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THE INTEGRATION OF COLLABORATIVE INDICATOR DEVELOPMENT IN WATER SAVING STRATEGIES AND POLICIES

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INTRODUCTION

Most of the Mediterranean countries are affected by more or less scarce water resources and periodical drought events with huge socio-economic and ecological impact on the societies. The reasons of situation of water scarcity are complex, including climate change, desertification, as well as expanded demand by different water user sectors. The total supply of water resources has to be distributed among different sectors of usage, namely the domestic, industrial and agricultural demand for water. It is stated for most of the Mediterranean countries that the main demand for water is cause from the agricultural sector (Araus, 2004). Moreover, the economic and social development in the Mediterranean countries is expected to cause a further increase in water demand for domestic and agricultural sectors and therewith a possible increase of scarcity problems and their respective impacts of threaten of economic and social development. In particular as water resources in the Mediterranean are expected to decrease within the next decades, due to climate change, the pollution of tributary rivers and the limited recycling and sewage systems for a growing urban population (IUCN, 2002; UNEP, 2004; GEO 2005).

The common strategies to overcome the scarcity problems are traditionally technological single sector (water) based approaches to increase the supply possibilities of water, particularly with dams, long distance water transport infrastructures, deep wells or other infrastructure solutions. This approach normally is characterized by top-down hierarchical and command and control management-systems and large investments. However, the approach is getting more and more to its limits. Exploiting new water resources and building the necessary infrastructure of these solutions is increasingly expensive (Rosegrant, Cai et al., 2002: 3) and therefore requires large-scale economic investments.

This may contradict the social and economic development efforts of many Mediterranean countries. Moreover, as water resources are limited or even scarce a further increase can not be fulfilled in many locations. Hence, the different sectors of use, including natural ecosystems, will compete for the scarce resources or are competing already. This can cause mayor conflicts within and between user sectors on the resource. This means the traditional single sector supply based approaches are causing one of the substantial problems for water resources management in the Mediterranean region as they not consider the continuously increasing demand for water and the underlying driving forces.

Hence, a new approach of water management is needed which consider the diverse range of resource-use features of water bodies, its interactions and driving forces to elaborate sustainable water resources management strategies. In the Mediterranean these approach in particular has to foster strategies and policies for water saving in the irrigated agriculture as most important water use sector. Central aspects of this approach are first the involvement of affected and interest stakeholder in the management process and second the use effective indicators, both to measure to resources and to evaluate the management actions, on which the management has to be based. By involving stakeholder in the management process of water resources and the implementation of water policies, these policies will gain higher acceptance by the relevant stakeholders, as the process is more transparent and the produce more trust of stakeholder in it. Hence, it is argued that water management policies are more effective and lead to more sustainable water management. The use of indicators as the second central aspect has to be build the basis of all management approaches, as it will provide the necessary information on what has to be managed and how. To provide these information indicators have to be applied and used by the involved actors (in this approach the interested stakeholders), will say, they have to be effective1 as well.

The presented study is mainly concentrating on these two latter aspects in the Mediterranean region. It reflects the actual approaches to water saving strategies in the region. Therefore it has investigated what is the current stage of water management policies in the Mediterranean regarding participation and indicator development, selection and use for water resource management. Coming from this, the study will derive the important role of a collaborative approach in indicator development

or selection for Integrated Water Resource Management policy approaches as framework of effective water saving policies.

BACKGROUND

In recent discussions on water resource management the approach of integrated water resource management (IWRM) gets increased consideration. IWRM can be defined "as process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in equitable manner without compromising the sustainability of vital ecosystems." (GWP- TAC, 2000). Therewith the approach has the stated goal to integrate knowledge from different disciplines and relevant stakeholders about an environmental problem along the whole chain of causes and effects to provide useful information for decision-makers. Such a strategy is also requested by the international community since the early 1990 in several international agreements and conventions, such as the International Conference on Water (Mar del Plata), the Dublin conference and principles on water and environment (Solanes and Gonzalez-Villarreal, 1999), the Rio Summit in chapter 18 of the Agenda 21 (UNCED, 1993) and the documents of the four World Water Forums.

