan, from being almost non-existent at the beginning of the process to become notably salient and used across different sectors of society few weeks before its approval. Three years later the most controversial articles of the National Water Plan were derogated by the new government claiming that a 'new water culture' needed to be implemented. Such cultural change which later resulted in specific changes in policy practices, such as the approval of the new programme AGUA, intended to be based on the 'New Water Culture' could also be understood as part of a social learning process within the water domain.

The way Anthony Giddens conceives the complementary functioning of structure and agency (e.g. Giddens, 1981) may clarify the distinction between culture and social learning. If we see social learning as the agency and culture as the structural aspect, then we can say that culture is reproduced and eventually transformed through processes of social learning. A structural framework exists and can be identified because people in their mutual interactions on a micro-level commonly behave in a usual way, and so reproduce the culture on a macro-level. But there is always the possibility that (as a consequence of confrontation between different perspectives, changing circumstances and/or critical reflection) they start doing things in an alternative way, accidentally or systematically. The more systematic those changes, the stronger this is reflected in changes in the cultural framework. In the end such changes may lead to a real cultural, a paradigm shift as we currently observe in water management.

4. Social learning across and within cultural boundaries

Are the two different approaches to conceptualize culture mutually exclusive? We consider them to be complementary and both useful to understand the importance of culture on water management and processes of social learning and institutional change at different spatial and temporal scales. The approaches using stereotypes emphasize the presence of an internal logic characterizing culture and in particular also characterizing artefacts generated and used in a cultural

¹ This controversial plan provoked the largest social mobilisations in recent times in Spain as far as environmental problems are concerned. It included "old paradigm dominant" measures such as building and transporting water through 900km of pipes out of and South to the Ebro river basin.

Table 1 – Different cultural frameworks identified in the analysis of the National Water Plan in Spain (Tàbara et al., 2004)

Cultural framework	Component			
	Perceptibility (what is important or not)	Rationality (what is logical or illogical)	Morality (what is ethically right or wrong)	Prescriptibility (what has to be done)
Nationalist	The main policy problem is the building of the Nation–State. Water is an essential component in the articulation of Spain as a single nation.	Water management must contribute to the building of Spain as a united nation (instead of creating division between the current 17 Autonomous Communities).	It is immoral to create obstacles to the building of the single nation but creating ecological impediments or differences between the different regions or citizens of Spain with regard to the use of water.	The National Water Plan must be used to articulate the Spanish nation.
Naturalist	Water is a component of a larger set of ecological river basin relationships, values and species which are part of the natural heritage.	What is logical is to preserve the natural heritage and it is illogical that the National Water Plan does the opposite.	It is ethically immoral that the NWP contribute to the destruction of natural rich areas and heritage.	Nature must be protected and humans must adapt to nature, not the opposite. The NWP must help to restore ecosystems and protect natural species.
Territorialist (regionalist and localist)	Water, and rivers in general, are part of the regional identity and of economic regional and local articulation.	What is logical is to preserve the local water assets both for economic but also a good state of the rivers for cultural reasons.	It is immoral to transfer such a local and regional key resource towards other regions which will, to a large extent, waste it or use it in their own profit.	‘We have to fight’ for the preservation of the regional and local water heritage.
Sustainability- ist	Water is a central component in the long-term well functioning of society with nature. A systemic view including social and natural relationships must be used to understand water issues.	Sustainability rationality must integrate different social, ecological and economic rationalities and domains. It is illogic to carry out water policies with negative irreversible effects on any of those domains.	Water policies must find a long-term global balance between meeting nature and social needs for water. It is immoral to affect negatively future generations’ rights to have access to quality freshwater resources.	Social, economic and ecological goals must be integrated to make sure that future generations, both at global and local scales, can also enjoy and have access to quality freshwater resources. The NWP must do so.
Catastrophist	Water is the source of both risks and securities, both for humans and for the environment.	What is most rational is to manage the risks and provide securities related to water, both for humans and the environment.	It would be immoral to expose humans or the environment to water related risks, such as restricted availability and quality of water or floods.	Action must be taken to protect humans and the environment to water related risks.
Growth-ist	Growth and the economy are the most important things to take when thinking about water. Water is mainly a production factor.	What is most rational is to maximise growth and water GNP productivity.	It is ethically wrong to stop growth and economic development as it has a direct negative impacts on large sectors of population.	Water management must contribute to the improvement of economic competitiveness. Water public works and investment must contribute to this goal.
Expert- economist	Water is an economic good similar to any other market commodity: it can be divided infinitely, put a price, and use the market rules for its optimal provision.	Water prices must internalise provision and environmental costs, without affecting economic competitiveness.	It is immoral that water uses do not pay a price for water which include provision or environmental costs. This distorts the market and exacerbates environmental problems.	Provision and environmental costs must be internalised. Markets should be created which include these costs.
Expert-legalist	Water is mainly an object of law, the property and uses of which are already regulated.	It would be illogical and pointless to propose actions which lay outside what it is already regulated by law with regard to water management.	It would be illegal to implement a NWP outside the existing laws, including those steaming from the European Directives.	Law must be complied fully. Current water laws can only be modified by following the already established legal procedures do to so.

