Sustainability learning for
River Basin Management and Planning in Europe.

HarmoniCOP

Integration report

HarmoniCOP project
Work Package 6
August 2005

The HarmoniCOP Partners

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The present report has benefited from results obtained by of all other HarmoniCOP WorkPackages. Special thanks to reactions and input to this WP6 report are given to John Colvin, Meritxell Costejà, Marc Craps, Dirk Gunter, Istvan Ijjas, Richard Raymond, Yvonne Rees, Brad Searle. Usual disclaimers apply solely to the main author.

The HarmoniCOP project is coordinated by Prof. Claudia Pahl-Wostl.

Prepared under contract from the European Commission
Thematic programme: Energy, Environment and Sustainable Development
of the 5th framework programme 1998-2002
Contract No. EVK1-CT-2002-00120
Deliverable num. 9

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Executive summary.

The study of the potential and limitations of participatory social learning in river basin management and planning is justified because results obtained from collaborative management of resources are usually superior in terms of efficiently achieving long-term win-win policy solutions than those only achieved by negotiation between individual users, technicians, corporate parties or self-interest market forces alone. Departing from this assumption, the present report examines the main results and the research process followed during the EU project HarmoniCOP (*Harmonising Collaborative Planning*) funded by DG Research and Development (2003-2005) as part of its programme on Energy, Environment and Sustainable Development. As a piece of *basic research*, this report provides analytical results stemming from this project but also aims at providing further theoretical insights for future research within the field of Integrated River Basin Management and Planning (RBMP). The main objective of the HarmoniCOP project was to increase the scientific understanding of Social Learning (SL) and public participation processes aimed at supporting the implementation of the European Water Framework Directive (WFD). In order to do so, HarmoniCOP joined efforts with 15 partners from Belgium, France, Germany, United Kingdom, Hungary, Italy, Netherlands, Spain and Switzerland and carried out 9 national case studies and 9 River Basin case studies, to follow empirically these processes. Notwithstanding, the overall goal of this report is not only to summarise or to reiterate the findings obtained by the different work packages and case studies. Rather, it attempts to go beyond that, by providing a new set of deductive questions as well as a new way to conceptualise, in a scientific and political relevant manner, the key issues related to social learning and public participation in RBMP. This task is mainly carried out by using a structural and cultural approach and is intended also to help the coming research within the context of natural resource management in general.

Within the HarmoniCOP project, social learning is referred to as the growing capacity of social communities to perform common tasks related to a river by developing new relational qualities and new ways to frame the problems at stake. In this regard, social learning occurs always within a context, it follows a process, and produces a set of outcomes which then feed back again creating new relational practices among actors and affecting the original institutional and environmental conditions of the context. Social learning needs to be materialised in cognitive, attitudinal, and organisational capabilities but also in biophysical changes. Particular techniques can be developed to increase mutual awareness of the plurality of assumptions, interests and perspectives involved in the management of river basins and enhance their adaptive capacity to changing conditions. Hence, social learning in river basin management and planning is not about only resolving specific technical problems and policy targets. It is about enhancing in an integral way the community development. This requires the changing of a large number of relationships within the social and the environmental domains. In the widest of its understandings social learning in river basin can be equated to *sustainability learning*, as it integrates economic, social and ecologic concerns. In a very restricted sense, social learning can be thought only an increased collective capacity to resolve business-as-usual problems without much reorientation of whole frameworks of action, social relations, policy goals and worldviews which determine our relationships with others and with the environment as a whole.

Therefore, significant social learning is not only about learning facts or technical skills. It is also about learning new ways to conceive the natural and social worlds, about learning a new vision of knowledge and of the relationships of humans with our life support systems, and about learning to create new institutions and processes capable to put in practice all these new visions and values in particular contexts of action. At river basin scale, social learning can be enhanced by information, consultation and participation, each one of the three strategies bestowing different levels of co-responsibility, power and engagement. At structural level, social learning depends of such obvious factors such as public education, which constraint or enhances the possibilities for social learning in the particular context of action where individuals develop their daily activities. As pointed out by Sinclair and Diduck a decade ago[1], public education has been –and still is- one of the most undervalued components to understand and manage public involvement in environmental assessment. In our case, understanding the processes and possible techniques to enhance public education is also a necessary condition to understand and enhance the ongoing processes of social learning at river basin scale.

[1] Sinclair, J. and Diduck, A. 1995. 'Public Education: an Undervalued Component of the Environmental Assessment Public Involvement Process'. *Environmental Impact Assessment Review*, 15(3):241-274; our conclusion deals with the question of the relationships between public education and social learning.

Several mechanisms which foster social learning in RBMP have been identified by the HarmoniCOP project. Such mechanisms relate to the *time and resources*, the *procedures*, and the *contents* of participatory processes aimed at promoting social learning. With regard to the first, time and resources are needed in order to ensure a close and frequent interaction between stakeholders. With respect to procedures, it is important that stakeholders get involved at early stages and during enough time through the participatory processes. Careful attention to process management needs also to be taken, and in particular, proficient skills of facilitation and communication of meetings need to be acquired. Furthermore, it is important to make explicit the procedures timings and 'ground rules' that the people involved need to attain so different stakeholders can participate in the design of the process, besides of that of the content. As for content, win-win situations need to be encouraged, which means that procedures need to be linked to specific outcomes. For social learning entails building a critical and reflexive capacity to question underlying assumptions and perspectives of different parties with the goal of learning together. This often requires an attitude change and a commitment to learning from others which can only be achieved in an atmosphere of trust, transparency, respect and openness. This may encounter resistances by the most powerful stakeholders, and may entail a reorganisation of existing power relationships. The use of a variety of Information and Communication (IC) tools can foster social learning, but information needs to be properly translated and integrated into the diverse contexts of action in order to become *applied knowledge for the improvement of sustainability* in RBMP. Social learning is also dependent upon the style and choice of participatory processes applied, i.e., a process that facilitates more interaction and greater opportunity for dialogue have better chances to enhance social learning.

With regard to the barriers of social learning, obstacles also appear with issues related to time and resources, procedures and content. Deadlines for participation are often too tight, and public officials in charge of the implementation of the WFD may not have enough time and capacity to fulfil the participatory requirements of the Directive. Furthermore, procedures of participation may not be sufficient representative of the diversity of interests and values involved in the RBMP. Lack of clarity about stakeholders roles and responsibilities and specification about what to do with the outcomes of the participatory process may lead to disillusion and retreat. Several cultural and institutional factors such as traditional expert top-down attitudes to RB linked to hierarchical organisational structures may also impede social learning. Reduced potential for social learning is usually associated with processes that are rushed, and that have afforded insufficient time to properly play-out all the relevant components of the process.

The analysis of the findings and the theoretical framework developed in this report uses a macro-social structural and cultural approach. This perspective is intended to complement the more local / RB scale as well as more social-psychological approaches which were used during the earlier stages of the HarmoniCOP project. Such a broader perspective is seen as necessary to integrate the results from the 9 national case studies, 9 national River basins and at the same time to shed new scientific and political light which has validity also beyond the European borders. Hence, four pivotal issues frame and lay at the core of this report:

1) The role of *structural change in institutions* with regard to social learning and public participation, and in particular within the context of the European WFD;

2) The influence of *culture*, and the *cultural perception of knowledge and of natural systems* in the process of social learning related to RBMP.

4) The role played by *Information and Communication (IC) Tools* in social learning, and in particular to enhancing the generation of *knowledge for sustainability*;

3) The question of whether the WFD and the processes of social learning involved in its implementation can be seen as a process of *sustainability learning*, provided that the WFD entails the integration of social, economic and ecological goals.

From the analysis of the national experiences on public participation in RBMP the following conclusions can be extracted: (a) Public participation in RBMP is not a new matter in Europe, and future strategies aiming at enhancing participatory processes at river basin must depart from existing networks of action rather than debunking them and trying to create alternative new ones. Processes of social learning may be implemented to stimulate social innovation within the existing organisational settings; (b) Government structure –currently conditioned by the tensions between decentralisation and new centralisation forces- as well as governance style strongly influence the possibilities of social learning at river basin scale. In this respect, one should

notice that while environmental changes often derive from forces which often lay outside the river basins –e.g. from economic globalisation- actions and responses at the local level may generate greater legitimacy and help creating a stronger sense of commitment and identification between relevant stakeholders; (c) New experiences on public involvement in RBMP are now occurring across Europe. However, some of the key lessons learnt from these experiences are lost. A procedure must be set in place to share such gained knowledge between and within the different levels of governance.

The role of IC tools to social learning can be assessed to the extent IC tools: a) create a common and questionable representation of problems and to a shared reality; (b) contribute to the building of specific *communities of interest*; (c) enhance a *community of action*, e.g. by playing a role in the strengthening or creation of new *identities.* The HarmoniCOP project reviewed 27 different types of IC tools and classified them according the most common purpose of use, phase in the participatory process, direction of the communication, and size or type of audience. The present report argues that IC tools, in order to contribute to the implementation of the WFD and to improve sustainability standards in the use of water resources in RBMP, such properties must be linked to specific contents. Looking at processes and type of tools is not enough, a discussion which is again in latter stages of the report in the discussion about *sustainability learning.*

To conclude, one should underline the fact that river basins management regimes cannot longer be viewed in isolation but embedded in a larger societal landscape. Long-term changes towards new more sustainable governance styles will be influenced and will themselves influence such landscape. Although the case studies conducted under the umbrella of the HarmoniCOP project do not yet allow drawing straightforward conclusions on the interaction between different levels of governance and interrelationships between social, political and environmental domains, one can identify indications of change. In particular, our findings suggest that the WFD may provide new real opportunities and stimulating new practices for effective *sustainability learning* not only at RB scale but also at the European level with regard to the management of European water resources. In this report, we argue that any attempt to adapt human societies, and in particular human communities as those which characterise the management of common resources of river basins needs to examine and learn how to adapt also the socio-cultural structure of knowledge and the predominant views of natural systems which affect scientific and policy making process. Hence, this presupposes both a cultural and an institutional transition. The problem of un-sustainability in the use of water resources is not 'out there', in the environment, but within the type of relationships humans maintain with the rest of the aquatic systems. In particular, a new vision of information, knowledge and life supporting systems, together with the attendant new relational practices and identities with the environment, need to be learnt and implemented. Moving towards new adaptive institutional regimes, as the one proposed by this report as *hybrid self-organisation,* may contribute improving sustainability planning and management of river basins. However, while this process of adaptation can be stimulated in many ways, there are still many difficulties which remain. Many *constraints to sustainability learning* are still very difficult to overcome because many of them are of structural and cultural nature and the possibilities to change such conditions lay beyond the scope and the purposes of the WFD or any other piece of legislation.

1. INTRODUCTION.

The present report deals with some of the most critical questions which have been raised during the course of the HarmoniCOP project. Results of the different work packages are looked through the articulating question about what are the key factors which constrain or stimulate social learning and effective public participation in River Basin Management and Planning (RBMP). From the outset, the HarmoniCOP project has recognised the complexity and multiple interdependences between different scales and actors which are involved in the management of water resources and has claimed that the approach of social learning could be useful to illuminate the processes occurring both at RB and national scale previous to the full implementation of the Water Framework Directive (2000/60/EC; WFD; see also EC 2002, EEB 2001a, 2001b). Our overall goal in this report is to link the theoretical developments provided by an original analytical framework on social learning provided by the HarmoniCOP project with the empirical material obtained from the case studies in order to gain relevant insights both for science and for policy. In particular, we have organised its structure as follows:

1. *An analysis of the meaning, insights and relevance of the approach of social learning in RBMP as provided by the HarmoniCOP project:* in order to explore to which extent HarmoniCOP has contributed to the better understanding the relationships between social learning, public participation and RBMP. The goal is to assess how public participation processes involved in RBMP can contribute to social learning and how the social learning perspective can contribute to a better framing and understanding of the public participation processes within the WFD. In this report, the notion of social learning is understood from a broad macrosocial perspective, that is, considering the interplay of multi-level social institutions examining not only the local scales, but also taking into account social learning processes occurring at society at large both within and between social networks of action.

2. *A synthetic review of European case studies:* aimed at linking the theoretical framework of social learning with the empirical experiences gathered both in the national case studies and at a river basin scale. In this regard, the role of Information and Communication Tools are analysed with some detail. This section will provide an examination of the main mechanisms which foster or constrain social learning within RBMP.

3. *An assessment of the HarmoniCOP results and its contribution to scientific theory, methodological innovation and policy integration:* from the analysis of the theoretical contribution and from the lessons learnt from the case studies, this section analyses in a relational way to which extent the HarmoniCOP project has contributed to a better understanding of to the theory and methodological innovation within the field of social learning, and to the *science for policy* to support the implementation of the WFD. Results obtained from mutual learning discussions between stakeholders and researchers are used to frame this evaluation.

4. Key issues on public participation, social learning and sustainability: A further theoretical analysis is provided with regard to the following aspects: (a) the role of culture and of the different cultures of participation in the social learning processes, and which concern the implementation of the WFD at RB scale; (b) an analysis of the possibilities and constraints of institutionalising new forms of polycentric learning for integrated RBMP; and (c) an examination of the actual contents of social learning in the integrated management of water resources, and in particular by looking at whether what is learnt can be assessed upon sustainability criteria, hence as to be considered as a truly *sustainability learning* development.

5. Conclusion: It argues that some of the most important constraint to social learning, and the potential to overcome such constraint lays in unveiling and questioning the cultural conceptualisation of information, knowledge and natural systems, which affect the current assessment and management processes within environmental policy. While this is a structural constraint, which depends to a large extent on the existing public education systems, it also affects and can be influenced at rive basin scale. HarmoniCOP project found out that most numerous factors influencing social learning occurs at the context level, that is within concrete context of action where people develop their daily activities.

Hence the present report does not only intend to summarise the key lessons obtained from the work carried out within HarmoniCOP. It also tries to illustrate and examine the state of the art of the approach of social learning in RBMP and to provide some new directions for future research within this field. At the end of the report, the notion of *sustainability learning* is used as an heuristic yardstick to assess to which extent the processes stimulated by the implementation of the WFD are provoking changes not only on the quality of the natural systems but also on the social and economic organisation upon the sustainability of such natural resources depends on. We believe that such concept may help to sharpen the understanding of the social learning and public participation processes linked to the improvement of assessment and management European river basins, which was the original purpose of the HarmoniCOP project (Fig.1).

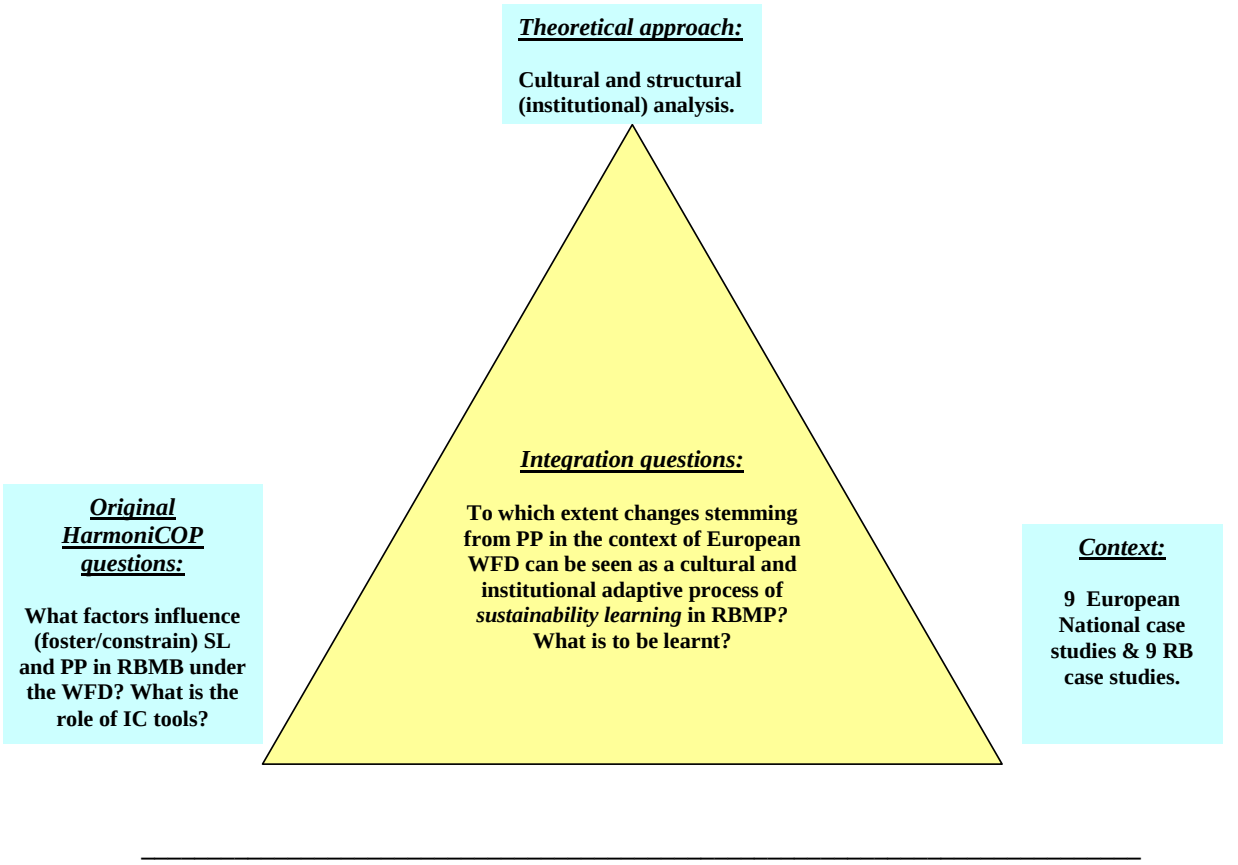

Fig. 1. Content and overarching questions of HarmoniCOP *WP6 integration report.* Learning in social research entails not only answering departing questions but also to develop new ones from actually carrying out the research.

2. SOCIAL LEARNING: CURRENT MEANING AND IMPLICATIONS FOR INTEGRATED BASIN MANAGEMENT AND PLANNING (RBMP).

1. 1. Introduction: from public participation to social learning.

Social science has been studying public participation in environmental issues for over thirty years (Franquena & Koelin, 1988). Most of the early studies focused on the social structure of the people involved in environmental improvement and decisions and were mostly aimed at answering the questions such as who participates and for what reason. The understanding of the environmental movement and of the public participation in environmental issues as an expression 'upper-middle class movement' generated a large bulk of literature already in the sixties (J. Harry et al., 1969) and continued over the eighties. William R. Burch, to give a notable example, argued that public participation in natural resource management emerged and later expanded as an interlinked result of three processes. First, because the thrust of conservation was accepted by the dominant system of authority: the elite involved in these matters had a shared set of values and visions to those of the old notables and hence, conservation claims did not threat existing *status quo* but reinforced it. Second, the emergence of the 'salariat' middle class provided new potential for public participation in these matters. And third, the removal of an increasing number of resource decisions from the market to the state created a new array of resource professions, both from the natural and social sciences, initiating a process of *socialisation* of those decisions which has continued until the present (Burch, 1976). Public participation in water management and planning had also been studied in the early seventies (Wengert, 1971).

As it had already been observed in other fields, people's participation in voluntary associations, including those related to the environment, was explained in terms of people's position and changes occurring in the social structure. One of the masters of contemporary sociology, David L. Sills (1968), noted that in the United States, individuals' voluntary involvement depended mainly on their socioeconomic status and place of residence. In particular, those urban dwellers with higher level of education and economic welfare were more able to participate in collective matters than those with lower status. He interpreted that the possibilities of people of getting involved depended above all of their possibilities for *social interaction.* Disfavoured sectors of society had fewer opportunities for such interaction and hence less change to participate in public affairs. In a classic book by Verba and Nie (1972) on *Participation in America* six categories of citizens were identified, stretching from the *complete activists* to the *inactives,* and they also emphasised the idea that participation is conditioned by the social structure[2]. Analyses of participation became more elaborated, and in this regard, Sherry R. Arnstein, who advanced the idea of participation ground rules, provided a famous categorisation of public participation depending on the level of citizen power bestowed to stakeholder. However, Arnstein also warned about the risks of 'ritualism' and of participation being instrumentalised. For Arnstein, the eight types of involvement from non-participation to total control were: 1) manipulation, 2) therapy, 3) Informing, 4) Consultation, 5) Placation, 6) Partnership, 7) Delegated power, and 8) Citizen control.

FIGURE 1 *French Student Poster. In English, I participate; you participate; he participates; we participate; you participate . . . They profit.*

Fig. 2. Risks of participation. Extracted from Sherry R. Arnstein, 1969.

[2] The whole participation category was: the complete activists, the campaign activists, the communalist, the parochial participants, the voting specialists an the inactives. This makes the point that not all people do or can participates in the same way or in the same strength and scope in all the different political issues.

Also in the seventies, Timothy O'Riordan depicted participation in environmental policymaking as an evolutionary process dependent on the political culture in which it emerged. Changes affecting the political cultures of contemporary democracies were leading to a natural and logical process in which environmental participation was gaining terrain:

> 'The inevitable thrust of the participatory strategy is toward wider power sharing and the politicisation of citizen awareness into new democratic forms, particularly at the local level where the quality of the environment really is a matter of immediate interest and concern' (T. O'Riordan, 1976:256).

For O'Riordan, two dimensions limited the potential for public involvement in environmental reform. First, the spatial scale of the issue under consideration, and second, the degree of power that could be shared in those decisions. For him, global environmental issues only attracted the attention of political and professional elites, whereas local environmental projects and programmes offered more room for citizen participation. In particular, he distinguished between three ideal types of actors involved in the environment, the 'egoist', the 'ideologist' and the 'civic'. Involvement of the first kind was only motivated for selfish and private interests, and was only reactive and sporadic. On the contrary, ideologists included reasoning based on morals and beliefs and their actions were not concerned on one single interest or specific issues but on wider concerns. According to O'Riordan, the civic environmentalism would be situated between these two extremes in which both egoistic and altruistic reasons would explain people's involvement. Together with D. W. R. Sewell, O'Riordan also argued that public participation in environmental decision-making was depending on particular cultural factors (Sewell & O'Riordan, 1976).

In the eighties the discussions on who and why people participate in environmental issues continued intensely (Dotson, 1983), and several studies made by Stephen Cotgrove (Cotgrove, 1976, 1982 & Cotgrove, S. & Duff, A. 1980) provided deeper insights into the question whether involvement in environmental was an expression to what Frank Parkin called 'middle class radicalism' (F. Parkin, 1968). For Cotgrove, not all the middle class would participate in environmental issues, but mostly those individuals who hold occupations outside market forces, with above-the-average level of income and with a left-wing political orientation. In this regard, Morrison went even further in the analysis, by saying that while some degree of sociostructural elitism was noticeable within environmentalism, this was not substantially different from the elitism which showed other social movements in other fields (Morrison, & Dunlap, 1986). This debate also extended to assess whether public involvement in environmental issues could be understood as 'rational' or as 'irrational' forms of action and to examine what were the conditions for the public which could lead to 'voice' (involvement) instead of 'exit' (non-participation). According to Mitchell (1979), there was no contradiction in the view that environmental action could be based on rational, and utility-maximizing reasons, particularly, because many environmental problems can be understood, not as 'public goods' but as 'public bads' were no exit is possible. In those conditions, *what would be irrational would be not to participate* (Mitchell, 1979; Olson, 1971, Hirschman, 1970, 1979; for a review Tàbara, 1999). Selfish involvement could explain public participation in the environment in situations such as 'Not in My Back Yard' issues, although such explanation is not sufficient to understand the whole array of reasons why public participate in environmental issues (Freudenberg, 1984). Moral values and beliefs are crucial to explain environmental activism, although other structural factors explain the involvement or lack of it in a given situations[3].

In the nineties, there was as 'rediscovery' of the importance of participation in environmental issues, a movement which has continued until the present (Box 1, and Moster 2003). The problem, however, is that many professionals and researchers working in this field seem to have left apart or not sufficiently integrated a good wealth of knowledge accumulated during the last three decades on these matters. Official understanding of public participation, which to some extent is already incorporated in legislation and in official statements with regard to the management of water resources, seems to have omitted one of the main lessons learnt during all these years of social research: that public involvement in collective affairs is an expression of social inequalities, and that public participation in natural resources needs first to address potential distributional conflicts in order to become a substantial part of efficient and equitable environmental management (see Schnaiberg, et al. 1986). A major piece of work underlying this point was the provided by Ortwin Renn et al. in 1995, with their *Fairness and Competence in Citizen Participation*, which stimulated a large number of

[3] For instance, *individual lifestyle aspirations*, very much influenced by media and advertising, and the perception and *cost of time* in a given society are very influencing determinants of public participation, as they affect the demands and possibilities for social interaction in public matters.

research projects and provided crucial insights for the development of deliberative approaches in technological and environmental matters (Renn et al. 1995).

Some lessons learnt on Public Participation (PP) processes initiated by the Government.

1. Before using any PP technique, reach agreement between the different government bodies concerned on the scope of PP (what can be discussed and what cannot?), the purpose (what benefits are aimed for?, why PP?), the level of PP, the different publics to be targeted, the project I organisation and procedures for exchanging information and deciding on follow-'up.
2. Conduct some form of actor analysis.
3. Identify the relevant publics on the basis of (a) the interests they represent; (b) the information, ideas and skills they have; and(c) their influence on decision-making and implementation.
4. Make a process design.
5. Discuss the process design beforehand with the major stakeholders and develop "co-ownership". Important t topics are the type of contributions from the public that are expected and what will be.done with them. Do not build up false hopes.
6. Make c1ear afterwards what has been done with the input by the public.
7. More support for water management is a legitimate aim of PP, but if the input by the public is not taken seriously, PP may backfire and public support may decrease.
8. Approach the different publics actively to prevent limited of unrepresentative response. Intervener funding and/or participatory training may be needed, especially if some publics have far fewer resources than others.
9. Consider the appointment of a professional outside process manager of facilitator to enhance the legitimacy and effectiveness of the process.
10. Start PP as early as possible, when still something can be done with the public input. Different publics may need '10 be targeted in different phases.
11. Organise PP on the different aspects of river basin management at the geographical scale (local, regional, river basin, etc.) that is c1osest to the most relevant publics for these aspects, while still keeping the process manageable.
12. Ensure smooth communication between scales and between units at each scale (e.g. different basin states).
13. Try to involve ,the different publics in policy research, if only to prevent technical controversies.
14. Prevent a "participation burnout!' It is better to ask the public to participate in one integrated planning exercise than in 20 sectoral exercises.
15. Review and develop the PP capacity of government (personnel, skills, budget, openness, flexibility).
16. Choose "realistic" PP methods and techniques that fit the available resources, the concerned publics, the geographical scale, the type of issues to be addressed and the phase in the planning cyc1e.
17. Evaluate PP afterwards in, order to learn for future processes and during the PP process in order to adjust to unforeseen developments.
18. Foster mutual trust and open communication.

Box 1. Some lessons learnt on public participation processes initiated by the government according to Erik Moster (2003)

Parallel to these developments, and also in the nineties, social learning as an approach for the understanding and management of environmental issues, was becoming a prominent discourse and motivated a number of important research programs (Parson & Clark, 1995, Social Learning Group, 2001; Worcerster & Barnes, 1991; Webler, et al 1995, Wynne, 1992). At the turn of the century, those new ideas were combined with the thrust of public participation being incorporated in integrated environmental assessment facilitated the emergence of the new *sustainability science* (Kasemir, et al 2003). These emerging perspectives, together with others such as *postnormal science* (Funtowicz & Ravetz, 1991) or *civic science* (Irvin, 1995), helped to consolidate ideas about *mutual learning methodologies* (Rotmans, 1998), and others which see public participation as an indivisible and necessary part of integral resource assessment and management. Social learning has finally trickled down to the environmental (Keen et. al. 2005; Daniels and Walter, 1996) and water management research-action agenda, and it seems capable to inform and orient future development in this field (Craps, et al. 2003, Pahl-Wostl, C. 2002b, Pahl-Wostl, & Hare, 2004, Ison et al. 2004; Schusler et al. 2003). For instance, research carried out on the application of the approach of social learning for collaborative natural resource management indicate some of the potentials and limitations of this concept. In this sense, Schusler et al. (2003) found eight processes which fostered social learning in this regard: open communication, diverse participation, unrestrained thinking, constructive conflict, democratic structure, multiple sources of knowledge, extended engagement, and adequate facilitation. In particular, they found that social learning is necessary but not sufficient condition for collaborative management, as other requisites that relate mainly to the context in which social learning is supposed to unfold, such as enhanced capacities, processes, structures and supportive policies were necessary to sustain joint action.

One should note that water management has traditionally been dominated by a technical and prediction-control based approach to management. Hence, promoting new participatory management styles is a particular challenge. In this context, the HarmoniCOP project set up to improve our scientific understanding of the factors enhancing or constraining social learning processes or RBMP under the provisions on public participation within the WFD and the role and potential of information and communication tools in these processes (Fig. 3). In this report, the goal to go a step further with these original purposes and approaches by linking the concept of social learning as understood by HarmoniCOP project and the results from the case studies to the notion and practice of sustainability. To do so the concept of sustainability learning is introduced and used to analyse the HarmoniCOP process and results.

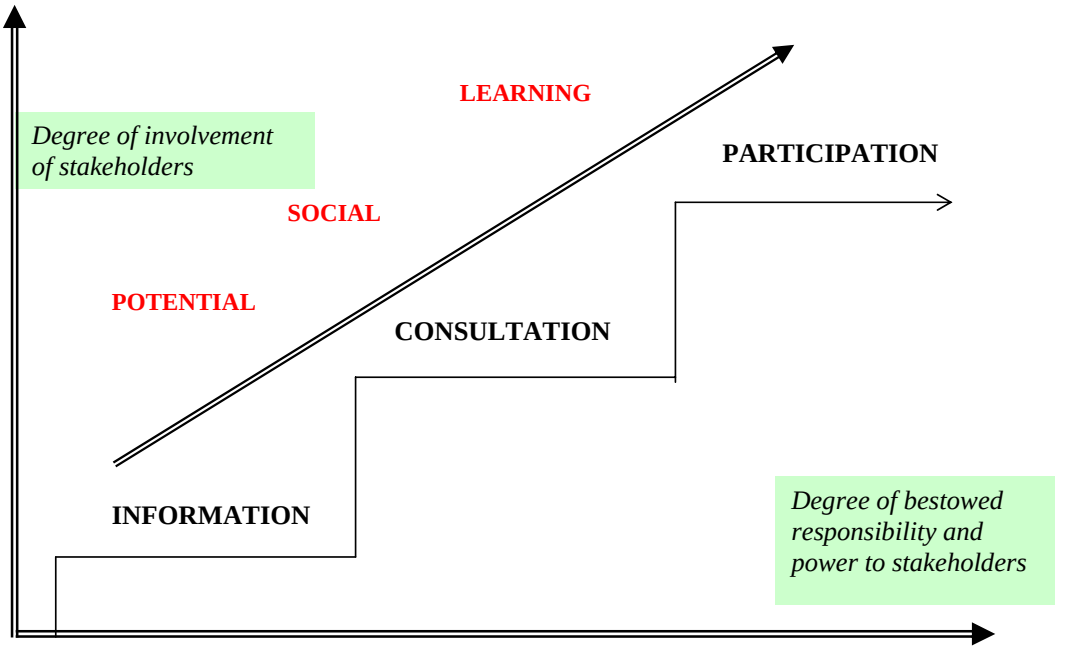

Fig. 3. Information, consultation and participation and its potential for social learning in RBMP.

2. 2. Meaning and relevance of social learning in integrated RBMP.

One goal of the HarmoniCOP project was to provide a better scientific base to the rather pragmatic approach towards understanding stakeholder and citizen participation in water management, in particular, and in natural resources management, in general. To do so HarmoniCOP developed an concept for social learning applicable to water resources management. Social learning, as understood by the HarmoniCOP project in the context of RBMP, can be seen as an interlinked processes occurring as an interplay between the following components: a *context,* formed by a given governance and physical system, a *process,* formed by a set of relational practices, and a series of *outcomes* which feed back again into the original context as changes in that institutional and environmental systems. It is by sharing different points of view and types of knowledges that actors involved in RBMP can build a social learning process in an emerging community of practice (Bouwen & Tailleu, 2004; Craps, 2003). More specifically,, and with regard to social involvement, social learning is affected by the following elements: (a) *framing and reframing* of the problems at stake, (b) Boundary management on who participates or not in the process, (c) the type of *negotiation strategies* involved, (d) the kind of *ground rules* established to facilitate the processes of interaction, (e) the leadership, needed to steer and coordinate the process, and (f) the facilitation and allocation of resources (Fig . 4.).

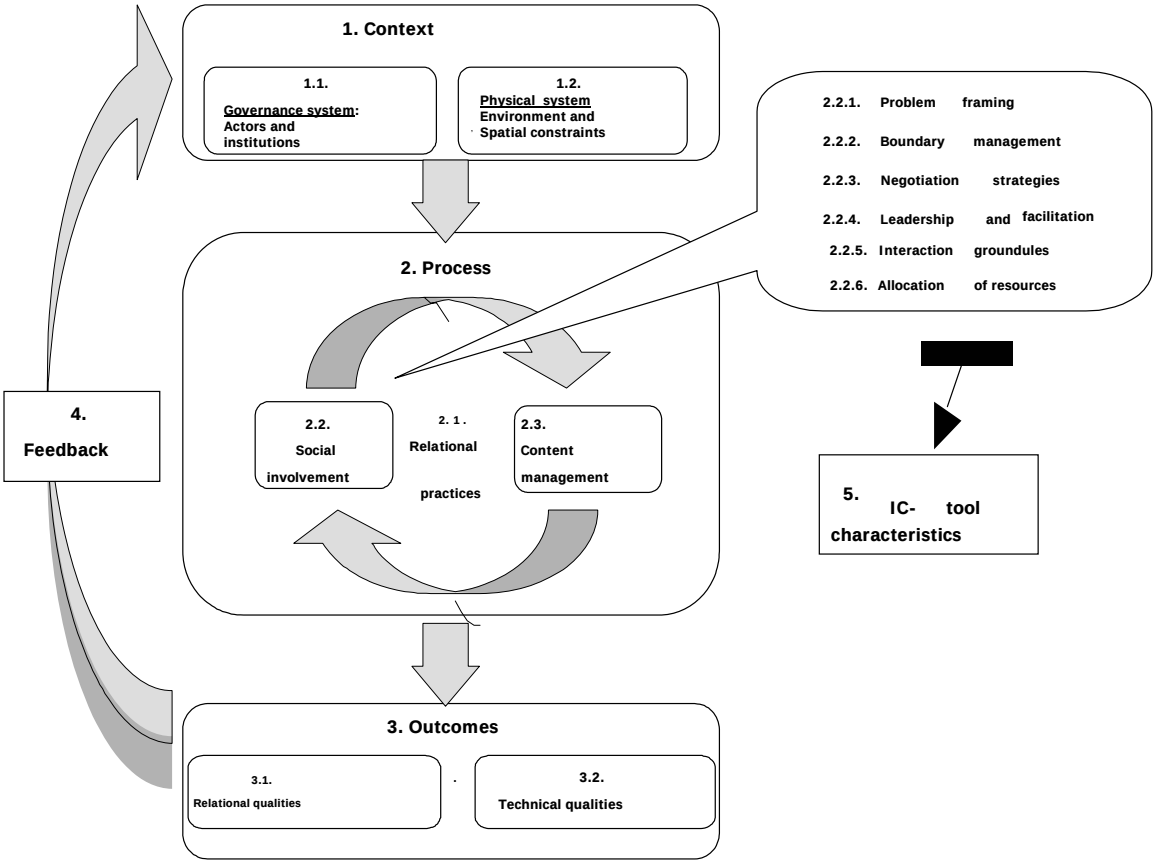

Fig. 4. Social learning as feedback interaction between context, process and outcomes.

The notion of social learning has been used in quite different meanings to refer to processes of learning and change of individuals and social systems. The work of Bandura (1977) 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 learner and their environment, the learner changing the environment, and these changes affecting the learner. This approach provide to be too narrow and too much focused on the individual to embrace the learning processes of relevance in resources management. Authors like Wenger (1998) introduced social theories of learning that have influenced considerably the approach followed in the HarmoniCOP project which has adopted a broader definition for social learning in the context of river basin management. Such a broad understanding of social learning that is *rooted in the more interpretative strands of the social sciences* characterizes also the approach adopted by the HarmoniCOP project. As far as the WFD is concerned, we will need to move a step further since the overall goal is already prescribed albeit in quite broad terms. This is important some in some other cases, a group of actors may also learn how to exploit their environment even more effectively.

In HarmoniCOP, the concept of social learning has been embedded in a larger context of social structural change. First attempts have been made and we believe that we made a major contribution towards a developing a comprehensive foundations for a theoretical framework to understand societal transformation processes towards sustainability and its relationships with social learning. Such a framework must integrate and further develop insights and contributions from a wide range of social science disciplines such as individual and social psychology, sociology, anthropology, political sciences, institutional economics.

HarmoniCOP focused on social learning in formal and informal multi-party processes (e.g. fora with representatives from stakeholder groups; working groups with representatives from different authorities). The development of mutual respect and trust, the agreement on ground rules are perceived to be essential for the encoding of relational practices in such diverse groups with different perspectives, interests, power and resources. Hence, the results of social learning become part of the identity of the group. As outlined in figure 4 such learning processes at group level are influenced by the governance context and they feed back to trigger change in the governance structure. Hence, social learning as a group processes has to be embedded in a larger perspective of societal structural change which may include changes in value structure, societal norms and formal regulatory frameworks. More specifically, we can say that social learning in the management and planning of River Basins requires:

- Opportunities for critical mutual reflection and awareness and modification of taken for granted assumptions and cultural frameworks.
- The development of participatory, multi-scale, democratic processes, of decision-making,
- (Reflexive) capabilities of individuals and societies, for the development of polycentric forms of resource assessment and management.
- Empowerment of social movements and actors to shape the political and economic *boundary conditions* which determine their opportunities to get involved in the processes aimed at improving the existing situation.
- Recognize mutual interdependencies and interactions in the actor network.
- Increase the capacity to reflect on assumptions about the dynamics and cause-effect relationships in the system to be managed and on the subjective valuation schemes.
- Promote active engagement of individuals in collective decision processes. This may include the development of new management strategies, and the introduction of new formal and informal rules.

Processes of social learning can be improved by:

- Recognition of the diversity and complexity of the different types of mental models and cultural frames which influence problem definition and decision making.
- Building up a shared representation of the issues at stake. Participatory modelling can help to achieve a common ground on the problem perception among a diversity of a group of actors, in particular when the problem is largely ill-defined (although this does not imply consensus building).
- Building trust among the main stakeholders and institutions as base for a critical mutual and self-reflection.

Hence, there are three major challenges in relation to social learning in RBMP*:*

- To start with the idea that achieving the new substantial objectives requires a major change in mind sets of existing professionals and the "public" (society). These new objectives relate only to the content but also to the style and to social roles played by different individuals and organisation in the management of water resources. It requires also thinking in terms of wider trade offs and not so much in relation to sectoral interests but to think in terms of conflict resolution aimed at obtaining win-win and no-regret situations.
- To organise action in specific procedural changes, such as coordination, and involving the public, which at the same time also entails changes in mind sets, and not simple adaptation.
- To materialise learning in long-term institutional changes, such as building new capacity, bringing in new professionals, establish committees, new interaction forums for joint decision making or advisory board. This represents institutionalization of the social learning that has taken place responding to the recognised challenges and problems. Institutions must be bestowed enough capabilities to assess, intervene and account for relevant decisions in order to carry out adequately the different functions which are carried out within RBMP.