Following this approach the challenge for water management in the Mediterranean is to convert the management approach from a single sector supply based approach to an integrated water resource management strategy which is considering all different water use sectors, the different driving forces and impacts. Furthermore it should manage both the supply of water and the demand side. Hence, water can only be managed effectively if all the uses of the resource within the water body, by ecosystems and by human, both above and below ground, are considered as a coherent whole (IUCN, 2002:8). Thus, water saving strategies and therewith policies to implement the same become more evident. The aim is to overcome a managing approach of reacting to increased demand by increase the supply, but to reduce the demand and introduce water saving policies at all levels.

However, water management approaches always reflect the prevailing government policies and also the norms and values of the actors with in the sector (Hooper, 2005: 2). Therefore the involvement of all relevant stakeholders is essential for developing and implementing such an integrated strategy to water management and saving. Effectiveness of an indicator here is defined first by its application by stakeholder to assess and evaluate certain aspects of the system under evaluation targeted to incorporate local tacit knowledge, to raise awareness and to investigate the underlying norms and values as driving forces to derive appropriate management strategies. This can improve the effectiveness of implementation as the acceptance of measures is supposed to be higher by the actors. However, management approaches will not be successful and effective if the norms and values of the water user are not considered, as the actors will not follow the measures or, even more serious, will go in opposition to it.

The implementation of an effective integrated strategy and policy for water management and saving has also to be based on a comprehensive and integrated assessment of the water bodies. For a meaningful assessment in this sense, hence, all relevant components of the system have to be considered, like hydrological, geo-morphological, socio-economic and environmental issues. This request expert knowledge. By incorporating local tacit knowledge about the water body, the local circumstances can be obtained and the implementation will be more effective as it would be adapted to the specific local conditions.

Assessments are mostly based on indicators which can provide useful insights to the water resource system (stage, uses, vulnerability, etc.), its driving forces and impacts to derive effective management policies. The literature on management processes in general and water resource management in particular gives also evidence for the importance of using indicators in management processes. Indicators are defined as correlates depending on an interesting dimension of a system which is not measurable directly. They are providing insights to the system by reducing complexity, to assess (quantify and/or qualify) the interested issues and to describe a desired future stage of the system. However, indicators are never a complete and entire picture of the reality, which they should represent (Benninghaus, 1994). Therefore the use of indicators comes always with information lost, subjectivity and uncertainties. Nevertheless, indicators are seen as important instruments to enable a quantification and qualification of system aspects and therefore for evaluation.

Several indicator-sets for water management exist from different institutions, like UNEP, EU, Mediterranean initiatives or nation states. Also in particular for the agricultural sector many countries have developed and use indicators (comp. Bos, 1997; Molden, Sakthivadivel et al., 1998; Lorite, Mateos et al., 2004).

The aim of indicators in this regard is to provide the basis for the important first step of assessing the objective within a management process. However, as well in all other steps of the management cycle indicators are playing in important role (Kockler, 2005). According to literature of business administration, environmental science, and regional science the use of indicators in management processes have a central role in assessing the current state of the (water) system, to identify the problem(s) at stake, to derive actions fields, setting priorities and to evaluate progress and/or improvements in the system.

To ensure the adequacy of the provided picture of the system the indicators should measure the most important variables of the system. The selection of the same should be mainly driven by their relevance for the issue to assess. If an issue is identified the indicator which represents the best this issue should be selected. This selection or development process is mostly driven by scientists, a central authority, or other external sources with expert knowledge on the underlying system. By doing so indicators are supposed to provide rather objective and knowledge based measures of the reality. However, both the content of an issue (problem at stage) as well as the indicator itself which should represent this content might be rather controversial. Even the desirable future stage of the system might be controversial as well. Hence, the entire selection process is depending on normative implications and subjective perceptions based on personal norms, values and world views, but also and not at least on interests. Thus it can be judged that there is no value free indicator, but all serious indicator work is political because indicators mirror the perspectives, norms and values of the actor or group of actors (e.g. government, water user etc.) developing them. "Even with a solid scientific approach based on physical facts as well as systems theory and analysis, indicator cannot be defined without a significant amount of subjective choice“ (Bossel, 2001: 9). Hence Innes (1990) give the process of indicator development an important role in management processes and argues if indicators are defined as instruments for managing, this should not only consider their application, but also the development of the same. A meaningful and effective indicator-system should be focused to a clear purpose and reflect the norms and values of a community having a stake on the assessed system (Besleme and Mullin, 1997: 50). If this is not respected the resulting measures can be of limited use for the actors needs and/or be rejected by the actors. Hence, participation has also an important role in the development and selection of indicator-sets for water management and the implementation of water saving policies.

