

# **THE ACCESS OF SMALL AND MEDIUM SIZED INTERCOMMUNALITIES TO SUSTAINABLE DEVELOPMENT**

## **The case of urban water management**

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### **ABSTRACT**

Small municipalities, which want to follow the principles of sustainable development in order to prepare the future of their population in a most efficient way, with mid and long-term development plans, accounting for environmental, social and economic aspects, face difficult problems because of the lack of significant financial, scientific, technical and human resources. Actually they even have difficulties in their daily management and this concern has led to the creation, in some countries, of institutional, legal and financial associations of municipalities pooling their competences, resources and means, e.g. the intercommunalities in France.

In the case of water management, we examine how such associations could constitute an efficient way towards sustainable development. We also point out that a critical mass has to be reached and that small and medium sized intercommunalities may still face resources problems and that scientific and technical cooperation with neighbouring universities and research institutions can be an interesting method to cope with these problems.

We discuss the French intercommunality and the US water district systems. We illustrate our analysis by presenting two examples of groundwater management, one in the North of France, the SIVOM<sup>1</sup> of the Béthunois area and the other in Southern California, Orange County Water District.

We conclude by a series of recommendations as guidelines of action in the domains of education, training and research for the implementation of sustainable development methods and instruments by small and medium sized intercommunalities.

**Key-words :** sustainable urban water management, management and decision-making tools, legal and financial framework, medium-sized intercommunalities

## **1. RATIONALE: THE ASSOCIATION OF MUNICIPALITIES IN INTERCOMMUNALITIES TOWARDS SUSTAINABLE DEVELOPMENT**

Applying the principle “Think globally, act locally”, local Agendas 21 have been conceived as a policy instrument enabling the integration of the principles and objectives of sustainable development in all the policies projects and plans for a territory or a city, and supported by a strategy, or territorial action program, defining the objectives, methods and instruments to implement sustainable development locally. Our purpose in this paper is to understand whether and how such a policy and its supporting strategy can be concretely implemented by small and medium municipalities, which, because of their sizes in terms of population and available means, may face difficulties in simultaneously handling the short and long term and other various geographical (or space) scale problems.

Actually, time and space scales introduce paradoxes in the conception and implementation of sustainable urban development policies for any city: e.g. the long term of sustainability versus the short term of political and financial interests, or the dimensions and technical characteristics and the resulting costs of a comprehensive and efficient infrastructure versus the financial and technical capacities of the local authority which plans, decides, builds and manages.

These paradoxes are further complicated when they concern small and medium sized municipalities, without significant financial, scientific, technical and human resources, often also

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characterized by a lack of communication tools, usable by the local authorities, the water boards and other stakeholders.

In general, the territory chosen to implement sustainable development has to be at a scale consistent with a coordinated management of economic and social development and environmental protection, especially in terms of financial and technical capacities and institutional and legal organization. There are no rules to define such a scale but, in France for example, a number of municipalities are organizing their sustainable development and establishing their Agenda 21 according to a concept, introduced and supported by a set of laws, the “intercommunality”. Intercommunality is the association of several municipalities to pool their various resources, services and competences and reach a scale of operation compatible with a sound elaboration and implementation of a sustainable development policy.

Such an association is not specific to France, although French legislation clearly emphasizes sustainable development preoccupations, and, to illustrate this point, we present two examples, one in France and the other one in the US, namely the Bethunois area in the North of France and Orange County in Southern California, and we propose some guidelines and recommendations, to be supported and developed by further research.