In short, social learning can be understood as learning together to manage together. However, it is evident that not everybody can or does learn in the same way, or about the same things, at the same time and/or for the same purposes. Learning processes are very complex and are distributed unevenly among society. They depend on the particular tasks and roles particular actors and organisations play in their particular contexts of action as well as on the power and abilities they hold. As expressed in the previous section, inequalities in the possibilities to get involved in processes of public participation, which are expression of inequalities of the social structure, are also manifest in the possibilities for social learning. To la large extent, the possibilities for a truly social learning depend also on the possibilities to overcome such inequalities –which go beyond simply improving representativeness in participatory process- and to incorporate them as a potential for change and socioecologic adaptation at a structural scale.

2.3. Structural change as social learning. Towards a general framework.

Social learning, whenever it really occurs, must entail some type of changes in the social structure of society. However, not all changes occurring at societal scale are the result of conscious of purposive social learning. Indeed, unintended consequences and even structural constraints resulting from the aggregation of side effects of collective action can occur (see section 5.4). Much of the global and regional problems with regard to the environment have now become part of the socio-environmental structure which condition and shape human behaviours and the possibilities of future adaptation to new environmental situations. Within Europe, the legal provisions of Water Framework Directive provides opportunities for structural change, but in order to grasp the scope and implications of such changes as a result or inducing social learning in the use of common water resources, the different elements of the concept of social structure need first to be defined.

The notion of *social structure* has long been at the heart of social science. It denotes the stable and reproductive parts of society. In contrast to the notion of *agency,* which relates to the dynamic and purposive components of society result of social action carried out either by individuals and organisations, social structure is what remains. In the following lines, **social structure is understood as the whole array of political, economical and cultural institutions which limit, as well as facilitate, the individual and collective actions** of a given social community in a particular moment in time. As put by Anthony Giddens in his *Constitution of Society (*1991) and his concept about *duality of structure,* a society is possible to a large extent because of the creation and existence of social structures and these structures both constrain and enable individuals' freedom of action. Social structures are therefore historical constructs, result of individuals' social action, the latter being always based on motives, meanings and intentions, either latent or conscious and explicit. Furthermore, structures are not always built necessarily on explicit formal reason but on trust, daily social practices, and somewhat unconscious routines. However, it is precisely the intentional and purposive character of social action, which allows for choice, rational deliberation and social and moral learning, which mostly distinguishes the way human systems work in contrast to the way ecological systems do. However, the distinction and separation between the social and natural types of systems is becoming less apparent as we

now move toward the development of new hybrid fields of environmental thinking (Freundemburg, 1995) and theoretical approaches such as the new *ecological sociology* (Tàbara, 2003)

According to one of the most influential American environmental sociologist, Frederick Buttel (1997: 40), social research on environmental issues have focus its attention on three main types of social institutions: economic, political (including legal regimes) and cultural ones. For Buttel, **a social institution is 'a specific or special cluster of norms and relationships that channel behaviour so as to meet some human physical, psychological or social need, such as consumption, governance and protection, primordial bonding and human meaning, human faith, and socialisation and learning'.** While this interpretation follows to a large extent the old classic sociology distinctions on social institutions already provided by Weber in his *Economy and Society* back in 1922[4], it is clear that at present times, under the conditions of accelerated environmental change, a more systemic, less compartmentalised idea about the possible types of social institutions, which also includes the ecological knowledge gained during the last decades of environmental research, needs to be developed. In particular, that which takes into account relational, intricate, and indivisible nature of social and ecological phenomena, and which can illuminate the consequences of such indissoluble connections (Freese, 1997). Technological innovations such as genetically modified crops are as much part of nature as of culture and have become part of social structure since the moment global transpolinization of GM seeds (otherwise called contamination) become irreversible and at global scale. As another example, a market with its price value system is at the same time an economic, political, cultural and ecological institution. As economic institutions, markets distribute (unequally) both wealth and welfare on the basis of monetary exchange and utility values (Schnaiberg & Gould, 1994); as political institutions, markets are the foci for the resolution or the intensification of power conflicts; as cultural institutions, markets constitute some of the most powerful means of communication and (mis)information about stocks of natural resources through the price system as well as of social representation of social distinction, inclusion and exclusion; and finally, and with regard to their impacts on the environment, markets have become embedded as part of and one of the most important drivers determining of the dynamics and change of global and regional ecological systems. To think that a market is only an 'economic institution' is not only a very serious and dangerous reductionism but also one which has very serious and perverse environmental and social consequences.

One of the earliest reflections from an environmental sociology linking the issue of social learning, sustainability and structural change was provided by Lester W. Milbrath in his work *Envisioning a Sustainable Society. Learning our way out* (1989). In a chapter entitled 'An inquiry into social learning', Milbrath underlined that 'we will have to design social structures that nourish it' [social learning]. In his view, social learning occurs when a dominant institution or practice is replaced by another'. Here we talk about societal practices and norms shared by a large collective of actors. He recalled the contributions made by Argyris and Schon (1978) who distinguished 'between single loop learning, which is experimentally based incremental learning, and double loop learning where the learner becomes aware of the assumptions and values on which it is based and is capable of major shifts [within the frames] of reference'. And then, by mentioning Trist (1980) he argued that we need to develop our capability for double loop learning, both at the personal and at the social level, as we are increasingly moving into a 'turbulent environment' that requires to improve the adaptive capacity and not merely to learn how to do the same better. Furthermore, learning also entails a completely new way of thinking and a radical change in values. The importance of changes in values was also taken into account by Argyris (1999) who refined his concept by introducing triple loop learning where he makes a distinction between change in governing assumptions and cultural systems of reference (double loop) and changes in governing values (triple loop). Milbrath had a clear view in which direction social learning for sustainability should go and for him (p.85-87, adapted), we must learn:

- How to become conscious of our ways of knowing.
- The crucial role played by values and beliefs in the shaping of reality and that science is not value free.
- To reason together in public debate about our values to use it in redirecting scientific development and society.

[4] Max Weber 1978 (1922). *Economy and Society: an Outline of Interpretative Sociology.* Edited by G. Roth and C. Wittich. Berkeley: University of California.

- About the complexity and interconnectivity of ecosystems and the implications of these for social action.
- To think holistically, systemically and integratively.
- Not to exempt human societies from nature but learn to live in harmony with it rather than dominate it. Avoid interfering with nature's systems and cycles and recognise the limits to growth.
- We need to learn to empathise with, and extent our compassion to people of other lands, to other species, and to future generations, in order to preserve the integrity of the ecosphere and the survival of us all.

While these words may sound too grand, it is clear that they are increasingly making much more sense and becoming more ingrained in contemporary political language than when they were first stated. Some of these statements still may sound too daring to many audiences and may easily be subject to ridicule. However, it is clear that a business-as-usual way of thinking will not lead human societies to sustainability. Learning new worldviews and paradigms, which necessarily need to be reflected in new ways of talking, is necessary. For that, and according to Milbrath, *a learning society towards sustainability*:

- *Would utilise of a wealth of information*: and should overcome the legal, social or financial barriers for an easy sharing of such information.
- *Finds better ways to disseminate and use information*: e.g. by means of a 'world electronic library' aimed at helping 'to understand ecosystemic processes, resource stock and depletion rates, and anticipate consequences.
- *Emphasises integrative and probabilistic thinking*: starting from basic education, people need to learn to think in long time /space frames of reference and holistically.
- *Emphasises values as much as facts*: society need to learn how to learn from others' values and how they relate to the interpretation of facts.
- *Is critical of science and technology:* in a structural way, to develop procedures evaluate and control the role of science and technology in society.
- *Combines theory with practice:* scientific understanding is not enough, change must also be oriented by purposive action.
- *Is consciously anticipatory*: people should ask themselves: 'we can never do merely one thing' and 'and then what'.
- *Thinks that change is possible*: people need to be empowered in order to believe that change is possible and that they can participate in its direction.
- *Examines outcomes to learn from them*: systematic evaluation of feedbacks are necessary to assess the outcomes of learning and support social learning.
- *Develops institutions to foster systemic and futures thinking*: in government, business and other major organisations.
- *Institutionalises the practice of analysing future impacts:* in order to try, in major societal decisions, to follow the basic principle of 'taking a look before we leap'. Methods for 'value impact analysis' need also to be developed.
- *Reorients education toward social learning:* educational institutions need to incorporate the principles of systemic, future, integrative thinking and others expressed above, as well as to foster moral reasoning.
- *Supports research*: encouraging interdisciplinary research and the reframing of research toward a more harmonious relationship with nature. While the goal of universities, is to encourage social learning, when they put obstacles to such research, ironically, become obstacles to social learning.
- *Maintains openness and encourages citizen participation*: enhances frequent connections between citizens to foster learning between them and to counter-balance an excessive bureaucratic policy making.

Therefore, **social learning toward sustainability is a process that involves a multiple-agent strategy in which a whole set of social assumptions, objectives and means and established institutions to achieve those objectives that are usually taken for granted are put into question and finally can be redefined and modified through a collective action.** In such a process, science may not make normative claims which values and norms of conduct a future society oriented towards sustainability should adopt. Science, for

instance, may limit to the developing scenarios that portray the implications of different value systems with embedded assumptions, actions and management strategies.

It would be inaccurate for a complete analysis about the extent and implications of the processes of social learning if one only looked only at the changes occurring at a single type of political, economic, or cultural institutions present in particular European river basins and disregard completely the changes and close interactions occurring between them at a structural level. In our view, it is clear that changes taking place in a subset of economic institutions have interdependent, multilevel, and multiplicative effects on another set of institutions, such as the cultural and political ones, and vice versa. In turn, the new changes create new structural conditions which affect the innovation and the implementation of new technologies as well as the ecological basis which constraints or enhance human development[5]. Figure 5 describes in a synthetic way important the elements of the governance context which influence and are influenced by the results of social learning. We can only grasp the extent and real implications of multi-scale social learning by looking at changes occurring at structural level in a multidimensional guise[6]. However, and in order to carry out such task, we need to analyse carefully the particular changes happening in the different institutions at a more manageable level. This is what the HarmoniCOP project has attempted to do by focusing at the processes and the dynamics of water resources management and planning at a river basin scale.

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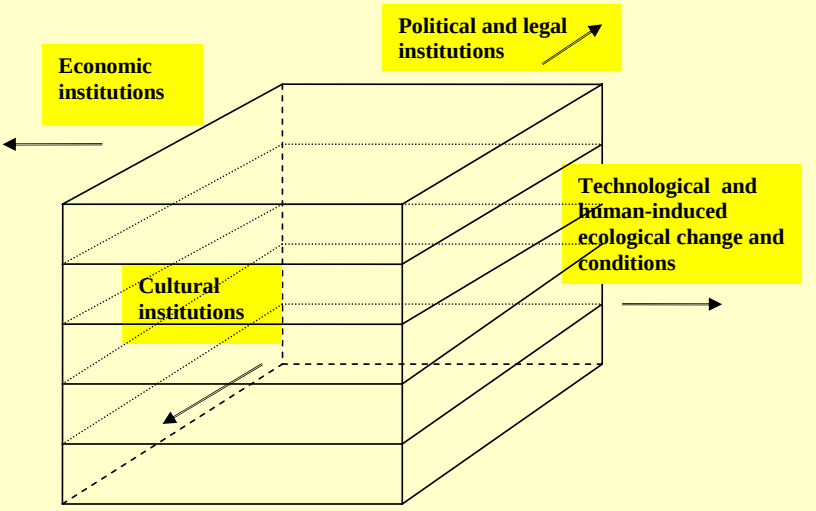


Figure. 5 Social structure (e.g. of a river basin) as the human-created context result of the aggregation, growth and interplay of multi-layer economic, political, cultural institutions as well as technological and human-induced ecological change (now global). Social action and social learning takes place within this indivisible structural setting, although in turn, this social setting can be changed by social action as a result of social learning.

[5] As already pointed by Burch thirty five years ago (1970): social structures change as the result of the changes in the availability of natural resources.

[6] At this stage it may be worth clarifying the relationships which exist between social structure and culture. While some deeply ingrained components of culture can be considered as autonomous –since all attempts of trying to be modified are bound to fail as are out of reach from human volition- others are conditioned –although not determined- by particular and historical cultural institutions result of social action such are the educational systems, the mass media or the marketing systems. The latter are the cultural components of the social structure, that is, the relatively stable means of the reproduction of a certain culture, but not the contents of culture itself. Social learning with regard to sustainability issues depends to a large extent on the possibility to develop adequate cultural institutions which can help to develop a culture more suited to adapt to the new ecological situation (Tàbara, 2002).

As will be argued in section 5.2. institutional designs which encourage a certain degree of decentralisation and facilitate experimentation, deliberation, and learning may be more capable to cope with the challenges posed by the need to move towards a sustainability transition within river basin management systems. In this line of thinking, the case studies and empirical research carried out by the HarmoniCOP project have centred their analysis in the dynamics occurring in the of some of those different types of institutions as a result of public participation and deliberative processes at national and river scale levels. In our view, social learning occurs in different stages and is initiated by ***actions*** taken either by particular individuals or institutions which confronted with the conditions of particular ***contexts,*** which provide their initial conditions and resources; then, if actions are successful, they may be able to ***change*** specific frames, boundaries, interests, strategies, networks, knowledge production processes, perceptions or discourses in the desired or expected manner; and if those changes affect to several different types of institutions in a desired collective way –e.g. improving ecological adaptation- then, social learning can be said to have occurred also at the ***social structure,*** the ultimate scale influencing local action at the individual level. Hence, we now turn to the examination, in an integrated cross-comparative manner, of the key lessons with regard to the social learning dynamics and its effects on social institutions and its possible consequences on the adaptation of existing socio-environmental structures to the challenges of sustainability (Fig.6 and box2).

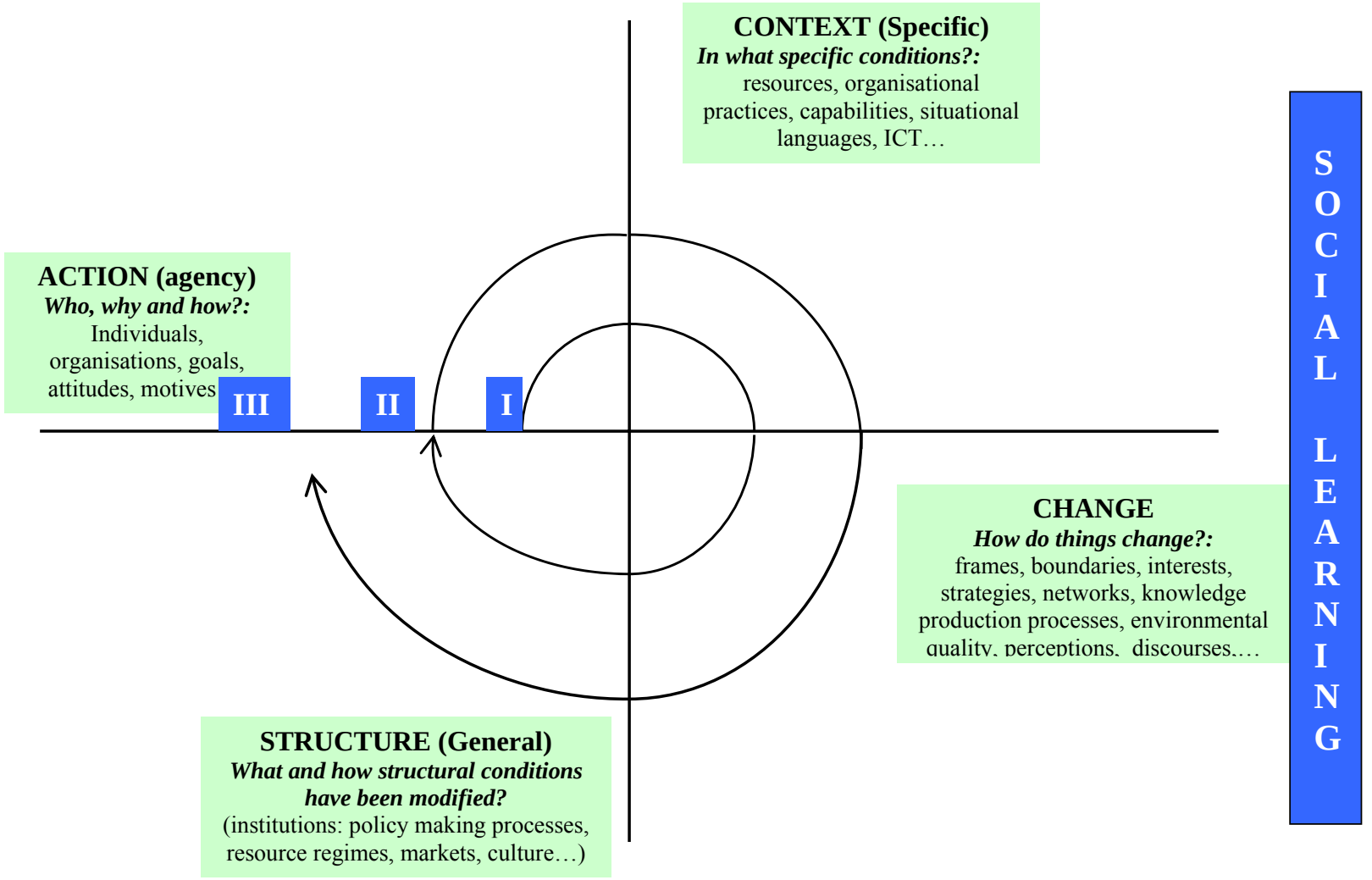


Fig. 6. Social learning as a sequential structural change induced by social action. This graph portrays the feedback loop between context and participatory process in Fig. 4 in more detail as an iterative cyclic process.

Democracy and protection of human rights as structural social learning.

It may be difficult to find examples of social learning and to assess whether a whole society learns or not on a particular issue. However, some social processes of change can be understood to be the product of social learning. Social learning occurs when societies succeed in creating new desired social conditions which are *not only different but better* from those of the past according to the organisations and actors who have participated in their creation. These processes are usually the result of an intricate mix of collective reflection, cultural innovation and purposive social action which materialise both in particular rules and institutions as well as in individual manners, languages and attitudes.

The number of democracies increased worldwide during the whole XX century, together with the institutions devoted to protect human rights and free elections. This new situation has prevented some of the most blatant inequalities and unjust situations which are still present in the existing authoritarian regimes. The emergence and consolidation of democratic regimes in large parts of the world is not the result of chance, but can be seen as the consequence of social learning. However, while democracies may have been institutionalised formally in many countries, it is clear that still many difficulties remain. Democracy can only fulfil its functions in the delivery of responsibilities and in the protection of common rights and liberties to the extent citizens also participate in the making and remaking of its institutions. Adequate working of democratic institutions does not only need of formal rules and procedures but also of active commitments and civic attitudes held by the society at large. In a parallel guise, social learning processes in other fields like the environment, in order to be complete, need to be materialised both at the institutional level –as structural constraints and opportunities- and at the individual level -as a set of attitudes and a customary behaviours. It entails a process of cultural adaptation and evolution upon which moral and civic education plays a most decisive part. Similar to the learning of *tolerance* – e. g. respect and active protection of others' values, lifestyles and beliefs-, it implies a generalised personal attitude as well as an institutionalised practice which can be seen as a result of social learning.

Box 2. An example and the conditions of structural social learning.

3. LESSONS LEARNT FROM EUROPEAN CASE STUDIES.

3. 1. Social learning and public participation in 9 national case studies.

As indicated in the previous section, social learning entails a recursive process in which the eventual outcomes of public participation are not only affected by the original contexts from which such involvement departed but also the results of public participation eventually modify such contexts. New institutional, environmental and other structural conditions and personal attitudes are generated as the result of social learning, giving way to new opportunities and/or to new constraints for social learning and participation. HarmoniCOP Work Package 4 carried out a comparative analysis of 9 European national case studies to explore such original conditions, traditions, and the evolution to public participation in RBMP. Their results help us to find out about the extent to which these original conditions where modified, contributed or constituted barriers to public participation and social learning. Different opportunities and constraints to social learning were identified on a case by case basis and reflected the varying nature of historical circumstances in each particular country. The national contexts analysed were Belgium, France, Germany, Hungary, Italy, Spain, Switzerland, The Netherlands, and United Kingdom. A wealth of information can be found in the WP4 report and those interested in further information should consult WP4 that document (Patel and Stel, 2004). It is very difficult, if not impossible, to generate far-reaching generalisations across such a diversity, because as noted earlier, each context is unique both in socio-political and environmental terms. However while our analysis in this section draws extensively on that report, it has mainly looked at some common patterns and has succinctly concentrated in the following issues:

- Historical, cultural and environmental background.
- Influence of the governance structure.
- Recent experiences and new methods for public participation, social learning and knowledge integration.

3. 1. 1. Historical, cultural and environmental background.

While diversity characterise the different traditions upon participatory processes have been set up in the several countries studied by the HarmoniCOP project, there are several commonalities in the way river basin water resources have culturally been perceived and have also been historically managed by the different nation-states. Such differentiated traditions have also resulted in inertias which have conditioned the contexts, processes and goals of public involvement in the domain of water policy and thus their possibilities for social learning in RBMP. For centuries, and more intensively after industrialisation, rivers had been perceived as strategic assets which had to contribute to the national interests, where users' economic profits had to be maximized and attendant risks -such as floods and insufficient supply- controlled. Hence, the maintenance of ecological conditions was not understood as a priority; on the contrary, the dominant rationally understood that rivers had to be modified to meet these goals. This created a set of well-ingrained visions of river basins as engineering problems in which the control over their forces to a large extent represented the success of the building of the nation-states. In the United Kingdom, for instance, such engineering tradition goes back to several hundreds years, while in Belgium and The Netherlands, an extensive network of inland waterways, ports and dikes altered completely the original conditions of the river basins. In Spain, such tradition was epitomised by the building of reservoirs to control water supply variability. As a result, Europe was creating a throughout new artificial socio-economic and inland aquatic environment in which the new relationships between river basins actors and public institutions had to take place.

During the last decades, environmental awareness has risen substantially in many European countries and this may have been incorporated in the way water resources are regarded and dealt by resource decision-making institutions, citizens and users. An institutionalised environmentalism, tinged with market and corporate tones, can increasingly be found across European resource management institutions. However, in this regard, many differences also existed in Europe. While in Germany, the rise of the Green party was a reality in the early eighties, in Spain, a distinctive green party with seats in Parliament still does not exist[7]. Even though, at the level of the perception of water and water management this may be changing even in countries like Spain

[7] Studies made in the nineties on environmental awareness (R. Inglehart, 1995), for instance, showed Portugal and Spain as the top of a list, out of a selection of 43 countries which included some from Africa, Asia and Latin America, with the lowest willingness to pay for environmental protection.

usually associated with little environmental awareness. The 'New Water Culture' movement, which seems to have affected Spanish water policy and also move across Europe is one prime example. The goal of achieving the good ecological status of all European river basins expressed within the WFD may reflect this overall trend towards the greening of certain domains of public policy. Furthermore, the emphasis given by the WFD to adapt water management to the river basin scale can be interpreted as the influence of 'bioregionalism' (see Cronnon, 1996), a ideological strand of environmental thinking which was most popular in the seventies and eighties, but which became both institutionalised and disguised in many environmental management proposals in the nineties. This notwithstanding, large differences are still present and these are not only related to the distinct cultural and institutional backgrounds influencing water management but also to the biophysical and environmental conditions in which the WFD must take place, a contrast which is particularly sharp between the Northern countries and the southern Mediterranean ones.

Institutionally, the development of regimes for the management of river basin water resources had already started in many European river basins centuries ago. For instance, in *l'Horta de València* in Spain, a regulatory allocation system for water users was set and run until the modern times for five hundred years (see Ostrom, 1992; Becker & Ostrom, 1995; Maestu, 2003). In the Netherlands, water boards were also established as early as in 1100 (Enserink et al. 2003). The expansion of industry, the mechanisation and intensification of agriculture and the growth of urban settlements generated new problems and challenges for the management of European river basins. The new situation produced the need for the formation of new river basin associations, as it was the case with Germany (Kampa, et al. 2003) and Spain (Maestu, 2003). The thrust for public participation in river basin increased as the environmental conditions and the interests involved the management of water resources were becoming increasingly complex. In the XX century, the political arrangements in the post-war period were also very different within the distinct European countries, creating also very distinct institutional conditions for the management and planning of hydrological resources. Authoritarian regimes of Spain, East Germany and the Eastern European countries did not leave much room for democratic and open participation of stakeholders, hence affecting the political culture and the perception of the meaning of participation. However, even in these contexts, as it was the case of Spain, the importance of involving local stakeholders in the management of water was recognised.

It is difficult to assess whether such original cultural and institutional historical conditions which to a large extent have determined the content, processes and outcomes of public participation in RBMP have substantially been altered in recent times as a result the new experiences in public involvement, as those promoted now by the new Water Framework Directive. For instance, different political cultures have also had contrasting impacts on the way public involvement in public affairs are conceived. Certainly, many of the old cultural perceptions, institutional values and traditional practices are still well present today and it will require a wide and sustained process of social learning before they can be significantly modified. The nine countries analysed have shown different approaches and periods of stakeholders' involvement at river basin scale. Such differences can be observed not only between countries but also within them. However, one of the main observable results from the analysis of the national experiences within the HarmoniCOP project is that **public participation in river basin is not a new matter in Europe.** Some countries have a long tradition of involving stakeholders and users in the management of river basin water resources, have adopted differentiated approaches to it, and in turn, have created differentiated conditions for its materialisation. Taking into account all these particular experiences and contexts is necessary understand the current evolution of participatory and social learning processes within European river basins and may be may prove crucial for the successful implementation of the WFD.

3.1. 2. Influence of governance structure

Across Europe, very distinctive institutional structures influencing the planning and management of water resources at river basin scale were also present. Some countries studied by HarmoniCOP, such as Switzerland, had already a very de-centralised structures, while in other contexts, such as in France or the UK, policy decision were taken from strongly centralised arrangements. These differentiated situations also generated distinct structures of opportunities for the involvement of stakeholders, as well as they limited or enhanced the flows of learning feedbacks between the distinct levels of governance. However, even in France, a move has been noticeable in the direction of de-centralising its governance structure, although the territories covered by current water authorities are still too large as to stimulate sustained action at the local level (Le Bourdhis, 2003). In Spain, the process of democratisation initiated after the end of the Franco dictatorship was combined with a process of strong de-centralisation which, according some authors, prevented the break of Spain in multiple nations as it has been the case in other democratic transitions processes in Europe. This has meant that

responsibilities for river basin management and provision of water services, specially now with the new ecological approach of the WFD, are strongly divided between national, regional and local levels of government. For instance, in Germany, power is very much divided between federal, *lander* and the local administrations, and while on the one hand, this situation may stimulate public participation at the local and regional level, a quite rigid hierarchical structure may also constitute a hindrance for communication between the different the local and the federal level (Kampa, 2003). A similar situation can be observed in Spain where the costs and times of coordination between the 17 Autonomous Communities, the 9 river basin authorities, the thousands of local municipalities and the central government can be high. The coordination of this multi-level forms of cooperation is a challenge for public participation and social learning, which becomes even more a manifest difficulty in trans-boundary river basins (a more detailed discussion on multi-scale social learning can be found in section 5.4.).

Moreover, a double process of *Mercantilisation* (intensification of market rationalities in public governance) and *corporatism* (increase of close links and interdependencies between corporate interests and public administration) has also been observed as a trend affecting the current evolution of water resources management decisions in Europe. In the United Kingdom, for instance, such trend was mostly illustrated by the privatisation of the eighties and nineties, and the increase of the mounting role taken by private water corporations in the management of water resources, mainly for urban supply. An increase of the corporate environmental decisions may have also blocked the power of non-organised and informal stakeholders to take part in the resource decision making process in Italy, hence also limiting the possibilities to integrate other sources of knowledge and policy judgement into the decisions (Massarutto, 2003). However, the influence of corporate interests varies within Europe. Mercantilisation is also linked to a larger process of *commodification* of the environment, where all environmental goods and services can be assigned an economic price, a cultural perception which still provokes strong resistances in many countries.

Indeed, the above process is also linked to another one also of with ambivalent characteristics. A two-sided process of *globalisation* and *localisation* is affecting current governance structures of natural resources, including water management. With regard to the former, it means that forces which drive social and environmental change are not longer located at the local, regional or even national level. Water demand at one river basin, e.g for agriculture, may be stimulated by global markets of high water intensive commodities (otherwise known as virtual water markets). However, institutional responses to those global forces tend to be situated in the local and regional spheres. Crisis of legitimacy of the policy making structure has also resulted in a greater emphasis in the local decision making, which is supported by the greater demands for transparency and democratic control over the natural resources use, now flowing at global scale.

In short, HarmoniCOP found out that the overall **success of public participation experiences, in order to become a means for social learning depended very much on the changing conditions of socio-economic and governing systems**. This is the case, for instance, of the emerging governing structure in France which eventually encouraged insertion of new actors into the institutional framework and transformation of the content of policies; or in the case of Spain, where successive governance systems provided new and 'self-made' conditions for stakeholder interaction. The reasons for such structural changes in the governing institutions, in some cases, may respond to the interplay of internal forces, while in others, external pressures or alliances, such as those from international cooperation or legislation may be the trigger of change.

3. 1. 3. Recent experiences and new methods for public participation, social learning and knowledge integration.

While experiences in public involvement in the management of water resources are not new in Europe, it was mainly during the nineties when a whole new set of initiatives aimed at engaging stakeholders at community level were tested and developed in more extensive way. Some of these new initiatives took the form of exploratory and experimental designs, while others aimed at having a more substantive impact on policy decisions. It is important to note that local governments promoted many of these new proposals. The new wave for participation also responded to different reasons (see section 2.2), although in general, there was a manifest need to find new ways to improve the efficiency, equity, transparency and legitimisation of increasing urgent, more complex and compromising policies. The search of valid procedures for implementation of Local Agendas 21 was an important source of inspiration and the lessons learnt from those experiences have proven to be very valuable also for the understanding of the potential and limitations of public involvement in the management of water resources at river basin scale. In this regard, the trend towards enhancing public

participation in river basin decisions cannot be separated from a larger similar process aimed at improving the quality of policymaking. Within this mood, criteria such as co-responsibility, proximity and identification of those affected or involved in the creation of public problems are seen that should also be in charge in participating in the design and implementation of their solutions are receiving greater salience. Evidently, there are other contextual factors which have lead to an increase in the search of innovative forms of public participation. This is the case of Switzerland, where an increased awareness of the limitations of the old systems for flood control, yielded new plans proposed by the Cantons for integrated RB in which the importance of public involvement was recognised (Simeoni, 2003). Nevertheless, problems of representation of diverse interests in RBMP in all these new experiences still have not been solved.

Within the HarmoniCOP project, such trend of increased engagement of stakeholders at river basin scale was clearly visible in countries such as Belgium with the creation of the Flemish Integrated Committee of the Consultation of Water (Van Rossen, 2003) or also in The Netherlands with the experience gained from the Scheldt Estuary. In the latter country, some institutions have been particularly active in experimenting new approaches, methods and tools for public involvement, as those developed by ABC Delfland (Enserink, et al. 2003). An array of new approaches and new tools for public participation were being tested and used also in the UK, Germany and Hungary, while in other countries like Spain such new procedures and methods for participatory water management were tried and developed later mainly as local or NGOs initiatives. However, most of those public participation initiatives limited involvement to organised groups only, such as users and corporate interests, or at too later stages in the consultation processes; for instance, once the most important decisions related to the management and planning of water resources had already been taken. This was the case of many countries studied by HarmoniCOP as for example, Switzerland or Italy, where in the latter case weak forms of public participation (see section 5.1) were only allowed at the implementation stage. Furthermore, as in the case of Belgium, some of these processes raised high expectations which responsible coordinators feared to be unmanageable. In general new proposals for enhancing public participation at river basin scale has provoked ambivalent reactions. While in some cases, suck as the UK or Germany, such initiatives were highly valued, in other contexts like in Italy and Belgium enthusiasm was less evident and they raised some suspicions. Nevertheless, participation may also be seen as a way to channel and deal with conflict and obtain the positive lessons that divergent perspectives and interests may bring into the policy making process, while enhancing the legitimacy of the governance structure without jeopardizing it.

In addition, in those institutional structures where the formal distribution of responsibilities with regard to the management of water resources was perceived as to complex, bureaucratic, or hierarchical, as it was the case of Belgium and Germany, such institutional arrangement may have acted as constraints for the success of the new initiatives to public participation. The lack of legal requirements and of financial resources to support and to enhance public involvement has undermined many of the possibilities of engaging relevant actors at river basin scale. 'Participation', as was visible in the case of Italy has occurred only between different administrations (Massarutto, 2003)[8] and mainly within the same layer of administration but not along the different scales of it. New participation processes may threaten existing structures of power, and this may explain the resistances and the aversion of some public officials to open up their spheres of action and share their authority. Moreover, there exist important difficulties to overcome in order to improve the communication and to share the knowledge and experiences from not only between the different European contexts but also within each country. In some cases, as in Hungary (Ijjas, 2003), international water organisations provided assistance and cooperated with national institutions, facilitating the implementation of more open and transparent procedures for resource planning and management.

Despite these difficulties, some interesting good examples linking new scientific approaches within resource management and public participation have been observed within some European countries studies by HarmoniCOP. For example, in the river Thur in Switzerland, a process of re-naturalisation was linked to the enhancement of public involvement, in line with the new approaches proposed by this report which see sustainable river basin management in the direction of supporting *hybrid self-organisation* (see section 5.3). In the UK, some experiences followed similar purposes, as in the case of the river Brent rehabilitation and restoration project, where sufficient funding and consultation was possible from the beginning of the process and allowed the use of an array of different tools and methods for public involvement (Tunstall & Green, 2003). In the Baix Llobregat, Catalonia, Spain, the setting up of an institutional system for the common management and distribution of responsibilities between users prevented a typical 'tragedy of the commons' situation in the aquifer's waters use, helping to ensure the long-term sustainability of the resource. All in all,

8 Otherwise called administrative *cooperation*, not participation.

these examples show that **social and sustainability learning *can* occur, whenever plural sources of knowledge and the involvement of science, policy and citizenship are integrated for the conscious and enduring improvement of both social and natural conditions**. Whenever public participation has been used in an in-depth orderly way, managers at RB have recognised the improvement in the quality of the decisions, despite also have admitted that a lot still need to be learnt in this regard. Setting systems which make possible sharing experiences between different river basins and also at the different levels of governance seem a crucial step in the process. Whenever public participation has been used in an in-depth orderly way, managers at RB have recognised the improvement in the quality of the decisions, despite also have admitted that a lot still need to be learnt in this regard. Setting systems which make possible sharing experiences between different river basins and also at the different levels of governance seem a crucial step in the process.

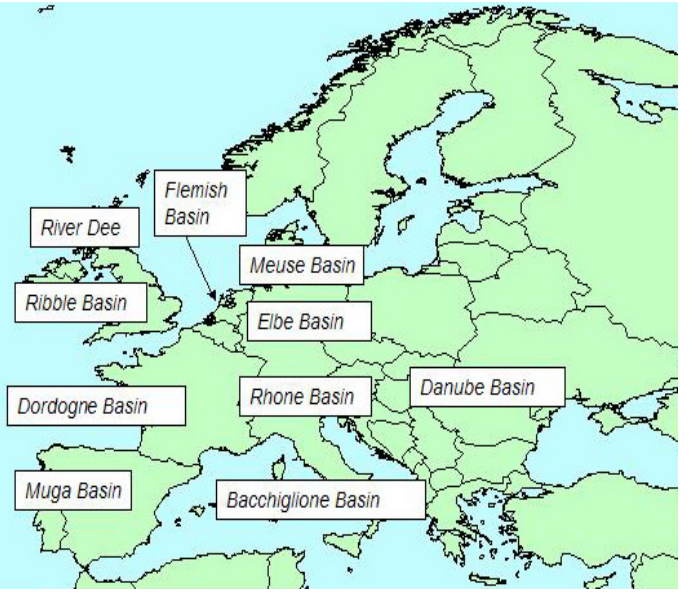
In sum, different issues have contributed positively to the creation of more favourable conditions for public participation and social learning in RBMP. While in some contexts the value and potential of public participation in RBMP still has not been sufficiently appreciated, others have already carried out exploratory experiences, develop new tools, and implemented procedures to open up and extend the current boundaries in which river basin policy making currently takes place. The implementation of the public participation provisions of the WFD will be conditioned by the differentiated experiences gained in this earlier and more experimental stage of the new forms of involvement of stakeholders in RBMP. Some countries, such as Germany, had already been preparing for the WFD during the nineties, and this may have allowed them to already accumulate a wealth of know-how which may be lacking in other countries. However, **WFD must provide a clear definition of what constitutes the 'public', and set explicit, open and fair criteria of representation together with the attendant system of responsibilities. It also must set clear guidelines on the actual role and influence of the consulted publics into the policy making process and in particular in the relevant decisions to be taken in RBMP** –e.g. to which extent or in what type of issues such role is limited to information, to consultation or to real participation. Furthermore, as expressed by Patel and Stel (2003:24) such guidelines must be built upon and stimulate synergies departing from the existing experiences instead of replacing them. Otherwise, risks abound. Not only potential conflicts around an increasingly scarcer and valued resource could materialise, but also ambiguity in these issues may jeopardise the incremental gains in terms of improving the sustainability of RBMP and the quality of social relationships of RB communities derived from greater opportunities for public participation. Furthermore, as expressed by Patel and Stel (2003:24) such guidelines must be built upon and stimulate synergies departing from the existing experiences instead of replacing them. Otherwise, risks abound. Not only potential conflicts around an increasingly scarcer and valued resource could materialise, but also ambiguity in these issues may jeopardise the incremental gains in terms of improving the sustainability of RBMP and the quality of social relationships of RB communities derived from greater opportunities for public participation.

3. 2. Social learning and public participation in 9 river basin case studies

The HarmoniCOP project, besides carrying the analysis of the national contexts, had also a closer look to the conditions, processes and contexts of public participation and social learning at a river basin scale (Rees et al 2005). Originally, a total of 10 of nine river basins, of very different characteristics and issues at stake were selected in each of the national case study countries. However, the originally planned Scottish case study on River Dee could not be completed due to unforeseen private problems of the principal scientist in charge of the study (Table 1 and map 1).

River Basin	Country	Lead researchers	Sources[9]
• Ribble Basin	England and Wales	Miles Davis	Davis et al. (2004), Tunstall and Green (2003).
• Dordogne sub-basin of Adour-Garonne Basin	France	Jean Pierre le Bourhis Bernard Barraque	Barraqué et al. (2004, 2005).
• National level: Hungary/ sub basin of the Danube	Hungary	Krisztina Botond,	Ijjas et al (2003, 2004)
• Rhone River	Switzerland	Gianpietro Simeoni	Colenco (2003, 2004)
• Elbe Basin	Germany	Ilke Borowski	Borowski (2004)
• Muga River basin (plus additional reflections on Aquifer 23).	Spain	David Saurí, David Tàbara Josefina Maestu	Tàbara et al. (2004, 2005).
• Bacchiglione River	Italy	Alessandro di Carli, Antonio Massarutto	Massarutto (2005a, 2005b).
• Demer Catchment – part of Sceldt River Basin	Belgium	Marc Craps Edward Van Rossen	Craps and Prins (2004); Van Rossen (2004)
• Meuse River	The Netherlands	Henriette Otter	Otter et al (2004)
• Dee estuary	Scotland	Susan Walker	Walker (2003), Searley 2005).