Experiences from Local Agenda 21 processes (e.g. Sustainable Seattle) and management processes of several common pool resources all over the world provide evidence for this hypothesis and show the advantages of a participatory approach in indicator development and selection.

These experiences raise evidence that a collaborative approach to develop indicator-sets together with relevant stakeholders can increase the quality and effectiveness of both, the indicator-sets themselves and the underlying management process (Kockler 2005; Besleme and Mullin 1997). With a collaborative approach indicator-sets will gain relevance for the stakeholders (e.g. water user, farmers) as they have contributed to the development and/or selection; indicators will be more transparent as stakeholder know how they were developed and selected; and the collaborative approach will give higher trust and acceptance to the management process as the stakeholder have a stake in it.

Following this argumentation, a collaborative approach of indicator development and selection for an integrated assessment will contributed substantially to a development and implementation of necessary water saving strategies and policies in the Mediterranean.

METHODS USED

The presented study investigated the state and possibilities of policies to participatory and integrated approaches of water management and the requested collaborative development and selection process of indicators for assessment of water systems. For the elaboration of the study a multiple approach was used which consists mainly of a broad literature analysis and of three field studies with interviews incorporating relevant stakeholders and experts in water management in the Mediterranean. The literature analysis consists first of all of an analysis of the already existing WASAMED documents and presentations elaborated in the cause of this project. Second, experiences from other European projects on (integrated) water management in the Mediterranean were incorporated, as well as a review of relevant scientific literature. The aim of the literature analysis was to get insights about water management in particular regarding institutional structures including the most relevant stakeholders, problems of water management and irrigation, and participation in the Mediterranean. Also a preliminary stakeholder analysis was done to be incorporated in the later field studies.

The field studies focused on three regions in the Mediterranean represented in the WASAMED network. Namely the surveys are work out in the Iberian peninsular (Spain and Portugal), in Morocco and in Turkey. Because of resource constrains it was necessary to concentrate on these regions, although other countries may differ from this selection in their specific approaches to water management. However, together the three field study regions seem to provide a comprehensive overview about the Mediterranean region. Furthermore for the same reason, it was in none of these regions possible to do an entire inventory of water management practices, but to concentrate on single water basins (Guadiana and Tajo in the Iberian peninsular; Tadla in Morocco and Harran plain in Turkey). However, the literature analysis gave evidence that the results of the field studies could be generalized to most of the 20 countries in the Mediterranean region. Within the field studies each region was visited. The field visit in Turkey occurred in summer 2005, Morocco were visited in autumn 2005 and the field visits at the Iberian Peninsular occurred in summer and autumn 2005 and spring 2006. Within each field visit semi-structured interviews with stakeholders, identified by the preliminary stakeholder analysis, were done. Guiding question in the interviews were the problem framing of the stakeholder regarding water use and management in agriculture, the problem framing regarding the water shed, perception of participation including cooperation and conflicts with other stakeholders, perceptions on indicators for irrigation and water management and the development / selection process of indicators. Furthermore, the interviews were aimed to provide insights to water management and participation which were not get from the literature review but also verifying the findings got from the literature review. The same aims were followed with another sort of interview with experts on water management, irrigation and participation in the Mediterranean region (or the investigated water sheds).

RESULTS AND DISCUSSION

From the literature analysis as well as from the interviews with experts and stakeholder in the three investigated water sheds it can be concluded, that participatory approaches in water management are foreseen theoretically and partly implemented in almost the entire Mediterranean region. However, the introduction to the proceedings of the 1st WASAMED workshop on Participatory Irrigation Management (Hamdy, Tuzun et al., 2004) showed that in many countries the development and management of at least the water supply infrastructure remains in the exclusive or at least main responsibility of government bodies. This observation is verified also by the field studies in the Mediterranean. Nevertheless, a tendency can be observed, that participatory approaches are getting increase recognition in the region. This is due to the requirements of the Water Framework Directive in Europe and due to reforms initiated by the World Bank in Northern Africa. To build Water User Associations (WUA) is the common approach of participation in water management. Farmers are participating in these associations and have therewith also a voice in water management. The Water User Associations are participating in different forms, from consultation to active involvement, in the water management processes on higher levels. In the most cases WUAs can distribute water that is allocated to them in their own responsibility to their members.