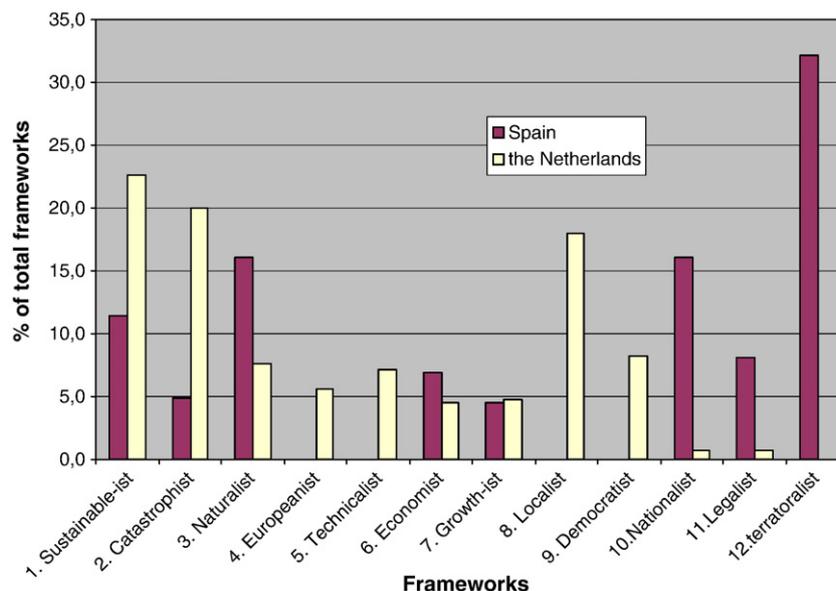


Fig. 1 – Cultural frameworks present in Spain and Holland in the management of water resources Sept 2000–July2001 (Van Woerden, 2001).

context. Hence they refer to long-term stabilizing elements and transferable traits. Cultural frameworks have a focus on streams of discourse on specific themes, looking hence at much more dynamic elements and processes. One can expect this approach to be far more sensitive to capture cultural dynamics and paradigm shifts which may express themselves in changes in the main streams characterizing a discourse.

Social learning is needed to build and sustain the capacity for communication across cultural boundaries. Otherwise the presence of different perspectives may lead to unsolvable conflicts and an inability to come to shared agreements. Empirical evidence suggests that the type of social conflict by itself does not account for the selection of conflict-enhancing or conflict reduction techniques/strategies in coping with disputes; its effects are moderated by culture linked individual differences in construal of interdependence by disputants (Derlega et al., 2002; Gray, 2004). This is a strong support for the social learning concept introduced previously where the role of relational practices is central to understanding how the management of content is linked to social involvement. Individuals belong to different social groups and thus operate within different cultures and institutional settings that belong to different national, regional or organizational boundaries. Framing is an interesting intermediary concept that can make the link between cultural frameworks or societal discourses on the one hand and specific problem situations on the other hand. Lewicki, Gray and Elliot (2003) have identified a repertoire of frames adopted by environmental stakeholders. These include views of nature frames, social control frames, conflict management frames, characterization frames, power frames, risk frames and identity frames. The specific relation that persons or actors have to a problem situation or change opportunity guides them in framing that situation (Dewulf, Craps & Dercon, 2004). People or actors involved will assemble frames by drawing on the cultural frameworks that are

available to them, and according to their stake in the situation some (elements of) cultural frameworks may be more salient than others. For example, for a country representative in a bi-national river basin management committee the national cultural framework may be more salient, while for a representative in a regional structure such a regional cultural framework may be more salient. From the point of view of the problem situation, someone experiencing major problems from unpredictable flooding will be more likely to use a risk frame than someone in a situation where this is not an issue. In sum, cultural frameworks can influence social learning by the kinds of perceptivities, rationalities, moralities and prescriptivities they make available to people who are assembling their understanding of specific problem situations into meaningful frames. The crystallization of cultural frameworks into specific frames for a situation can have important consequences for social learning, since certain types of frames, like strong identity and power frames, or mismatching conflict management frames can lead to difficult conflicts (Gray, 2004).