Table 1. River basins and researchers involved within the HarmoniCOP project.



Map 1. River basins analysed by the HarmoniCOP.

The factors used within work package 5 to characterise the case studies covered the following

- Process issues:
  - Case Study Typology;
  - Stages in process covered;
  - Driver for Participation;

[9] These include also papers from national reports. This list is not exhaustive; information on those river basins was also included in many other power point presentations and posters produced during the course of the project.

- Environmental issues:
  - Level of Scale;
  - Case Study Area;
  - Trans-national RBD;
  - Main Water Uses;
  - Environmental pressures;
- Institutional issues:
  - Type of lead organisation;
  - Lead organisations' responsibilities;
  - Scale of Lead Organisation Involvement;
  - Other key types of organisations/SH's;
  - Total number of organisations involved;
  - Structure/s for Involvement;
  - Responsibilities;
  - Conflicts;
  - Evidence of Actor Alliances;
  - Relationship with other plans;
- Socio-economic issues:
  - Population;
  - Demographic breakdown; and
  - Previous PP Experience.

Furthermore, HarmoniCOP WP5 assessed the results on social learning of the river basin case studies on the basis of evidence on the following outcomes derived from participatory processes:

- Process outcomes

- Effectiveness of networks;
- Active management of boundaries;
- Promoting two-way flow of integration across levels of scale; and
- Development of new institutions.

- Social outcomes

- Increased understanding of key issues;
- Changes in perspective derived from the process;
- Building trust and improving relationships between different groups of SHs; and
- Social empowerment.

- Environmental outcomes

- participants agreeing about what constitutes an improved environment prior to deliberation;
-
- Based on an commonly consensuated objective notion of an improved

- To the extent social learning contributed to the delivery of the WFD

While that analysis provides important insights on this matter, it also made clear that more refined indicators are still needed to assess the progress of social learning in resource management as it is the case with RBMP. Table 2 provides a selection of the issues used in the analysis of the HarmoniCOP river basins (except Switzerland), which illustrates the large diversity of the physical and socio-political contexts studied by the project.

CONTEXTUAL ELEMENTS	Belgium	Netherlands	England & Wales	Scotland	France	Germany	Hungary	Spain	Italy
River basin	**Demer catchment**	**Meuse river**	**Ribble basin**	**Rive Dee**	**Dordogne**	**Elbe**	**Danube**	**Muga**	**Bacchiglione River**
Environmental									
Scale (RBD, River Basin, Sub-basin)	Below sub-basin (Valley)	RBD	River Basin	Sub-basin Valley	RBD, sub basins (Cère, Céou)	RBD Sub-basin	RBD/International RBD River Basin Sub-Basin	River basin	River Basin
Case Study Area (km^2)	3600 km^2	3500 km^2	1800 km^2	21000km2	24 000 km^2 (1054 km2, 610 km2)	148 268 km^2 (Basin) Subbasin:5440 km^2	2000 - 93 000 km2	846km^2	3 000 km^2
Trans-national RBD (Yes/No)	No	Yes	No	No	No	Yes	Yes	Yes	No
Main Water Uses	Agriculture, Recreation Industry Angling Drinking water abstraction	Transport Agriculture Recreation Drinking water abstraction	Agriculture Recreation Drinking water Abstraction Salmonid breeding	Industry Drinking water abstraction Recreation	Hydroelectricity Urban Wastewater discharge Fishes and fishery, ecological management, Recreation, Tourism	Agriculture Drinking water abstraction Urbanisation Recreation Industry Power Generation/ Navigation	Agriculture Flood-protection Nature-protection Irrigation Eco-tourism	Drinking water abstraction Tourism nature conservation Agriculture	Agriculture Tourism Drinking Water Abstraction
Environmental pressures (List 3 most significant)	Lowering of groundwater levels Hydromorphological impacts arising from river widening and straightening	Hydromorphological impacts due to canalisation	Industrial discharges Impact on environmental flows from abstraction	Eutrophication Urban and industrial wastewater discharges Hydromorphological impacts from agriculture Diffuse pollution from agriculture	Impact on environmental flows from hydroelectricity (Morphological pressures arising from sand and gravel extraction)	Diffuse pollution from agriculture, Urban wastewater and industrial discharges and impacts on hydromorphology from navigation	Falling groundwater levels due to over-abstraction and river training Illegal disposal of waste containing hazardous substances Hydromorphological changes	Urban discharges Over abstraction	Urban wastewater discharges Industrial wastewater discharges
Institutional									
Type of lead organisation (environmental, planning, transport, NGO,)	Environmental and Navigational (Government)	Public works and water management (Government)	Environmental (Government)	Environmental (Government)	Environmental (national government, local government and SH deliberative assembly)	Environmental	Agricultural (Government) Environmental (Government) Nature protection (WWF)	Environmental (Catalan)	Water Services planning

Lead org responsibilities	Environmental is competent authority regarding implementation of WFD (Low budget, previously supported by political party that no longer part of government) and Navigational is legal authority over river (High budget, supported by government)	Organise and facilitate participatory process. Plan development and implementation Formulate and adopt national water policy & competent authority for WFD	Competent authority responsible for implementation of the WFD and attending regional and local visioning workshops	Competent authority responsible for implementation of the WFD	Competent authority responsible for implementation of the WFD	Competent authority for implementation of WFD	Ministry for Environment and Water and Ministry for Agriculture and Rural Development are responsible for implementation of WFD and organisation of PP WWF/ICID/GWP are co-organisers of PP	Several institutions in charge of environmental planning, basic research and implementation of EU Directives	Competent authority for the planning of water service assets
Scale of Lead Organisation Involvement (National, regional, local)	Regional	National, Regional	National, regional and local	Regional Local	National, Regional, local	National/ Internation (basin); regional (subbasin)	National, Regional, Local	Regional	Local
Other key types of organisations/SH's (Resp's)	Regional environmental and water supply institutes Nature conservation groups, farmers etc (Regional, NGO) Provincial Government Municipal government (Government, Local) Polders and Wateringen (Government, Local) Local sections and committees (NGO, local) Committees	Env. & Spatial Planning (formulate and adopt environmental and spatial planning policy) Provincial (formulate and adopt provincial water policy) Local Councils (Manage sewers) Waterboards (operational water management)	Regional assemblies and development agencies, local government, Water authorities, Environmental NGOs, Industry, Local conservation groups,	Water Authorities Local Authorities	Water Agencies EPIDOR State Services Industry Services Local authorities	National environment ministry National co-ordination group (FGG) water authorities	Regional water management associations and NGOs Union of Water Management Organisations Local Governments Regional Authorities Environmental NGOs	Water Agency Private interest organisation (water companies, hydroelectric companies) Local Councils Environmental NGOs Irrigation communities	Water Companies Regional and provincial administrations Irrigation and drainage boards NGOs
Structure/sfor Involvement	Daily Follow Up Committee Planning Committee Steering Committee and work groups	Steering Group Project Group Theme Group (Process and Contents) Working Groups Reflection Group	Project Team Stakeholder Forum - Steering Group Stakeholder Forum	Steering Group Working Groups	River Basin Council Geographic Committees River Contracts Public Debates	Basin: Observer in technical working group; participant in annual meeting; Subbasin: Government Steering Group, Advisory Board Regional Fora	International Consortium National Consortium Stakeholder Organisations Local and National meetings Conferences	Integrated Assessment focus groups, focused interviews (consultation), web page, public hearing, local media, and other informal means of participation.	Project Team Operative Technical Team (GTO) Widened Technical Group (GTA)

Responsibilities	Daily follow up committee co-ordinate and steer process; Planning committee decision maker who determine vision Steering Committee consultative function	SG represents decision making level and provides advice to nat'l ministry PG safeguards co-operation between all parties involved WGs focus on issues such as potential measures	Project Team leads the process and will provide feedback to the national administration, the steering group within the stakeholder forum undertakes review and liaison between the Project team and the stakeholder forum. Stakeholder forum is the participation function	SG has full responsibility for decisions WG report to SG and resp for delivery of each sub-catchment project. Each gp has its own PP strategy	RBC-In charge of developing master plan (SDAGE) GCs-facilitate involvement of SHs at local and regional level River Contracts-programmes of measures	Gov't SG plays central role in co-ordination and implementation of PP	International Consortium - indicates the main issues National Consortium-responsible for financing and organisation, information-supply, reporting activities to the International Committee Stakeholder Organisations-responsible for travelling of their representatives, hosting of the regional and local meetings, feedback activities to the National Consortium	Research team takes the responsability to organise the consultation process and to integrate the diversity of knowledges and views relevant to support the assessment and management of the RB	PT - decision making responsibilities with respect to the different options put forward GTO gathers info/data to support solutions and mediator at workshops GTA resp for wider engagement of SHs
Conflicts	Lead organisations have different visions. Preventing flooding and making more agricultural land available vs preventing flooding and making making space available for river	Conflicts between national policy and province policy I.e. national - strong building restrictions in areas sensitive to flooding and provincial - oppose restrictions re spatial planning in sensitive areas	Historical conflicts between farmers and anglers, conflicts over moor land gripping affecting river flow	Conflicts between fishermen and recreational interests	Industrial interests vs recreational interests Fishing vs hydroelectricity		Agricultural interests vs environmental Civil Organisations vs Governments	nature conservation, water extraction, water pollution	water pollution, localisation of sewage
Evidence of Actor Alliances	Environmental groups tend to be aligned with the Water and Nature Administration while farmers and land owners with The Navigable Waterways Administration		At the current stage of the process, all actors are mutually trusting and putting aside traditional differences for the greater good		on one hand EdF, territorial communities, fishermen (sandres, brochets…), ecologists (with a global approach) tourism and on the other hand an other kind of tourism (gabarres, canoë…), ecologists (with a local approach) and fishermen (salmons, trouts)		Common projects: WMAs and WWF for revitalisation of floodplain areas and conservation of wetland habitats Implementation of the best agricultural practices	several local goverments, private interest groups and regional goverment agencies contribute in the monitoring of water quality and building of water infrastructure.	A rainbow movement linked concerns of general planning, beyond that of water management, develop as threats from tourism and development also increase in the county.

Relationship with other plans	Part of integrated RBMP required at RBD level and includes local sustainable management plans		RBMP will need to link with flood management plans, flood defence plans, shoreline management plans, catchment's abstraction management strategies, water utilities business plans		RBM need to link with local flood management, local management of fish populations, regional management of information about water qualities, national energetic strategy…		Common Agricultural Policy and Rural Development Plans Tools of CAP and RDPs for the implementation of the WFD were considered as very important issues	lack of integration with land use planning is also a source of conflict.	RBMP links to Regional Water Quality plan which in turn links to Water Infrastructure Plan
Socio-economic and political context									
Demographic breakdown			High proportion of low skill, ethnically diverse series of urban communities in basin	Population widely dispersed throughout middle and lower reaches	Predominantly rural Population density under national average	Made up of many rural states with low population density Following re-unification economy's have shifted toward public and private provision of services Unemployment in federal state of Brandeburg high	1990- Transmission of the market economy - restructuring of the society (restructuring of industry, agriculture, privatisation) 2004 - Joining to the EU: new requirements, possibilities, financing tools	significant decreases in population in inland areas and significant increases in population in lowland coastal areas. Largely a result of demise of agriculture and an increase in tourism and second residences	Multitude of small industrial towns as well as agricultural towns
Previous PP Experience		Limited to consultation of organised SHs	Minimal experience of PP, generally limited to consultation, actors used the example of a public participation / consultation over a water abstraction scheme as being particularly ineffectual	Information provision and consultation as opposed to active engagement	As in all RB in France since 1967 (with an hight speed since 1992), but EPIDOR was the first EPTB with a great experience of PP in RBM (since 1991).		public participation activities since the end of 80s (RBMPs) PP mainly limited to consultation with organised SH groups Long tradition of education on PP	single issue participation focused on nature conservation of coastal wetlands and sporatic situations of conflict related to water uses and quality.	No previous pp experience

Table 2. Characteristics and issues of HarmoniCOP river basin case studies (from Rees, et al. 2005).

Within the HarmoniCOP project the a total of 71 factors which enhance or constrain social learning for the case of river basins were identified. Those issues were classified according they related to the domains of action, context, change or structure as follows (see also Figure 6 in section 2.3):

- Action: individuals, goals
- Contexts: Capabilities; organisational practices, participation process design, resources, situational languages
- Structure: culture, institutions, markets, policy making processes.
- Change: Networks, boundaries, frames, knowledge production processes, environmental quality perceptions

To facilitate comparison and discrimination of factors was also ranked by asking each case study leader to score their relative importance in the processes. Table 3 shows the scores for the 9 case studies, plus one sub-case, scored from 0 to 3. Notice that a given factor can be both a mechanism which foster or constrain social learning, e.g. whenever sufficient time and resources are available or when these are not available.

Issue	**Ranking**	**Social learning category**	**Stage of Process**			**Total Assigned Significance**	**Total No. of case studies where issue observed**
			Preparation and planning	**Implementation**	**Evaluation**		
Continued, high motivation and engagement with high technical competence – personal qualities (establishing and maintaining legitimacy of organiser)	1	Action	1	9	1	19	9
Independent technical mediator/facilitator	2	Action	6	7	3	18	8
High level of commitment from the leaders	3	Action	4	5	1	13	7
Establish and maintain legitimacy/openness of project, continuous feedback, dissemination of minutes, questionnaires, comprehensive language, presentations and background documents	4	Context	2	6	1	11	7
Flexibility from both sides to do common work and move from original position	5	Change	1	3	0	10	4
Crisis moments/ issues of high concern e.g. flooding	6	Change	0	1	0	9	3
Organisers well trained in group interactions	7	Context	2	3	1	9	4
Clear expectations	8	Action	5	3	0	9	5
Joint planning of approach	9	Context	2	1	0	8	3
Providing sufficient time and resources	10	Context	1	4	0	8	4
Good exchange of information	11	Context	2	5	0	8	5
Limited number of participants to enable in-depth discussions	12	Context	2	3	0	8	5
Delegated leadership	13	Context	1	1	0	7	4
Clear ground rules for interaction	14	Context	2	2	0	7	4
Bilateral meetings to inform and to listen with a specific focus	15	Context	3	3	0	7	4
Cumulative nature – develop from past experience	16	Change	3	4	3	7	4
Strong river basin institution	17	Structure	3	2	0	6	2
Degree of interdependence amongst participants	18	Structure	2	3	0	6	3
Start from a blank-sheet, no pre-conceptions	19	Context	1	1	0	6	3
Common or shared area in the frames of all participants	20	Change	3	4	0	6	4
Frequent and focussed discussions	21	Context	3	3	0	5	5
Support of traditional political representatives	22	Context	2	2	0	4	3
Complementary multi-party interaction	23	Context	2	3	0	4	4
Close interaction of key stakeholders with relevant policy makers	24	Structure	1	1	3	3	1
Informal work groups and field trips	25	Context	1	4	0	3	4

Table 3. Mechanisms that constraint and /or foster social learning in RBMP with regard to the stage in the process of public participation (Extracted from Rees et al. 2005)

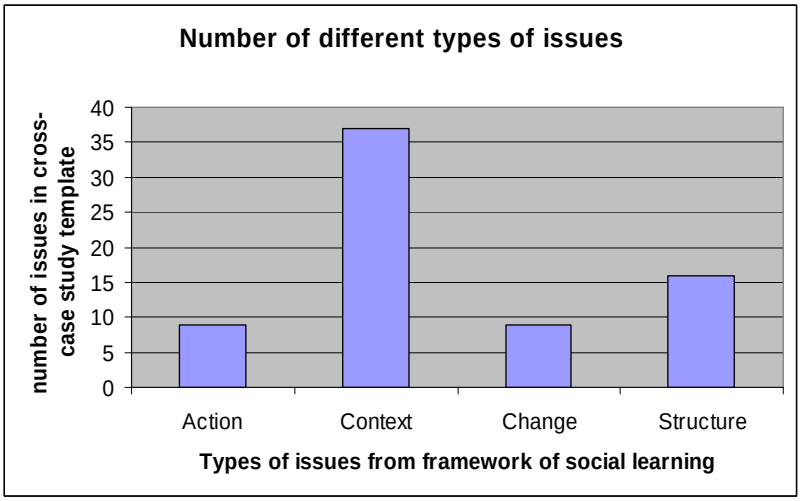


Figure. 7. Type of issues affecting social learning in RBMP in the HarmoniCOP case studies.

As shown in figure 7, contextual factors are those which score higher as determinants affecting social learning. It may be inferred from such analysis that it is by looking at the specificities of different contexts in which public participation takes place where social learning, including at structural level, may then occur. On the one hand, the mechanisms which were identified as contributing most to social learning had to do with a high level and enduring motivation, engagement and trust with the technical competence and with the organisation in charge of the participatory process. And this, in turn, was dependent on the capability of such organisation to show its independence, competence and ability to integrate different views into the assessment and managing process. As in the case of the experiences reviewed in the national case studies, having enough time and resources is a necessary condition to make sure an sufficient number of representative stakeholders are involved at a early stage and though all the process. On the other hand, the mechanisms which limited social learning had to do precisely with the lack of time and resources, and to the lack of realisation by stakeholders of the meaning and purpose of the participation processes and whether their involvement will actually make a difference.

***Cumulative social learning* and public participation in the Dordogne RB:**

- The French case study (Barraqué et. al. 2004) describes the participatory and social learning processes of the large river basin of la Dordogne at three different scales with particular emphasis in the development of the creation of the EPIDOR (Etablissement Public Interdépartemental de la Dordogne) and SDAGE (*Schéma directeur d'aménagement et de gestion des eaux*). With respect to the first, the role of the Observatory of the la Dordogne, the documents previous to the 'RB Summit' and of information technologies in the form of SIG is underlined. These helped to create a new representation of the river basin problems which was important and possible collective actions to take. With regard to the creation of the new institution of EPIDOR two elements which explain its success are mentioned, its capacity to provide expertise and its democratic legitimacy and credibility. Subcase studies such as the tributaries of the Céou and Cère are also explored with regard to the processes of 'river contracts'. At one point in the paper, participatory processes are taken as dependent variables to political and cognitive factors but also, on the other hand, the effects of such participatory processes –internet site, protocols, raising environmental awareness- are described. Of particular interest was the process of the 'Sommet Vallée Dordogne', which gathered over 150 representatives of the river basin and elaborated a Chart with 370 recommendations regarding the river basin water management. However, while the authors acknowledge that a hindrance to such document was the lack of precision of those agreed recommendations, they recognise that the whole process contributed to long-lasting transformation of the government at local level regarding water management. With respect to the evaluation of the river contracts processes of the Ceou and Cere the results appear somewhat ambiguous. Many interests and actors have been excluded and may have not produced significant impact with regard to improving the environmental quality and management of such river subcatchments.

- The discussion of the participatory processes around the *water levels* offers also an interesting example of how rivers increasingly become the social area for a growing number of interests in conflict (mainly between electric power production on the one side and fishermen a environmentalists on the other) and also how participatory processes can help to avoid the recourse to lawsuits. The studies promoted by EPIDOR, which supported the participatory process and which explored not only the technical hydrological issues but also their social perceptions, were important. In this respect, the role of the professional anthropologist who carried 70 in-depth interviews is thought to have contributed to provide a different view of the problems of the river basin, beyond technical issues. Other information tools, such as the graphs of variations of water levels were deemed to have contributed to changing previously held views.

- The French case study refers to social learning as the result of the 'accumulation of knowledge' regarding the phenomena affecting the river basin, in the form of data, studies or cartographic assets. Also it refers to social learning as a 'cumulative collective action'. This interpretation is particularly relevant and original and worth exploring in more depth, particularly with regard to how such pool of knowledge is kept, socialized, fed, distributed or maintained. That is, how such accumulation of knowledge or information really becomes social learning in changing social relations and frames (every knows that now we have more information but not necessary more knowledge as what is crucial is the relationships and changes which occur between information, the socio-political context and the actors involved; and also that if only *few* learn but the majority don't, this is not *social* learning). The distinction between 'technical mediators' and 'political mediators' is interesting and have been selected as 'key mechanisms' in the analysis but its role or description, is not entirely clear to me in the previous sections.

- But interestingly enough, the French case also distinguishes between the two forms of social learning and this reminds two types of social learning identified in the Muga case study: those between *first order* (learning to do the same as we have been doing so far) and *second-order* social learning (learning to change frameworks and social relationships, including building institutions, such in your case the EPIDOR). Also in their analysis it is implicitly stated that such two forms of social learning correspond to two stages and that the first stage occurs at the local level (which makes sense; but also the second form of social learning could be also more possible, as innovation niches and experiments can be more likely to happen the smaller the scale is).

- In sum, an interesting paper, particularly because it tries to deal with different scales which exist in a single river basin, which its differentiated problems, actors and processes at stake. It also underlines the difficulties and the limits of river basin participatory experiences to change national practices particularly in centralised institutional systems as the French one. The role of information tools is often underlined. And some interesting theoretical remarks with regard social learning –mainly the distinction between two forms, two stages, and the role and interpretation of social learning as accumulation of knowledge and collective action- are also included.

Box 3. The case of the Dordogne: C*umulative social learning.*

First order and second order social learning
in the La Muga River basin, Catalonia, Spain.

- A participative process aimed at the integration of plural sources of knowledge, the assessment of water related problems and the exploration of the social learning processes and the role of the participatory provisions of the WFD for the case of the Muga river basin (Catalonia) was carried between 2001-2004. Based on the theoretical discussions on *social learning, adaptive management* and *sustainability science* the methodology of *Integrated Assessment Focus Groups* was applied. A long term historical and institutional analysis of the area, comprising the analysis of over three decades of issues and actors involved in the management of water resources in La Muga was also carried out.

- Findings suggested that *The boundaries of public participation were altered during the three decade period.* In particular, main social movements interested and involved in the planning and management of water resources and the environment within the Muga river basin have widened the scope and the number of actors engaged with and issues taken into account. That is, from an early stage where participation was characterised by a narrow, single-issue and to some extent reactive nature to another which was increasingly encompassing wider constituencies, was more aware of the current policy complexity and interests in conflict, and was using new means of communication (such as mass media). At present, new actors have come into play, mainly in an informal manner, and to some extent because of that, the participatory processes have used increasingly more sophisticated concepts and rhetorical resources to support their claims. This can be interpreted as a reaction to a mounting more complex socioenvironmental landscape but also as a result of a social learning process occurring among the whole actors involved and interested in the river basin natural resources. Nevertheless, *formal public participation mechanisms* for the engagement of local stakeholders in the planning and management of water resources within the Muga river basin *in accordance with the Water framework Directive requirements have not yet been developed*. The current channels for the inclusion of demands of local stakeholders are still based on traditional users' structures and organisations which to a large extent make it difficult to accommodate the new and wider concerns on the need to rationalise the organisation of the space as a whole. Under these conditions, informal and non-structured forms of participation, such as those carried out outside existing institutions, have taken a particular relevant role all along the analysed period.

- Results also pointed out that within the Muga river basin social learning had mainly (and to large extent only) occurred as *first order social learning* –at specific skills to solve technical and management problems- but not so much as a *second-order social learning* –at the level of changing interpretative frameworks, perceptions and values, and finding new ways to open up participation borders, set up new collaborative practices and create institutions for polycentric systems of governance. For the case of the Muga, it was perceived that land-use and water management planning need to be closely integrated, including public participation mechanisms, to produce efficient, equitable and long-lasting results in both policy domains. In May 2005, nevertheless, the Catalan government approved a new territorial plan, which may be seen as the beginning on the stage of second-order social learning.

Box 4. ***First-order and second-order social learning*** **in the Muga River basin.**

3. 3. Mechanisms which foster or/and constrain social learning in integrated RBMP.

HarmoniCOP project carried out a synthesis study of 9 European national experiences plus 9 river basin case on public participation and social learning in RBMP. The purpose of the study was to establish a foundation of knowledge and understanding about the different national histories and experiences of public participation across Europe. Work packages 4 and 5 synthesised the findings aimed to highlight the key findings of these individual studies. As said, social learning entails building a critical and reflexive capacity to question underlying assumptions and perspective of different parties with the goal of learning together. The national studies explored a whole range of issues in respect to the histories and experiences of public participation in each respective country. With respect to the focus of this integration report it is important to highlight some relevant findings which help to improve our understanding of social learning. These findings refer specifically to conditions that support social learning (see also section 3.1.and table 4 below).

3. 3. 1. Conditions and mechanisms that support social learning in RBMP

- A *local basis* of public participation – Highlighted within the French study, this made specific reference to the need for social learning to be rooted within a specific territory, thus giving tangibility to the abstract notions of water management to the wider stakeholder community. The establishment of links such as between local and regional levels, by exercising communication through dialogue and other forms of communication, integrating new actors, etc… can help in finding adequate and effective translation of concerns between the two levels.

- Need for *open discussion* - Also identified within the French study this refers to the need for all stakeholders to participate in a discussion as an initial step, with the aim of developing a shared vision for identifying measurement of tools, diagnostic and technical matters relating to the case-study. In so doing participants will be required to develop a shared understanding of a problem through explorating the diversity of problem frames and perspectives

- *Governing structure* as a basis – A governing structure that recognises and strives to institutionalise public participation can serve to better support social learning. This can be done gradually, such as through the insertion of new actors into the institutional framework, and it can be done more directly such as through a transformation of the content of policies that govern RBMP to that which recognise public participation. Both these were experienced in France with their emerging governing structure. This governance structure responded to the more restrictive post-WWII traditional RBMP governence structure that was dominated by the water authorities and basin committees and was against the intervention of new interests.

In Spain the evolution of 'successive governance systems' have been recognised as being a catalyst for stakeholder involvement. Such systems, referred to also as 'external' changing dominant ideologies, include *the globalisation process, the decentralisation of government, the increasing valuation of environmental qualities by the population, the liberalisation of policies and the changes in the European context (WFD and sustainability debates)*. These *contexts* determine, to varying degrees of social learning, both the way decisions are made and the relationship between the actors. The interactions between the changing dominant ideologies are external to the water sector. Attempts to cope and adapt to them by the different groups of the water community help for better understanding the kinds of pressures the water sector is under in order to proceed with further change, and in achieving social learning. More specifically the kind of influences social learning has upon the performance of 'internal' forces such as *influences upon public participation, the appearance of new actors, the positions of actors and their power, and the ways they interact in the process of problem solving*.

- *Organized stakeholder groups* – In Germany social learning has been enabled through organized stakeholder groups. Such groups have played a vital role in mobilizing and reaching out to the general public through several campaigns. But more crucially, as these groups usually have better access to the general public than government officials, their campaigns have been more efficient. Through their activities at a more local level, they were able to effect changes in the awareness of the general public. Thus, in some cases, this has also led to a better and deeper understanding of the issues related to water management, as well as decisions made by government authorities, and furthermore, of complex

matters such as those related to the WFD. The outcome of this has meant that stakeholders have been able to make valuable contributions in participation processes, thus contributing to the overall success of certain policies.

- *Policy support* – There is also a great deal of recognition of active involvement of stakeholders within policy in Germany Policy support for interactive processes provides a solid basis upon which social learning is able to manifest. In addition to policy, specific awareness raising activities that are also popular in Germany. Activities such as the Living Elbe enable members of the public to become more involved with their local rivers, to improve their understanding of the issues, and to develop the overall relationship between stakeholders and the river basin.

- *Involvement* – Germany RBMP has also recognized the benefits of involving stakeholders both early on in the process and over a relatively long time. This has helped in facilitating **mutual trust** between the stakeholders, process transparency, and **acceptance** of common goals, both of which are regarded as a consequence of greater social learning.

3. 3. 2. Obstacles to social learning

To better understand what conditions stimulate social learning within RBMP it is also important to recognize what act as its barriers. The following list identifies some of the main barriers that were highlighted in the national studies.

- *Devaluing public participation* – When higher levels of authority and project managers do not value public participation, this acts as an immediate barrier to social learning. Skeptical attitudes towards public participation – which do not value it as improving decision-making are usually characteristic amongst those with little actual experience, skills, and foresight of the opportunities of public participation. Making efforts to communicate the opportunities and benefits of public participation can help overcome these attitudes.

- *Constraints to public participation from governance structure* – In France public participation is strongly determined by the governing structure – which usually resist to external pressure for change. These restraints asserted upon the participatory decision-making and planning processes meant that some participants and/or issues were excluded.

- *Limited sharing of learning* – Despite the general successful experiences of the Baix Llobregat (Barcelona) and in Mula (Murcia) case-studies in Spain, one drawback within the cases was the extent to which lessons about the 'quality of relational practices' in public participation in both experiences have been explicitly 'learnt'. The community of practice at all levels was dominated by the 'technical professions', mainly concerned with 'solving the problems, thus no real emphasis was placed upon relational practices. The consequence has been that the **lessons have been embedded in the personal experience of the leaders/facilitators but do not become more widely/shared or considered**. The Dutch/Flemish LTV project, failed to achieve real participation as some stakeholders were excluded from the project. Thus the social learning effects remained limited to a restricted group of experts and public officers. It would even appear that 'certain' plans could only be made because 'certain' stakeholders were excluded. Additionally many of the stakeholders who were included – such as local authorities, provinces and environmental organisations – were not 'actively' involved but merely informed. Such exclusions and biases usually mean that social learning is constrained to the interests of the few and limited groups involved.

- *Constraints of sticking to traditional systems* – The limitations onset by sticking to traditional or well-accustomed styles of planning or decision-making can often stifle progress and be restrictive upon the degree of societal learning. In the Dutch ABC Delfland project, social learning was not achieved to its full capacity due to the process lacking in innovation and use of effective methods to entice stakeholders. There was little evidence of more active forms of involvement and the forms of involvement that were employed were really only one-way.

- *Limitations of informal public participation* – Informal public participatory styles can often exist within the institutional framework, often by-passing the official public participatory frameworks. Although such practices can prove very effective and powerful, they can serve to hamper any opportunities for

social learning. As with the Loire case-study in France for instance, informal forms of public participation here have proved to be powerful means for citizens to express themselves yet unless they evolve toward more institutional forms can also be an obstacle to social learning. However, taking account of this form of public participation should be an important objective for the institutional design in such cultural contexts.

Encouraging Factors	*Discouraging factors.*
• **Increased decentralisation of power** • **Move away from bureaucracy** • **Move towards a more open government** • **Good political recognition of the positive value of the public voice** • **Greater environmental awareness by members of the public** • **Developing a more consensus based culture.** • **Promoting integrated RBMP**	• **Centralised political and economic systems** • **Privatisation and commercialisation of environment.** • **Bureaucratic systems.** • **'Representative democracy' systems** • **Political secrecy and poor public access to information.**
Factors affecting attitudes towards public participation in RBMP.	
• **Personal experiences with the environment, e.g. whether a strong public role is given in environmental management or not.** • **Lack or availability of resources and time in public participation processes** • **General willingness to be 'involved' and general public attitude towards public participation** • **Perception of political competence, of possibility of real influence and/or decision-making power. Feelings of empowerment /disempowerment in relation to environmental issues.** • **Attitudes towards environment, in comparison to other sectors.** • **Level of interest and awareness in water issues, e.g., related to the level and type of media attention given to the environment** • **Trust –or lack or it- in authorities, e.g. of those responsible for the environment or other sources such as business.** • **Belief in the willingness of other actors, such as business or government, to take action in environmental issues.** • **Outcomes and experiences in public participation in other fields.** • **Costs of public participation, which may provoke a perception where public participation is too expensive and not worth considering.** • **Perception that water management is only a government obligation.**	
Some recommendations for enhancing public participation in RBMP.	
• **Use existing structures and networks.** • **Provide sufficient recognition to the public.** • **Special attention must be provided to prescribe tailor-made processes for public participation.** • **Involve the stakeholders at early stage.** • **Move away from traditional static approaches of public participation in RBMP and towards dynamic/adaptive process oriented approaches to participatory RBMP.** • **Explore and develop new techniques, methods and tools to enhance stakeholders' involvement. Generate trust in order to encourage social learning.** • **Generate trust in order to encourage social learning.**	

Table 4. Factors encouraging or discouraging factors of public participation in RBMP as identified in the national case studies. Related factors affecting of attitudes towards public participation in RBMP. Some recommendations. (Adapted from Patel & Stel, 2003).

3. 3. 3. Managing expectations, dealing with free-riding and empowering processes for social learning.

A crucial factor of success or failure of social learning relates to the adequate *management of expectations* in participatory process, an element which of a paramount importance while designing the communication of the initiatives for public involvement in RBMP. Expectations relate to a number or intertwined aspects, for instance, as to the delimitation of boundaries about who is invited or entitled to participate, about the specific development, ground rules and timing of the process –or the possibility to participate in its design- or about the efficiency or impact of the decisions taken on the actual management of water resources. Other influencing expectations relate to the role and legitimacy of the facilitator, and of the proper representation and balance of interests and claims that may have a decisive incidence in the possibilities to foster social learning at RB scale.

Very likely, if social learning occurs, all these expectations will change as a result of the stakeholders' engagement in the process. With time, different stakeholders may develop a common understanding of the situation and of the issues at stake which in contrast to the ones which were present at the beginning of the social interaction. Such new understandings may conflict with those held by other authorities at different levels of governance, or by other river basins within the same level of governance. So it is important that such social learning, and the outcomes of it –e.g., in terms of new proposed institutional designs- occurs not only within at one single scale of the river basin but is also across different levels and segments of the governance structure.

The perception of effectiveness and the degree of power conferred to the process may also determine the importance bestowed to it by interested parties. In other words, public participation and social learning processes must provide changes for empowering people. Whenever the process is perceived only as an information process, and not as a truly consultation or participatory process, then the motivation to contribute to it, to bargain interests and positions, and to adopt an open attitude to learn from it may be low. When the participation process does not promise substantial change, for instance, in the form of a new institutional design capable to provide win-win solutions, individually, for the different parties and collectively, but on the contrary only contributes to the reinforcement of the current statu quo, the participation processes are likely to fail. More specifically, social learning cannot be imposed or motivated from outside. It can only stimulated from the every party's realisation that it is worth the while to enter into the process of understanding and bargaining others' views, positions and interests, both for their own and everybody's advantage. A process perceived and communicated as efficient in terms of contributing to the well-being and interests of those involved as well as to the common good will exert an important pressure on those actors which resist to enter in the procedure.

Managers must also be aware of the existing *structure of opportunities* for social learning in each river basin situation. In some cases, such structure of opportunities may be based on economic incentives, for instance, whenever particular new funds for public involvement have been made available. In other cases, they may need to depart from the existing network of informal relationships, social capital and trust to generate their own resources, to reframe the issues at stake in a collaborative and coordinated manner, and to set up a process able to generate win-win collective and individual solutions. However, it is clear that every participation process is unique and conditioned by its own set of factors and events, some of them may be very difficult to anticipate. As a general rule, reframing and transforming formerly perceived threats and risks as near-future opportunities and potential advantageous situations for all the interested parties may contribute positively to encourage public involvement and to sustained participation.

An evident threat to the success of public participation processes, and in turn, to social learning in RBMP, is that of *free-riding* (Olson, 1971). Many stakeholders will find rational to try to take advantage of the public goods that particular participatory processes may yield, but will have no intention to contribute to their costs in terms of investing the time, the resources or sharing their expertise in the process in the first place. Not only this, but in case they participate in it, once in the process, if they see that their interests are guaranteed, they may try to leave as soon as possible in order to reduce their individual costs and maximise their benefits. In Hirschman terms, 'voice' is often a more costly option than that of 'exit'. Public participation procedures aimed at improving the efficiency, equity and sustainability in the management and planning of river basin resources must also establish clear systems of responsibilities, beside that of rights and potential gains, among the parties involved. For instance, such systems should ensure that participation meets minimum standards of representation, inclusiveness, and fairness and that the different parties are engaged in a structural coordinated way so that the improvement of the common good, besides the individual interests, is guaranteed[10].

[10] In this regard, both *regime theory*, and *game theory* provide a large array of analytical insights which are very relevant for the understanding of the collaborative processes. For instance, according to game theory, cooperation is only possible

Hence, social learning can occur at river basin level to the extent the development of new proposals, frames of policy and regimes for public involvement do not oppose radically the interests and view of the existing stakeholders. Successful public participation processes must be able to reframe the current situations in a way where it makes sense to enter into a process of cooperative learning because it is understood that such a process may contribute not only to the interests of the river basin at large but also to the stakeholders' own ones. Short term and local interests on the use of water resources may be seen as threatened by opening the decision-making process to other sources of value, as those aiming at improving long-term river-scale ecological quality and distributional equity. Such perceptions may constitute truly barriers to social learning and create lock-in situations where no cooperation between parties is possible. A system of incentives may be needed to break such non-cooperative structure, which is resistant to communication between the different river basin users and stakeholders. In other cases, such cooperation may be partly regulated from external conditions, as it is to some degree the case of the WFD. However, to the extent that such participation is only a form of a reactive adaptation of external legislative requirements and it is not perceived as an opportunity for individual multiparty gain, it is difficult that it can generate the necessary engagement and trust from stakeholders as to become a suitable platform for social learning.

Finally, in this regard, there is another way to analyse and try to synthesise the mechanisms which constrain or enhance social learning by looking at: (a) the available time and resources, (b) the specific procedures of public participation, and (c) factors which have to do with the content of the participatory process. Some examples are given in table 5:

within a space which occurs between a range of two possible situations labelled as 'Deadlock' –where any actor can find any marginal interest or gain which would lead to cooperation- and complete 'Harmony' where all actors are willing to cooperate and will do so resulting in an optimal outcome and without having to adjust their behaviours. Evidently, neither extremes are realistic and multiple games and theories have been devised to understand under what conditions, rules or incentives such cooperation between individuals or organisations is feasible or likely (see for instance, Axelrod, 1982; Gehring, 1992; and Young, 1982, 2000). Game theory also provides important insights on social learning, e.g insofar actors are able to learn, act within, or change the rules of the game.

	Some examples for case studies	
Type of mechanism, related to:	**Fostering social learning**	**Constraining social learning**
Available time and resources	- Sufficient time and resources allows an early involvement of stakeholders, and frequent interaction with them at different scales of action.	- Deadlines for participation being too tight. - Officials in charge of the implementation of the WFD not having enough time or capacity to fulfil the participatory requirements of the WFD
Procedures	- Specifying clear purposes and responsibilities of the process. - Ensuring an early engagement of stakeholders. - Bestowing the process of public participation with real decision power. -Providing good skills of facilitation and for communication of meetings results and learning feedbacks. - Making explicit clear ground rules from the outset. - Creating an atmosphere of trust, transparency, respect and openness. - Providing an appropriate translation and contextualisation of IC tools inputs - Making explicit how the process will influence decisions and the use of resources from the outset. -Commitments/attitudes to learn and change from participants. -Create appropriate interaction forums, e.g. at inter-scale.	- Insufficient representation of the diversity of interests and values involved in the RBMP. - Processes with lack of incentives or disempowered. - Not setting the necessary channels to report back the outcomes of participatory process to ensure learning feedback within organisations and different scales of action. - Suspicions of commitments and hidden agendas being produced at the end of the process resulting in lack of trust. -Asymmetry of resources and power yielding
Contents.	- Encouraging win-win situations. - Specification of aims to be achieved, leaving room for framing-reframing of the issues at stake.	- Resistances by the most powerful stakeholders to modify and reorganise existing power relationships. - Lack of clarity about stakeholders roles and responsibilities and specification about what to do with the outcomes - The prevalence of expert top-down institutional cultures and attitudes

Table 5. Some examples of mechanisms fostering or constraining social learning with regard to available time and resources, procedures and contents of participatory processes.