However, in all three field study regions participation is understood as participation of water users, i.e. irrigation associations, farmer association, domestic water supplier, and hydro-electric industry. Water users, however, are only one group of stakeholders affected by water management policies and strategies. There are other stakeholder groups which should be incorporated as well, like social groups, environmental groups, representatives of local communities and other parties having an interest in the water bodies or being affected by a certain water policy. From an institutional perspective in none of the water basins a participation of these other relevant and affected stakeholder is foreseen. This often results in the lacking discussion on the environmental and social costs of water management strategies and practices.

As well for Integrated Water Resource Management and for an effective implementation of necessary water saving strategies the participation of all relevant stakeholders is essential.

Generally spoken the restriction of participation to water users will not give incentive to incorporate environmental and social costs and develop appropriate strategies for water saving from the process. Water user will negotiate in the participatory process on the allocation of water, but not on reducing the total amount of water use, as they have a strong interest to use water for their purposes. Reducing the amount of water, i.e. water saving strategies, therewith is not in their interest. Of course, there are other important institutional aspects failing in giving incentives to water saving strategies, like low water pricing, promoting to grow inadequate and water demanding crops, etc. However, a serious participatory approach would provide somehow a balance to contradicting aspects to water saving strategies.

A second observation with respect to water management can be drawn from the field studies and interviews: Indicators for water management in general and for irrigation management (as important activity to water saving) in particular are not effectively used on the local level, i.e. by the stakeholders involved. Also other empirical studies in the Mediterranean imply that most of the indicators for water resource management are not effectively used or even unknown on the implementation level in the Mediterranean, i.e. by the WUA or farmer associations. However, this is not a problem only in the Mediterranean but can be observed in many other countries in the world. Water users are mainly interested in the amount of water allocated to them. In general they are not interested in quality aspects of water if it is not introduced from outside (law) to them or they are suffering from poor water quality. Hence, the use of indicators for integrated water management is not on the agenda of water users in the region. Therefore, one reason for this lack of effective usage of existing indicator sets might be again the missing consideration of affected stakeholders and the lacking incorporation of local tacit knowledge in the formulation of the specific policy and the selection or development of indicators. It is argued that the effectiveness of the indicators requires stakeholder (not only water user) participation during the development or selection of indicators. Through a participatory approach the knowledge and perspectives of the stakeholders can be incorporated into the development of indicator-sets for sustainable water use in agriculture and therewith the indicators can be perceived as relevant and useful. It is acknowledged that the indicator development requires the multiple concerns and, among others, stakeholder participation is considered as a principle during the development of indicators (Hardi and Zdan, 1997; Bell and Morse, 2004; Beratan, Kabala et al., 2004; McCool and Stankey, 2004). Nevertheless, the reasons for the lacking effective participation are multiple ranging from legal aspects in water laws to lacking education and knowledge on issues of water scarcity, its origins and driving forces.

In the interviews several times the institutional framework for water management was mentioned as the most important constrain to effective water saving strategies in the Mediterranean. As well as water laws and participation forms agricultural policies and subsidy systems for agricultural productions are not giving incentives to water saving strategies but the contrary.

CONCLUSION

To conclude the findings of the presented study it can be argued, that the implementation of water saving strategies and integrated water management policies is not yet been progressed in the Mediterranean. Even the European Mediterranean countries are lacking progress, although they have to implement the European Water Framework Directive (WFD).

Participatory approaches are developed and implemented with the Water User Associations. But participation of all relevant stakeholders (like required in the WFD) is often not even foreseen. This course also a lack in effective indicator use at the management levels, which is an evident precondition to water saving strategies. Furthermore, it can be concluded from the literature review and the field visits that still traditional supply-based management approaches predominate water management in the Mediterranean. Giving the reason for this lacks from the study findings, the can be argued that effective water saving policies in the framework of an integrated water management approach need an institutional change in the sense of an opening of participation processes to all relevant stakeholder. This can be reached relatively easy be allowing not only water users to participate in the water boards, but also other interested and affected stakeholders.

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