At the same time processes of framing and reframing are nuclei of cultural transformation. Both the forms and contents of culture are always subject to change. Such cultural change can be the result of endogenous or exogenous social forces (that change existing system conditions) and becomes effective by the acquisition of new ways of perceiving, representing, valuing, and prescribing reality. Social learning occurs whenever a community of practice becomes aware of new social and ecological realities that are relevant for their own development and well-being and *at the same time* is capable of generating new forms of agent collaboration and rules of interaction to achieve common goals which could not be achieved otherwise. Social learning also entails developing critical competences of individuals in the existing cultural artefacts, hence igniting and placing the conditions for future cultural change.

Social learning leads to a transformation of culture to the extent that it affects the core educational, communicative and symbolic production institutions that generate the dominant systems of references and which provide meaning, sense of order, and coherence to a given society and orient its social practices. A cultural crisis occurs whenever a culture is unable to provide the majority of the community with these integrative references or when such cultural change is so fast or encompassing that it impedes agents from adapting their behaviour to the new systems of values and beliefs. At the same time, social learning may help to prevent a cultural crisis (e.g., expressed in situations of disorder or anomy) if it empowers agents with new references and tools to reorient their values and beliefs in a way that is better suited to their needs and system conditions in which a society now develops.

Given the importance of cultural differences and path-dependent historical settings for processes of social learning and stakeholder participation, it is evident that generic recipes for the design of participatory processes and institutional settings are not applicable. Any design should rely on sound analyses of social groups and their cultural identities. The kind of culture and group identity encountered in different processes can be expected to strongly depend on context and scale.

5. Water management in transition

The implementation of integrated management of river basins, in general, and of transboundary river basins, in particular, poses major challenges to the integration of different administrative, legal, cultural, institutional and economic traditions at a range of scales from local to international. The change in water management paradigm with a clearly stated desire to integrate over a wide range of issues and to involve a wide range of stakeholders into the whole management process is putting an even higher demand on the integration of different cultures. At the same time, the need to engage into such learning processes can be instrumental in implementing the advocated paradigm shift, a structural change in the culture that drive dominant practices in water management.

The example of flood management illustrates very well the profound paradigm shift currently taking place (Pahl-Wostl, Berkamp and Cross, 2006; Pahl-Wostl, 2007a). In the yet prevailing command and control paradigm management is perceived as control. Solutions are technology driven. There is a firm belief that risks can be quantified and that optimal strategies can be chosen. Zero-sum-games in closed decision space. This cultural framing supports the implementation of controllable and predictable technical infrastructure (reservoirs, dams) based on fixed regulations for acceptable risk-thresholds.

In recent years the command and control paradigm has been replaced by a paradigm based on the notion of “Living with water”. In this paradigm the limits of control and the importance of uncertainties are clearly acknowledged. Acceptable risks and decisions are negotiated. This cultural framing supports integrated solutions and the implementation of multi-functional landscape with an increased adaptive

capacity of the system. This new paradigm argues for an integrated approach where flood protection and the restoration of a good ecological state of rivers are not framed as irreconcilable goals.

However, most international regimes focused on single issues such as flood protection or water allocation whereas, the development and implementation of management plans that are based on an integrated river basin management concept require a wide range of stakeholders to communicate and cooperate at different scales. The clearly perceived need to adapt to climate change requires a whole range of measures to be implemented. The processes by which adaptations to be judged at different scales will involve new and challenging institutional processes (e.g. Adger et al., 2005). In the same guise, water transboundary cooperation demands improving processes of social learning to integrate distinct cultural frameworks that agents at different locations use to deal with their issues at stake.