Some lessons learnt from the HarmoniCOP project on public participation, social learning in RBMP and the WFD.

Public participation and social learning in RBMP depends on:

- Historical, cultural and environmental background of the national and river basins.
- Influence of the governance structure and management styles.
- Experiences in applying new methods for public participation, social learning and knowledge integration.

In particular, HarmoniCOP found out that:

- Public participation in RBMP is not new in Europe. In some countries it has existed for centuries.
- Formal and informal forms of public participation are complementary not exclusive. A balance between both is needed. Informal and voluntary participation has played an important role in RBMP.
- While participation is usually asked at a latter stages of the RBMP process, e.g. implementation of the proposals, not consistent or uniform pattern exist within the European context.

With regard to IC tools:

- The role of IC tools to social learning can be assessed to the extent IC tools: a) creates a common and questionable representation of problems and to a shared reality; (b) contributes to the building of specific *communities of interest*; (c) enhances a *community of action*, e.g. by playing a role in the strengthening or creation of new *identities.*
- Increased familiarity of stakeholders with new IC tools may help to make them realise their potential for public participation and social learning in RBMP.

With respect to social learning:

- One of the main results of social learning can be seen as the creation of social capital, a more extensive network of actors and an enhanced trust in institutions which also increases the awareness and the collective capacity to deal with common problems.
- Participation channelled to different levels of governance also yields different levels of social learning. At each level, different contents are discussed and different outcomes and feedbacks occur.
- Effective means of multi-layered communication need to be established to share experiences and enhance social learning among the different scales of governance. Feedbacks must be monitored and incorporated into effective institutional changes.

With regard to the implementation of the WFD.

- Explicit guidelines on what constitutes the public together with the attendant systems of responsibilities at RB scale need to be established. This regard both to formal and informal forms of participation.
- The regime and the role of public involvement in RBMP and to which extent and in what issues is expected to fulfil information, consultation or actual participation function needs further clarification.
- Multi-level participation and social learning remains one of the major challenges for the success and implementation of the WFD.
- Specific geographical and environmental conditions, e.g. Southern / Northern river basins also condition the implementation of the WFD.
- Those contexts and river basins which have already tested and used new IC tools and methods for involvement will likely have a comparative advantage for the implementation of the WFD public participation provisions and will likely be able to anticipate possible problems and conflicts.
- Institutional and structural support is needed for the success in the implementation of the WFD, for instance for education and training in public participation and for developing new tools and methods for public involvement in RBMP.

Further research is still needed to understand:

- The role of conflict and non-consensus as a source of social learning in RBMP. Conflicts may spark processes of social learning but need to be properly managed.
- The ambivalent role played by IC tools in the management and extension of borders for public participation and in enhancing social learning.

Box 5. Some lessons learnt from the HarmoniCOP project on public participation, social learning in RBMP, and the WFD.

3. 4. The role of Information and Communication (IC) Tools. From information to action.

'In modern society with its heavy load of information,
we are likely to become information-rich and knowledge poor'

Lester W. Milbrath (1989:96)

What type of environmental information is needed to enhance social learning in RBMP?, What conditions must occur in order transform *general information about the environment* into *applied knowledge* for the improvement of sustainability in the use of RB water resources?, what is the role of public participation in the production and communication of such information and knowledge?...Acknowledging the challenge and the difficulties that entail the answer this questions, in the lines which follow we attempt to deal with them, first from a conceptual approach –distinguishing different types of information and knowledge relevant for RBMP- and then, by looking in an integrative way at the findings of WP3 and WP5on the actual use of IC tools in the management of the European river basins.

Environmental information, communication and knowledge for the management and planning of river basins can be improved through the application of new IC tools, despite there is no one single procedure that eventually can select the best options to deal with environmental issues might be valid for all social contexts to improve sustainability. Participatory and deliberative procedures may contribute to put environmental information into context and create useful environmental knowledge in this regard. Naturally, many disagreements and suspicions about the content of information will arise when discussing complex issues such as those related to RBMP. However, one must take into account that such conflicts do not necessarily steam from any deficiency in the information or knowledge base, but rather, they are often the result of the prevalence of broader divergent worldviews and political cultures. The HarmoniCOP concept acknowledges explicitly that the role of information is always shaped by the nature of social involvement and relational practices into which it is embedded (cf. Figure. 4). Therefore, it is the realm of culture and the role of values, beliefs and local practices where we need to explore the conditions and factors influencing the role of particular IC tools being used in RBMP (see section 5.1). All these elements filter and shape the ultimate effects and interdependencies of the communication process, they determine how and if information is transformed into knowledge that has meaning for different actors

Similar to the fact that information is by no means the same as knowledge, general knowledge *about* the environment is not the same that *knowledge for sustainability*. The latter is a specific kind o knowledge which can be applied for the specific purpose of improving sustainability, and therefore it must based on personal experiences, local contexts, as well situational languages (see Box 6 and Figure 6). Information, in order to become applied *knowledge for sustainability* needs to mean something to people and be used for the conscious goal of improving sustainability conditions. However, meanings are constantly created and modified, in a multimodal way, through the whole process of communication and there is no one single meaning which can be selected as the only truth for sustainability. The same IC tool message can yield different meanings to different audiences, contexts, as well as according to the purposes and interests of the main actors involved, and all the positions, in democratic societies need to be taken into account. This is why social learning processes can be enhanced by creating decentralised, attractive and participative channels for involving stakeholders in the production of such knowledge. Social learning processes need to integrate the plurality of views and allow for the acknowledgement of scientific uncertainty which is essential for the improvement of environmental information but its transformation into knowledge for sustainability depends on a complex process of meaningful contextualisation by different actors within their context of action. Participating in the social learning towards sustainability entails to be able to participate in the processes of production of common sense and in this respect, moral dialogue and reasoning and greater systems awareness are fundamental.

Cultural and communication studies have often represented the process of production and consumption of communication meanings –which can be applied to the information provided by computers- in circular models. The content of texts and messages are reinterpreted and re-recreated at every stage of the communication process by the different sources, communication actors, and audiences who participate in the communicative process. The degree of meaningfulness depends on individuals' previous experiences, their ability to decode information in their own personal terms and on the eventual purposes for which a particular information might be used. More specifically, river basin information can become *more* meaningful whenever actors and

institutions involved in the assessment and management or water resources can potentially use it actively, hence becoming closer to personal experiences, goals and the strategies to achieve those goals.

At present, one of the most efficient ways –and to a large extent the only one possible- to produce systemic, multi-scale and integrated environmental information on RBMP is by computer models. However, a large part of the process of generation of such information is still very restricted to expert forums and discussions and cannot be given to ample sectors of the population. Furthermore, if the increase in the power of expert tools to process information increase, so does the need to sort it out, and the associated difficulties to understand it, not to mention the difficulties to connect them to preferences, attitudes and actions of the actors involved in RBMP. Such advanced information and communication tools can considerably reduce the time spans of the production and transmission of information; they can display graphs and charters about given environmental and socio-economic trends in forms that now can be easily disseminated by wider audiences than experts; but what the general public usually gets about these models are final assessment outputs, although few or none explanations are given about the processes and the uncertainties involved in generating such outputs. Only a very small portion of relevant information on environmental change is sufficiently discussed, understood or become meaningful for the relevant stakeholders involved in RBMP to become knowledge for action at the local level.

Expert information, when put in informal interpersonal settings can be crucial to arise awareness in the need to stop the most unsustainable practices and to activate alternative or corrective paths of action. However for that integrated information to induce a social learning process for adaptive social change, *time for reflection* is also required. *Interpersonal dialogue* settings with access to integrated sources of information are needed to generate discussion and foster the generation of such knowledge at the local level. Informal and RB based physical settings with close links with local museums, cultural, or nature-related associations where people meet for a variety of voluntary purposes can be particularly relevant in this regard. If the goal by policy makers and users in a RB is to enhance the knowledge of the majority of actors involved in its assessment and management, traditional means of communication, such as talking, must also be taken seriously into account. Eventually, it is by personal social interaction by which most people eventually *understand* not only complex data but also how to deal with daily environmental decisions. The task of deepening in creation of knowledge for sustainability may need to look further for strategies that can enhance interpersonal dialogues of a variety of contexts of action with the support of the most advanced media systems and the use of latest integrated sources of information. *Dialogic communication procedures*, based on a balanced combination between human and technological resources, may be able to enhance reflection and spread meaningful information and knowledge change to a large number and diversity of social contexts of action on the assessment of complex environmental issues such as RBMP. Adequate IC procedures ought not to show 'scientific facts' but also the motives, values, strategies, organisations, technical developments and related options which diverse cultural contexts provide to deal with and to reduce socio-economic pressures on the ecological systems. That would mean not only to depict an accurate and detailed picture of maps and figures on impacts, costs and benefits of possible environmental, economic or social changes, but above all, to make sure that the publics are able to understand the assumptions, theories, political interests, and functions which determine the content and origin of such information.

Information, communication and knowledge in RBMP

- ***General information about the environment:*** Constitute that part of environmental information communicated to large audiences in a non-discriminated manner. It usually focus more on the content than on the audiences of the messages (e.g., on what rather than on to whom). Therefore, it has not necessarily close connections with the actual stakeholders or actors involved in the management of RB water resources. This type of information may not provide either specific options for action. It often only stress the effects or the people affected by processes of environmental change, without providing sufficient interpretative resources as to connect them to some identifiable personal frames of meaning. General information about the environment frequently only provides the background of the issues and problems affecting the environment but does not relate them to what individuals can specifically do.

- ***Potential knowledge about the environment.*** Emerges when specific environmental information and communication becomes meaningful to individuals and organisations and translated into specific options for action. Value and meaning of environmental information is obtained as a interaction of individuals working in concrete situations and allows the selection of specific messages from the general flow of environmental communication to become the potential knowledge for action.

- ***Applied knowledge for sustainability:*** Stems from the intertwined relationship between information and action-knowledge (applied know-how) for the conscious purpose of improving sustainability. It is the knowledge which finally becomes embedded in the culture of actors and within rules of institutions and has effective positive consequences in alleviating human impairment on the ecological and social systems.

Box 6. Types environmental information in relation to mass knowledge for sustainability of RBMP

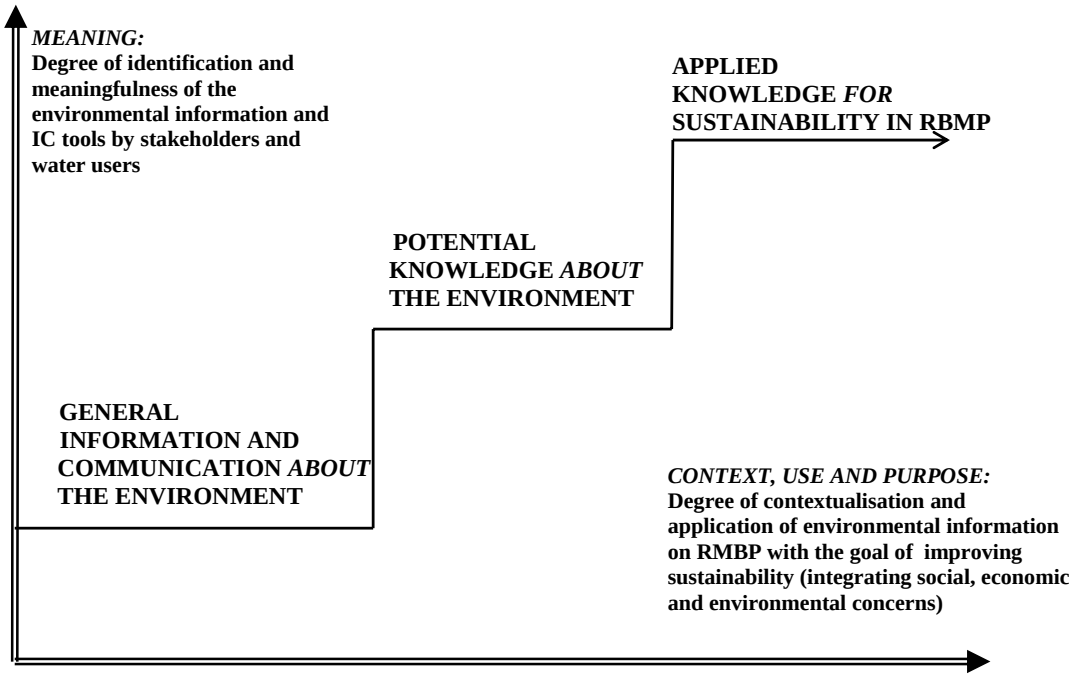


Figure 8. Types of information and stages in the transformation from *general information and communication about the environment* into *applied knowledge for sustainability* for RBMP. The latter being the basis of sustainability learning.

Therefore, knowledge for sustainability is partly based on information *about* the environment, but it includes also other types of contextual knowledges, as well as values and experiences from the actors involved in its production, communication and application in the particular context of action. Local conditions affect the generation and understanding of information and its transformation into *applied knowledge*. In this regard, IC tools can raise awareness of the number of options that individuals and organisations can taken at the local level, but they do not necessarily increase the likelihood that the most sustainable actions will be eventually taken. The eventual choice depends on the personal as well as contextual factors where an array of perceptions, rationalities and understandings of moral issues intervene. A main challenge of information and communication strategies dealing with RBMP is to contribute to the generation and transmission of messages that can be transformed into applied knowledge for the improvement of sustainability. Hence, communication strategies must take into account the values, beliefs, and cultural traditions make the process of knowledge-building unique in each social context. The building of knowledge for sustainability demands finding new communication procedures where the existing forms of local knowledge production and transmission can be integrated with expert IC tools as well as those used by non-expert. Creating procedures that help the integration of the plurality of views,

Communication of environmental and sustainability issues is not only about providing facts and figures but to a large extent is about communication uncertainties and conflicts (Stern, 1991). This entails that communicators must underline that uncertainty cannot be completely eliminated nor completely controlled constitutes one of the basis for the improvement of environmental information and knowledge for sustainability. Since knowledge entails knowing what is not known, the development of IC tools aimed at enhancing social learning should also show that part of environmental change or risks which is uncertain and little understood. The development of appropriate social communication procedures which allow the translation of complex environmental data about global and regional processes into intelligible languages, local rationalities and plain formats is crucial. It is not sufficient that the public and stakeholders know the effects of particular processes of environmental change, but most important know how they can be involved in developing new opportunities and options for the improvement of sustainability at the local level. Social learning towards sustainability, or *sustainability learning,* entails that its discussed actions must also be taken and materialised in particular rules and institutions.

Furthermore, for practitioners engaged in public participation processes a major difficulty remains in deciding how much information and of what type in order to effectively support social learning. A phenomenal challenge in this respect is to communicate information *for* sustainability knowledge building to large publics is not only one of *quantity* but most importantly one of *quality*. In relation to the *quantity*, we can argue that environmental information is *sufficient* when the potential information-users know the different options to take positive actions at the local level. With respect to the quality, environmental information can be said to be of high quality when the citizens are able *to understand this kind of information and is also relevant for their personal lifestyles and daily actions*. High quality environmental information would stimulate people to participate in the production and transmission of environmental knowledge, and above all, help them to decide on what they believe to be the most sustainable available options of action. Needless to say, both quality and quantity of information are intimately interrelated and so they depend on the interrelationships between the producers and users of information. Different "qualities" and "quantities" might be needed for different contexts By combining the quality and quantity we can talk about the criterion of **"***situational sufficiency of information"* serves to assess how much environmental information is necessary for a learning reflection that helps building the knowledge for sustainability. In our case, the information provided in a given social situation such as a public participation process aimed at social learning should be that one in which the actors involved find enough to understand, be aware of and reflect morally upon the ecological consequences of their individual and aggregated actions.

The number and type of IC tools relevant and available for RBMP is breathtaking. Table 6 synthesises and classifies those tools according to the function it performs, the purpose of their usage, the phase there are used, the direction of the communication and the size of the public to which it is addressed. It also qualifies those tools according to the level of interest in each case (Maurel, 2003).

	USAGE PURPOSE				PHASE IN THE PP PROCESS					COMMUNICATION DIRECTION			PUBLIC SIZE	
Type of IC tools	*Info & K management*	*Perspective elicitation*	*Interaction support*	*Simulation*	*Start org.*	*Actors anaI., context*	*Diagn. situation*	*Search solution*	*Implement / Evaluation*	*Bottom up*	*Top down*	*Bi-directional*	*General public*	*Group of actors*
To obtain information:														
Questionnaire	1	2	O	O	1	1	2	2	1	2	O	O	1	2
Static representation of reality:														
Maps	O	2	2	1	1	1	2	2	2	O	2	1	'1	2
3D landscape scale model	O	2	2	1	1	1	2	1	O	O	2	1	1	2
Information system	2	O	1	1	2	2	2	2	2	O	2	1	1	2
Geographic information system	2	O	1	1	O	O	2	2	1	O	2	1	1	2
Conceptual model					O	O		O	O	O	2	1	O	2
For (geographical) data base	O	1	1	O	O	O	1	O	O					
For systems dynamic	O	2	2	1	O	O	'1	2	O					
Cognitive mapping	O	2	2	1	O	O	2	2	O	O	O	1	O	2
Actors analysis	O	1	2	O	1	2	O	O	O	O	2	1	O	2
Management of comments	O	2	1	O	O	2	2	2	1	2	O	1	2	2
Dynamic: representation/ simulation:														
Scenario tools	1	1	1	2	O	O	O	2	O	O	2	1	O	2
Multicriteria analysis tool	O	1	1	2	O	O	O	2	O	O	2	1	O	2
Simulation models	O	1	1	2	O	O	2	2	1	O	2	1	O	2
Spreadsheet (e.g. : Excel)	2	O	1	2	O	O	2	2	2	O	2	O	O	1
Decision Support System	2	1	1	2	O	O	O	2	O	O	2	O	O	1
Integrated assessment model	O	1	1	2	O	O	2	O	1	O	2	1	O	2
Interactive tools:														
Interactive white board	O	1	2	O	1	2	2	2	1	O	1	2	O	2
Internet	1	1	2	O	O	O	O	O	O	O	2	2	2	2
Web information	2	O	O	O	2	2	2	2	2					
Forum communities	1	1	2	O	1	1	2	2	1					
Computer supported decision making	¡	2	2	O	O	O	O	2	O					
Web mapping	2	2	1	1	O	1	2	2	1					
Group Support Svstem	1	2	2	O	O	1	1	2	O	O	O	2	O	2
Gaming::														
Role paying game	O	2	2	1	O	O	2	2	O	O	O	2	1	2
Board game	O	1	2	1	O	O	O	O	O	O	O	2	1	2

Table 6. A qualitative representation of IC tools relevant for RBMP (Maurel, 2003); O : Low interest, 1 : medium interest; 2 : high interest

Type of IC-Tool	Case-studies	Comments
questionnaires polls	F, UK, BE, CH, H, SP F	- questionnaires and polls were usually used for a broad diffusion of information (several hundred people). - for the Flemish case, the questionnaire was used as a basis for face-to-face interviews
paper model, flipchart spreadsheet interactive whiteboard	UK, I, H, D F, UK, I, CH I	- during meetings or active involvement workshops, these were used for different purposes e.g. for the lead organisation in the UK case or as a support to other IC-Tools (slide shows for example, French and German case). - interactive whiteboards were used only during technical meetings.
internet	F, UK, I, CH, D, H, SP	- various forms: From a simple collection of information to a real working tool with restricted access for a selected audience. - sometimes contained message board (forum) functionalities (e.g. German case study). - almost always in relation to paper documents (newsletters, flyers...)
maps Geographic Information System (GIS), Information System (IS)	F, UK, NL, BE, I, CH, H, SP F, BE, I, CH, D I	- the maps used were very diverse in terms of make-up and purpose: - by content (flood mapping, habitats, microfauna, water user representations of the water release...for example), - by format (A4 to room-size map), - by the technical means of production/diffusion (GIS-based, e.GIS based, click-maps...) - by context (shown during meetings with stakeholders usually but co-built with public (UK case). - GIS or IS were mainly developed by water management boards
slide shows / PowerPoint presentations and targeted documentaries mascot, 3Dmodel of a river basin	F, H, I, CH, D CH F F	-all these visualisation tools were used during public events (except the beamer was used also for technical meeting) - the mascot is a 3D resin model of a sturgeon (an important fish species in the Dordogne Basin), symbol of the Dordogne River (French case). The mascot and the 3Dmodel of the river basin were used during public events.
Decision Support Systems (DSS), simulation tools, scenario tools	BE, Nl, Flanders UK, Flanders	- scenario tools were desired by stakeholders in the UK case - all the tools simulate bio-physical processes (hydraulic model, ground water model for example) - the DSS presented in the Dutch case was more complete and contains slide-show of landscapes, artist's impression, in complement in the biophysical, technical and economical data.

Table 6. Use of IC-Tools in European river basin case-studies

To summarise, the use of IC tools in RBMP have ambivalent and not necessarily contradictory effects. On the one side, they may help to facilitate the management of knowledge and information, link processes of environmental change and identify the relevant actors involved in management of the RB problems. On the other hand, however, IC tools may also constitute barriers for social learning and tools for social exclusion, e.g. to the extent they remain only in the hands of few experts. Among the **potential opportunities and positive effects** of IC tools we can underline the following:

- IC tools can help to provide a new representation of relevant RB issues, based on an aggregation of the plurality of perspectives and knowledges which could not be obtained otherwise. Representatives of particular organisations may have difficulties to get a full view of the complexity of the issues at stake, so IC tools may also help to underline the conflicting interests, besides representing the physical and environmental data of the RB.

- IC tools can support a better communication of the uncertainties inherent in the knowledge about such complex systems as river basins which includes judgements on future developments and the efficacy of proposed measures. Increasing the awareness of stakeholders and partly of experts as well for the origin of partly irreducible uncertainties is a prerequisite to address them in RBMP.

- IC tools may hold an important and parallel function, of 'socialising expertise'. For instance, and whenever the results of a particular IC tools –or even the actual tool- is put on the web it is immediately subject to public scrutiny, possible contributions from 'outsiders' as well as potential criticisms by those who do not agree with it. Thus, IC tools may help to open up the borders of expert knowledge, raise questions about the social validity of the assessments and decisions taken, and in this regard also to alleviate the social exclusion with respect to the generation of expertise relevant for RBMP. To a large extent, the degree to which a particular IC can contribute to social learning within RBMP depends on the extent it can be socialised by the relevant stakeholders.

- In this way, IC tools may also be important to make knowledge and information more independent from one sole institution or individual (e.g. expert) as it can make it necessary to confront the views, knowledges and interests with the wider public and other actors involved in the RB management.

- Given that social learning in RBMP is constrained by time and resources, IC tools may help to accelerate social learning processes since they may facilitate the sharing of important information which may be decisive in the management of RB water resources.

While with regard to the risks or **potential risks and pitfalls** of use of IC tools in RBMP:

- *Manipulation*: orchestration of public participation processes with the aim of legitimizing decisions taken beforehand the processes are carried out is a common risk and should not be overlooked. To avoid so, it helps that participants are allowed to participate not only in the contents of the discussions but also on the procedure or *ground rules* upon such discussions are to be carried out.

- *Knowledge exclusion:* expert language and expert IC tools can be used to exclude people and reinforce the statu quo, rather than to include them in the process of social learning. One procedure to prevent so is to provide the information in different layers of complexity and depth adapted to all the main potential different audiences and publics who will participate in the process. *Inclusiveness* is not only a fundamental criteria in all public participatory process, which needs to be properly managed and taken into account, but which plays a crucial role in deciding the type of IC tools to be used in each situation.

- *Wrong-framing or overframing*: meaning that IC tools suggest wrong questions to the issues at stake are provided, hence from which only wrong answers and policy option can emerge. Thus, there are risks of over-framing (imposing a particular frame) and out-framing (imposing a wrong out-of-focus one) the issues to be debated. This could happen, when debates are structured, for example, in a solely expert manner –and therefore which little room for public discussion-, or in too unrealistically way which leads people to think that everything is possible. Finding a right balance between facts and values and between ideal and realistic options is difficult but totally necessary. This is why it is

fundamental to try to transform out-of-context 'information' into contextual 'experiences' where people identify themselves with the messages and meaning of the discussions so they make sense to them. There is no knowledge for action out of a particular context of action. Starting by understanding the context may provide with invaluable clues for facilitators and integrators on how to deal with the selection of information for social learning and participatory procedures. Increasingly, public participation facilitators are using media supports and the recourse to art works in order to invoke emotional experiences to the participants in their own contexts of action. This can compensate the overemphasis that often some participatory processes endorse on environmental issues as technical and expert issues. In any case, information must be meaningful to all the invited constituencies and redundant information must be omitted.

Social procedures aimed at enhancing public capacity to understand, assess, and decide on RB related issues, need to be able to translate expert and useful knowledge into the policy arena in a way that can be easily understood, used by the different actors and for different social situations. Simplicity, accessibility, flexibility, and intelligibility might be some of the most adequate criteria to orient future developments of new approaches in order to make them widely applicable in a diversity of local settings. Obviously, due to the voluntary and free character of citizen participation in democratic societies, such procedures have to be based on a diverse number of incentives and would not make any sense to think that they can be imposed by means of coercion. Thus, the process will not be complete until new *incentives* to participate are designed, and the attendant resources provided as well. At the same time, costs of public participation processes aimed at social learning can increase or reduce depending on the availability of communication tools. On the one hand, if participatory processes in river basins include modelling or other expert information tools, which can be costly, it is important to make sure that the property rights for the use of such data inputs have been guaranteed and that we can have access to them. On the other hand, internet chats and public web-page sites can also substantially reduce the costs of face-to-face meetings. However, the possibilities for mutual learning, -including those of the organising institutions- also tend to be reduced unless a 'virtual community of learning' is created and sustained over time with the help of a facilitator around a given pivotal issue. Such electronic resources can be used for more specific and already selected topics which demand less in-depth exploration of worldviews, values and interests. Mutual questioning and learning in internet discussions is also limited because opinions tend to be provided from a personal and individual point of views instead of from building a collective group reflection taking into account the different view points of all the others. The peculiarity of the information for social learning processes, in contrast to those only focused in participation processes is that the information provided should not only be focused on physical or environmental issues but also contain other social, moral and cultural references. Mapping out the different assumptions, interests and values behind different policy preferences and options can truly enhance the transparency of the whole policy process. This social information plays a central role in raising the collective awareness, for instance of the community of stakeholders involved in the management of a river basin. Furthermore, it is a knowledge not only about resolving particular 'problems' but also about how to advance in one's own personal human development, which is linked to a collective experience.

4. AN ASSESSMENT OF THE SCIENTIFIC AND POLICY CONTRIBUTION OF THE HARMONICOP PROJECT.

4. 1. Description of the methods. Scientific and methodological innovation.

> "If sustainability goals are to be achieved, science and technological developments as potential forces for public good have to be guided by a quality control process based on explicit ethical, political and epistemological reflection (...). [O]vercoming the communication gap between scientists, policy makers and the public at large requires new approaches. The old conception, of a one-way traffic of information from the experts to the public has to be replaced by a partnership among those involved in the process. (...). The major challenge for science for sustainable development is bridging the communication gap, so that a process of mutual learning and trust can be established among all the parties" (S. O. Funtowicz,; J. Ravetz, ; M. O'Connor, 1998).

The HarmoniCOP results have been obtained from an array of diverse methods, depending on the objects, contexts and questions of analysis during the course of the project. In particular, the outcomes of the project are the joint effort of 17 European partners which yielded a total of 18 case studies plus the theoretical insights provided by work packages 1 (framework for analysis), 2 (conceptual review of social learning) and 6 (integration). Inevitably, to some extent, all these results reflect the different backgrounds of the researchers as well as the different cultural and academic traditions currently present in interdisciplinary environmental science. However, common guidelines were discussed and established to help carrying out empirical work in a comparable manner both for the analysis of the national contexts as for the river basin case studies. Furthermore, from the outset, stakeholders were invited to all the project meetings so that they could participate in the discussions, in the analysis of the on-going results, and in the making of some outputs. Involvement of stakeholders was remarkable in the making of the handbook. The organisation of the project is illustrated in Figure 9[11].

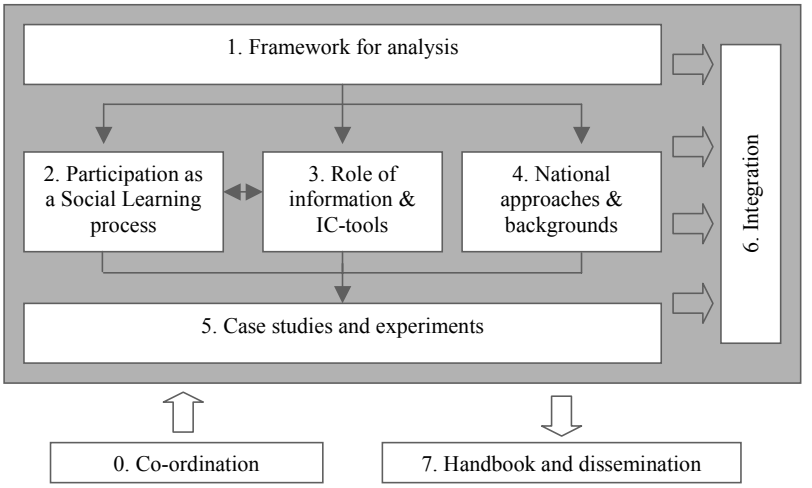


Figure 9. Organisation and development of the HarmoniCOP project.

[11] For the deliverables of each work package visit www.harmonicop.info

According to the original work plan, the main objective of HarmoniCOP project was 'to increase the understanding of participatory river basin management in Europe. It aims at generating practically useful information about social learning in river basin management and at supporting the implementation of the public participation provisions of the Water Framework Directive'. A more specific set of objectives, alongside with a series of research questions with regard River Basin Management and Planning (RBMP) were also formulated as following:

1. Compare and assess national public participation experiences and their background:

- What types of public participation are presently organised in the different European countries towards public participation and what are the attitudes towards public participation?
- What are the effects of public participation in the different countries?
- What role do geographical factors play (e.g. small or large basins)?
- What role do cultural factors play (e.g. different national cultures)?
- What role do institutional and legal factors play?

2. Increase our understanding of the role of information and information tools:

- Which role do information tools presently play in participatory RBMP?
- Which role can information tools play?
- What are the information needs of the different publics?
- How can the experts incorporate information from the public in their models?
- How can the work by experts be made more transparent and participatory?
- How can the information coming out of the public participation be incorporated in RBMP?

3. Provide insighst into social learning in a multi-phase multi-level context:

- How can social learning be organised in a multi-phase multi-level context involving large numbers of actors, such as a RBMP process (learning in and between differently sized and partly overlapping groups)?
- Which forms of public participation can be used in each phase of RBMP and at each level to promote social learning (e.g. parties to be involved, level of involvement, methods)?
- What are the minimum public participation requirements according to the WFD?

4. Involve of national and subnational governments and major stakeholder groups in order to:

- Learn from and with them,
- Improve the quality of the research, and
- Increase its practical relevance.

Work Packages 4 and 5 looked at the first group of questions, work package at the second group, and the section 4. 3. of the present work package 6 report will examine in more detail the third group of questions. Involvement of stakeholders during all HarmoniCOP meetings aimed at ensuring the goals stated in the fourth group of issues. While most of the original questions have been addressed, new concerns and challenges have arisen as a result of the actual making of the research. Appendixes A2.2 and A2.3. provide a list of questions which can be used both by academic and by policy practitioners to evaluate the relevance of the concept of social learning, to assess the progress in implementing public participation processes aimed at social learning and also how to integrate such approaches with the challenges of sustainability in their own particular contexts of action. Therefore, the HarmoniCOP project aimed not only at providing practical knowledge on the conditions, triggers and obstacles of public participation in RBMP within the context of the WFD, but also it carried out a scientific review and tried to advance the state of the art with regard to the concept of social learning. This has been the ambition of work package 6, by developing and specifying the concept of *sustainability learning* which is also expected to be valid for a better understanding of the current natural resource decisions and to support river basin planning and management.

Within HarmoniCOP the examination of most of the national contexts relied on the analysis of secondary documentary sources, while for the case of the river basins a more face-to-face interaction with actors of on-going participatory processes were also employed. The latter methods included also action-research techniques in which both stakeholders and researchers took active part in the design of the procedures for assessment as well as for the analysis of results. This was the case, for example of the Flemish case study in the Demer Catchment (Craps and Prins, 2004); in the Muga case study researchers, and not policy makers, led the process, and while discussions were supported by input provided by researchers on the basis of interviews and data provided by the same stakeholders, the final results were presented in a public hearing at the end of the process and made public via internet (Tàbara et al. 2004a, 2004b). The different methods used in the river basin case studies were classified as stated in table 8. This provides a good idea of the diversity of approaches, motivations and stages in the participatory processes in which the HarmoniCOP research was carried out and how it complemented the more theoretical work carried out by work packages 1, 2 and 6.

Cate-gory	**Type of Analysis**	**Description of Analysis**	**Likely in-put/ Time require-ments**	**Strengths and weaknesses of outputs**
H1	Historical: Literature Review	Review of a completed participatory process using the original documents, e.g. a draft plan, the minutes, written reactions, etc.	Low	Limited opportunities to test results of other WPs. The public participation process might not be directly relevant to the WFD, river basin management planning, or ICT tools. The literature may be limited in the type of information it provides and difficult to access. However, it might provide insight into longer-term benefits of public participation processes.
H2	Historical: Interview-based	Review of a completed participatory process using the original documents (as in H1) and interviewing the participants (stakeholders, members of managing authority).	Low	The strengths and weaknesses are similar to those of type H1. Interviews may fill in the gaps left by the available original documents, but this depends on the validity and extent of the recollections of the participants.
RT1	Real-time: Observing	A real-time public participation event, in an observational capacity.	Medium	First hand experience of public participation at the river basin level but limited to observing only. (NB All real-time studies will depend upon the managing authority for their time-scale, which will have to be compatible with the time scale of the HarmoniCOP project).
RT2	Real-time: Participat-ing	A real-time public participation event, participating in the organisation of the process (e.g. in an advisory capacity).	High	First hand experience of public participation at the river basin level, with the opportunity to influence the process. This gives limited possibilities to test ideas generated by other WPs and e.g. try out ICT tools and methods of social participation. This (limited but active) role of the researcher in the case itself could be seen as problematic by those aiming at objective scientific knowledge.
RT3	Real-time - Designing and Partici-pating	Participating in the design and organisation of the case study.	High	The strengths and weaknesses are similar to those of type RT2. However, the possibilities to influence the case and test ideas generated by other WPs are greatest.

Table 8. Types of methods used in the river basin case studies. (extracted from Rees et al. 2004)

Kommentar: – past tense now

River basin/ Country	Types of methods used	Stages in process covered (planning, implementation, evaluation)	Driver for Participation (WFD, Flooding, water quality, water quantity)
Demer Catchment – part of Sceldt River Basin, Belgium	RT1 , RT2	Implementation	Flooding Nature Conservation
Meuse River, Netherlands	H1, H2, RT1	Planning Implementation	Flooding
Ribble Basin England & Wales	RT2	Planning	WFD
Dordogne sub-basin of Adour-Garonne Basin France	H1, RT1	Planning Implementation Evaluation	Water quality and water quantity, WFD and water discharges
Rhone River, Switzerland	H1	Planning.	Flooding
Elbe basin, Germany	RT1, RT2, RT3	Planning Implementation	WFD
National level: sub basin of the Danube, Hungary	H1, RT1	Planning Implementation	WFD and agriculture; Nature Conservation Rural development
Muga, Catalonia, Spain	H1, H2	Planning Implementation Evaluation	Water Quantity and quality;
Pacchiglione River Italy	H1, RT2	Planning Implementation Evaluation	Water quality improvements

Table 8 (cont). Types of methods used in the river basin case studies. (extracted from Rees et al. 2004)

In sum, within the HarmoniCOP project *scientific innovation* focused in the theoretical grounding and development of new concepts based on a vast literature review of the state of the art on issues related to public participation, social learning and sustainability within the context of the RBMP and the WFD. In this regard, new concepts and frameworks have been developed and such ambition is clearly visible in the documents produced by work packages 1, 2, and 6. *Methodological innovation* of the HarmoniCOP approach is also evident with regard to an early involvement of stakeholders and with the goal of integrating lessons from a multiple number of scales –River basin and national-, from a variety of sources –both from academia and from policy makers and practitioners- and from a variety of countries and cultural backgrounds. This interaction may have also enhanced the near-future *policy relevance* of the HarmoniCOP project, although at this stage, it is still too early to say. Given the range of issues and partners involved in the project, some difficulties have arisen in finding a common language for the mutual understanding of expectations and results coming from different partners. However, this interdisciplinary endeavour has also proven to be fruitful and not only providing a simple addition of individual works. Indeed, one can say that results from *all* work packages have had descriptive, practical and analytical content which go beyond their own boundaries of disciplinary or policy making expertise.

4.2. A typology of results from public participatory resource assessment and management.

One way to assess the scientific, methodological or policy relevance and innovation of a participatory process, whether it is mainly focused for academic purposes or it is oriented toward the application of specific policy programs is by looking at the different types of outcomes obtained during the process. Classifying the different types of results is an important task in order to structure the knowledge obtained in social learning participatory process. This classification can also help to communicate with the different audiences, evaluate the relevance of the process upon different criteria –including social learning- , and integrate such results within the policy process. Results can be grouped following the classification below. Specific comments for the case of HarmoniCOP project are also provided.

- *Cultural/Educational*: In this respect, two types of outcomes can be distinguished:

  (a) Cognitive: such results provide new perspectives to the community about the common problems and can generate new cultural frameworks of action which define, interpret and focus the problems at stake in a more robust manner according to the stakeholders' views. These new frameworks can also help the public to acknowledge the complexities and uncertainties of the public decision making, to contribute to showing the main pitfalls of their institutional system and to make the public reflect about their role and possibilities of engagement in collective decision making. It is possible to assess to which extent problems are re-framed and interpreted in a different manner than they were before the process, for instance by carrying out a new set of interviews to a selected number of participants or by carrying out a new round of meetings with them at the end of the process.

  ⟹ *An example of re-framing or alternative framing is given by this report in which an option is given for the concept of social learning to be linked to sustainability issues by the notion of sustainability learning. At river basin scale, re-framing and the building of new cognitive capacities has been observed in many cases, as in the case of the Demer catchment in Belgium.*

  (b) Relational: Social learning participatory processes can contribute to interaction and empowerment of people who previously were not connected or who were not taken into account at the beginning of the process. Such outcomes regard to the building of new networks of action with others actors, e.g. either for general reflection, or specific assessment or management purposes. Questionnaires and interviews can be carried out to see whether new networks, groups or organisations –formal or informal- have been created as a result of the process.

  ⟹ *Internally, the HarmoniCOP project used questionnaires as a means to communicate with stakeholders and also interviews were common to explore the evolution of relationships between stakeholders in the river basin case studies. New networks of action have been built not only within the academic world but also with regard to policy makers and practitioners.*

- *Political and regulatory:* Also two types can be distinguished:

  (a) *Political:* Results from a participatory process can enhance -or debunk in case of failure- the legitimacy and the trust of existing political institutions and actors. Particular outcomes from participation can also strengthen –or increase the awareness of the lack of public representation- the political system and the beliefs –if that is the case- that the public views are taken into account by the attendant policy makers. A crucial indicator to assess the impact of public participatory process is the extent they have entailed a new redistribution of power and of the political functions between the main actors. This is one of the main reasons why public participation processes tend to be most feared by the statu quo, and great pressures are usually made to orchestrate and control such processes. Dominant institutions which see their positions threatened usually hope that participating people will not go beyond providing their views as *information* or *consultation*, but not modifying the real structure of power relationships.