## **2. SMALL AND MEDIUM-SIZED INTERCOMMUNALITIES: SUSTAINABLE DEVELOPMENT CHALLENGES**

The association of municipalities in intercommunalities provides the right critical mass in terms of population and financial means to address sustainable development challenges in a federate manner. However, the instruments necessary to implement a sustainable development policy still need to be adapted to the characteristics of the intercommunality, also in the context of scale and financial capacity. This leads us to introduce the concept of “medium sized intercommunality”, which in France are defined as those intercommunalities with a range of population between 20,000 and 200,000 inhabitants (Pornon, 1998). Most of these medium sized intercommunalities present the following characteristics (Martin, Carlier *et al.*, 2002):

- little computerized structures or structures in the process of being computerized,
- scattered data in different services, which are not capitalized,
- lack of tools allowing forward studies and simulation,
- lack of communication tools, usable by the local authorities, the water boards personnel and other stakeholders.

In most cases, these intercommunalities have the responsibility to cope with the urban water management issues including water supply and sanitation of their municipalities. Nowadays, the intercommunalities are facing new challenges due to an increase in water supply demands and subsequent sanitation requirements, among others. To understand how the systems operate is possible today thanks to the existing information systems and modelling and simulation tools, but complementary developments are necessary to adapt these tools to the urban water management forward studies and strategies in a sustainable manner . If large-sized intercommunalities have the necessary dynamics for setting-up and operating these tools, small and medium-sized intercommunalities are rarely equipped and their competences, tools and human and resources are limited (Boulémia, Henry *et al.*, 2000).

Water managers need to have tools and technologies to meet problems related to daily management and mid and long-term development plans. These tools may allow them on the one hand, to be autonomous in order to develop their own management strategies and decision-making processes and on the other hand, to facilitate data collection and analysis for the study of the urban water systems.

In the particular case of urban groundwater management, which we illustrate by two case studies (see below 5), the activities concerning the exploitation of the groundwater resource are diverse and imply a great number of data and variables from various sources and levels of quality according to their objective (diagnostic, interpretation, forecasting, planning,...) and to their implementation (short, mid or long-term). Managers and decision-makers must often take quick, elaborated and relevant decisions, which requires an effective study strategy based on the knowledge of the physical behaviour of the hydrological system and on the use of suitable indicators on the functioning of the system. These indicators are defined by the manager and the local authorities according to their management priorities but also according to the indications and standards from the official documents.

### **3. INSTITUTIONAL AND LEGAL INSTRUMENTS SUPPORTING SUSTAINABLE DEVELOPMENT**

In France, the concept of intercommunality has been introduced by four laws adopted between 1999 and 2002 with the objective of strengthening the consistency of urban and territorial policies and bringing a legal value to local sustainable development.

These laws stimulate sustainable development in three ways:

- Think and act at the right territorial scales
- Give its significance to the long term with respect to the short term
- Reinforce public participation

Two of these laws can be of direct assistance to small and medium municipalities, suffering from a lack of financial means, by giving them the legal opportunity to join efforts and capacities and creating a genuine fiscal and economic solidarity. Of course water management is not explicitly specified within these laws but they cover resource management in general and it will be up to the water managers to fully understand the scope of these laws and apply the planning, organizational and economic opportunities, which they offer, to their field of water management.

The law of “Orientation for territorial planning and sustainable development”, of June 25, 1999, officially introduces sustainable development as a mode of development and public action for the municipalities of a territory, giving them the legal possibility of associating themselves and sharing their capacities. According to this law, in an urban area of more than 50,000 inhabitants, where one or several communes have more than 15,000 inhabitants, the intercommunal cooperation public institutions dealing with territorial planning and economic development and the communes which are not members of these public institutions can associate themselves and design a project of “agglomeration” (conurbation), whose legal expression in French is the “contrat d’agglomération” (conurbation contract). This project, on the one hand, determines the orientations concerning economic development and social cohesion, planning and urbanization, transportation and lodging, urban policy, environmental and resources management policy according to the principles of local agendas 21, and on the other hand, identifies the measures necessary to implement these orientations. These conurbation contracts are established between the State, the Region and the municipalities, according to the principles of sustainable development and emphasizing proximity, the mobilization of the actors and the specificities of the urban challenges.