Fig. 2 illustrates the organizational framework within which social learning unfolds. It needs to take place between formal governmental authorities and stakeholder groups organized formally or informally at different scales. Integrated water management typically requires cooperation across sectoral boundaries. The development of river basin management plans requires for example coordination with regional planning which is generally impeded by sectoral fragmentation. Since administrative boundaries hardly ever coincide with biophysical scales new coordination groups are established with representatives from different administrative units and different sectors. In addition stakeholder processes have to be organized to involve stakeholders on different scales. This results in a remarkable complexity in the whole learning process.

National cultures determine the nature of transboundary cooperation. They shape legislation and negotiation strategies

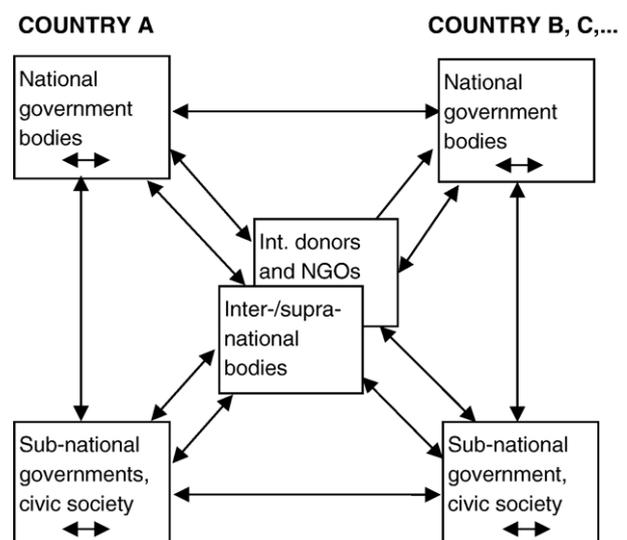


Fig. 2 – Organizational framework for collaborative water governance in transboundary water management. (from Mostert, 2005. How can international donors promote transboundary water management? Report for Deutsches Institut für Entwicklungspolitik, Berlin).

and influence the nature of the participatory processes (Patel and Stel, 2004). Regarding the distinction between context-sensitive cultural frameworks and anthropological theories of culture based on a few idealized stereotypes one may conclude for characterizing national cultures and their impacts on formal legal institutions and the roles of representatives of the regulatory system the more general approach seems to be useful. One key distinction which was shown to have influence on the nature of participatory processes in many cases is the importance of individualism versus collectivism.

An individual holds different social roles and belongs to more than one social and thus cultural group. Hence, it is possible that different cultural frames occur within individual persons and may be activated in different social contexts. At the level of commissions, negotiation processes between countries and in processes of stakeholder participation of organized groups individuals act in their role as representatives of an interest group and represent the cultural values of these groups (Kastens, Newig and Pahl-Wostl, in review). Here context specific approaches are more appropriate to characterize and understand negotiation strategies.

Professional cultures (e.g. farmers' beliefs and practices) may be more important than national cultures for some stakeholder groups and establish an identity across national scales. The influence of national cultures seems to be stronger than the influence of the technology/expert culture characterizing the community of water resource practitioners across national boundaries. Information management is a good indicator on governance styles (Langaas and Timmerman, 2003). Nilsson reported on studies of information management in transboundary water regimes in Europe (Nilsson, 2003; Nilsson and Langaas, 2003). The studies provide evidence that a technical/scientific paradigm and a hierarchical governance style still prevail in transboundary water regimes which influences a wide range of factors of key importance for social learning. Information requirements are mainly determined by the river basin commissions' own needs and not by the requirements of stakeholders. Such findings have been confirmed for national water management bodies and by the results from the GIS working group on the implementation of the European Water Framework Directive (GIS Working Group, 2002). The kind of information used and the way information is used refer mainly to state of the environment and potential impacts with little attention to response options. Nilsson and Langaas conclude that current information management approaches do not meet the requirements of integrated water resources management and collaborative and more adaptive governance styles. New information requirements should be defined taking into account the needs of stakeholders and other interest groups and more participatory forums and mechanisms should be developed. In times of increasing uncertainties due to climate change and fast changing socio-economic boundary conditions collaborative problem solving requires active involvement of stakeholders and the public. Information production and exchange have to be perceived as part of a mutual dialogue and not as a one-directional transfer of expert knowledge. It will imply a change in the role of the participants in the process of developing, taking ownership, implementing, monitoring and revising a river basin management plan (Pahl-Wostl, 2002).