  (b) *Regulatory:* such results take the form of new agreements, laws and/or institutions, which in the case of RBMP are in charge of regulating the use and distribution of water resources. Therefore it

is crucial to asses to which extent the results of such participatory process have had an impact on the institutional system, and in particular, on the regulatory regime of the community at stake. One should not forget that all participatory processes involving the management and planning of water resources at river basin scales are political processes which concern the appropriation and distribution of common resources. Those participatory processes which did not end in specific agreements or laws, can hardly be said to have any impact at all, despite there other results in a social learning participatory process which do not circumscribe to those which are obtained at the end of the process. Indeed, those shared knowledges, values and experiences which enriched the dialogues of participants are also as important as those tangible ones which can be obtained at the end of the process. The implication of resource users, in order to create systems of self-governance on particular management tasks is often seen as a basic condition of success for regulatory change.

⟹ *Within the HarmoniCOP project, interaction and proximity of the different partners to the regulatory and policy making bodies varied to a great extent, and hence so the influence of such interaction in the different levels of governance. However, the goal of the project was not to influence in any direct way the political and regulatory institutions in charge of the implementation of the WFD in Europe as a whole. Rather, the scope of HarmoniCOP was limited to provide a set of empirical and theoretical insights useful for such decisions to be taken in a more informed, reflexive and grounded manner.*

- *Economic*: which can be separated in those short-term and mid/large term results:

  (a) *Short term*: participation processes are costly, and need the mobilisation of human and economic resources which might not be perceived available or justifiable in the short term. People will often ask who will mostly benefit from the process, how much tax payer money the people engaged in participatory processes will earn, and what is the real use of all that. Transparency in all economic issues is paramount, and the sooner official public economic arrangements are made public, including those needed for the follow-up, the better. This can avoid later conflicts and suspicions in crucial stages of the process.

  (b) *Mid/large term:* public participation processes, if well designed, can improve the economic efficiency of public decisions by reducing future costs of decisions taken by a 'trial and error' mode. They can also improve the provision of services to the needs of the community, and lowering the probability of occurrence of costly 'expected surprises'. Participatory processes may produce demands for introducing new eco-accounting systems, e.g. by considering the need to incorporate environmental costs and negative externalities, which can control and reduce ecological and economic costs of long-term policy making.

  ⟹ *Concerns about the costs of public participation were often observed during the review of the national experiences (see section 3.1.3.) and the river basin case studies. To a large extent, different perceptions on the costs of participatory processes can condition the success or failure of a participatory process as it determine the possibilities to involve at early stage the sufficient relevant amount of actors relevant for the assessment of the issues at stake. HarmoniCOP project itself was a relatively costly enterprise - not so much when compared with research initiatives in other natural sciences or technological domains. Such investment can be justified on many grounds, and it is expected that both the knowledge acquired and the scientific and policy networks created can contribute to an improvement of the policy making related to the public participation and social learning process for RBMP, which in turn could save future costs of decisions taken otherwise from inaccurate conceptual frameworks.*

- *Physical and/or environmental*: Participatory process dealing with the management of natural resources and environmental conditions must have an impact on the actual appropriation, use and quality of such resources. Biophysical indicators about the real evolution of such environmental realities are needed in order to assess the impact and the relevance of these participatory processes. If the trends in the consumption of natural resources, generation of pollution and the impact on ecosystems remains unchanged after a given participatory process we can easily conclude that no *sustainability learning* (see sections 5. 4 and 6) has been occurred in this community.

⟹ *The HarmoniCOP project has not carried a follow-up process or comparative analysis to monitor the changes in the environmental conditions of the different river basins studied before and after the public participation processes. However, all the case studies have examined situations in which the involvement of stakeholders was aimed to an improvement of such environmental conditions and reducing pressures on water quality and quantity derived from a diversity of economic activities.*

- *Contribution of fairness, efficiency and the quality of public decision making system*: Participatory processes can also be assessed by the extent to which such processes have contributed to the improvement of fairness, transparency, efficiency and representativeness of the existing decision making processes. Indeed, fairness and competence are usually acknowledged as two of the most important dimensions to take into account in any participatory process (Renn, O. et al. 1995; Webler, 1995), including those aimed at tackling with the more long term, broader and cultural change issues such as those understood as social learning. Participation can improve the quality of democratic policy making by providing in-depth insights and suggestions about complex policy issues which rarely could be obtained otherwise. But participation can also undermine the quality of democratic systems if used as a substitute to the legitimate party systems which are based on collective ideologies, strong political structures, and which are less vulnerable to corporate or parochial interests. Participation can also be of symbolic nature to try to legitimize very weak and ineffective measures.

⟹ *The HarmoniCOP project has repeatedly identified problems of representation within the river case studies and has insisted the need to tackle at the very beginning the issues of equity, distribution and differentiated access to social interaction for a successful and effective participatory process in the assessment and management of common natural resources as those of RBMP (see sections 2.1, 3.1 and 3.2)*

In sum, the multidimensional nature of the results produced by the HarmoniCOP project makes it very difficult to provide a single overall assessment of scientific or policy relevance the outcomes derived from this joint enterprise. However, it is precisely the vast amount and the diversity of results obtained, which makes the HarmoniCOP effort a unique mutual learning experience from which each of us, inside and outside the project, can draw differentiated lessons capable to be applied to the particular different contexts where we develop our activities.

4. 3. Results on scaling within the HarmoniCOP project. Towards multi-scale social learning in RBMP?.

4. 3. 1. Geographical scale, the scale of problems and the multi-scale nature of actors and interventions.

Environmental change affects and is driven by forces operating at different scales and different scales of responses occur as a result of environmental change. The importance of scaling issues in Integrated Environmental Assessment has been recognised for some time and a major contribution in this field can be found in Rotmans and Rothman (2003). Lovell et al (2002) provide additional insights on the questions of how scale issues can be treated in the context of integrated natural resource management. Issues of scale and institutional design are also considered in Ostrom et al. (2002: 487), arguing as a hypotheses that 'effective common management is a cross-scale co-management process (local, governmental, national, supranational) that allocates specific tasks to the proper level of social organization and ensures that cross-scale interactions produce complementary action rather than actions that interfere with or undermine one another' (see in particular, Berkes, 2002). Bonnie et al (1998) considers some positive functions of boundaries and the main trade offs related to scope of issues and scale. For instance, boundaries on particular issues can help to develop a sense of ownership and responsibility in people. More generally, some of the following **trade offs between scope and scale** can be identified:

A. *Geographical Scale:* Issues perceived too small for create a sense of ownership but being large enough in terms of managing in an integral way natural processes and ecosystems.

B. *Social scale:* While cooperation and consensus building may be easier with fewer people, full representation may better need to be carried out at a greater scale.

C. *Scope of issues:* trade off between considering single versus multiple issues; advantages of opting for simpler, focused management versus issue linking in negotiation.

The interest of considering explicitly the multi-scale issues in the context of social learning relates to the fact that some of the conditions for learning may not be present a different levels, namely the ability to interact when there are large groups or to reframe positions when the actors are in turn representatives of other organizations. Furthermore, including many diverse actors may lead to bring in knowledge and expertise and to widen the issues to allow for win-win solutions that may not be possible in more restricted groups. In this context it is specially useful to discuss the possibilities for polycentric social learning where there are also questions of power relations between different actors at different scales and how this may be reframed or change de facto "in practice" in light of the interactions among different actors.

Furthermore, the move toward participatory and sustainable water management of river basins can only take place if embedded in a societal change towards more sustainable transition in general. In order to understand change and transitions it is useful to distinguish the following three levels (macro-meso-micro) of a system (Pahl-Wostl, 1995 and in review; Geels, 2001; Rotmans et al, 2002):

- The Landscape or macro-level with stabilizing factors that constitute the context for a water management regime. The landscape encompasses e.g. environmental variability, legal frameworks, deeply rooted societal norms and cultural values. The landscape provides the context and also the selection environment within which a management regime unfolds. The landscape level is not entirely independent from the micro and meso level since feedback processes can operate bottom-up (e.g. diffusion of innovation, new attitudes) and top-down (e.g. selection of regime).
- The management regime or meso-level with stabilizing interdependencies between the elements such as governance styles, technologies used, information management etc.
- The niches or micro-level where innovative approaches can develop in a locally protected environment (e.g. large scale research projects, subsidized pilot studies, informal stakeholder settings) and/or in new areas of application such as the restoration of riverine landscapes that has started to become an integral part of water resources management.

In particular, social learning is related at multiple scales with all the key issues identified by HarmoniCOP in the conceptual framework of social learning and in particular to: 1. Framing and Reframing; 2. Boundary Management; 3. Negotiation Strategies; 4. Interaction ground rules; 5. Leadership and Facilitation; 6. Allocation of Resources. And how the feedback of all these elements affects the different scales of the governance and environmental contexts. Each of the above elements are related, among others, to the following: (a) Centralisation / decentralisation; (b) Public awareness of the environment and accountability; (c) Environmental awareness of the river basin problems; (d) Attitude of authorities towards public participation; (e) Attitude of the public towards public participation; (f) Individual identification with and degree of meaningfulness of the information about the state and the problems at stake; (g) Individual identification with measures and the goals to be achieved (f) Degree of agreement with the management plan (h) Timing and resources of the implementation plan.

The HarmoniCOP project emphasized some of the specific characteristics of public participation in RBMP which includes the multi-scale and multi-stakeholder (multi-party) nature of both the issues at stake and of actors in the process of developing and implementing measures. In particular, the HarmoniCOP concept of social learning focused on:

- Direct interactions between stakeholders at one scale where scope issues are the most challenging.
- Considers the iterative nature if the social learning processes joint change and reflective practice dealing to progression.

- Social learning in multi-party interactions: learning to deal with changes (social and natural) and take into account external constraints.. and communicating local conditions and lessons to higher level social organizational levels so that they can inform general policy regulations.

Work package 1 focused its attention on issues of interdependency of organizations at RBMP scale and the interactive nature of knowledge creation; to the fact that the multiplicity of actors and scales helps bring specific knowledge, including that of "in between" organizations; and the need to look at what works at small scale and catchments scale. Work Package 2 concentrated in the HarmoniCOP concept of social learning based on direct interactions (and iterative and adaptive) and the challenge of applying this in RBMP characterized by integrated and complex multiparty structures operating in increasingly complex macro societies characterized at the same time by *interdependency and fragmentation* (in interest and identities/communities of practice). Actors are part of organizations that in turn may be part of formal and informal hierarchies and their geographical frames of reference differ. It also stated that dealing with scale implies looking: (a) *at links of processes and actors at different spaces and time,* (b) *changes (differences) in processes and actors upwards and downwards*, and also (c) *recognizing the interconnectivity of scales* and the constraints, interactions and feedbacks (lateral flows) associated with changes in scales. Natural and anthropogenic systems display heterogeneity and *feedback* occurring across overlapping scale spaces. Box 7 and table 9 shows a more detailed characterization of issues related to scale in RBMP.

In order to draw some conclusions on these aspects we now focus on some of the issues raised in Work Packages 1, 2 and 4, in relation to the lessons from the case studies of Work Package 5. We will be looking particularly to the institutional context and the nature of the management problems; to the roles of the different individuals and organizations; and to the boundary management issues and which "changes" are possible or have taken place.

Issues of scale in social research, according to Evans, Ostrom and Gibson (2003)

1. **The small things are the ones that determine the characteristics of the living world.**
2. **The small things are the ones most amenable to study by the methods of science.**
3. **The large things are the ones that have the most profound effect on humans.**
4. **There is a feeling that we should be able to use knowledge of small things to predict and manage these large-scale phenomena.**
5. **Although the small things are easier to study and understand, they are more numerous.**
6. **The large scale is likely to have at least some characteristics we cannot predict at all from a knowledge of the small things.**
7. **The small scale is likely to have at least some characteristics we cannot predict at all from a knowledge of the large scale.**
8. **Scaling-up is not part of our scientific tradition.**

Scaling and social learning.
Insights from the HarmoniCOP project

Specific challenges of scale in RBMP are the related to the following issues:

- **Actors** have different geographical units as frames of reference (in many cases there is lack of identification with River Basin).
- **Organizations** in RB have their own scales of operation. It is important to distinguish between: Formal hierarchy; informal hierarchy that also exist between informal groups (networks??); there might be bottom-up organizations such as NGOs and networks of NGOs.
- **Who is there :** Difficulties of moving towards a multiparty approach, failure to include all the stakeholders.; strong river basin authorities may be an asset.
- **What are the interests and expectations:** Differences between scale of the project and the scale of interest of the Stakeholders; Contradictory expectations about how to be involved; Governance structure.
- **Working out public participation :** Asymmetries; Degree of interdependence; Opportunities for interaction; Relationships between technical teams and stakeholders. Splitting between formal and informal negotiations; Networks and scale; Systems for exchange between organizations;
- **Role of institutional arrangements:** Legal authority and final decision making power may lie outside the actors that have participated; Confidentiality; he role of leading institution defending its own interests; Political representatives support; Administrative procedures.
- **Appropriateness of the use IC tools at different scales.** IC tools use must be adapted to different scales as each context is related a particular issues, geographical and social boundaries inextricably linked to one or several scales.

Box 7. Issues of scale in social research. Scaling and social learning. Insights from the HarmoniCOP project

SCALE AND…	Related aspects	
Natural processes in natural resource management	There might be **cumulative impacts** from local actions; **local may be impacted by global processes**	
	Some processes are slow and others fast; most cyclic and recurrent	
	Some processes **affect different areas.**	
	Some **processes may dominate** the response (lack of rainfall for example)	
Institutions	**Issue**	**Characteristics**
	Responsibilities on functions and assets at different government levels;	Consider interactions when ecological and functional imperatives **Links through negotiated and reciprocal interest** Need for boundaries social with clear authority and responsibility; rights definition and limits to these.
	Two major policy thrusts: **big government with comprehensive authority and action at a few nodes.** And small community local level	Ecological **interconnectivity,** resource scarcity, **interrelationships** of scale may be better managed by **one jurisdiction or by few integrated** ones; versus **community management more transparent and accountable** to the citizens; clear .link between management inputs and output benefits; but can result in lack of integrated action.
	Different **types of boundaries**: administrative, infrastructure, regional, informal, stakeholder, natural systems (some difficult to agree upon)	Involves management of common property, open access, private and publicly owned assets and resources. Some **conflicting interests**
	The question of bottom up integration or top down.	**Community level action (independence) embedded in wider planning** framework (in the context of larger, scalar, INTERDEPENDENCE). Alternatives: - Small units based on local interest groups build into bigger coordinated units insures greater ownership (but lack of capacity; and ineffective links). - Top defining smaller units (but the problem that these may not have delegated authority; only responsibility) insures consideration of upstream versus downstream and other external spatial effects Differentiate in scale between plan/vision development and program management.

Table 9. Scale in RBMP. Related issues. (Adapted from Lowell, et al. 2002)

SCALE AND…	Issue	Characteristics
Management of processes	Importance of building relationships and creation of enabling environment	Need for **social organization** (difficult where private action is the norm). Need for **flexibility** (adaptive planning rather than adoption). Need for **clear defined roles** of organizations. Need **to train government officials on participatory planning**. **Group access to finance**.
	Reconciling sectoral top down approaches and bottom up integrated approaches Government addresses fragmented sectoral interests with high administrative costs (many expensive top officials meetings). Communities think and act holistically and are more efficient in human resources.	**Key issue**: effectively **link community based actions/programs within larger structured visions/plans/financial support** Links (in the middle) in the form of **common interests groups; plan and vision development process** that facilitates public participation in joint action. **Key issue**: effectively link government departments and with local organizations. Enacting links across sectors may be facilitated by **Government financial allocation to integrated programs.** Enacting links between scales requires **increase capacity and middle and lower scales; genuine social empowerment, and delegated authority (not only responsibility**). Each scale must function and a **missing scale is a block**. Right level of decentralization (too much disperses authority and responsibility) given capacity. **State support in capacity; strengthening, finance integrated programs; conflict mediation and legal framework for it.** **Key issue**: dealing with scales is about relationship building Build capacity to make better decisions and influence decision making authorities. **Collaborative planning, Government and NGOs**. Need for commitment to reconcile top down (generally too technical) and bottom up (social/institutional) approaches to IWRM.
	Bridging the gap between top down and bottom up	Governments: stable **enabling environment**, and long term support fro IWRM and decentralized structures; **avoid top-down manipulation**; clear mandates; provide technical support and to disadvantages communities; ensure independent monitoring and evaluation. NGOs: establish strategic alliances; build community pressure; lobby politicians; influence market forces; encourage local champions; **help construct a shared vision; strengthen community knowledge** (law, planning, communication, team building, conflict resolution, natural resource management; government processes); **build social capital** (trust and cooperation networks)

Table 7 (cont). Scale in RBMP. Related issues.

The list of issues below provide a framework in which scale issues can be taken into account in RBMP. Most of these issues were identified in the HarmoniCOP case studies as follows:

1. GEOGRAPHICAL SCALE: There is potential for the analysis of the cases studies in relation to the types of issues related to scale and for drawing lessons in the context of social learning Most of the cases relate to the river basin scale, with only the cases of Belgium and Scotland (and Muga-Spain) relating only to more local interventions. The scale measured in this dimension in relation to the area affected by the problems and the planned actions show that the geographical scale varies between the 846 Km2 of the case in Muga (Spain) to the 24000 km2 of Dordogne (France) or the 148268 Km2 of the Elbe (Germany).

2. SCOPE OF THE PROBLEMS: The drivers and the problem context (pressures and issues at stake) generally relate to different scales. Some may have local impacts, but both the solutions and the causes of the problems are often beyond the local boundaries and relate to the basin wide context. This is the case with the issues related to flood control (Belgium, Holland, France) or the issues related to water quality (Scotland, France, Italy) where the pressures originating pollution (industrial and urban discharges, diffuse pollution) are not necessarily local. This is specially the case with other issues considered problematic in relation to WFD and nature conservation (over-abstraction of ground and surface waters; hydro-morphological impacts from navigation; agriculture or sand and gravel abstraction) in the cases of Belgium, UK, Scotland, Germany, Spain, and Hungary. In the case of river Dee (Scotland) there were two processes at different scales and with different scope: the Catchments Management Plan and the 3 Dee vision project. In this case, several representatives of the public agencies individuals sympathetic to public participation were chosen to represent them.

3. NUMBER OF PARTICIPANTS: According to the definition of the geographical boundaries and of the problems in most of the cases there are different organizations participating at different scales. This is specially problematic when there are many stakeholders involved particularly in the UK (45); France (more than 100); Hungary (10 + 76) and Germany (more than 10 groups).

4. MULTISCALE OF ACTORS: Different public bodies participate at different scales. In most of the cases there is participation of more than one type of governmental body in addition to the environmental authorities (navigation/public works/water management) either at regional or national scale because they have different statutory powers related to the issues at stake (for example, environmental protection versus flood control). In most of the cases there is also official participation of municipalities and/or provincial authorities. Other stakeholders representatives of users interests (farmers, tourism, fishing, navigation, industry, water companies) and of environmentalists and conservation organizations may be represented through regional or local organizations.

5. VARIETY OF ACTORS: The scale of the problems and of the action areas -in addition to the type of initiator and the way the initiator of the public participation process frames the problem and issues at stake- influence the types and variety of stakeholder representatives and whether there is direct participation by citizens or through representatives. In France, the SDAGE experience (see Box 3 of Dordogne case) shows how higher level organizations can serve to support bottom up processes. For example it helped improve public interest in water issues; new actors can draw connections between "sides" and commissions were created to deal with inter-scale.

4. 3. 2. Roles and interests of actors at different scales in the process.

There are different roles related to scale identified in public participation processes including convener, leader, financial support, expert, local knowledge, decision making, bringing in sectoral interests. In most of the cases the lead organizer and convener of the public participation process is a public body -except jointly with environmentalists in Hungary- although the type varies along two dimensions: their main responsibilities and the scale of their responsibilities. In the cases of Italy, Hungary and the Netherlands (and to some extent in Belgium) the process was initiated by the water management, public works, navigation or agricultural public bodies; whereas in most others this is an initiative of the environmental authorities, e.g., with stakeholders in

France and Hungary. Of special interest is the cases of Belgium, France and Scotland where there are parallel planning processes converging initiated by different public bodies. In relation to the scale of the lead organizations in 4 cases these are regional or local (Spain, Belgium, Scotland and Italy) and in the rest there are a combination of national, regional and local. Different dimensions affect and are affected by the roles and interest taken by social actors at different scales and stages of the participatory process:

1. KNOWLEDGE CONTRIBUTION AND SCALE: Because of the greater specialization, skills and financial resources national (or regional) public bodies often contribute in a differentiate manner to the public participation processes with the technical studies and expertise. Other local stakeholders, however, provide often local knowledge, which may not be able to go through the different scales of RBMP. Local water services agencies (public, private or public participation process) and the other stakeholders of users interests may not be so much concerned much with the general vision or strategic questions at basin scale but with the operative aspects when strategies/visions are reflected in concrete actions/measures which affect their own local contexts of action. A main concern of local stakeholders which influences the management process is the extent to which the public participation will finally influence decision making. This is strongly linked to whether the convenor organization has decision making power on the issues at stake and establishes a clear understanding among members on how the public participation process will feed the overall decisions on actions and on implementation of actions (see for instance, the case of the Meuse river).

2. FRAMES OF REFERENCE AND SCALE: Statutory responsibilities and prior legal commitments often establish the frame of reference of the officials representing public bodies in the participatory processes. There are often long standing alliances with stakeholders groups such as the environmentalists with the environmental administration; or the navigation authorities with the land owners and farmers (see Flanders River Basin). Pressures and conflict may arise to re-frame the issues at stake in different scales, e.g. at full river basin instead of at sub-river or administrative scale, or in a way most suitable

3. DEALING WITH INTERRELATIONSHIPS IN MULTISCALE PROCESSES: In relation to the role of different actors at the different scales in the public participation processes there are some important differences in the different HarmoniCOP case studies. Many of the cases have considered that a key factor for success was to include a facilitator that is perceived as neutral in the process and which had not a stake in any particular scale of action. However, in other cases, there was no formal role of facilitator external to the process by the chair or the lead organization played that role either through the process or rotating among different participants. According to some of the cases (see Dee River Basin) it was the personal qualities and the ability to build trust and establish alliances among participants what was important, but there seem to also be an element of whether the convener had legal powers and eventually financial resources that establish the necessary certainty for participants that the public participation process was going to have some impact. The ability of the leaders to deal with managing conflicts, building trust, foster direct interaction, dealing with institutional rivalries and exclusions, etc..) which may arise from interrelationships at multiscale processes is important and if the public organization is perceived as having a double agenda of fostering their own agencies interest as well as facilitating the process this may create problems.

4.3.3. Scale and social boundaries management: who is in and who is out.

The different case studies have pointed out some specific issues in relation to boundary management as a key concern in all initiatives because it delimitates what issues and actors are relevant to be taken into account and acknowledges the importance of developing an strategy for managing the boundaries. Boundaries may not be formal and observable but psychological and subjective as they relate to the identities of actors (Craps 2003). The need to consider boundary issues in relation to scale can be in at least analyzed from four different dimensions: (a) geographical/Physical boundaries; (b) Time boundaries; and (c) Social boundaries (who is in and out). (c) Problem boundaries. However, there are some important aspects related to scale and boundary management related to the perceptions of actors about the issues at stake, about their role in the process, and about the differentiated power that they have at each level of action. This can affect how the boundaries of the issues at stake are perceived and how the actors involved at different scales may interact. The definition on

who participates in the process is dependant in many cases on the perceptions of the issues at stake of the convener organization although this can change through the process. A key issue may be the way *leading officers want to keep rigid boundaries* around an initiative and who and when different actors participate. This may be based on *arguments on the legitimacy of representation* of local interests as framed as too far from general public interests; and perceived time and resources constraints. This may *change during the collaborative process* and raises questions on whether to involve early or late. Some of the key aspects related to the social and political content of the boundary management within the HarmoniCOP project can be summarised as follows:

1. ASYMETRIES IN POWER: The case studies have identified asymmetries of actors at different scales related to financial means, time, expertise, experience, power and legal influence. In the case of Belgium the public authorities had the financial means and the officers many years of experience of dealing with the issue. The other stakeholders had to invest their private time and had not the same level of insight into the problem. These asymmetries between actors at different scales can create a kind of technocratic hierarchy. Other cases also point out to the need to look into how asymmetries in power balance based on financial and technical expertise influence the role taking (leadership).

2. DIFERENT PERCEPTIONS ABOUT POSITIONS: Actors at the same scale and at different scales define differently the various "sides of the fence" in the public participation process. In the case of the Flemish River Valley this included the Environmental Administration in "one side" and the waterways and the traditional users in "the other". The later see the former as the "green boys" and vice versa the Waterways is perceived as acting against the wider public interests. These different perceptions between 'insiders' and 'outsiders' (in Irvin Goffman's terminology) are particularly acute when boundaries between organizations are fixed because of the lack of communication and leads to mutual stereotyping.

3. DIFFERENT PERCEPTIONS ABOUT THE BOUNDARY OF PROBLEM TO BE TACKLED: The differences in the perceptions of the boundary of the problems relates in many of the cases to some actors aiming at strategic wider visions versus others more interested in concrete action taken (Ribble). The issue of river basin being too large for some stakeholders to be of interest to them raised the dilemma between early involvement and inclusively and efficiency, in the Meuse case. Some actors are anxious to move to solutions whiles others prefer a more strategic approach to options to insure that they are effective in solving the problems.

4. WIDENING BOUNDARIES AND SCALE: Decisions about who is in or out are related also to the following issues:

    - Boundaries of the problems and interest may be widened when the stakeholders are considered to the extent they represent sufficiently the diversity of opinions about the issues raised in the public participation process, e.g. including hunters, local authorities and others (Flanders, Bacchiglioni). Background in the definition of the problems as well as the ability to perceive the problem may be widened with the diversity of expertise they bring in (UK case).

    - Including more stakeholders may require managing and overcoming initial suspicions (UK case).

    - The process by which new actors were brought into the process seemed important in the Italian case. Widening of actors from the local to the basin level and engaging them in the collaborative process may be prevented if there are on going bilateral negotiations between the authorities and some actors. Hence the public authorities needed to make clear where the legitimacy lays for different types of participation.

5. PROCESSES INVOLVED IN DEFINING AND REDEFINING THE PROBLEM:

    - Content boundaries are often set by the lead agency or initiator but during the collaborative process in cases such as the Meuse river the boundary of issues was widened and this required the statutory authorities to provide some flexibility and support.

    - The differences in perceptions and interests of actors at different "scales", in the cases of Dee and Dordogne (and Meuse), seem to have been managed by creating different participatory processes at different scales. This provided for the additional challenge of creating ways to manage the relations between the different levels of public participation at different scales so that they feed into each other. In the case of the Meuse river (Holland) the multi-scale issues were dealt with through ad-hoc structures such as steering group, project group and secretariat and them groups on content and process with different working groups with clearly defined responsibilities for different types of products and deadlines. In the Dordogne case it was important to consider widening the perception of actors as users of public property rather than as private owners. However, the ability to widen the issues was restricted by existing property rights.

6. CHANGES IN PERCEPTIONS OF EACH OTHER ROLE AND POWER AND ABOUT THE INTERDEPENDENCIES OF ACTORS IN THE PROCESS:

    - Management of boundaries between different stakeholders at different scales include managing prior relations, tensions and potential conflicts as well as preconceptions about each others frames and positions. This included in the Dee case the suspicions that decisions will ultimately be taken by the public representatives at regional level and the public participation process is only to give credibility. Public representatives have suspicions also that local stakeholders would become too influential through the process.
    - From a polycentric frame of action the key power criteria in the Dee case was the power associated with the financial means but also the regulatory power as well as the expertise and skills. This perception on the power balance changed because of the network relations of some local actors in the Dee, in Dordogne and in Bacchiglione river basin that helped bring in information and widened the public participation process.
    - The new awareness of the interdependencies of actors at different scales seemed to have been key in the Dee case where actions were identified that could not be delivered by a single agency without the cooperation of other actors.

4. 3. 4. Managing the interface between the official representatives and the actors they represent.

In the HarmoniCOP case studies the following issues were raised in relation to the management of the interfaces between the official representatives and the actors they represent.

- Actors often expressed the opinions of their organizations even if they did not have to report back to them at a given scale of action.

- The importance of the transfer of knowledge of representatives and their organizations so that the issues learned are not lost to their organizations. The issue of transfer of information and learning from the representatives to the groups they represent is important, both within a given level of action as between different scales and organizations.

- Rules of representation at different scales and within organizations need to be made explicit as well as the importance of actors in their role of integration in the wider institutional context need to be acknowledged.

- Managing the boundaries around the multiparty group can help deal with complexity and if this is worked out those engaged in negotiation can engage in forming a collective identity

(Elbe). In the cases in the Elbe River Basin this very much depended on the individual representatives.

- The importance of considering that the interests of participants in public participation processes could be multifaceted in some cases (Bacchiglioni) and actors may have wide networks of relations (may be more specific of relational cultures).

Within the HarmoniCOP project, one of the most complex cases in terms of number of actors at different scales (District, Basin, Regional, sub-river basin, Department, State and local) involved in the different phases (and scales) of decision making was the Dordogne case (France). In addition to some issues mentioned above there are some questions raised by this case in relation to scale issues:

- It illustrates the usefulness of a "*top down - two step approach*" where the starting point is first the "construction of the Dordogne" as a political issue in the public sphere. A second step included a more operative public participation processes to discuss more local actions within the overall framework developed in step 1.

- To manage the multi scale issues, in the Dordogne River Basin, it seemed specially relevant the *creation of a new institutions (EPIDOR) that facilitated new links and networks* with new institutions and actors. These *networks are new coalitions* based on the collaboration between scientists and technical people (as in the Muga case) and local actors that promote ecological approach as well as some users defending this too. This led to generation of "new knowledge". The issue of the legitimacy of the work of EPIDOR is important and this is provided by different levels of government.

4. 3. 5. - Discussion: toward a multilevel social learning?

The national reports and the case studies carried out in the context of HarmoniCOP provide evidence of the structural complexity of multi party processes as discussed in the initial WP1 and WP2 reports. This is specially the case when actors, problems and issues are at multi scales as it is in River Basin Management. Complexity is linked to the need for many participants to represent organizations with different jurisdictions (spatially), legal/formal responsibilities and different interests. Actors have very different resources and there are important asymmetries in power. Actors have different interests -some more concerned with strategic considerations versus others more interested in concrete local action- and often actors operating at an upper level have constructed their own alliances, e.g., on some sectoral basis, with local constituencies and bring to the process their own preconceptions on the positions of others. In particular, within the HarmoniCOP project, evidence shows:

1.- The importance of understanding within multi-scale public participation processes as a positive asset, the different qualities in the knowledge brought in by different actors; and the importance of effectively playing of different roles in public participation by actors at different scales. Specifically, the importance of government bodies to play effectively the role as convenors, initiators and providers of technical capacity at strategic level. While sectoral and local organizations provide other types of local/sectoral knowledge and have other roles (i.e.: building community trust).

2.- Where there are multiscale public participation processes in multiscale RBM, these are often initiated by government agencies (local public participation IWRM cases are not multiscale to the same extent although they aim at replication). It is important to understand how important may be in complex, multi party, multiscale public participation processes and social learning the way governmental agencies insure that the "enabling" conditions for effective social learning are in place. They need first to provide the necessary legitimacy to the process, make clear how this will influence decision making and show willingness to respond and respect adequately the outcomes of the process.

3.- Dealing with the existing differences in issues/problems, perceptions, jurisdictions, responsibilities and interests of actors at different scales may require to set up public participation processes at different scales but at the same time for adequate RBMP it requires that these are explicitly linked. In

some cases it has been useful to set up a series of "linked public participation forums" (interaction spaces) at different scales for the different purposes of plan, vision or program of measures development. Evidence in case studies shows some specific formulas for dealing with these multiscale issues through a top down two step approach (in Dordogne) where local public participation processes are carried out in the context of vision and plans developed in a public participation process at a higher scale. Other alternatives are multiple linked processes (in UK and Meuse) at different scales, feeding each other. Here too the new public participation structures at the different scales and the forums that serve "linking" purposes (as EPIDOR in Dordogne) need to have been provided with new legitimacy.

4.- Where they have been adopted, these new multi-layer structure of organization of public participation processes have helped reframing the issues (and perceptions of participants on each other) and led to creation of new knowledge and new identities (they could be seen a new type of community of practice dedicated to "linking" different scales) helping create a new collective identity at RBMP scale.

5.- The relevance of some attitudes and conditions for successful public participation and the need for dealing explicitly with inter-relationships, specially in the case of multiscale RBMP processes where actors are from so different communities of practice. It seems to be that given these differences in background and knowledge and hence the opportunities for misunderstandings, and the lack of common language or symbolic references, that there might be specially important the role of facilitators. Intertwining with previous processes of decision making (e.g. technically determined, lobbying and bilateral agreements on decisions) and in insuring that the actors do not perceive that there is manipulation or attempts of by-passing the process, seems to be specially important for successful involvement and learning. In the part of government, effective public participation and social learning requires that government representatives provide clarity (as convenors) on how the public participation will influence decision making and use of public financial resources. However, it is not only government decisions that need to be influenced. In the part of NGOs, private organizations and citizens this requires also a commitment to change visions reflected in changed practices, as agreed.

7. Social learning with representatives from authorities and organizations still takes place between persons, although it materialises in particular rules and procedures within institutions which work at different levels. Difficulties arise on how to transfer those learning results into the organizations and how to ensure in a context where the individuals are not consistent social learning might be fostered. Social learning on local and probably regional level can involve stakeholders which are on a more personal/ privately involved since they might be directly affected by the results/ measurements taken. On national, international, transboundary level decisions are taken most times on a general level, concerning more strategic issues and overall goals if the RBMP, less operational measurements.

6.-Some change processes in multiscale processes have also been observed in relation to:

- Widening of participation through a redefinition of legitimacy on who participates. These required dealing with initial suspicions about willingness to control (by some actors) versus the fear of delegating too much control to the local level. As a result of social learning, the boundaries of participation may be extended to new stakeholders and to new issues. In this regard, social learning can be directed to the removal of some structural constrains to cross-issue multilevel participation and to substitute them by a system of clear opportunities, incentives and communication strategies to enhance and sustain stakeholders' involvement in the long term.

- Changes on perceptions of power asymmetry through greater awareness (in the interaction process) of the quality of the interdependencies among actors; new coalitions of interest formed along different facets; and a greater awareness that interests can be multifaceted with some actors gaining influence because of having a wider network of relationships.

7. Different levels of learning (see figure 10) may also occurs and be associated to different scales of action depending on the content and procedure and particular contextual conditions of the participatory process. At first level, social learning may only occur at the level of cognitions or technical skills; at second level, social learning entails the framing and reframing of issues; while at a third ultimate level, it implies the creation of new relational qualities, the re-creation of new social boundaries. Within the Muga case study, the second and third levels were referred to as 'second order social learning' while the learning of technical skills as 'first order social learning'. In this report, as will be explained in section 5 and 6, we argue that even another type of social learning can occur with regard to the assessment and management of natural resources: that of *sustainability learning,* which entails learning an array of new cognitive skills, cultural values and institutional capabilities besides of technical ones. Although changes in cognitions, framing and relational qualities can occur a all scales and at different stages of the process a given scale, it is at the local scale where such changes may be more evident. (However, as it will argued later, sustainability learning needs changes in frames and relational qualities at the macro scale).

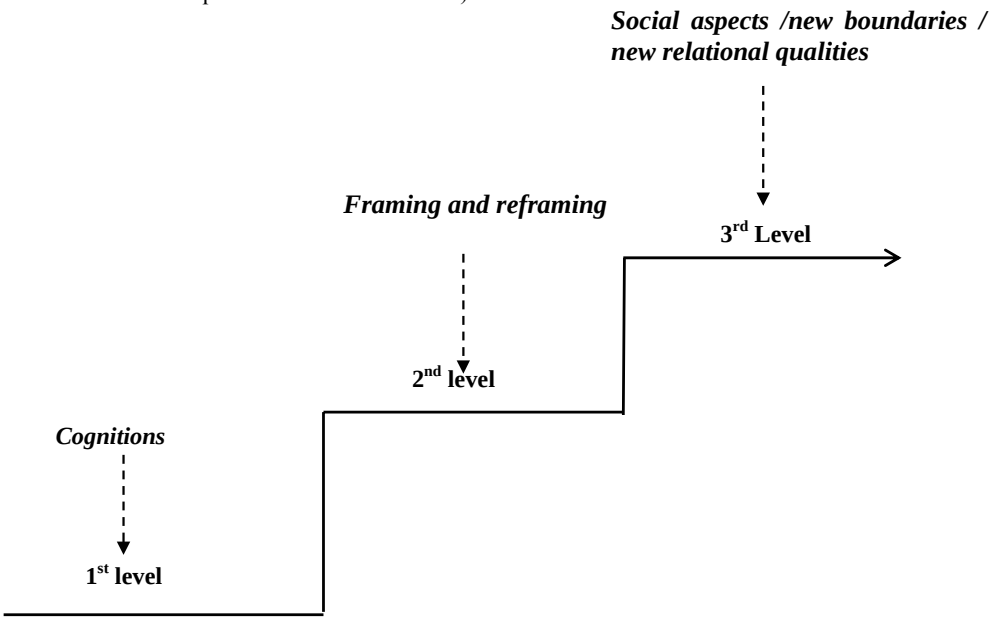


Figure 10. A ladder of social learning.

In this sense, as a third level type of social learning outcomes, it is important to remember that social learning can result in the building of *new identities* at different levels. Such new networks of representation and action are not independent of processes occurring at different scales. Indeed, for instance a process of multi-level social learning can occur and the case of the National Water Plan (NWP) in Spain in 2001 provide a blatant example in this regard. At local scale, at the Ebro Delta, for decades, relationships with environmentalists and some representatives of local populations were very difficult. During the late eighties and nineties such relationships deteriorated even further and the conflicts between the developers and conservationists got to a point that even the former labelled the latter as 'Taliban fundamentalists'. However, the threat posed by the NWP to the whole Ebro river basin ecosystem and interests, made necessary to create a new consciousness and a new 'river identity', which united the previous extreme opposed positions and created new rainbow alliances to work together. Such movement included members of civic, economic and academic spheres and worked at multiple levels of policy making, including at the European Union scale. The success of the movement cannot be overemphasized. The legal articles of NWP aiming at diverting huge amounts of water from the Ebro river basin to the south of Spain for intensive agriculture and mass tourism were withdrawn and the lessons learnt undoubtedly affected perceptions and practices at the multiple levels of resource policy making. Social learning can occur a multiple levels, although in some cases, it may only result from a certain degree of conflict or from external pressures which go beyond the willingness or the intended consequences of the purposes of the people involved in a particular scale of action. Furthermore, social learning may be

restricted to a particular set of very identifiable objectives and avoid a more systemic, long-term procedural approach, in which case it can become simply a sporadic 'single-issue social learning' event.