The law concerning the “reinforcement and the simplification of intercommunal cooperation” of July 12, 1999, has created a new instrument of intercommunal cooperation, the “communauté d’agglomération” (conurbation community), which is supported, on the one hand, by the association of strong competences for land use planning, economic development and urban social development, and, on the other hand, by the mobilization of a fiscal resource transferred from the commune to the intercommunal structure, the professional tax. And this creates a genuine fiscal and economic solidarity at intercommunal level.

The two other laws are also interesting, although they do not directly concern the small and medium urban communities: the law of 13 December 2000 stimulates solidarity and develops participation and local democracy while insisting on a more economical use of space by introducing new planning instruments like the territorial consistency schemes (SCOT) and the local urban plans (PLU); the law of 27 February 2002 strengthens local democracy, e.g. creating district councils in communes over 80,000 inhabitants, which could be applied in an association of communes.

The “conurbation contract” defines the choices of development and spatial organization of the communes at the scale of the intercommunality (or association), within which the “contract” will coordinate the concerned public policies, such as water supply, sanitation, waste water treatment, storm water among others. It defines the spatial scale of action of the association of communes and contributes to the strengthening of the intercommunality. It is the basis upon which a number of French municipalities are now establishing their agendas 21, namely as an “intercommunal agenda 21”, such as, among others, Poitiers with 10 municipalities and 110,000 inhabitants, and Saint Etienne with 43 municipalities and 390,000 inhabitants.

In the US, the structure of city governments is rather similar to the federal structure of the Federation and the States: an elected mayor, with the executive power, and a council whose members are either elected or selected in electoral districts, with the legislative power. But some public services, and water in particular, are managed by specific local public authorities called “districts” or “authorities” and created by a specific law. These authorities are geographically distinct from the cities and this is where an equivalence to the French intercommunality can be found: a water authority or district will gather a number of cities, or parts of cities, and create a synergy in terms of water supply, sanitation and waste water treatment and reuse; in some cases other uses of water are dealt with by the water district, such as, for instance, fire protection in the Bangor Water District of Maine (<http://www.bangorwater.org>).

We wish to stress that, although these districts have usually been created quite a long time before the 1987 Brundtland UN report (e.g. the Bangor Water District created in 1957 or the Orange County Water District created in 1933), they now constitute a valuable facilitator and practical instrument for sustainable water management, comparable, for water of course, to the “conurbation contract” and the intercommunality in France, but at a much larger geographical scale corresponding to the respective sizes of both countries, France and the US.

#### **4. MANAGEMENT AND DECISION-MAKING TOOLS FOR MEDIUM-SIZED INTERCOMMUNALITIES**

Since the emergence of the Geographical Information Systems (GIS), priority has been given to management applications. The applications in decision-making support, in particular in small and medium-sized communities, are less developed. However, local authorities and water managers and practitioners in these intercommunalities have recently expressed a very strong request for equipment and data-processing and modeling tools which, in the mid term, will have to be not only daily management tools but also instruments for prospective and development in their territory (Boulémia, Henry *et al.*, 2000). These tools, contrary to the management tools meant for technicians, must allow the anticipation of a phenomenon and provide the appropriate decision-making framework.

#### **5. TWO CASE STUDIES OF INTERCOMMUNALITIES DEALING WITH GROUNDWATER MANAGEMENT FOR URBAN SUPPLY**

##### *5.1 The SIVOM of the Intercommunality of the Béthunois (France): science for sustainable groundwater management*

The SIVOM of the Community of the Béthunois has the mandate for 32 technical tasks including the production and supply of drinking water for 13 boroughs in an area of 51 km<sup>2</sup>. The population supplied was of 40,000 inhabitants in 2004. The local community, wishing to preserve its groundwater resource, which is the main source of freshwater in the area, while responding to the increasing demands for water, needs suitable tools to understand the behaviour of the aquifer system, model and monitor its response as regards an increase of the groundwater abstraction.