The example of the role of information shows that political discourse on innovation in water management is slow in entering operational implementation. At that level processes of social learning are needed to support the development of new shared practices reflecting the change in the water management paradigm (Pahl-Wostl et al., 2006).

6. Conclusions

There is a growing recognition that in order to address adequately current environmental problems it is necessary to abandon many of the assumptions of the dominant paradigm of resource management about their perceived causes, explanations, and possible remedies and shift toward a more holistic and integrative approach. There is a need to embrace a more systemic understanding of environmental problems which means in practice that remedies must also include basic changes in belief and behaviour systems.

We started our argument by noting the current paradigm change in water management. To understand the dynamics of this change and to develop and implement innovative management practices requires new methodological approaches from the social sciences. The current paradigm change in water management can be interpreted as sign of a more general change in societal cultural perspectives. New participatory and adaptive water management approaches will not be implemented in sustainable fashion unless they are more deeply rooted in a cultural change in society. The paper developed the argument that we cannot understand dynamics and transition towards new management regimes without understanding the interdependence between social learning and culture at different scales.

Radical changes in resource management require social learning which necessarily includes changes in culture as well as institutions, to eventually modify the material causes which provoke the problems at different scales. This is why transformations in the realm of culture need to be accompanied by changes in social structure and vice versa. While for social structure we understand the whole set of economic, social and environmental institutions, rules and social arrangements which regulate individual and collective behaviour, for culture we understand the set of beliefs, values, knowledge and reference systems which make sense to those behaviours and contribute to the building of such institutions in particular contexts. Changes in institutions can be triggered by external forces – thus modifying their associated cultures – or/and by changes occurring within its own institutional culture, for instance, by a process of social learning. Hence, institutionalised norms – including those regulating the management of natural resources – are never static but reflect the dynamics embedded in the existing cognitive and value systems. A strong argument for deepening in the study of the relationships between culture and social learning is that under the new paradigm of integrated resource management, environmental problems cannot be appropriately conceptualised otherwise. However, to do so requires an improved theoretical foundation for understanding processes of social learning and institutional change in general, and in the specific context of integrated resources management, in particular. Such a theoretical

foundation has to build on contributions from a wide range of social sciences — individual and social psychology, sociology, political science, institutional and resource economics to name the most important ones. We have presented one attempt to make a contribution in this direction and demonstrated its importance and usefulness for the sustainable management of river basin. The HarmoniCOP project has developed a conceptual framework for social learning embedding group processes and multi-party collaborations into a wider context of governance in a river basin. Multi-party groups must develop a shared practice to become independent of individual membership. Such processes may lead to new emergent institutions that are more flexible than formal settings. We need a better understanding of the interdependence of formal and informal institutions and the influence of culture in institutional adaptation. Using the concept of context dependent cultural frameworks allows us to link processes of social learning and institutional change with societal discourses that reflect issue specific cultural constructs and practices. This has been illustrated under the analysis of cultural frameworks for the case of water policies communication in Spain and The Netherlands. One can expect that the nature of societal discourses will be different in entirely different cultural contexts (e.g. Asia, Africa) with different roles of the various actors in civil society and non-democratic traditions. First results obtained from case studies in non-European countries indicate that the conceptual approach chosen is capable to capture these differences and analyse their influence on water management institutions and their dynamics.

Such an approach emphasizing culture and context deviates considerably from the neo-classical rational actor paradigm and formal decision theoretical approaches where cultural differences are largely ignored and textbook recipes such as water markets are advocated as generic solutions to water management problems. Our analysis supports the participatory design and implementation of institutions tailored to the diversity of cultural, legal, economic and environmental conditions of river basins (Becker and Ostrom, 1995; Ostrom, 1999; Dietz et al., 2003, Tàbara and Giner, 2004). Despite the fact that culture is often referred to as a key element to understand the context specificity of resource management remarkably little work has been devoted to develop a sound foundation for investigating this relationship. We see this paper as an important step to remedy this unsatisfactory situation. We are convinced that this concept or similar ones will gain major importance in the years to come. The implementation of Integrated Water Resources management and innovative water policies require also innovative concepts for their implementation. Given uncertainties in socio-economic conditions and climate change and in our knowledge about ecosystem dynamics and measures influencing them, water management goals cannot and should be operationalised too narrowly. Instead a change towards more flexible and adaptive management strategies is much more appropriate and highly needed.

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