Some issues raised in WP1 and WP2 remain to be further discussed on the basis of HarmoniCOP research. This includes aspects related to interdependencies and interconnectivity and the qualities of interaction in multiscale processes; the existence of different types of boundaries along different aspects at different scales; the use of instruments such as condition the financial allocations to the existence of integrated public participation multiscale processes and actions; the need to increase capacity at lower and middle levels of the multiscale public participation processes in RBM; a more explicit treatment of the nature of natural links and cumulative nature of natural processes in RBMP and the public participation multiscale processes; a greater understanding of the iterative, adaptive nature of public participation multiscale processes that are so important to be able to adapt to the changing nature of natural systems. However, and to summarize, it may suffice to say one can view social learning as a multi-scale, multi-phase and multi-actor process. The HarmoniCOP project can only draw preliminary conclusions on the interaction between these different scales based on the national and river basin case studies. In RBMP participatory processes are organized at different scales – the (transboundary) basin, regional / subbasins or even local at community level. The nature of the process, the role of participants and the issues under consideration change vary with scale. At river basin scale participants in participatory processes in general act as representatives of their constituency which may be formally (e.g. professional association) or informally organized (e.g. interest group). Issues under consideration are of more strategic nature such as transfer payments or sharing of pollution loads between up- and down stream users. At local scale individual farmers or citizens represent their own interests in issues of local concern. They may be directly affected by pollution or measures to reduce the pollution from agricultural land and/or they may contribute with their behaviour to pollution problems elsewhere. An ideal process of social learning would establish a communication between interests and strategic measurement plans at basin scale, operational implementation at regional scale and concerns and individual options at local scale. This would require considerable efforts to provide information making transparent links between scales and empower individuals to act.

4. 4. Representativeness, validity and policy integration of results for the implementation of the WFD.

4. 4. 1. Representativeness, validity, and costs of participatory processes in RBMP.

In looking at the representativeness of a participatory process, the issues of costs and of availability of resources come to the fore. Two main types of costs can be distinguished when preparing a participatory process aimed at enhancing social learning, and in particular those which entail the personal interaction with stakeholders:

(a) *Fixed costs:* Fixed costs are those which cannot be reduced given the minimum number of participants to make the participatory process feasible. Among those fixed costs are: money given to participants to ensure representativeness; salaries and overheads of the organising institutions; cost of location and other material infrastructure; preparation of the inputs of information to be used in the deliberative process, costs for latter dissemination and integration of results within the policy process.

(b) *Variable costs:* As said before, paradoxically, not everybody can participate in a given participatory process. But even though, it is not necessary that *everybody* participates. However, it is important that all the parties are sufficiently well represented in the participatory process. It is the task of the facilitator or mediator that this will be achieved. In a similar manner of quantitative poll sampling, where after a given number of participants or sample size, the sampling error does not diminish in proportional or marginally substantial manner by increasing its size -but the costs will do so-, a similar process can be said to occur in deliberative processes. In other words, there is a minimum amount of people who must participate and be represented in the deliberative meetings, (and also an optimum one if resources are available), but after this number, which is very context dependent, costs increase substantially without the proportional increase in the validity of the results.

Costs of recruitment increase with the number of participants engaged in the process. After a minimum number –which the organising institution may define as to the optimum number- costs increase substantially

without a significant marginal increase in the representation of diverse viewpoints or in the validity of results. Costs can also increase given a fixed number of selected participants, depending onto the extent it has ensured the diversity of the group of participants. Although it very much depends on the specific context –e.g. to which extent participant are willing to participate voluntarily-, the more representative the recruitment is, the more expensive it is, as more time and resources need to be deployed to ensure that representativeness (figure 11).

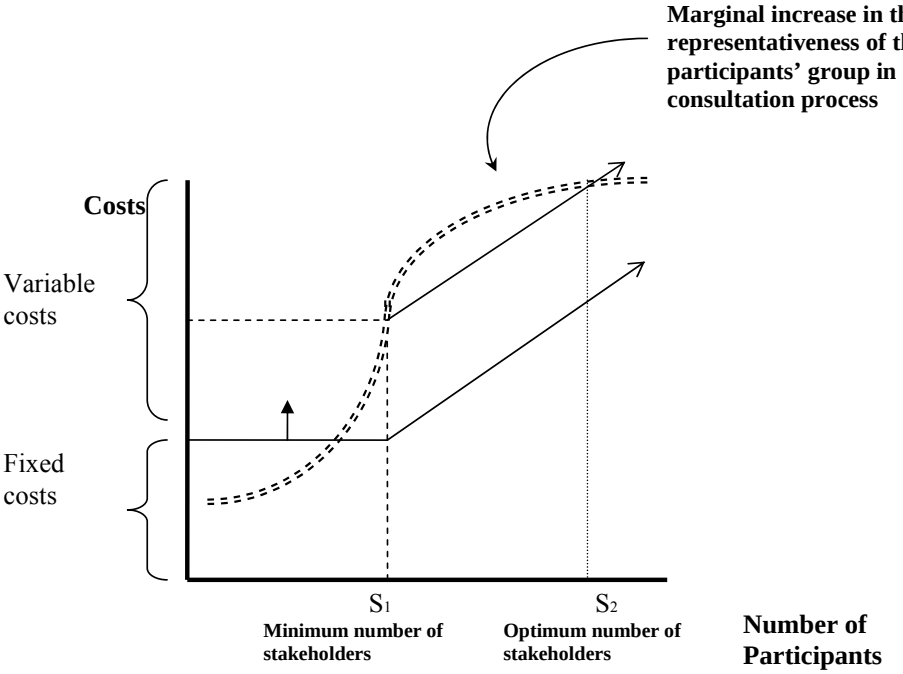


Figure 11. Costs of recruitment and its relation to the increase in the representation of diversity of the participants' group. Before S1, representativeness can be increased by improving recruitment procedure but without the need to augment the number of participants in the group. Between S1 and S2 the number of participants grows as well as its representativeness of the issues at stake. After S2 an increase of participants, similarly to a snowball effect, will not significantly increase the representativeness of the process while the costs will increase substantially.

Within the case studies of the HarmoniCOP project, resources were crucial to decide the process of boundary management, to ensure early and sustained involvement of stakeholders. Costs of coordination of the public participation processes can be lowered as a result of social learning. Indeed, a result of social learning is how to improve the efficiency of the available resources for public participation and to design less costly procedures in which long-standing and fair representation of interests, views and knowledges is ensured (see box 8). In this regard, IC tools can play an important role, albeit they cannot substitute altogether the more personal and direct forms of social interaction needed for social learning.

For reliability we understand that the instrument used to gather and later on to analyse the opinions of the participants can really reflect their views, and therefore they really express of what happened during the process. For validity we refer to the fact that such results are representative of the different perspective hold by the community at large. In those public participation processes where discussions are not tape recorded for latter analysis, reliability can hardly be guaranteed, although this can be (only partly) compensated by the

writing of consensus report with the stakeholders. Similarly, those public participation process in which participants are self-selected –e.g. on the basis on their power and resources to attend the meetings- cannot be said to produce valid results representative of the views (or the change of views) of the larger community. A major challenge for the adequate implementation of the WFD in Europe will be for the various institutions involved in organising public participation process to ensure the reliability and validity of the results of the participatory processes. Such difficulties will be even greater given the large diversity of possible procedures which can be employed and can yield valid –and non valid- results in terms of enhancing the efficiency, equity and sustainability of decisions related to RBMP. This is why the emphasis is given in this report on criteria more than on specific procedures to follow, as the latter need always to be adapted to the specific contextual conditions in which such public participation processes take place (Box 8).

Boundary management and public participation in deliberative processes.

Given the relatively small size of groups usually involved deliberative participation processes it is impossible to ensure that the outcomes obtained will be fully *representative* in a strict statistical sense. However, such processes do provide *indicative* insights which can be very useful to support policy making for river basin management. The first thing to admit -and to be aware of- in any participatory processes is that not everybody in a given community can or will participate. There are many criteria to decide about the level of openness and composition of the participants and such criteria can also be negotiated with local stakeholders. Among those criteria for selecting the public in a process aimed at social learning, the following can be underlined:

- ***Maximum representation of diversity:*** of knowledges, interests and values. As a general rule, all the different identified parts involved in a community should have equal probability of being represented. A previous study of the social structure of the community in order to learn what are the main segments of the society, if possible in a quantitative way- is very useful tool to have to organise the recruitment of participants. It is important to have a representation of each segment in the participation process under different dimensions. Some authors consider also that such representation should be proportional in the meetings to the one existing in the population at large in the area under discussion.

- ***Fairness and competence:*** To ensure as much as possible the equal capacity and probability of all stakeholders to develop their arguments and to compensate the power of those dominant stakeholders who aim to control the process. Furthermore, a public participation should not be initiated if it does not have a minimum set of guarantees that the results will be taken into account by the attendant constituencies and in the case of natural resource policies by the attendant policy and management institutions.

To ensure a satisfactory level of participation, it is also important that the stakeholders perceive their involvement is an opportunity to fulfil some of their own interests and demands, and that they can profit from such interaction. Usually, an invitation letter is enclosed explaining not only the reasons of the participatory process but also how it can benefit the different stakeholders. A small amount of money can also be given to stakeholders to compensate them and as a sign of appreciation for the time invested in the process. Note that this economic contribution is important to make sure that all the interested parts will be represented. Otherwise, some sectors run the risk of being underrepresented or, as it is often the case, that it is always the same people (and who would have been involved in the decision making process anyway), participate once and again hence consolidating the statu quo, the dominant views about the problems at stake, and the measures to be implemented. The amount of money given to participate in a public matter discussion is also very variable according to the standard of living of the community, their political culture.

Box 8. Some key criteria for selecting stakeholders in a deliberative process aimed at social learning in RBMP.

4. 4. 2. Policy integration. The case of Spain: lessons learnt from HarmoniCOP for the implementation of the WFD.

In Spain there is a strong tradition of participatory processes in local water management and there are established public participation processes in River Basin Management and Planning of the River Basin Authorities (*Confederaciones Hidrográficas*) since the 1920´s. These processes were designed for the development of new water storage and transportation infrastructures that served a combination of users (many beneficiaries) and required a Basin wide approach (insuring economies of scale) because of the effects of new infrastructures on the whole hydrological regime of the basin. Top-down linked participatory planning and management bodies exist with clearly defined restricted roles and responsibilities. At lower scale the public participation processes in exploitation boards, dam management commissions and infrastructure building boards, in each of the Basins, result in proposals for decisions on the regime of use, the regime of filling and release of water from specific dams and on construction of new infrastructures. These decisions are taken in the legal framework resulting from the public participation planning decisions taken at the "top" at a River Basin scale that define water use rights (concessions to use water); water availability for different types of users; and plan new infrastructures. River Basin Plans being legally binding. Proposals from these public participation processes are taken to the RBAs executives and President who has the authority to make the final decisions (in some emergency procedures it is the Council of Ministers).

Existing local participated bodies (irrigation and users associations) have been incorporated in the management structure of the River Basin Authorities and have delegated responsibility and authority to distribute (though tertiary distribution network) the water served mainly through main channels by the RBA (or from collective wells), managing water allocation to farmers private lots (time and flow of watering) or different demand units and dispute resolution in the context of legally defined planning regulations, water use rights (and conditions) specifies at higher scale and responsibility of the River Basin Authorities. They have develop their own water juries, simple management structures and cost allocation systems to cover their costs of the water distribution and allocation system (and to pay the tariffs of the RBA). In light of the WFD the present public participation processes, as set up, may be insufficient, as analyzed in the Spanish report of WP4. They have been set up as single issue (infrastructure planning, building and management) and, accordingly, with public participation restricted to organized user stakeholder groups and public organizations (as representatives of the public interests) and only recently has opened up more to wider membership. Existing public participation linked processes have been set up in the context of a strict hierarchical context where the lower levels decisions (and representation at lower levels) are taken in cascade of those taken at higher level and subject to the overall authority of the President of the Basin. There could be said that structurally there is little room for feedback bottom – up, although double memberships of some participants at higher and lower scales and proposals from the boards and commissions are communicated to higher levels.

The public participation organizations, and their way of functioning is tributary of cumulative changes in the last 100 years and much of the perceptions, ways of dealing between organizations, power relations among different bodies, and overall participatory relations reflect in an important manner through the values and participants in the process the successive changes in ideology and context. RBA and their public participation procedures were alien to the authoritarian Franco regime and hence there were introduced changes to their independence of decision making (making them more dependent on the central state). Although they survived the authoritarian regime, and today they are modern capable organizations with increasingly well trained committed professionals, many consider that they have inherited some of the intrinsic authoritarism, back door decision making, technical determinism, autarchic and arbitrary decision making. Many argue that they base support on lobbying and responsiveness to specific stakeholder groups (that maintain them in place) but effectively this may only reflect that they may be trapped by the dilemma of having many responsibilities whiles having little independent authority, since this lies with central government. All these generates frustration in actors at regional and local level and has generated a strong wave of opinion arguing for its complete change. Some of the proposals for changes include a greater and stronger participation of the regional governments. As "newer" comers in the increasingly politically decentralized state, they bring new attitudes, greater professionalism and a more open democratic attitudes to decision making. Still the often strictly "legal approach" that frames solutions to be mainly greater legal decentralization of responsibilities and authority, does not seem the only answer, and issues of collaborative government at the interface may need to be further considered. In this context there is an important opportunity today for structural changes in the organization, participants and roles in RB planning, management and decision making. These changes are taken place today, aiming to reflect the new issues brought about by the WFD (beyond infrastructures); and

the increased decentralization in many legal responsibilities on the new issues. Questions of the importance of human actors and processes may need to be acknowledge as of greater importance.

The main lessons from HarmoniCOP that may be specially useful to move beyond the existing system and proposed changes are related both to a) the importance of understanding the structural context for public participation and the right conditions to be provided for effective public participation and Social Learning: and b) the importance of considering the relational aspects of public participation. There are important lessons for Spain about the specific role that the government needs to play in the public participation processes (as convenor, providing certainty and legitimacy to the public participation processes, for example) that may be different from those that are played presently. There are good examples on how this could be carried pout in Andalusia and recently in the Aquifer 23.

There are also importantly, lessons about the fact that responsibility on sustainable RB management may need to shift in the "public eye" from Government to all stakeholders and that this requires also commitment and shift of attitudes from all actors, it is not only about influencing government on how to do things differently but that it is everybody committing to do so. Looking at relational capital and its importance may require to consider how previous interaction process construct (or destroy) social capital. Specially important may be the participation of facilitation professionals to manage public participation processes when there are such as long history of participation, alliances and interest generated for a different water policy and objectives .

The lessons on the specific design on the public participation processes where actors (and problem issues) are multi-scale may also be especially useful, specially where there are linked processes with build up feedbacks between scales. In Spain the existence of public participation water management at local level (water users associations) may serve as a basis to establish some of public participation for the design and implementation of the programs of measures. An open question would be if the existing top –down linked processes for infrastructure management may need to be complemented by others so that there is appropriate feedback to decision making at the different geographical scales. HarmoniCOP has provided examples where this new multiplayer organization of public participation has been tried out (UK, Holland and France)and there are lessons from this that are useful.

Finally, there are important lessons on the attitudes that actors may need to have and exercise in the process of public participation. Openness; transparency, respect, avoid arbitrary decisions and back door decisions; whiles there are positive aspects to alliances and changes in alliances resulting from new power relations and network relations. There are also important lessons about how it may be important to consider in reframing and negotiation the interdependencies among actors and the right interaction forums (formal and informal). The relevance of experiences gained from the HarmoniCOP project for the implementation of the WFD may depend on the willingness of those participating in decision making to change practices and given way to Social Learning. This in turn has a first precondition to be willing to "listen" to be able to learn and hence move beyond thinking of public participation as merely consultation and information Further questions stemming from the HarmoniCOP research, relevant not only for the case of Spain, but of a wider scope are given in Box 9.

Some further questions stemming from the HarmoniCOP project.

1. On social learning

- The social learning concept and approach appears to be relevant to understand process of social network building. It also allows introducing a realist interdisciplinary approach into RBMP which justifies the need to create new knowledge / epistemic communities to develop tools and procedures to deal with common problems.
- A structural approach should also be considered and this is compatible and can be integrated with the more local and micro-social approaches.
- Social learning is related to Putman's concept social capital (see Ostrom, 1990, 1992). Investments in social learning in RBMP can be seen as social capital investments. Social learning goes beyond than building institutions. An important question is how costs of social learning can be reduced. Also, social learning is a result of results in social conventions, taken for granted practices or Bourdieu's Habitus. This is why the role of informal involvement is social learning needs to be clarified.
- 3 dimensions to the concept of social learning can be identified: it cognitions, frames and conventions, which are related to time, space and social organisation.
- In public hearings and within the future processes leading to the implementation of the WFD it is important to distinguish social learning from public participation, as the former is much broader in scope and also with regard to results.
- SL can occur not only by purposive, conscious involvement; it can be simple the result of the awareness of negative consequences of collective action, or of unwanted external pressures which raise new concerns of make develop new attitudes and institutions which otherwise would have never be developed.
- Indicators of social learning need to be developed to evaluate to which degree social learning has occurred
- An important aspect of social learning is learning about existing power distributions and how these affect the efficiency, equity and sustainability in the use of common resources.

3.- Social Learning & Uncertainties

- Social learning also entails learning about uncertainties. There are also different levels of awareness of uncertainties within RBMP. Furthermore, there are Multiple uncertainties all along the content and process of social learning that need to be recognised:

  - Ecological status
  - Implementation Costs and procedures.
  - Power relationships
  - Expert and IC tools roles

- Important questions in this regard are: how can these uncertainties be dealt? What mechanisms to deal and harness uncertainty can be implemented in RBMP while at the same time respecting fairness, openness and efficiency in the processes of assessment and management of common water resources?.
- A possible way to deal with uncertainties in the context of social learning for RBMP may be to:

  - Focus measures and actions not so much in producing fact and information about what the problems are, but in communicating on what people can do (see section 3.4);
  - Enhancing interaction and trust, even if this implies some degree of conflict.
  - Increase multiparty awareness of uncertainties, instead of denying them.

4.-On Information and Communication Tools

- At present there are difficulties to establish clear links between expert models and tools and practical problems for RBMP in which stakeholders can have a say. IC Tools may show too technical complexity.
- More research is needed to see the extent on ot IC tools enhance exclusion or exclusion in RBPM

Box 9. Further questions stemming from the HarmoniCOP project. Future research directions?

5. BEYOND HARMONICOP: KEY ISSUES IN PUBLIC PARTICIPATION, SOCIAL LEARNING AND SUSTAINABILITY IN RBMP UNDER THE WFD.

The following sections are intended to build on the HarmoniCOP findings but do not limit to or necessarily stem from them. More specifically, the goal of the following lines is to reflect upon a selection of key issues related to public involvement and social learning within the RBMP and to link those issues with the debate and practice of sustainability. They are also intended to provide further pointers for the analysis of results emerging from RBMP research and practice, by focusing mainly on the cultural and institutional aspects of the relationships between the implementation of the WFD and sustainability. First section will introduce the notion of *strong and weak sustainability*, arguing that each of the two models of public involvement has also differentiated implications with regard to the implementation of a strong or a weak model of sustainability; conversely, the WFD could aim for the implementation of strong or weak forms of participation and sustainability. Section 5.2. will examine the question of *culture* and resource assessment and management, largely overlooked within RBMP research and practice. A growing strand within environmental thinking acknowledges the crucial role played by culture in the definition of causes of environmental change and the selection of the attendant policies regarding the use of natural resources. Given that the omission of the study of culture is certainly acute within RBMP, some theoretical background and recent results are given which may help framing future research in this field. In section 5.3. the *institutional aspects* of RBMP are dealt integrating three theoretical sources: systems theory, post-modern environmental sociology and common-pool resources approach. This allows providing an original model for RBMP conceptualisation and practice, which sees river basins as 'hybrid self-organisation systems'. Such model may help to improve the understanding of transition management paths toward more sustainable RBMP. And finally, in section 5.4., the concept of *sustainability learning* is introduced and linked to the implementation of the WFD. While the WFD may be seen as a the beginning of a structural process of change toward more sustainability futures within the use of water resources, it has some limitations. The progress toward more strong sustainability forms of societal organisation needs of changes which go beyond the legal and administrative spheres. It demands a deep-rooted change in culture, and especially, in the way information, knowledge and life-supported systems are conceived and treated by scientific assessment and policy domains. Section 6, conclusion, will aim at specifying how a more sustainable knowledge and life systems vision may look like and will try to link it to the evaluation and practices now existing within RBMP. Indeed the role of knowledge and values regarding our understanding of natural systems is one of the most under-researched within environmental management being at the same time one of the most crucial that determines the different transition paths towards sustainability. In this sense, the conclusion of this report, may be read, not as a simple summary of findings of the HarmoniCOP project- which can be found in the sections 3 and 4 of the present report and in the respective work package documents-, but as reflection on a possible programme for future research in natural resource management and in particular for RBMP.

5.1. Strong versus weak participation.

A central debate, relevant for the WFD, exists on whether one should opt for the implementation of a *weak* (or very weak) *or a strong* (or very strong) mode of sustainability. Each of the two modes of sustainability can be associated also to allowing or promoting a weak or strong forms of public participation. The development strong institutional designs for strong sustainability can be seen of requiring of multiple and enhanced forms of participation upon social learning depends. This is the case because, as pointed out by O'Riordan and Voisey (1998:16) 'very strong sustainability' is associated to a 'comprehensive cultural shift coupled with technological innovation and new community structures' where 'community-led initiatives become the norm'.

It is possible to distinguish, at least, twelve different dimensions or ways citizen participation in environmental and sustainability related issues can be carried out providing different levels of strength in the involvement of the public (Tàbara, 1999). Choosing one option or another is not only a matter of individual will but also depends upon the political culture and social structure where citizens develop their daily activities. The relationships between individual motives, values and interests and the structure of opportunities in a given context of action will determined the forms and outcomes of participation. Acknowledging the existence of multiple ways citizen can channel their views in public matters may also allow more flexibility and creativity in some of the most rigid current participatory processes. The different forms of public participation which will determine the degree of strength of the civic involvement in environmental and sustainability issues can be classified as follows:

1. *Depending on the relation between reason and time of action*:

A) **PROACTIVE**: action and participation is taken before expected negative side effects might occur or, simply, to improve the current situation.
B) **REACTIVE:** results as a reaction to the eventual occurrence of a negative harm or side effect (e.g. *NYMBY* and *LULY* movements).

2. *According to the scope which guide the aims of action*:

A) **SYSTEMIC:** based on a global, relational, and a systemic and holistic perspective.
B) **SINGLE-ISSUED**: centred on particular and limited number of matters.

3. *Given the choice of participatory procedure:*

A) **DIRECT:** all the parties have equal possibility and sufficient capacity as well as the same means of intervention to define, select and provide solutions to whatever problems they want to raise (e.g.: communitarian decisions).
B) **INDIRECT:** citizens delegate both deliberations and decisions to third political parties or channel their opinions through social methodologies that use restricted but representative groups or samples of the population.

4. *Depending on the previous possibility to define the options to be selected:*

A) **QUALITATIVE:** based in "deliberative discourses". Stimulates an open and representative reflection which allows for the previous definition of problems, its relative importance and the options to tackle with them before they are voted or asked opinion upon. The emphasis lies more in the process that in the result. Enough time is provided, generally is a lengthy process (days, weeks or months).

B) **QUANTITATIVE:** based on the addition of votes or opinions about already-given preferences and options, whether through electoral system or by quantitative public opinion polls. The emphasis lies more in the result than in the process. Short time is provided to participate, and normally it is a fast process (minutes or hours).

5. *Whether formal institutions channel individual actions and preferences that need also to be expressed in a formal way*[12]:

A) **FORMAL:** when formal institutions gather formal forms of individual action and expression.
B) **INFORMAL:** Neither organized by formal institutions nor actions and preferences need to be expressed in a formal manner.

6. *In relation to the openness of the participatory process and what actors intervene*:

A) **INTERESTED GROUPS' PARTICIPATION**: restricted to organized interests' groups.
B) **CITIZENS' PARTICIPATION**: focuses in the inclusion of the whole set of non-organized interests of the general public.

7. *Depending upon the spatial scope of the reason and effect of participation*

A) **LOCAL:** only considers the local community.
B) **MESO**: with regional or national scope.
C) **GLOBAL**: worldwide orientation. Taken into account global issues.

[12] In this case another combination is possible: formal institutions that gather non formal expressions of individual preferences and action.

8) *Depending upon the temporal scope of the reasons and effects of participation (depends on the issue)*:

A) **SHORT TERM:** one generation.
B) **MID TERM:** two generations.
C) **LONG TERM:** three or more generations.

9) *According the way individual action is channelled*:

A) **ECONOMIC ACTIONS:** by donating money, buying green products and services or following other responsible economic behaviour.
B) **POLITICAL ACTIONS:** preferences and interests are channelled through established political institutions.
C) **LEGAL ACTIONS:** using legal means of pressure.
D) **SOCIAL AND CULTURAL ACTIONS:** following other forms of social and cultural expression, towards changing perceptions, values, or cultural beliefs or adopting alternative lifestyles. Includes educational strategies.

10. *According to the radicalism of the strategy.*

A) **MODERATE:** based only on dialogic procedures.
B) **RADICAL NON-VIOLENT:** uses means of radical pressure, except violence, such as non-collaboration, demonstrations or parallel government.
C) **VIOLENT**: using violence as a means of pressure.

11. *In relation to the regularity of the participation*:

A) **PERMANENT:** guarantees regular intervention, e.g. by institutionalising public involvement.
B) **OCCASIONAL:** parties only participate occasionally, e.g. as a reaction to specific issues.

12. *Depending on the actors that initiate, lead and control both the procedure and the results of the participation process:*

A) **TOP-DOWN:** limited number of political and administrative elites lead and control the process of "participation" as well as concentrate the power. Citizens or stakeholders do not have capacity to ensure the implementation and compliance of the possible agreements resulting from the process.

B) **BOTTOM-UP:** Citizens and stakeholders are empowered enough as to be able to select and design the preferred process of participation as well as to make sure that the possible agreements resulting from the process will be implemented.

Strong and plural participation is therefore called for, and justified on the grounds of improving the efficiency, equity and sustainability of complex policy decisions such as those related to integrated water management. To a large extent, the necessary *minimum* common understanding of the issues at stake depends on the ability and the willingness of different stakeholders to *acknowledge the need and the project for sustainability* and therefore to change current business-as-usual policies. In particular, some basic guiding principles to improve sustainability can be agreed, -which is different to reaching consensus in all other aspects of policy making- such as avoiding pollution and resource depletion processes with huge negative irreversible socio-environmental effects, extending the temporal, spatial and moral scales of the policy decision frameworks, or improving the respect for both cultural and natural diversities,

Also, and given that good governance depends upon multiple factors such as legitimacy of political institutions (and therefore of *trust*) and the capacity of such institutions to respond efficiently and in a equitable way to urgent public problems, informal means of participation and nearness to the individuals and groups with interests in the common pool resources is indispensable. It is precisely in this sense where the role of social and informal networks comes to play. Such networks will determine the shape and the results of the participatory processes, the selected participants and the mechanisms chosen to achieve the locally defined goals.

From this classification, it can be argued that two ideal models of participation are possible. A ***weak model*** would be that one in which individuals only acted when some kind of negative outcome eventually happened, based their actions only on single issues, where participatory procedures would no allow for direct, qualitative, informal and citizens' intervention, focused only in local spatial scope and short term time frame, and were only moderate, occasional and top-down natured. On the contrary, a ***strong model*** of participation would entail that individuals act in an precautionary manner before a negative and undesired outcome happens, actions are not only oriented towards single issues but include a holistic perspective, participatory procedures allow and promote direct, qualitative, both formal/informal and citizen/stakeholder means of intervention, are based on extended time and space frames, and follow only or excessively moderate and top-down strategies. Significant sustainable adaptation is unthinkable without a strong participation. And indeed this is one of the most straightforward way for social and sustainability learning as will be dealt in more detail in section 5.4. It is not clear, however, the degree of strength in which participation is intended to be implemented within the WFD, which depends the impact such participation can contribute to improving sustainability.

5.2. The role of culture in social learning and the cultures of participation in RBMP.

Water resource management has a strong tradition based on controlling environmental problems with technical solutions. The management of risks has relied on the ability to predict extremes and control their impacts with technical preventions, such as flood protection, building higher dikes or bigger dams and reservoirs. Such practices are embedded in particular cultural perceptions and interpretations of the causes and nature of environmental problems typical of an old water resource management paradigm. Under such old paradigm, beliefs systems, human attitudes and collective behaviours were perceived as external boundary conditions but not as integral part of management objective and strategies. However the situation has changed dramatically. Over the past years integrated water resources management has become the reigning paradigm. Changes in institutions regulating processes of social organisation and individual behaviours are not longer seen as separate from changes in the efficiency of water technologies. Both natural water ecosystems and social systems of water demands are now understood as integral parts of the same process to be managed. In this regard, the importance of governance and cultural adaptation have become major issues of concern. Given that in democratic societies, such adaptation can not be imposed by force but only learnt in a extensive and participative way, new institutions based on a more holistic approach need to be produced. However, current management science and practice have not kept pace with the new challenges. More flexible, systemic and integrated management concepts are yet to be developed and/or improved and put into practice. More input from the social sciences is also required to sharpen our understanding of collaborative governance, of the implications of cultural differences and of the transition towards more adaptive management regimes. The paper outlines the importance of processes of culture and social learning for environmental resources management, in general, and water resources management, in particular. A new a concept for social learning is introduced, together with its implications for cultural and institutional change, aimed at contributing to the new paradigm of integrated resource management.

Indeed, 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. As pointed out by Lynton C. Cadwell (1997), we need to abandon those interpretations of environmental problems as incidental and embrace a more systemic understanding of environmental problems which means in practice that remedies must also include basic changes in belief and behaviour systems (see table 10). Given that in contemporary democratic societies such changes cannot be imposed by an authoritarian force, there is no other option but social learning.

Perceived Causes	*Explanations*	*Remedies*
I. Incidental: Harmful behaviours occurring in the normal course of human activities	**Errors in judgment:** Dereliction, ignorance, care1essness, alcohol and drug abuse	**Exhortation:** Ad hoc responses, c1eanup campaigns, indoctrination, education, and penalties
II. Operational: Misdirected policy, flawed program planning and execution, and bureaucratic intransigence	**Ineffective management:** Insufficient or incorrect information, poor morale or operating procedures, avarice and corruption	**Correction:** Improved procedures, impact assessments, independent review of proposals, standards, enforcement, and incentives
III. Systemic: Impairment inherent in technology economic systems; unsustainable and exploitive economic practice	**Built-in hazards:** Narrowly focused policies failing to assess full dimensions of environmental consequences; policies based on unwarranted assumptions	**Reorientation:** Basic changes in beliefs and behaviour systems; redesigning institutions and development of alternative technologies, elimination of harmful products and procedures.

Table 10. Interpretations of environmental impairment according to Lynton K. Caldwell (1997).

Social sciences since their beginning took the need for a deep understanding culture and their connections with the biophysical environment at the centre of their preoccupations. In the post-war period, in the work of ecological anthropology (Hardesty, 1977) and authors like Cliffort Geertz (1963) or Amos R. Rappaport (1971) we find some the first serious attempts to operationalise the relationships between cultural and ecological systems. The influence of culture in the interpretation of natural resources, already explored by Spoehr (1956) and later masterly illustrated by Mary Douglas (1970) has been a continuous field of interest across anthropology and sociology, the latter mostly dealing with the issue of the 'social creation of nature' (Evernden, 1992, Dake, 1992, Eder, 1996; Mcglen et al. 1979; Schmitt & Grupp, 1976). Nevertheless those contributions could not be understood either without the work of few classical sociological thinkers like Emile Durkeim with concepts such as 'collective conscience'. This notwithstanding, contemporary environmental sociology has taken a rather lees general approach to the study of culture-nature relations. For instance, Dunlap et al. (2000) have focused on the study of cultural paradigm change from one being characterised by the belief in the exemptionalism of humans from of ecological constrains, in its non-belief in the ecological crises or limits to economic growth, based on anthropocentrism assumptions, and which takes nature as robuts –otherwise refered to as the Human Exemptionalism Paradigm, to a New Ecological Paradigm, mostly characterised by its opposite. A new line of research is now the study of 'sustainability values', aimed at integrating both worldviews (see Leisserowitz, 2004; Tàbara, 2001; Tucker, 1993);

At structural level, there is also a long tradition of social enquiry exploring the relationships between culture and negative environmental change. One of the seminal works in this regard was advanced by Lynn White (1967) who argued that the roots of our environmental crisis should be found in the way Christian religion in the West had depicted a dualistic picture of the relationships between nature and human societies based on the divine mission of humankind to dominate the natural world. In his view, because of roots of this crisis have to

be found in the cultural contours provided by religion, its remedies must also be of a religious kind, whether we call them religious or not (see also Passmore, 1974 and Moncrief, W. 1970). A new 'religion' must be learnt, surely of a civic guise, containing a whole new set of cultural references, values and rationalities, in order to overcome the current ecological predicament (Giner & Tàbara, 1998, Tàbara & Giner 2004).

Social learning necessarily includes changes in culture as well as on institutions, in order 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 in 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. Culture exists always before the creation of institutions –and to some extent, culture is partly independent from them- although particular institutions not only express particular cultures, but also reproduce them in particular manners. 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[13]. 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 institutions is that under the new paradigm of integrated resource management, environmental problems cannot appropriately be conceptualised otherwise.

However, in the social universe, there is not only a single environment but many. All of these views and perceptions about the natural world function as social interrelationships of knowledges, power and value distributions which are created and re-created in every social situation. In a similar guise, neither just one single environmental culture exists, nor one single morality, or rationality from which the best o a supposed universal environmental policy prescription can be made[14]. From the acknowledgement of the plurality of social reality, the analysis of interrelations between culture, politics and environment ventures into one of the most promising lines of research within the socio-environmental sciences, albeit one of the most difficult to carry out. From an methodological point of view, it is important to find specific and operational procedures to analyse and the effect of particular cultural components on socio-environmental change. One of such methods, which can provide measurable, beside interpretative results, is the study of *cultural frameworks.*

A cultural framework is understood as a *coherent system of cultural elements relative to the way of recognising, rationalising, evaluating and prescribing determined phenomena's of social (or socio-environmental) reality in such a way that they become significant and memorably for the different social actors at stake.* These frameworks provide *meaning* to the information and enable the structuring of messages as communicated out by the main forums of public discussion. As indicated by its name, cultural frameworks do not refer so much to content, but more to the way of interpreting and presenting such messages and information.

The use of the concepts 'frames' and 'framing' is taking a leading and prominent role in the analysis of ideological and cultural strategies employed by various social movements in their symbolic fight to gain particular shares of power.[15]. In the socio-environmental field, the authors that have assumed this analysis of culture have been characterised by theoretical preference of social-constructionist character, notwithstanding the fact that such a choice does not suppose the rejection of the ecological-realist vision or a justification of

[13] For an example of the application of the concept of institutional cultures and the role of social learning in the management of global environmental issues in the UK see Wynne et al. (2001)

[14] See M. Douglas & A. Wildasky (1982); M. Thompson; R. Ellis. & A. Wildavsky (1990). In comparison with the classical, 'top-down' –and somewhat dogmatic- approach of Douglas, Wildasky and their colleagues (with divides all the world views in individualistic, communitarian and hierarchical, and also in some cases fatalist- , the approach of the cultural framework allows for more 'bottom up contextualisation'. It does not depart from *a priori* set of worldviews but through a process multistage discourse analysis the different components of a cultural frameworks are identified and latter on a coherent structure is empirically found.

[15] V. P. Bourdieu (1991); R. Edelman (1997). According to D. A. Snow et al. (1986) the *alignment* of a particular framework is an essential condition for participation. In accordance with these authors, in the campaigns of social mobilisation, the different groups try to frame its interpretations over the subjects to handle it in such a way that they are meaningful to its members. Also see D. A. Snow y R. D. Benford (1992) y V. M. Zald y B. Useem, (1996).

primacy of the constructionist before the realist perspective.[16] On the contrary, adopting heuristic procedures like the Cultural frameworks makes it possible to reveal in a unique –and from the point of view of social explanation, necessary- way, the fundamental role that culture plays in the actual transformation of environment, as well as its consequences in terms of sustainability.

One of the most valued sources of terminology about frames are the contributions of sociologist E. Goffman (1974). According to Goffman, a frame is above all an interpretation scheme that permits various actors to reach, recognise, identify to a selected phenomena's of reality in such a way as to give it meaning[17]. Even so, subsequent re-conceptualisations of this concept have made it possible to increase its explanatory capacity and reveal relations that are entirely decisive to understand social reality, and especially those that have contents of a political character. In this way, for example, M. Entman (1993) emphasises that the framing processes consists of four main functions: defining problems, diagnose its causes, make moral judgements and suggest solutions[18]. Cultural frames can be expected to be more enduring than frames of other origin and as results there will be a stronger resistance to reframing in social learning processes.

Within the environmental research, one of the seminal works in applying this perspective in the environmental field was written by W.A. Gamson and A. Modigliani (1989) for the analysis of discourses about and against nuclear energy in US communication media. According to these actors, *interpretative frameworks* make it possible for different audiences to decode the various images and messages as transmitted by communication media, and group them in distinct *media packages* (see also K. Eder, 1996) Likewise, C. Trumbo (1996) used a similar perspective for the study of the coverage about the environmental climate change issue in US press, observing that scientists tend to stress and frame this global problem in terms of problems and causes, while politicians and members of public interest organisations were inclined to do this in terms of value judgements and solutions. In the same sense, A. M. McCright y R. E. Dunlap (2000), found out that one of the most frequently carried out strategies by conservative American movements in relation to the climate change problem was exactly the 're-framing' as not problematic.

Although there does not exist a complete agreement about the exact meaning of the framework concept, in the work of the majority of the authors a series of aspects overlap which peculiar characteristics make them appropriate for the theoretical as well as the empirical analysis. In practise we can assume that every *cultural framework* contains at least the following elements[19]:

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 logic and illogic, 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 phenomena 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 should be handled in every situation.

[16] In environmental sociological sciences, a epistemological position of a *social constructionist* character is defending that environmental problems are mainly social constructions, while for the *ecological realists,* environmental problems are existing independently from the way that they have been created socially (v. J. Hannigan, 1995). Even though in environmental sociology it starts to be accepted in general that this two attitudes are not in contrast but complementarily, it should be mentioned here as only one of many dilemmas to which contemporary environmental sociology is facing up (v. D. Tàbara, 2001).
[17] Notwithstanding the fact that, according to Goffman, the process to framing reality will never be accomplished completely, and will always end up to be a task of precarious success.
[18] Also see, J. Williams (1998).
[19] In this report the wider concept of *cultural framework* has been preferred above 'interpretative framework', given that frameworks are understood here as not only giving meaning to or explaining rationally a certain situation, but moralising and prescribing them as well.

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 framework in policy making have therefore different effects on the use of natural resources as they select and structure a 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 context to devise the different cultures which emerge from their discourses and practices.

Using this theoretical approach, a comparative study to analyse the discourses present in the main national press of two water management processes was carried out in Spain and Holland (Van Woerden, 2002). 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 month before its approval in July 2001[20]. 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. A total of twelve distinct cultural frameworks were identified in both contexts and compared. 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 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'. Figure 12 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 when framing issues of 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 on-going debate which characterise the still uncompleted nation-building regime of Spain affecting also the contents and shape of policies in other fields.

20 This controversial plan provoked the largest social mobilisations in recent times in concerning environmental problems. It included "old paradigm dominant measures" such as building 900 kilometres of pipes for interbasin water transfers out of the Ebro.

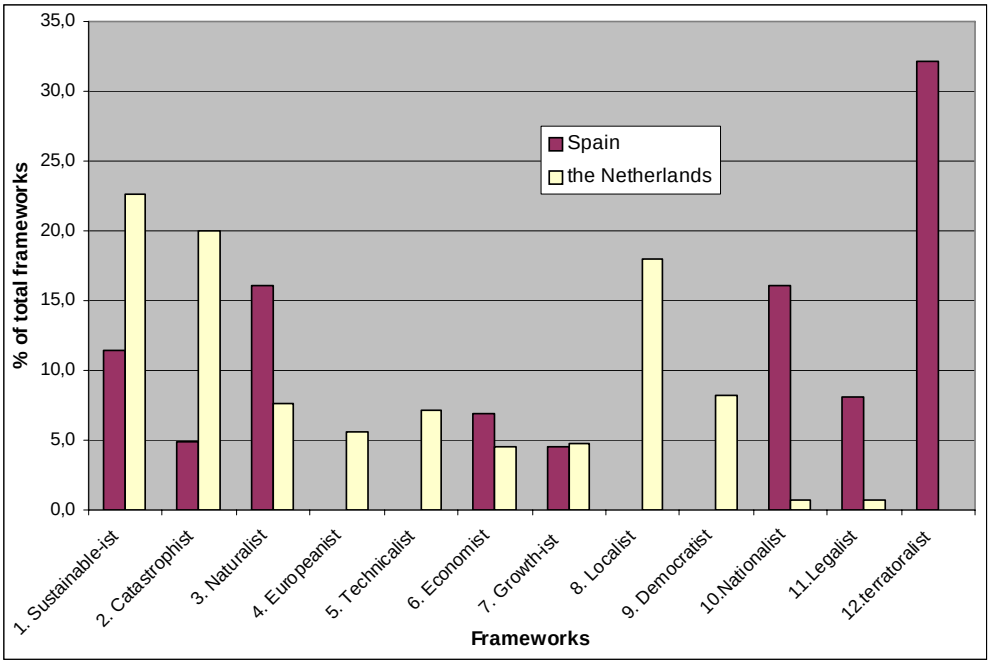


Figure 12 Cultural frameworks present in Spain and Holland in the management of water resources Sept 2000- July 2 001 (Van Woerden, 2002).

As shown, the approach of cultural framework can help to tackle the study of the complex issue of culture in different contexts in a more flexible way, a task otherwise very difficult to do. It can therefore be helpful to analyse the processes of social learning and public participation within the field of water management in river basin as studied by the HarmoniCOP project in a manner away from 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-existence at the beginning of the process to become notably salient and used across different sectors of society few week before its approval[21]. Such cultural change could also be understood as part of the social learning.

Furthermore, it is important to underline that an important aspect of the study of the influence of culture in policy is the study of *narratives.* In particular, it is important to understand how these narratives evolve, are originated, or relate to other narratives. Such discursive resources are usually constructed around the notion of 'motives' and 'situational languages'. This notion is important, because to a large extent, social learning depends to the possibilities to speaking and narrating reality in a fully new way. As will be argued in the following sections sustainability learning demands not only technical skills but a whole new language, both for science and policy. We need a whole new grammar and syntaxes which allows us to understand and perceive new needed realities which are now hidden under the autistic language we use to frame the rationality of daily actions with regard to the unsustainable use of natural resources. But also, because social learning also depends on the possibility of learning and integrating different perspectives which are structured around specific discourses. Given that most deliberative approaches to public participation are based on particular situational languages it is worth paying attention to the way such linguistic processes mean and work in practice. In this regard, one of the great masters of sociology, C. Wright Mills (1940: 905-913) believed that:

[21] 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.

> ‘‘Motives are words. (…) Men discern situations with particular vocabularies, and it is in terms of some delimited vocabulary that they anticipate consequences of conduct. (…) Institutionally different situations have different vocabularies of motive appropriate to their respective behaviours (…) Motive are accepted justifications for present, future or past programs or acts. (…) When an agent vocalizes or imputes motives, he is not trying to describe his experienced social action. He is not merely stating ‘reasons’. He is influencing others –and himself (…). Vocabularies of motives ordered to different situations stabilize and guide behaviour and expectation of the reaction to others. In their appropriate situations, verbalised motives are not typically questioned, (…). Motives are of no valued apart from the delimited societal situations for which they are the appropriate vocabularies. They must be situated. (…) Motives vary in content and character with historical epochs and societal structures.

Within natural resource and water management many distinct narratives converge, often in conflict. Hence, as pointed by John Colvin in one of the HarmoniCOP meetings[22], social learning narratives, as those which try to integrate public participation, must also take into account other dominant narratives, in order to become relevant for policy –and in turn to become a source for social learning themselves. In particular, some of the dominant narratives at present are those about innovation, social acceptance, inclusiveness and equity, welfare, democratisation and economic competitiveness. A cultural and attitudinal change is required to be able to learn from different narratives, while at the same time, contributing positively to the common good by providing our own perspectives in a reasonable manner, e.g. in dialogic and policy settings.

To conclude, one may be reminded, though, that the argument that the improvement of sustainability conditions and practices demands a cultural change, that it needs a different way knowledge and natural systems are currently conceived, and that technological fixes –including the new Information and Communication technologies- are not sufficient to resolve the problems of sustainability is not altogether new[23]. However, current literature has left untouched the normative question in *what specific content* or direction such new visions should be developed so that it can effectively contribute to sustainability learning. This is quite surprising, given that the origin of the *current sustainability problems is not about not having enough knowledge; rather, it mostly lays in the type of knowledge we have* and that Western societies are promoting and developing. This is why, in section 7, conclusion, a discussion is put forward to set the cultural contours of the current visions of information, knowledge and life support systems and how these could relate to natural resource and river basin management and planning. First, however, we look at what institutional arrangements may be most suitable for the processes of adaptation to the challenge of sustainability at river basin scale and to which extent the implementation of the WFD could be regarded as a process of *sustainability learning*.

5. 3. Institutionalising *hybrid self-organisation* and polycentric social learning in European river basins.

Interpretations of systems theory by authors like Isabelle Nicolis and Ilya Prigogine, Eric Jantsch and others advanced some of the key ideas that may now be crucial for understanding how the transition path to new systems of sustainable governance may look like. According to Nicolis and Prigogine (1977), there is not an overarching force or goal driving the whole organisation of physical and ecological systems but it is the dynamic and balanced interplay between a multitude of forces which shapes the content and functioning of such ecosystems. The accumulative effect of changes occurring within those systems may result in sudden bifurcations or even catastrophes, often difficult to predict, creating a new situation of chaos from which a new order may emerge (Prigogine and Stengers, 1984). Such order is not necessarily achieved by any conscious and centralised command but simply by as a result of their own dynamics of change, and by variation and selection between the different parts of the system in a self-organising mode. Eric Jantsch (1975, 1980 cf. in Milbrath, 1989), also argued that all physical, living and social systems are evolving toward such

[22] Personal communication, Barcelona, June 2005.
[23] Lewis Munford in his *Myth of the Machine* (1964, 1966) had already stated that the total destruction of the planet could only be avoided if a new ‘world organic view’, similar to the one rediscovered by Darwin by linking human evolution with non-human evolution, should be adopted the whole of humankind in a quasi religious way.

self-organisation pattern. For Nobel price Ilya Prigogine, for those systems which have some means to import either energy or information, as it is the case with social systems, the second law of entropy -which states that systems move to one state of organisation and energy production to one of less organisation and dissipation- does not apply. On the contrary, such systems are capable to move from one dynamic situation to another, each of them based on different forms of self-organisation. After the 'chaos', a new and more complex pattern of relationships between the different parts occurs, opening new options and possible new paths for future development of the system, instead of reducing them. In the case of human systems, the new degrees of freedom are given by the new possibilities for reflection and self-awareness of change, but are also limited by the constraints imposed by their interaction with other non-human and ecological forces, all of which will also move to a new self-organising state[24].

The previous reflections may also help us to suggest a possible system for the good governance of river basins based on a constant process of social learning and socioecologic adaptation (Holling, 1978; Beck et al. 2002). To some extent, institutional adaptation to a new drastic situation, as the one provoked by global environmental change, also depends on the possibility to increase or make a more efficient use of the available energy and information systems. In this way, river basins can be understood as *dissipative structures*, as their organisation depends on the constant supply of external energy / resources and of information from broader systems in which they are embedded. Furthermore, river basins may be seen as systems tending towards a self-organisation pattern of both human and non-human forces (see box 10). For instance, in coastal management and river restoration science, an increasing movement argues for allowing a greater integration of such self-organising dynamics of natural systems within in the management and planning of natural resources. Concepts such 'managed coastal realignment' or 'river re-naturalisation' are examples inspired in such approaches. In part, this acknowledge the fact that the greater availability and use of energy, resources and information, the greater the internal complexity of the system, and at the same time, the greater the forces pressing to move the whole system towards a new self-organised pattern. This is not incompatible with the mounting drive to incorporate public involvement in water planning and management, but it is part of the same process of increasing the degrees of freedom of both social and natural systems while allowing multiple patterns of self-organisation at different scales of action. A process which necessarily is interrelated with social learning.

[24] Either in equilibrium or not. The concept of equilibrium and it opposite, non-equilibrium, are very contested ones. Some authors, such as C. Dyke (cf. in Freese, 1997) even argue that a fish in equilibrium would have never lived, as life is only possible to the extent that energy and information are exchanged between a particular life form and its environment in a process of constant non-equilibria.

River basins as self-organising hybrid systems

River basins can be seen as hybrid systems in which several human and natural forces, unless constrained by external forces, tend to dynamic self-organisation and regeneration. In this regard, current approaches aiming at integrating new concepts such as river re-naturalisation, socio-environmental resilience, and/or resource polycentric governance can be integrated. These perspectives share the aim of taking advantage of the potential which exists from the creative and self-regenerative social and natural forces once freed from unnecessary limiting constraints. Once such constraints have been removed, e.g., in the form of 'unnatural' river shapes or inefficient pyramidal institutional designs, synergies embedded both within human actors and natural 'actants' can be unleashed, creating new forms of system reorganisation which have the potential to be beneficial both for humans and for other life forms. Every type of social arrangement, of knowledge, and of life form is a response to a set of systemic relationships the pattern of which goes from one stage of organisation to another, which tends to reduce the whole control of the system by one single force onto the others. Social learning in RBMP entails also learning to manage, encourage and take advantage of such diverse and multiple social and natural forces, which move towards hybrid self-organisation.

Box 10. Hybrid self-organisation of river basins.

Indeed, many of current ideas on polycentric governance in the use of common pool resources are to a large extent inspired in the idea of self-organisation (see Ostrom, 2000, 1990; Ostrom et al. 2002). For instance, Elinor Ostrom, argues that empirical evidence shows that whenever users of a common pool resource are able to communicate among them, set their own rules of appropriation, and to monitor, sanction and deal with conflict, it is likely that they will obtain greater economic benefits, preserve the resource and distribute it in a more equitable way than systems imposed from outside and above as those imposed by government. In *Crafting Institutions for Self-Governing Irrigation Systems* (1992), however, she analysed such systems in many countries arriving to the conclusion that self-organisation does not guarantee that optimal institutions, in the sense of ensuring long-endurance and sustainability will be built. This is why, over the years, Ostrom has refined a series of 'design principles' for the crafting of institutions so that they are able, in the long run, to overcome the 'Tragedy of the Commons', which leads to the destruction of the common pool resources (Hardin, 1968). Box 11 specifies such principles, which can be understood as *socially robust* in the sense that the same type of basic rules can be applied and adapted to the changing external situations one generation after another in a sustainable way. Ostrom specifically warns us that the self-governed systems will endure over time, to the extent they their institutional designs are consistent with this principles, and not necessarily because they are self-governed. Both conditions must meet. More specifically, Ostrom (2002: 47) states about appropriators of common pool resources that:

> 'Whether their self-governed enterprise succeeds over the long-term depends on whether the institutions they design are consistent with design principles underlying robust, long-living, self-governed systems (…). Policy makers-can already take some of the important finds and use them immediately. A consistent finding is that having a supportive legal structure at the macro-level that authorizes users to take responsibility for self-organising and crafting at least some of their own rules'.

And in particular, she argues that institutional reform according to such principles, which need to be adapted to local conditions is a 'long-term investment in social capital' which can yield obvious benefits to the users and appropriators of common pool resources. Three conditions are necessary, but not sufficient for the emergence of self-organised institutions: (a) that the resource must be salient enough to the users that they are willing to invest the time and energy to create new institutions; (b) users must have the autonomy to devise and change the rules; (c)at least a subset of users must be able to engage in direct communication with each other (Ostrom et al. 2002).

Design Principles illustrated by Long-Enduring Common-Pool Resource Institutions (Ostrom, 2000)

l. ***Clearly Defined Boundaries:***

Individuals or households with rights to withdraw resource units from the common-pool resource and the boundaries of the common-pool resource itself are clearly defined.

2. ***Congruence***

A. The distribution of benefits from appropriation rules is roughly proportionate 10 the costs imposed by provision rules.
B. Appropriation rules restricting time, place, technology, and/or quantity of resource units are related 10 local conditions.

3. ***Collective-choice Arrangements***

Most individuals affected by operational rules can participate in modifying operational rules.

4. ***Monitoring***

Monitors, who actively audit common-pool resource conditions and appropriator behaviour. are accountable to the appropriators and / or are the appropriators themselves.

5. ***Graduated Sanctions***

Appropriators who violate operational rules are likely to receive graduated sanctions (depending on the seriousness and context of the offence) from other appropriators, from officials accountable 10 these appropriators, or from both.

6. ***Conflict-Resolution Mechanisms***

Appropriators and their officials have rapid access to low-cost, local arenas to resolve conflict among appropriators 01' between appropriators and officials.

7. ***Minimal Recognition of Rights to Organise***

The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

For common-pool resources that are part of larger systems:

8. ***Nested Enterprises***

Appropriation. provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Box 11. Design principles of long-enduring, sustainable use of common pool resource institutions, according to E. Ostrom (revised in Ostrom, 2000; originally published in Ostrom, 1990).

In addition, Becker and Ostrom (1995) underline the importance of maintaining a certain degree of *diversity of institutions* as a necessary condition (albeit not sufficient) to guarantee the sustainable use of natural resources (also Tàbara & Giner, 2004). More specifically, and according to Dietz, Ostrom, and Stern (2003), policy attempts to reducing the structure of social institutions to pyramidal forms based on efficiency criteria are bound to have a greater risk of failure (and therefore of unsustainability in the long term) in complex social systems such are now our globalised societies. In their words:

> ‘Institutional arrangements must be complex, redundant, and nested in many layers. Simple strategies for governing the world’s resources that rely exclusively on imposed markets or one-level, centralised command and control and that eliminate apparent redundancies in the name of efficiency have been tried and failed. Catastrophic failures often have resulted when central governments have exerted sole authority over resources […]. Governance should employ mixtures of institutional types (e.g. hierarchies, markets, and community self-governance) that employ a variety of decision rules to change incentives, increase information , monitor use, and induce compliance ’ (Dietz et al. 2003:1910).

Adapting the current water resource management to both the requirements given the integration of biophysical conditions the diversity of river basins and to the new social demands for descentralisation and self-governance is a challenge which undoubtedly demands social learning. For Berkes and Folke (1998), institutions mostly placed at the local learn and develop capabilities to cope and react to environmental feedbacks faster that do centralised agencies and in this way it is possible to argue that different institutional designs, at a structural level, may also show different capabilities for social learning. Centralised authoritarian regimes for instance, are not precisely known by their abilities to learn from others’ perspectives and from viewpoints of organisations placed in a lower or peripheral parts of the hierarchical structure. In too pyramidal social structures, learning feedbacks may be simply not possible or may be too time-consuming, making adaptation to new environmental and social situations too slow for the changing needs. A *polycentric self-organising structural* setting, which does not need to wait for orders before taking the necessary actions, may proof faster in providing solutions to deal with emerging problems and demands. However, this may create difficulties for coordination with other institutions within or between other organisational levels and may depend very much on the specific principles and arrangements existing in each level of governance.

However, while the approach of common-pool resources is very powerful and can be used to explain and inform many processes related to the use of limited natural assets such as water, there are also some limitations. An important caveat of the use of using the framework of common-pool resources is that there is a large number of problems related to the use on natural resources and sustainability in which actors are unable or simple do not *perceive* them as such. That is, individuals and organisations often do not see in the first place the need of the crafting any kind of institutional arrangement to deal with them in the long term, even though once in place the benefits of such institutional arrangements are evident. As underlined earlier, cultural difficulties remain. However, one can say that the approach of social learning is compatible to the common-pool approach and both are necessarily complementary given the fact that perceptual and relational qualities, besides the technical and political capabilities, need to be developed in order to set the new institutions in the first place. Second, the management of river basins may not completely fit with the common-pool model, as many different resources and scale of actors, issues and systemic relationships occurs within a river basin beyond the use of a single resource. And last but not least, there are many other criteria to judge the sustainability of a particular institutional setting besides that of yielding and distributing resource output in a equitable way over a long period of time, hence avoiding the tragedy of the commons. Dozen of alternative definitions of sustainability are now available; some ecological, systemic and even aesthetical criteria, e.g. related to the conservation of biological diversity or landscape values, not readily perceivable by the actors involved, may be considered in this regard.

Furthermore, current sociological thinking about the human relationships with the environment is moving towards to the development of hybrid categories, in which the separation between the natural and social worlds are becoming less evident. Such conceptual and theoretical integration is also supported by the systems’ theory as mentioned above. Ostrom’s arguments may still be regarded as too anthropocentric and dualistic with respect to the integration of non-human sources of knowledge and agency. As a contrast, Freundenburg et al. (1995) using the postmodern framework advanced by authors like Callon and Latour, defends that we need to recognise the extent to which ‘physical’ and ‘social’ factors are conjointly constituted:

> ‘our ability to understand socially significant outcomes will ultimately depend not on the separation of the physical and the social, but on our capacity to recognize the extent to which each is a fundamental part of the other’ (Freundenburg et al. 1995:387).

Indeed such growing awareness of the limitations of the ‘modern thinking’ based on strict conceptual dichotomies and dualistic practices, was masterly debunked by the work of Latour (1993). Such new visions are not only tricking down within academic circles but also within the most innovative initiative of resource

management. A new series of 'actans', agents which are neither solely natural or solely social but are both at the same time, are given a greater recognition within environmental management. The environment is not longer seen as an entity without its own dynamics and rhythms, or as systems the forces of which can be totally subdued to humans' will. On the contrary, a mounting strand of thinking believe that the improvement of sustainability in the long term should not keep maintaining the endless confrontation of the human societies to the forces embedded in natural systems. Rather we should create new forms of conjoint management and interaction aimed at obtaining the best of the possible outcomes from both the dynamics of social and natural systems. Instead of attempting to weaken the forces of nature by unnecessarily imposing the social ones, usually of destructive character, both natural and social forces can be integrated with evident gains for sustainability. This is what is meant by *hybrid management*.

To conclude, the notions of public participation and social learning takes a much deeper sense once we know a little bit more about *what is to be learn about social learning in RBMP,* a departing question which motivated the present report. Evidently, this is a very difficult question and we can only and partly answer it on the basis of the integration of the current theoretical approaches with empirical evidence as the one gathered within the HarmoniCOP project. Neither can it be answered without making reference to content. The sole analysis of processes are not enough to evaluate social learning in situations where the sustainable use of limited resources over time is at stake. For this reason, we now move to the next section by focusing our analysis onto the question of whether the implementation of the Water Framework Directive can be assessed as the start of a new *sustainability learning* process occurring in Europe at structural way. In fact, the WFD may provide the 'supportive legal structure at the macro-level that authorizes users to take responsibility for self-organising at least some of their own rules', as pointed out before by Ostrom.

5. 4. The Water Framework Directive as Sustainability learning?

Are European societies learning anything from past errors with regard to the (mis)use of natural resources, and in particular with regard to water use and management? Is it possible for social and technological change, such as changes in information technologies, to occur without social learning? To which extent social learning is reflected in particular changes in the social structure of national and European practices as a whole?. What is the role or possibilities of individual or collective agency –individuals, organisations- in orienting social change towards particular collective goals -such as improving sustainability?. What is the real impact and effect of technology –including information and communication technologies- in the processes of social learning with regard to the implementation of the Water Framework Directive in Europe?.

These are only some of the few general questions which can be formulated as a background to analyse the extent contents of the processes of social learning in the management and planning of river basin water resources in Europe. Evidently, the intention here is not to formulate a general theory of social-environmental change, but to provide the background for reflection and for theoretical examination of the results provided by the HarmoniCOP project. This analysis is based, on the one hand, on the empirical work carried out at river basin and national scale on the issues of public participation in RBMP and also, from a macro-sociological perspective, looking at changes in practices at European level. As stated in section 2.3., a social structure can be understood as network of social institutions, and therefore of norms, held by a given social community to perform in a stable way their daily activities. Hence, the concept of social structure embraces not only those of institutions which regulate political or cultural behaviour but also those which regulate the appropriation and management of natural resources. In contrast to *agency,* or the dynamic components of society and the source of change, *structure* refers to those relatively stable elements of society produced as a result of particular historical or environmental conditions. Whenever such conditions change and the institutions remain the same, however, dysfunctions may appear and the need for adaptation may be peremptory for the durability of the social system. Expressions such as *adaptive learning* or *adaptive management* are often used to explain such processes in the field of environmental assessment and policy, while in this report our attempt is to go even further with the macro-sociological analysis of the effects of the WFD in Europe by introducing the concept of *sustainability learning.*

Sustainability learning is not the same as social learning[25]. Put it simply, in sustainability learning we need to learn about sustainability, which is different that only learning about how to organise society in a particular or desired way. In social learning we may do not know what to learn, nor how, or even neither for what reason. In sustainability learning, we may not know how or what to learn, but we definitely know why: to sustain life and human society, with all their diversity, on Earth (Tàbara, 2002, Tàbara and Giner, 2004). In social learning, we only expect to learn from other human beings. In sustainability learning, we also expect to learn from the knowledge embedded in other non-human forms and organisations of life in a systemic integrative way. Indeed, the quest for improving and managing the transition of sustainability entails new ways of framing problems, integrating knowledges, and incorporating different source of value in order to start asking the relevant questions and finding new imaginative options for collective action. Furthermore, it entails being aware of the limitations of social action, which often results in unintended and perverse effects (Boudon 1982; Merton, 1936). There cannot be sustainability learning without a change in the basic assumptions, as well as in the way to define current problems, with guide current thinking, cultural development and policy making. This is so, because the ***key for sustainability learning remains is developing an increasing awareness of the negative unintended effects of purposive societal action and to develop social and relational capabilities to prevent and deal with them in a reflexive way.***

Therefore, sustainability learning entails a new *conscience* and not only the acquisition of new skills or knowledges. Similar to the Durkheim's (1912) concept of collective conscience which refers to the moral constitution of society, the sustainability conscience entails a whole new collective but also individual awareness of the challenge and predicament which current societies face of global environmental change: that which is aware of the irreversibility of the negative consequences of current social change –together with the unavoidable uncertainties and complexities associated with them- and the need, in a precautionary way, to take urgent action accordingly. Similar to the Durkheim's 'practices of religious life', the practices for environmental and sustainability collective action can only emerge from collective identities bestowed with collective meaning.

Nevertheless, a crucial question with regard to sustainability is that of *ambiguity*: it is very difficult to define not only what it really means, but what it really *is.* (If sustainability *was* not anything it would not make any sense to invest money and human resources to deal with it; a realistic view of sustainability is therefore necessary in those public policies aimed at improving it). The contours of the problem, how to deal with it, and the implications of not tackle it properly escape precise definition (dozens different definitions are now available on sustainability, (see Kates et al. 2005). Furthermore, many interests, values and claims converge into its characterization making it even harder to unveil the real and -to some extent- objective nature of the issues at stake. But it is precisely because all these reasons, because of the ambiguity and the critical need to formulate strategies to deal with sustainability problems, that the basic principle of *precaution* applies: both policy makers must recognise how little they known about sustainability, how unsatisfactory are the assumptions and concepts used to operationalise their policies, and the huge potential harm of not dealing with them properly. But above all, they need to build a solid and open approach for the generation and integration of knowledge capable to support the increasingly complex and urgent decisions in this field.

One or the possible ways to try to answer whether the implementation of the Water Framework can be seen as the beginning of a process of *structural sustainability learning* at European level is by looking at a one of the most common –and classical definitions of sustainable development; that which understands sustainability as the continuous process of integration of the economic, social and ecological domains in policy. According Edward B. Barbier (1987), three distinctive domains of subsystems, which contain their own human-ascribed goals can distinguished in policy:

- *Biological system goals:*
  - Genetic diversity,
  - Resilience
  - Biological productivity.

[25] The social learning perspective entails a realistic view of the world. In contrast to radical constructionist interpretations of social change with regard to environmental issues (see Eder, 1996), where no real learning processes can occur with regard to our interaction with nature but only different ways of perceiving and creating it, the social learning perspective departs from the assumption that out there is something, ontologically, to learn about.

- *Economic system goals*: - Satisfying basic needs (reducing poverty)
- Equity – enhancing.
- increasing useful goods and services.

- *Social system goals:* - cultural diversity.
- institutional diversity
- social justice.
- Participation.

While it is important to recognise that it is not possible to maximise all these objective at the same time, those policy projects and programmes which do aim at integrating those three subsystems cannot be thought to follow the path of sustainability (Fig. 13).

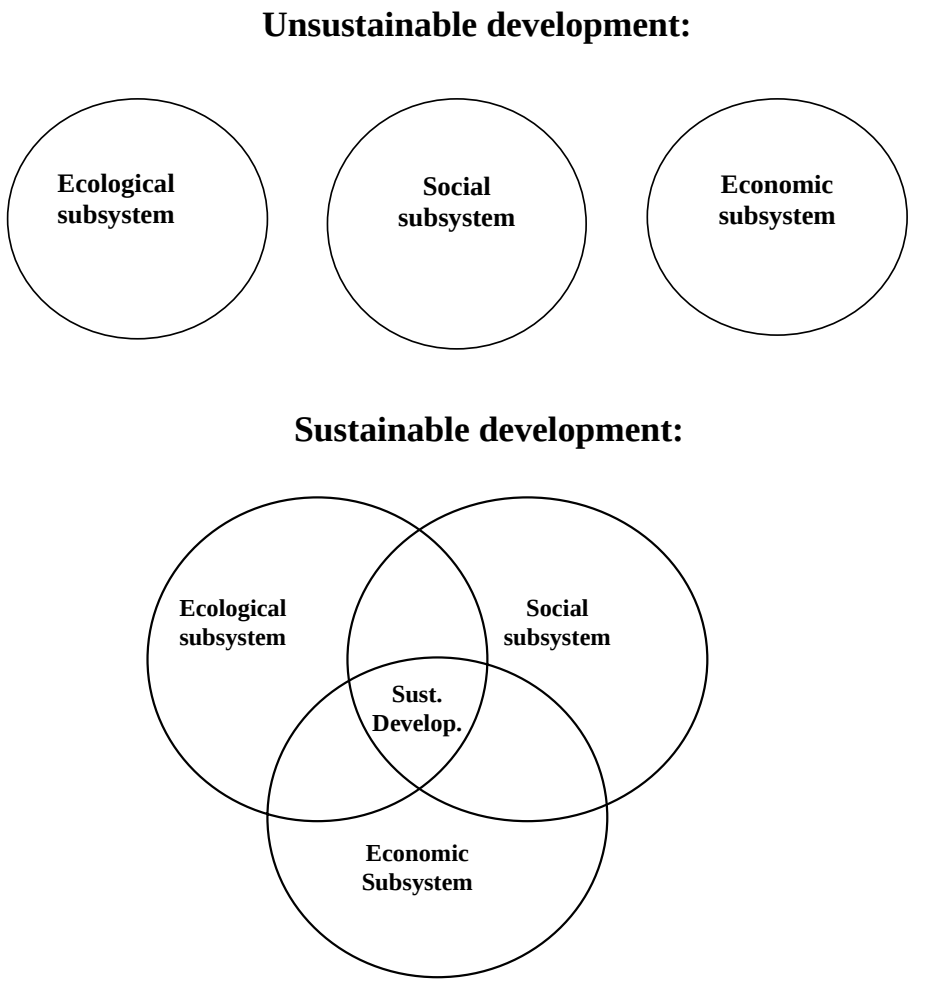


Fig 13. Sustainable development as the continuous adaptive process of increasing integration of trade-offs between ecological, social and economic goals.

If we were to apply such definition to the understanding of the process involved in the implementation of the WFD, we do certainly find some parallelisms in the underlying philosophy. Particularly, the WFD, to the extent that it aims to integrate the economic goals by incorporating full recovery of the investments, the aim of achieving a good ecological status of European river basins, and tries to promote public participation, it can be seen as a potential process which could lead to sustainability learning (Fig. 14)

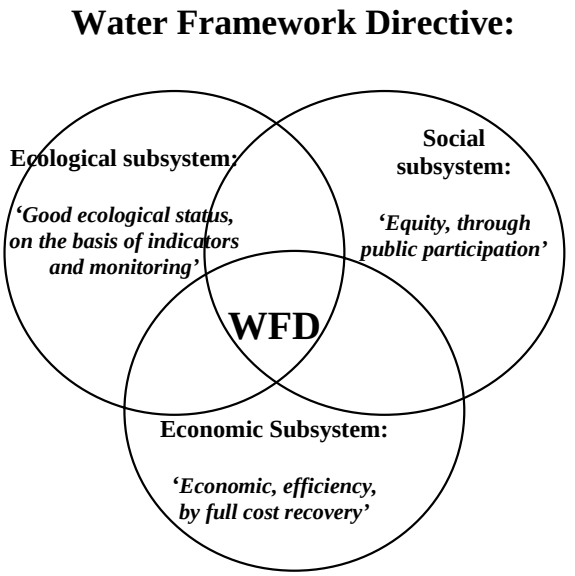


Fig 14. Integration of ecological social and economic goals within the European Water Framework Directive.

However, when looking at the discussion on sustainability and water, we also find that this domain has its own specificities which make this area of public environmental policy a unique one (see Loucks et al. 1999). According to the definition agreed in the Dublin International Conference on Water and the Environment of 1992, the concept of sustainability should involve the ecological dimension (water as a finite and vulnerable resource), as well as a social (accessibility of water seen as an indispensable social need; participatory and democratic approach in water policy decisions) and an economic one (water as an economic good to allocate efficiently). These three dimensions, appropriately specified in terms of indicators, provides the evaluation basis for water use. The concept of sustainability, defined in this way, allows to enlarge quite a lot the simple rationale of neoclassical economics, according to which a given allocation of water resources is "efficient" – and therefore optimal – as far as all users obtain the same net marginal benefit (resulting as the difference between individual value and the sum of price and individual costs, possibly including external costs and benefits in the calculation) and public money is spent up to the level that equals the marginal returns to society.

As a general criterion, widely agreed in spite of slightly different formulation and terminology adopted, we can assume that relevant functions of the critical natural capital ("water needs") should be effectively satisfied without creating prejudice for the integrity of the natural resource (quantitative and qualitative water balance between available renewable resources and uses) while "socially relevant" water uses should be affordable for anybody regardless income levels and social conditions. Therefore indicators of sustainability should reflect available environmental functions, appropriateness of investment in and depreciation of natural and man-made capital in order to achieve a satisfactory trade-off between them, affordability and accessibility issues, allocation of water among competing uses according to its "value", and finally an efficient use of economic resources in order to ensure that water services are supplied so as to avoid the creation of monopoly rents of any kind. Furthermore, the distinction between "water needs" (access to water as a right to be guaranteed) and "water demand" (water as a good to be allocated through the market or market-equivalent rules) is obviously a political one, and should be based on social consensus. Water is seen then either as a source of irremissible values or as a "critical natural capital", providing basic functions for which there are no substitutes.

Nonetheless, the concept itself remains to a certain degree ambiguous and requires an appropriate specification that can occur only through the political process and on a case-by-case basis. As a critical natural capital, sustainable use of water cannot be assessed at an overall scale, but rather on a local scale, where all relevant environmental functions should be preserved and water use should be kept below natural recharge of the renewable resource. The relevant territorial scale for the water balance can be a larger one only if resources are "averaged out" in a larger territorial unit by physical man-made infrastructure. Yet in order to do so, an economic as well as a social dimension of sustainability should also be considered: the cost of infrastructure should be fairly shared among generations (i.e. the next generations should not be charged for benefits that are enjoyed by the present generation); at the same time, the price charged on users for this purpose should not exceed a critical limit that excludes those who cannot pay.

This consideration is fundamental since it makes us recognize the importance of linkages between natural and artificial capital components that both contribute to define what environmental functions are ultimately available. Water assets improve the availability of water and its functionality to human and ecological processes; on the other hand, society must find viable solutions for guaranteeing that related water services are continuously guaranteed. In order to achieve this, three elements are crucial:

- Capacity of water management systems to attract appropriate resources (human skills, capital, professional expertise, innovation and research, etc)
- Coherence between patterns of risk allocation (e.g. concerning responsibility for new investment) and its remuneration
- Conservation of the asset value during time and fair sharing of this cost among generations
- Ensure that the asset base is not growing too fast with respect to the social capacity to pay, either through taxation or prices[26]

This notwithstanding, it is clear that there are important problems in the definition of sustainable development as depicted by the three subsystems or those approaches which try to emphasise the institutional or financial aspects. For instance, we look at the information contained in cultural and biological diversity in such monistic and dualistic perspective –and which does not take into account sustainability stocks and flows and the close interrelations with between human and natural systems-, such simplification make evident their real conceptual and practical limitations. Sustainability learning incorporates this but it goes beyond that, as it not only about content but mainly about process. In particular, sustainability learning concerns the development of new processes by which knowledge production is framed and reframed, incorporating new knowledges and new issues. As stated in section 5.2., this demands a cultural change, given that as two of the traits which most characterise one culture and distinguish it form another is the way they understand the meaning of knowledge and conceive the natural world. The view of knowledge and natural systems are at the centre of both science and policy and they affect the types of relationships through which we interact with the environment, e.g. from trying to dominate and subdue it to trying the manage its multiple forces in a self-organising sustainable way. Knowledge is both a cultural and a socio-structural construction, and in this is way, learning a new vision of knowledge and natural systems lays at the basis of sustainability learning. Hence, we now move, as a conclusion, to further specify an alternative perspective of information, knowledge and life systems which may be useful for sustainability learning in natural resource planning and management, and for RBMP in particular.[27].

[26] This might occur, for instance, if the natural resource base is deteriorating and new facilities are required in order to provide the same water functions as before.

[27] From a systemic point of view, sustainability learning can be summarized as the social process of change and adaptation to human disturbed ecological systems summarized by the following equation: $\Delta Sust\ S = f(Max\ I, Min\ E, Min\ D)$; Where $\Delta Sust\ S$ = Improvements in sustainability of a social system; I = Information and knowledge systems; E = Energy and natural resources systems; D = Socio-environmental systemic degradation (irreversible negative impact, pollution and loss of cultural and biological diversities). Each of these four subsystems is closely interdependent to the others, although they maintain and produce their own distinct properties, dynamics and results. For instance, the structure of a given society grows and becomes more complex, and does so faster, thanks to a mounting use of energy and/or information, but at the same time this generates a systemic change of a large scale and intensity, normally in the form of pollution. Furthermore, and in a similar way that energy tends to entropy, in the absence of social institutions to control it, pollution tends to dissipation (D. Tàbara, (2003, 2002).

6. CONCLUSION. LEARNING AND IMPLEMENTING A NEW VISION OF KNOWLEDGE AND LIFE SYSTEMS IN RBMP.

Finally, at this stage, one may try to deepening in the question on *what is to be learnt about social learning in RBMP*. In this report, we have argued that the implementation of the participatory provisions of the Water Framework Directive (WFD) may have opened unprecedented opportunities for the integration of the economic, social and ecological policy goals within the domain of water management and planning in Europe, and in this sense such a process may be regarded as a process of *sustainability learning*; that content, process, and relational qualities and capabilities are to be learnt and developed. The challenges are gigantic and a lot still need to be known about the specific procedures and of the significance of this major piece of legislation. In this report, we have also made the contention that the main issue about public participation is not simply the 'lack of sufficient representation of stakeholders', but to which extent such representation can contribute to resolve many of the inequalities resulting for the social structure and the inequity in the use of natural resources. The WFD may also have created new chances for reflexive learning at structural level within a wide array of European institutions. On the other hand, it is clear to us that the success of the implementation of the WFD depends on something more that simply complying with a given set of top-down timelines and requirements based on the more intensive use of information and communication tools and technologies. It also requires a *cultural change*, besides the institutional and structural reform, which integrates a new vision of knowledge and of the relationships that human communities maintain with the life-support systems upon we depend. Although this may sound too obvious for some, it may also come as a surprise for others: social learning and public involvement in resource management depends largely on *public education*, an undervalued component of participatory environmental assessment, as already noticed by Sinclair and Diduck (1995) now already a decade ago.

Sustainability learning in RBMP entails a lot more than just applying new technical skills to resolve end-of-pipe problems. Rather it also implies to develop and implement in practice a completely new vision about information, knowledge and life systems. In particular, one which replaces a conception of knowledge and life systems as detached, closed and static ones by a another where these are seen as open, interlinked systems in constant dynamics, the outcomes of which constantly modify the original conditions from which they emerged These visions have embedded particular understandings on how life systems are conceived and therefore how human agency and institutions prescribe their relationships with the environment. Table 11 and figures 15 and 16 summarise the main differences between the old and the new conceptions which are relevant to the way the use of water resources, and its related implications for other policy domains, are conceived for the case of RBMP. For instance, the development and application of the near-future tools and methods for *Integrated Sustainability Assessment* for the case of river basins may be based on this new vision and understanding of knowledge and life supporting systems (Rotmans et al. 2004, Tàbara, 2005). It may also stimulate the contents in new educational strategies aimed at enhancing alternative systemic perspectives of the common environmental resource management.

Traditional vision of information, knowledge and life systems	A new vision of information, knowledge and life systems
More information and communication tools ⇒ Reduction of complexities	More information and communication tools ⇒ Increase in the need to create 'contextualised knowledge for action'.
Increased knowledge ⇒ Reduction of no-knowledge.	Increased knowledge ⇒ Increased number of questions to be asked and of uncertainties to deal with.
Increased knowledge ⇒ Greater control over natural systems.	Increased knowledge ⇒ Greater awareness of indeterminacies and of the possibilities of system' failure.
Moral values can be easily separated from expert judgement and contain a secondary or inferior ontological status than knowledge about 'facts'. Myths and ethics do not contain substantive or relevant knowledge for policy. There is not need to make such values explicit or open to accountability.	Particular values, beliefs and myths are embedded in expert knowledge on external 'facts' and therefore cannot be easily separated from them. Need to be made explicit.
Knowledge is hardly lost, but increasingly accumulated and stored in information systems so it can be recuperated and used whenever necessary, e.g. by electronic forms.	Huge amounts of knowledges are constantly lost, some of them crucial for sustainability, and which are embedded in traditions, cultural myths and practices. The loss is irreversible and cannot be recuperated as usually is stored in and communicated solely by oral and non-formal means.
Social knowledge and information systems (e.g. expressed in culture and technology) are detached from natural knowledge and information systems (e.g. embedded in biological diversity).	Social knowledge and information systems are inseparable may be formed by similar structures as those contained in the evolutionary knowledge and information of the natural systems.
Knowledge and life systems are organised according to hierarchical structures whereby 'higher' types of knowledge and of life forms are situated 'above' other 'lower' types of knowledges and of life forms.	Each type of knowledge and of life form has an incommensurable and intrinsic value which ontologically cannot be classified in any hierarchical structure with respect to other types of knowledge or life forms. Each knowledge and life form maintains a multiple set of interdependent systemic relationships with other forms, whereby those types of knowledge or life forms perceived as more complex are equally dependent from those perceive as less complex and vice versa.
Both knowledge and life forms evolve in an independent, linear and ascending way.	Both knowledge and life forms evolve in a recursive cyclical way result of the multidimensional interaction with other knowledge and life forms.
Simple forms of life or of social organisation contain simple forms of knowledge or little information. Losing the stock of knowledge contained in this simple forms of life or of social organisations is not a major policy concern.	Simple forms of life or of social organisation may contain very complex types of relational knowledge and information which may be fundamental for sustainability. The loss of one simple form of life or of social organisation can affect the whole ecosystem in a negative irreversible way and therefore it should a major source of policy concern.
The way to deal with complex types of knowledge and of life forms is to divide, study and manage them in separated parts. Reducing the whole to manageable isolated parts is a necessary and perhaps the only possible method, both for science and policy, to deal with complex systems, as the whole is simply the sum of the parts.	Complex types of knowledge and of life forms must be studied and managed as inseparable entities, that is, by the own systemic properties, which go beyond the simple addition of the properties of each of its parts. Reductionism is a hindrance for the development of valid knowledge for sustainability, which is based on the understanding and management of complex systems' relationships.
Times and rhythms of natural cycles are largely independent from the times and rhythms of social, economic and political activities. Human information and knowledge systems can help to overcome dependencies and increase the distance between natural and social times. Similarly, human activities are independent from spatial constraints. Information tools and knowledge can be used to make space even less relevant for human development.	Times and rhythms of natural cycles are not independent from times and rhythms of social, economic and political activities. Information and knowledge systems should be used to understand the interdependencies and integrate natural and social times at different scales in an adaptive learning manner. Similarly, human activities are also dependent of spatial constraints. Information and knowledge should be used to integrate apply knowledge on spatial, time and social dynamics needed for sustainability.

Table 11. Sustainability learning also entails learning and implementing a new vision of information, knowledge and of life systems.

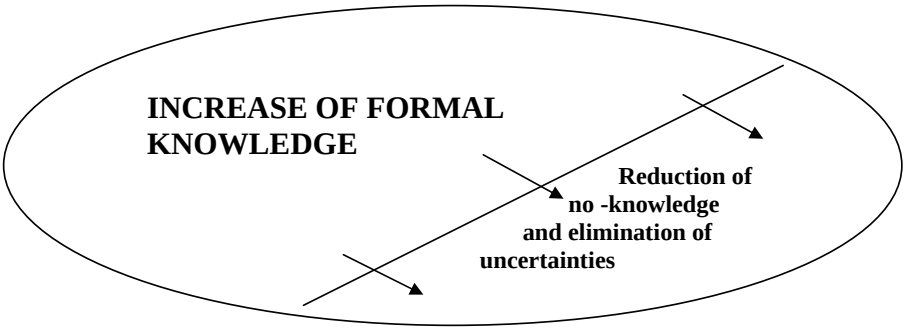


Fig. 15. A vision of knowledge systems as closed uniform systems.

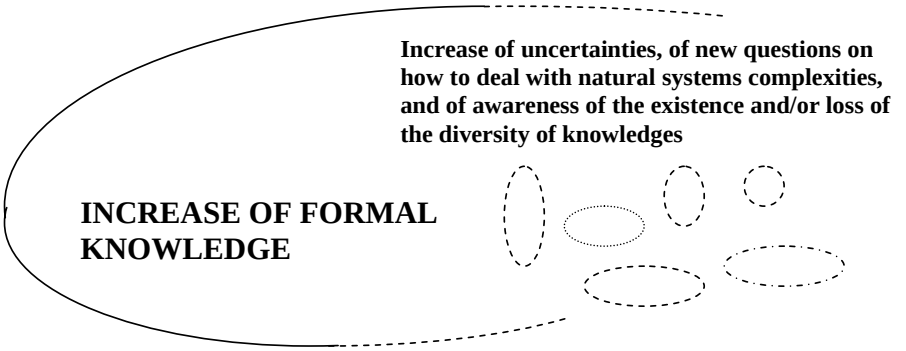


Fig. 16. A new vision of knowledge systems as open diverse systems[28].

Hence, it is hard to believe a reform of political and governance institutions without a reform of educational and knowledge generation institutions. Public participation and political culture in general depends, as much as other forms of culture, of education –a concept which evidently goes beyond the simple acquisition of formal capabilities to perform a given set of tasks[29]. However, most Western current educational systems emphasize *individual* learning, rather than *social* learning. Western educational systems do not focus on teaching how to collaborate with others, but to develop mainly personal skills; they to not enhance as much thinking collectively and to take into account and advantage of the diversity of knowledges and values, but tend primarily to universalise the development of individual capabilities and viewpoints. By doing so, many opportunities to achieve improved levels knowledge (and hence potentially greater stages of welfare) are missed. In general, learning is seen mainly as an individual endeavour, almost independent from the learning (or ignorance) of others. Often, it is also assumed that the foundation of collective success is the individual excellence and performance, rather than the opposite –the source of individual success being the common

[28] I am indebted for the inspiration in the depiction of Figure 11 to the discussions on nature and social knowledge with professor Raymond Murphy, from University of Ottawa, during his course on environmental sociology held at IEST-UAB in February 2005.

[29] This argument had already been point out in the classic book by Almond & Verba on *The Civic Culture,* where empirically was found that those cultures where people participate more in politics were those in which children were socialised in particular manner, mainly by taking responsibilities in collective endeavours.

knowledge and skills gained as a result of collective action. Most of the aptitudes learnt by children in western societies, despite being also of relational and social character, are assessed on an individual basis, and in fact, even popular sports promote competition between individuals and groups and award individual or small team success. Instead of encouraging abilities to collaborate with others and learnt together -or fail together whenever such collective action and collective learning has not been achieved- current educational systems usually inculcate that one does not need the others to learn himself. Furthermore, this usual entails the assumption that collective or large scale failing is not possible, only individual or small scale one. We learn –and most educational systems teach- how to develop ourselves as individuals, but not how to develop and learn as a community at large. The lack of indicators to assess collective learning and the disregard for the diversity of knowledges and educational systems by dominant Western instructive regimes is paradigmatic in this respect. Such systems even assume that knowledge is accumulated without any costs or losses on other forms of knowledge even though the current accelerated loss of global cultural diversity, with its serious consequences for global sustainability, have proven that this is not the case at all.

In addition, our structure of knowledge generation and selection is a hierarchical one. Educational systems are based on the assumption that some people know *more* than others, instead than people in real life know different things for different purposes in different contexts (such dominant assumption even entails that those who know less are of inferior value or deserve less recognition than those who know more). Such educational systems reject the *incommensurability of knowledge,* and are based on a rather abstract –not practical- view of knowledge. In practice, the value and diversity of knowledges is reduced to a simple numeraire which allows to discriminate accordingly in an abstract manner –e.g. not on the basis of practical uses in specific contexts. While all this might be true for some aptitudes at individual and abstract level, when we consider the collective level and the real life, such reductionist and simplistic view of knowledge utterly falls apart. The complexity and interdependency of modern societies, in which multiple and growing functions need to be developed simultaneously at different scales by large amounts of distinct people, disintegrates this simplistic, fragmented and highly inefficient pyramidal view of knowledge, and demands to be replaced by a more contextual, polymorphic and holistic one as the one summarised in table 11.

A new and different view of knowledge and the role of public education in resource management also entails a new and a different view of the role of policy and governance practices. In particular, one in which expert and formal knowledge needs to be complemented by other forms of knowledges and in which the diversity of cultural values and perspectives –not only interests- can be integrated together in order reshape and reorient the current resource management institutions. Indeed, the importance of enhancing and carrying out participatory processes for social learning at community level can partly be seen as compensating the deficit that the majority of current hierarchical and uniform educational systems show in the need to create collective capabilities based on the diversity of knowledges and aptitudes. Such abilities are now indispensable to face some of the most pressing challenges current globalised and interdependent societies, most urgently that of (un)sustainability. Learning to think of in solely individual manner, albeit indispensable and necessary in a democratic mature society, is not sufficient to face such challenge. It requires collective efforts and networks of actors to mobilize the resources that individuals cannot be arranges solely on their own.

In this regard, the main role of *public participation in sustainability learning* largely differs to that currently given contemporary mechanisms for public participation in general. Mainly, its role is not only to contain power conflicts based on ideological, religious or worldviews positions while providing legitimisation to policy makers, but that of contributing to the generation of *knowledge for sustainability*. Using the classic categorisation of public participation given by Arstein (1969), participation in sustainability issues starts only at the level of consultation. But most importantly, it does not only focus on 'what people want', but mainly on other set of questions such as 'what really want on the basis of what they know' or 'how they can contribute to what we know so we can better know what we want'. We should not forget the possibilities of the 'perversion of participation', e.g., whenever public participation is used to reinforce current unsustainable practices and inequalities in the use of natural resources.

Therefore, participatory processes explicitly aimed at enhancing social and sustainability learning would not simply ask the community what the community wants. Rather, they better start by questioning people about the adequacy of their own interests, preferences, values and claims taking into account their available resources and the context they operate. Processes of social learning entail an early discussion about the adequacy of peoples' own beliefs and reasons to see whether their demands can realistically, morally and collectively be met. They also need to question the existing social relationships and how these can be

improved or adapted to meet the changing needs. To achieve so, on the one hand, it is crucial to recognize the relativeness and dynamism of social attitudes and preferences, and to accept that these are not absolute and fixed in time but can be changed by the process of learning. And on the other hand, it is also as important to be able to acknowledge the real nature of the issues at stake and the structural conditions which can enable or impede meeting such demands. Both cultural assumptions as well as improved knowledge about the physical realities influence the process of social learning. And in between, educational, political and economic institutions mediate the practices and understandings of such realities while adjusting or -in case of failure- impeding the adaptation of such societies to the changing physical and environmental conditions (figure 17).

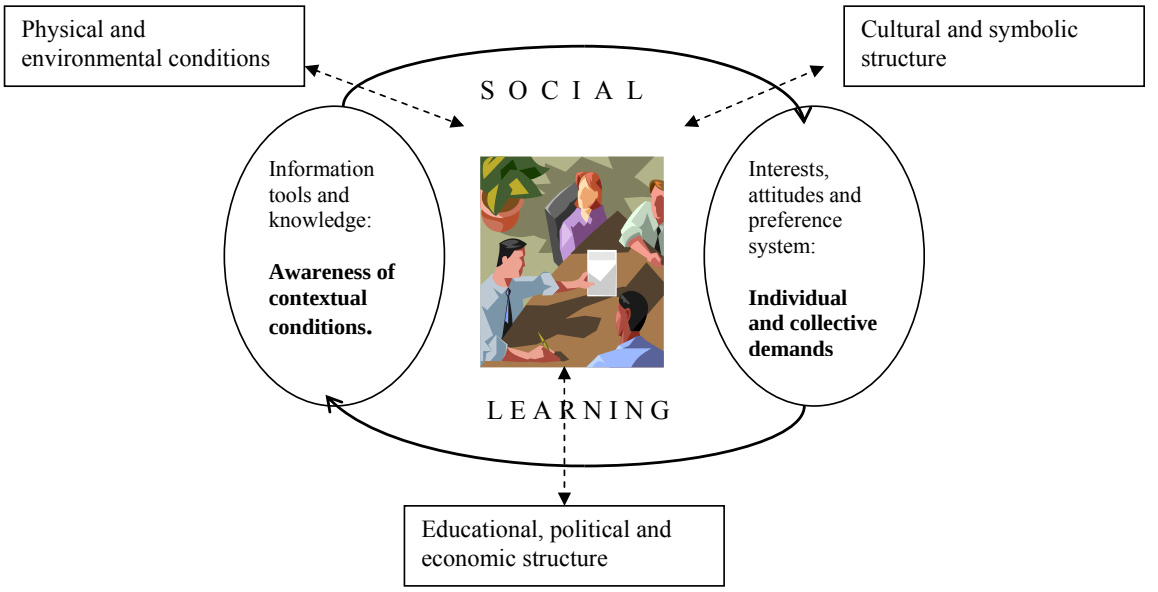


Fig. 17. The socio-ecological structure of social learning. Social learning occurs within a context formed by cultural, physical and socio-political conditions or social structure. Individual preferences and demands can be modified by a greater awareness of the changing structural conditions and can be adapted accordingly as a result of social learning. Facilitators can help the process of social learning by posing questions about the adequacy of the community' interests, values and preferences and by selecting and providing relevant information and information tools about the problems at stake. In turn social action and agency modify social structures and environmental conditions.

Evidently, IC tools have also an important role to play in sustainability learning. In sections 3.3. and 3.4 we argued that the role of IC tools in social learning can be assessed to the extent IC tools contribute to: (a) the creation of a common and questionable representation of problems and to a shared reality; (b) to the setting of specific *communities of interest*; and (c) fostering a given *community of action*, e.g. by playing a role in the strengthening or the creation of new *identities* . We also argued that the creation of applied knowledge for sustainability, characterised by a high degree of meaning and identification of the environmental information and knowledge into specific contexts of action, was the basis of sustainability learning. Sustainability problems, we claimed, demand the creation of new identities the development of new relational qualities not only between social communities but also with the natural world. The new IC tools can provide some very powerful means to foster such new environmental identities and relationships with the environment for a large part of highly urbanised and environmentally alienated European populations where such direct interaction with the natural environment is no longer possible. IC tools have an important role to raise awareness on environmental change and its implications for local contexts as well as in terms of global sustainability. They

can also compensate many of the deficiencies that show most of the predominant means of information, such as global mass media, and the resource evaluation systems based in market prices. New IC tools present a new opportunity for the democratisation of information and knowledge and to integrate new sources of contextual judgement in the valuation of the natural resources. Evidently, new challenges and threats remain, as IC tools could very easily be used as instruments for knowledge exclusion and decision-making legitimation. River basins constitute special contexts in which all such processes, difficulties and opportunities can be observed in their most critical forms. The HarmoniCOP project has gathered a wealth of knowledge on these challenges. However, it is clear to us that the lessons learnt are not limited to the boundaries of river basin but can be useful to illuminate the processes occurring in other domains of environmental and natural resource management upon the sustainability of contemporary societies depend on.

Furthermore, the HarmoniCOP project has provided a large array of insights on the conditions which affect social learning in RBMP. To a large extent the lessons learnt also apply to sustainability learning, insofar as the processes identified may be similar and only the content, that of introducing new ideas and practices about knowledge and sustainability, may change. At river basin level, the most numerous factors which have been identified by HarmoniCOP as constraining and/or enabling social learning relate to contextual issues. On the one hand, the mechanisms which were identified as contributing most to social learning had to do with a high level and enduring motivation, engagement, and trust with the technical competence as well as with the organisation in charge of the participatory process. This, in turn, was dependent on the capability of such organisation to show its independence and competence to integrate different views and knowledges into the assessment and managing process. As in the case of the experiences reviewed in the national case studies, having enough time and resources is seen as a necessary condition to guarantee that an sufficient number of representative stakeholders are involved at a early stage and though all the process. On the other hand, the mechanisms which limited social learning had to do precisely with the lack of time and resources, and to the lack of realisation by stakeholders of the meaning and purpose of the participation processes and whether their involvement will actually make a difference. The gains of sustainability learning may not be apparent in the short term, and this puts an additional difficulty for its materialisation, although the same may be said of many other structural processes of learning and public education, in which their benefits are rarely immediate.

In sum, recognising the role of public education and implementing a new vision of knowledge in RBMP will entail integrating a systemic precautionary approach not only within the institutional domain of governance but also to stimulate a cultural shift in the way information, knowledge and other life forms are conceived and understood[30]. It would be pointless to try to manage water in a sustainable way without managing at the same time the diversity of knowledges and the whole system of social-natural relationships associated with them. This goes beyond the explicit goals of the WFD of achieving 'a good ecological status', to ensure 'cost recovery' or to enhance 'public participation' of interested parties at river basin scale. It is about identifying, respecting and integrating different worldviews and social practices on the water resources –some of them based on long-term local experiences and non-formal traditions- which have proven to be more sustainable than those simply based on chrematistic or regulatory approaches. This is the meaning of social learning: learning from 'others', a mission which entails a humble attitude of openness and active quest for what is beyond our perception and understanding with the ultimate goal being to set up the necessary adaptive institutions to ensure that no relevant types of knowledge or of life needed for sustainability is lost forever. This is why, in our case, these 'others' in *sustainability learning* also include those knowledges embedded in diversity of non-human forms of life and organisations; perhaps now, integrated within new hybrid river basin systems of institutions based on self-organisation and polycentric multi-level learning.

[30] As pointed out by Antonio Massarutto (personal communication) this would demand also a change in style in RBMP: that which acknowledges that the more we know the more we need to know and that could be summarised as a transition from the 'technocratic' governance style to the 'Socratic' governance style.

APPENDIXES

A1. A glossary on public participation and social learning in RBMP.

Information and Communication Tools.

In this context, IC tools refer to the means and tools potentially used by organisations and stakeholders to obtain and represent the river basin reality, as well as to provide, share, and create knowledge related to the use and management of water resources. Different IC tools may be used at different stages of the RBMP process. New Information and Communication Technologies (NICT) are included in this category, but other more traditional means of interpersonal communication also apply. IC tools can contribute to the building of relational social qualities to the extent they also contribute to the creation of communities of interests and identities. In this regard, the use of IC tools may also contribute to the building of *knowledge for sustainability* if users sufficiently integrate and identify with the information provided and connect it with the problems of mounting scarcity and unequal distribution of resources with their own contexts of action.

Institutions

Any stable system of rules and norms which regulates human behaviour. Institutions can be formal or informal and can be based either in explicit or implicit sets of rules. Being part to an institution can be based on a voluntary arrangement, such as Western marriage, or imposed by forced, as compulsory membership to trade unions in some former communist authoritarian regimes. Examples of institutions are families, universities, prisons, economic corporations and political parties. Most common institutions in the management and planning of water resources are river basin authorities, users associations and national water agencies, usually linked to the environment ministries.

Hybrid self-organising systems.

A strand of systems' and social theory which believes that both social and natural systems, if relieved of external constraints, tend to one stage of self-organisation to another stage, in the way to avoiding total control of the system from one single force over the others. In RBMP, such ideas are useful to understand how to take advantage of multiple forces for the improvement of the whole aquatic system, while reducing or balancing the negative impact of one single force and enhancing others. Within RBMP, the integration of perspectives such as systems' theory, 're-naturalisation', or 'polycentric governance' is possible and goes in that direction. River basins can be thought as socio-natural hybrid systems tending towards self-organisation.

Agency.

As opposed to structure, agency refers to the dynamic components of society origin which lead to change and innovation. Some authors believe that natural systems also have embedded forces which should be understood and integrated in environmental management. In that case, some dynamics of natural systems may be seen as 'actants' intimately interwoven with the role of social actors.

Public participation

The WFD refers to the term "public" with respect to information and consultation levels of public participation. In this case, the definition given by Art. 2(d) of the 2001/42/EC SEIA Directive (European Union, the European Parliament, The Council 2001) is applicable: "*One or more natural or legal persons, and, in accordance with national legislation or practice, their associations, organisations or groups*." Government bodies are usually not considered to be part of the 'public'. In RBMP, participation should be distinguished from information and consultation in the sense that participation entails a higher level of empowerment and responsibility bestowed to stakeholders involved. In particular, Article 14 of the WFD states that '*River basin management plans Member States shall encourage the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of the river basin management plans'.* The WFD requires three rounds of written consultation: (a) Before the end of 2006, the elaboration of management plan development works; (b) Before the end of 2007 the identification of the main problems; and (c) Before the end of 2008 the draft Management Plan.

Social learning.

In RBMP, and in the context of HarmoniCOP, social learning in can be defined as the process by which actors and stakeholders continuously learn to ***frame and reframe the issues at stake in a constructive and cooperative way and create social capabilities to deal with common problems by***: 1) reflecting on the *institutional and environmental context* on which they develop their activities, 2) learning to manage new contents and new participation boundaries in order to resolve problems related to equity, efficiency and distribution of resources (including intergenerational ones); 3) by feeding back the outcomes of the participation and deliberative processes into substantial changes within the original institutional and environmental conditions where such processes first took place; and 4) by building new relational qualities and social capital, besides technical skills.

Social structures.

Social structures refers to the whole set of stable institutions present in a given society. Social structures condition, but not determine, the content and forms of individuals' social action. Social structures respond to changes occurring within those institutions but also outside them, such the availability of natural resources. The scale of a social structure –the extent on to it affects the behaviour of a given number of individuals- depends on the complexity in its organisations as well as the level of information and energy used by the whole social structure. Social structures can adapt to external conditions by a process of social learning.

Stakeholders

The terms "stakeholder" or "interested party" are used concerning the active involvement of citizens and organisations in public matters. Stakeholders include any person, group or organisation with an interest or "stake" in an issue either because they will be affected or because may have some influence on its outcome. The guidance document for public participation (EC, 2002) with regard to the implementation of the WFD proposes a typology of stakeholders involved in RBMP: professionals, authorities and elected people, local groups and non-professional organised entities (broken down into groups focusing on a place such as a resident association, and those focusing on an interest, such as fishermen) and finally, individual citizens, farmers and companies representing themselves. We can also add to this typology the "experts" (government and water authorities experts, academics, private consultants).

Sustainability learning.

A concept advanced by Tàbara (2002) which integrates the current discussion on sustainability, precaution and social learning from a cultural and structural perspective. Sustainability learning is not only interested in the process but mostly in the content of social learning, which can be assessed to the extent it contributes to the minimization of anthropic pressure and irreversible negative impact on life-support systems. In contrast to social learning, in which knowledge and values are expected only to be learnt from other human beings, sustainability learning also expects to obtain fundamental knowledge and experiences valid for the improvement of sustainability from the observation and interaction with other non-human forms of life and organisation. This is possible whenever a society and the members of it adopt a systemic integrative worldview of knowledge and of natural systems, as opposed to the dominant dualistic one mostly prevalent in Western culture. The respect, active protection and integration of biological and cultural diversities into the making of science and policy institutions is seen as a crucial aspect in sustainability learning.

A2. A template for assessing and improving social learning and public participation processes in RBMP.

The following template is intended to help constructive criticism and mutual reflection among those actors and institutions engaged in processes of social learning and public participation in RBMP. It is developed in three parts. The first one introduces the reader to the general definition of social learning with a quick summary containing the basic ideas developed with regard to its application in RBMP. Second, it goes through a checklist ***Social learning Pool of Questions***, based on the deliverable of WP2/WP3 (Craps and Maurel, 2003) which goes through the central elements of the concept of social learning developed within the HarmoniCOP project WP2. And third, another questionnaire, the ***Checklist of Integration Questions*** is devised as a tool for reflection for scientists, policy makers and civil society stakeholders involved in RBMP to assess to what degree the conceptual approach of social learning has been integrated in the design of the public participation process, to see whether such process has followed criteria or representativeness, fairness and competence, to observe the role of IC tools in the context of sustainability learning, and to look at the degree of integration of such outcomes on the policy process.

A2.1. A summary of ideas on social learning in RBMP.

Social learning in RBMP

General definition:

In RBMP, social learning in can be defined as the process by which actors and stakeholders continuously learn to ***frame and reframe the issues at stake in a constructive and cooperative way and create social capabilities to deal with common problems by***: 1) reflecting on the *institutional and environmental context* on which they develop their activities, 2) learning to manage new contents and new participation boundaries in order to resolve problems related to equity, efficiency and distribution of resources (including intergenerational ones); 3) by feeding back the outcomes of the participation and deliberative processes into substantial changes within the original institutional and environmental conditions where such processes first took place; and 4) by building new relational qualities and social capital, besides technical skills.

Social learning in the management and planning of River Basins requires:

- Opportunities for critical mutual reflection and awareness and modification of taken for granted assumptions and cultural frameworks.
- The development of participatory, multi-scale, democratic processes, of decision-making,
- (Reflexive) capabilities of individuals and societies, for the development of polycentric forms of resource assessment and management.
- Empowerment of social movements and actors to shape the political and economic *boundary conditions* which determine their opportunities to get involved in the processes aimed at improving the existing situation.
- Recognize mutual interdependencies and interactions in the actor network.
- Increase the capacity to reflect on assumptions about the dynamics and cause-effect relationships in the system to be managed and on the subjective valuation schemes.
- Promote active engagement of individuals in collective decision processes. This may include the development of new management strategies, and the introduction of new formal and informal rules.

Processes of social learning can be improved by:

- Recognition of the diversity and complexity of the different types of mental models and cultural frames which influence problem definition and decision making.
- Building up a shared representation of the issues at stake. Participatory modelling can help to achieve a common ground on the problem perception among a diversity of a group of actors, in particular when the problem is largely ill-defined (although this does not imply consensus building).
- Building trust among the main stakeholders and institutions as base for a critical mutual and self-reflection.

Hence, there are three major challenges in relation to social learning in RBMP*:*

- To depart from the assumption that achieving the new substantial objectives requires a major change in mind sets of existing professionals and the "public" (society). These new objectives relate only to the content but also to the style and to social roles played by different individuals and organisation in the management of water resources. It requires also thinking in terms of wider trade offs and not so much in relation to sectoral interests but to think in terms of conflict resolution aimed at obtaining win-win and no-regret situations.
- To organise action in specific procedural changes, such as coordination, and involving the public, which at the same time also entails changes in mind sets, and not simple adaptation.
- To materialise learning in long-term institutional changes, such as building new capacity, bringing in new professionals, establish committees, forums for joint decision making or advisory board. This represents institutionalization of the social learning that has taken place responding to the recognised challenges and problems. Institutions must be bestowed with assessment, decision and control power, in

A2. 2. A social learning pool of questions.

This *Social learning Pool of Questions*, is structured in the following sections:

A) CONTEXT:

1. Governance system.
2. Physical system characteristics
3. Social construction of the river basin.

B) PROCESS:

1. Relational practices
2. Social involvement
3. Content management

C) OUTCOMES:

1. Relational outcome qualities.
2. Influence of IC Tools on relational quality outcomes.
3. Technical outcome qualities.
4. Influence of IC-Tools on technical outcome qualities.
5. IC-tools usability.

D) FEEBACK OF RESULTS IN THE ORIGINAL CONTEXT.

1. On governance system.
2. On environmental qualities.
3. Geographical scope and organisational levels.
4. Stakeholders participation and the public at large.

A SOCIAL LEARNING POOL OF QUESTIONS

A) CONTEXT:

Describe the main characteristics of the socio-historical and geographical-natural context in which your participatory process takes place.

A1. Governance system

The concept "governance system" refers to the socio-political setting that allows the effective management and planning of activities that affect the RB.

A1.1. Stakeholders:

- Which actors are involved in RBMP and/or are affecting the river basin in a significant way?

A1.2. Actors involved in public participation :

- Which actors are currently involved, or have been involved, in a public participation process concerning RBMP?

A1.3. Formalized and/or legal context.

- What are the main public policies and legal standards regulating [he roles of the different actors in the RBM, their relations and (he procedures to be followed?

A1.4. Informal actor relations.

- How are the informal relations between the stakeholders related to the river basin, at the start of the participatory process.

A2. Physical system characteristics

- What are the main physical characteristics of the river basin and of the problems or issues under consideration in this study;

A3. Social construction of the river basin.

A3. 1. Opportunities and problems.

- What are the main opportunities and/or problems of the river basin, as identified by the different actors?

A3.2. Experts and public in RBM

- To what extent do the problems to be solved require data and knowledge from expert and non-expert actors?

A3.3. Authorities and stakeholders in RBM

- To what extent authorities are willing to share their decision making power concerning RBMP with other social actors?

B) PROCESS:

- How do the interactions between the stakeholders and the RBMP issue contents, they deal with, evolve in the period considered?

B1. Relational practices

B1.1. Critical events influence on relational practices:

Relational practices are defined as: task-centred actions with relational qualities of reciprocity and reflexivity, enabling all relevant stakeholders to connect with a shared domain, in a meaningful way for themselves and for the rest of the group.

- To what degree and in which way do the critical events in the RBMP process demonstrate characteristics of 'relational practices'?

B2. Social involvement

B2.1.The framing and reframing of a problem domain.

- How does the framing 01 the problem domain and its issues develop or change throughout the process? .
- Can moments 01 relraming (significant changes in how the issues are defin d) be identified?
  o By "frames" we mean here the conceptual entities and their interrelationships that are used by actors to describe an aspect 01 reality in such a way that it gets some sense lor them, and becomes

an issue to be dealt with. .

B2.2.Boundary management between in-group/multiparty group (representatives and constituencies).

- How is the relationship between the individuals participating in the inter-organizational conversations and negotiations on RBMP and their constituencies?

B2.3. Negotiation strategies

- What are the (mostly implicit) negotiation strategies with which the actors participate in the meetings concerning RBM?

B2.4.Interaction ground rules

- To what extent do {he parties agree on and adopt working methods likely to suppori an effective participation 01 aU those willing to participate?
- Is there some implicit or explicit procedure on the way public participation will be conducted?

B2.5.Leadership and facilitation roles

- How do the participants define the roles in the RBMP themselves and/or the others?
- How are different roles assigned to each other actors?
- How is leadership enacted in the multiparty RBMP process?
- In which way does this favour or complicate social learning ?
- Are there (professional) actors 'facilitating" the process? That means here: do they have an explicitly recognized function contributing to the (SL) process characteristics of the RBM? How do they (and the others) describe their role, and what is the effect 01 their presence/absence on the process?

Allocation of resources, with special attention to IC tools

- To what degree do the stakeholders dispose 01 the resources necessary to participate in a credible way in a joint RBMP process?

B3. Content management

- What are the concrete challenges and practical-technical problems with which the actors are confronted in relation to the river basin?

C) OUTCOMES

Evaluation of the social-relational and technical qualities of the outcomes of the process.

C1..Relational outcome qualities

- To what degree the multi-stakeholder group involved in joint RBMP can demonstrate evidence of its enhanced capacities to deal constructively with its internal diversity and interdependence?

C2.Influence of IC tools on relational quality outcomes.

- Which are the potentials and the limits of different types of IC tools in a given context concerning the communication and relations between the participants?

C3. Technical outcome qualities

- To what degree and in which ways a better RBMP can be attributed to the collaborative efforts of Multi-stakeholder group?

C4. Influence of IC tools on technical outcome qualities

- What is the impact of the IC tools used on the capacity of the involved actor network to resolve the substantive river basin issues? .

C5. IC tools usability

- How did the perceived IC Tools usability among the participants evolve during the process?

D) FEEBACK OF RESULTS IN THE ORIGINAL CONTEXT.

D1. On governance system.

- In which way and to what degree have the outcomes of the process under study had repercussions on the governance system of the RB?

D2. On environmental qualities.

- Are there lasting effects of the process under study on the physical qualities of the RB (water quality, quantity, biodiversity)?

D3. Geographical scope and organisational levels.

- Which ,effects do the actors report from their participation in direct, face-to-face contacts (e.g. interorganizational task-group) on higher levels of aggregation (coordinated behaviour between organizations, networks, regional and basin planning, etc.)?

D4. Stakeholders participation and the public at large.

- To what .degree and by which mechanisms the public at large has been in volved in the RBMP . process under study?

A2.3. A Checklist of Integration Questions and sustainability learning in RBMP.

This check list of Integration questions is organised as a set of intertwined questions selected under the following headings:

A. On social learning and sustainability learning. Use and relevance of the theoretical framework.
B. Sustainability learning, knowledge and influence of IC tools.
C. Analysis of procedural aspects. Development of new modes of relationships between science and policy. New processes for knowledge co-production.
D. Policy integration and impact of outcome on original institutional and environmental contexts.
E. Specific questions related to implementation of the WFD.

For each of the questions where a quantitative scale is possible, a set of possible answers have been redesigned. It also contain open questions which can be used in group discussions as a basin of integrative deliberation processes between science, policy and society representatives, in order to explore mutual frames and enhance reframing and collaboration whenever possible and necessary. It can also be used in an iterative way, that is, just *before* public participation process take place, to prevent issues that may arise at the time of the involvement of experts, stakeholders and policy makers, *during* those processes take place, to monitor those procedures, and also, at their conclusion, to assess the impacts of public participation on the original contexts.

A CHECKLIST ON INTEGRATION QUESTIONS AND SUSTAINABILITY LEARNING IN RBMP

A. <u>ON SOCIAL AND SUSTAINABILITY LEARNING. USE AND RELEVANCE OF THE THEORETICAL FRAMEWORK.</u>

1. To what extent or in what issues do you think the ***concept and the analytical framework of social learning can be helpful*** for you in understanding and improving the processes related to public participation in water planning management in your river basin / country?.

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

2. To what extent have ***sustainability criteria, frames of reference and discourse*** been used in your river basin or by the consulted stakeholders to frame and analyse and assess your results as to be considered as to have enhanced a process of ***sustainability learning?***

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

B. <u>SUSTAINABILITY LEARNING, KNOWLEDGE, AND INFLUENCE OF IC TOOLS</u>

3. To what degree do you think that ***IC tools have influenced social learning*** processes within your river basin /country in the management and planning of water resources?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

4. To which extent do you think that the general environmental information about your RB /country has been effectively transformed into ***applied knowledge for sustainability***?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

5. To which degree *complex and expert information* has ***been translated into comprehensible and empowering language*** for the different non-expert audiences and constituencies?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

6. To what degree do you think that the traditional view or knowledge and of life systems –and their relationships- has been modified by a more systemic integrated one as a result of the social learning process? (if possible show or succinctly comment table 11).

<u>*Nothing at all*</u>	<u>*Not very much*</u>	<u>*Somewhat*</u>	<u>*Quite a lot*</u>	<u>*Very much / crucial*</u>
☐	☐	☐	☐	☐

7. ***What main information and communication tools*** have been the most used in your river basin?

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8. ***What indicators*** would you use to assess the relevance ***of IC tools*** in terms of public participation and social learning in river basin management planning?.

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9. With regard to your RB, hat gaps need to be filled with regard to ***improving the available IC tools for the implementation of the WFD***?

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C. <u>ANALYSIS OF PROCEDURAL ASPECTS. DEVELOPMENT OF NEW MODES OF RELATIONSHIPS BETWEEN SCIENCE AND POLICY AND OF NEW PROCESSES FOR KNOWLEDGE CO-PRODUCTION.</u>

10. To what extent do you feel that the ***procedures used*** in your river basin scale has been sufficiently ***representative*** of the diversity of interests, values and views occurring in your river basin?

<u>*Nothing at all*</u>	<u>*Not very much*</u>	<u>*Somewhat*</u>	<u>*Quite a lot*</u>	<u>*Very much / crucial*</u>
☐	☐	☐	☐	☐

11. To what degree have stakeholders been able ***to participate in the design of the process*** of participation, in a bottom-up fashion (or else the process of participation has been imposed from the top or outside)?

<u>*Nothing at all*</u>	<u>*Not very much*</u>	<u>*Somewhat*</u>	<u>*Quite a lot*</u>	<u>*Very much / crucial*</u>
☐	☐	☐	☐	☐

12. To which extent the public constituencies, experts and policy officials have incorporated the ***uncertainties*** embedded in the production and use of expert assessments and in the selection of policy measures for river basin management?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

13. Has a ***precautionary approach*** –entailing recognition of uncertainties in the assessment and policy making of water resources and the need for wider participation to deal with them- been part of the RBMP process?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

14. To which extent do you think that public participation and social learning processes have been effectively used ***to create or enhance self-governing / polycentric systems of decision making*** in your river basin / country?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

15. To what extent have you tried the development of new ideas and practices on the ***relationships between science and policy*** of a more participatory, integrated, interdisciplinary guise?,

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

16. To what degree public involvement have changed your own ***assumptions*** and of the other stakeholders on the role and practices ***of science for policy***?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

17. To which extent the ***opportunities for public participation have been communicated*** in your river basin (e.g. by those to lead the process or the media) have been communicated?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

18. Could you make explicit the specific ***criteria followed to select and manage the boundaries of public participation*** in your RB?.

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19. Could you make explicit the ***ground rules followed to manage the facilitation and public participation*** processes in your RB?.

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20. What forms or ***types of participation*** (formal/ informal, economic/non-economic, …) have been most decisive in shaping the main results and/or social learning outcomes in your river basin / country? (check Appendix 2 for details).

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21. How has ***leadership*** changed over time? Was it clearly recognisable by most of the stakeholders? Was it trusted? What was the catalyst which ignited the participatory process? Who has led the most critical moments of the process? Has there been the intervention of independent facilitators or mediators? In that case, who or how were they funded?

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22. To which degree have ***explicit mechanisms to report the outcomes*** of public participation processes in your river basin been developed?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

23. To which extent have the ***criteria and methodologies to assess the adequacy of the knowledge for RBMP been made transparent*** and open to public debate in your river basin/country?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

24. To which extent particular aspects related to your '***culture of participation'*** have influenced the results of your river basin / country?. Please specify.

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

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25. To what degree has the ***role of experimentation, demonstration and/or benchmarking*** to known successful experiences in public participation been used to enhance social learning in your river basin?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

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D. POLICY INTEGRATION AND IMPACT OF PUBLIC PARTICIPATION OUTCOMES ON ORIGINAL INSTITUTIONAL AND ENVIRONMENTAL RB CONTEXTS.

26. How and in what aspects have ***your own assumptions and perceptions about the issues at stake, and the environmental and institutional context*** have changed as a result of the public involvement in your river basin / country?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

27. To which extent different ***stakeholders' expectations and main interpretative frames*** been modified as a result of the participatory process?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

28. How have ***power relations*** and in particular the ***distribution of responsibilities*** with regard to the use of water river basin resources have been modified as a result of the participatory process?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

29. To which extent do you think public officials' ***commitments to dominant or traditional policy goals*** (e.g.: foster economic growth, increase water supply, …) have been questioned and/or challenged by the participatory processes analysed in your river basin?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

30. To what degree do you think that new ***stakeholders have been sufficiently empowered*** to participate in relevant decisions related to the assessment and management of water resources use and quality at river basin scale? (or are such main decisions still taken elsewhere?).

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

31. To what extent do you think that the involvement of relevant stakeholders and users has been used or incorporated in your river basin to ***change the original institutional and environmental conditions*** of your river basin?

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

32. To what extent do you think the identified practices in public participation for river basin planning management in your river basin / country have been ***integrated into other sectors or domains of public policy***?. Comment on the constraints or opportunities for such integration.

Nothing at all	*Not very much*	*Somewhat*	*Quite a lot*	*Very much / crucial*
☐	☐	☐	☐	☐

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33. What new institutional mechanisms have been created in this respect? Has the improvement of equity in the decision policy making been sought as an objective of river basin management? Or has participation been framed as a means to attenuate conflict or improve the efficiency of policy making?

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34. What do you think could be the most adequate channels and institutions to **disseminate** or embed within key organisations the **results** of your work at RB with other and different institutional scales and decision levels in your country and at the EU ?. To which extent have you done that so far?

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35. In your view, what have been ***the most important changes in the way main actors, organisations and relevant stakeholders frame the problems related to*** RBMP of your river basin /country?

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E. SPECIFIC QUESTIONS RELATED TO THE IMPLEMENTATION OF THE WFD.

(c) In the light of the experiences of your river basin, what are the ***main pitfalls or potentialities of the current implementation of the WFD*** with regard to public participation?, and ***how they can be compensated by polycentric from of social learning*** at RB scale?.

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(d) In your view, how or in what aspects do you think ***your experiences at RB scale could be used to illustrate the participatory provisions of the WFD in other countries***? Please specify to whom, to what audiences and users.

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(e) In your opinion, what are the ***key institutional capacities and resources that need to be developed*** to enhance the implementation of the WFD your river basin / country and how do they differ from those other countries?

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