The local authorities of the SIVOM and the regional university, the University of Artois, as per request of the intercommunality, initiated a partnership by which the university would provide technical and scientific assistance to the local authorities to assist them in developing and implementing a methodological approach for the sustainable management and protection of the groundwater resource. In particular, the study also focused on the impact that an unsustainable exploitation plan may have on the natural phenomena occurring in the aquifer, such as the natural denitrification process. In this research project, the researchers of the “Hydrology, Soil and Environment” team of the University proposed a methodology for a better knowledge of the functioning of the aquifer system using management tools such as GIS, databases and models, and provided orientations for the monitoring and preservation of the resource.

### *5.2. The Orange County Water District, California (USA): finance and technique for sustainable groundwater management*

The Orange County Water District is the manager of the groundwater basin in coastal Southern California, which provides the majority of water demands in the area. The District was formed by a special act of the California Legislature in 1933 for the purpose of protecting the Basin. It does not deliver water directly to the 2.3 million residents of 21 cities south of Los Angeles, in an area of about 1000 km<sup>2</sup>, which is done by water retailers, such as the Irvine Ranch Water District. But it ensures the availability and good quality of the water supply, essentially groundwater, at the lowest reasonable cost and in an environmentally responsible manner (Orange County Water District). The District is governed by a 10-member Board of Directors, elected in 7 districts of approximately equal population or appointed by the city councils of three cities. The Board sets the policy and the budget. It should be stressed that the size of the District is medium at the US scale and this is the reason why we have chosen this example. It could be compared to the Metropolitan Water District of Southern California which serves 18 million inhabitants (Orange County Water District<sup>1</sup>, 2004).

The water exploitation management is based on financial incentives: a Replenishment Assessment, RA, or pump tax is charged on all water pumped; each year, the District determines the Basin Production Percentage, i.e. the percentage of each city's annual demand which can be satisfied with groundwater, but cities can pump more if they pay a supplementary tax which makes the cost of that water equal to the cost of purchasing imported water. The RA funds are used to construct, operate and maintain facilities to protect and increase groundwater supplies, e.g. by purchasing imported water for additional groundwater recharge (e.g. from the Metropolitan Water District of Southern California).

A major feature is the groundwater replenishment system (GRS), the world's largest water purification and reuse project, which certainly could not be managed by one city alone. The system also protects the aquifer from sea water intrusion, stimulating solidarity among all users who are financially collectively responsible for the system, whether they live near the sea or further inland. Another interesting feature is that the District has a research and development group, performing laboratory, field and mathematical modeling research, to find solutions to short range problems of the area covered by the District as well as longer term more general research questions.

Public participation, a significant principle of agenda 21, is a requirement of the State of California Water Code. Therefore the District holds publicly-noticed meetings as part of the regularly-scheduled board meetings. Besides other classical public communication means like public reports or water

producers workshops, the District informs and engages the public in groundwater discussions through an active speakers bureau, media releases, the water education class “Orange County Water 101” for adults at no-cost, and a Children’s Water Education Festival in partnership with the Disneyland Resort.

## **6. RECOMMENDATIONS FOR A BETTER ACCESS OF MEDIUM-SIZED INTERCOMMUNALITIES TO SUSTAINABLE DEVELOPMENT INSTRUMENTS**

From the experience and the analysis of the difficulties that small and medium-sized intercommunalities are currently facing in the sustainable management of their urban water systems and water resources, illustrated through two case studies, hereafter we propose some guidelines of action in the domains of education, training and research that will enable the implementation of the sustainable development instruments and methods described in this paper.

The first set of recommendations aims at facilitating a closer cooperation between the local authorities and water managers and the higher education and research institutions. The second set of recommendations aims at proposing some of the new directions that research may take to support effectively the needs of intercommunalities.

### *6.1. Cooperation with higher education and research institutions*

- Partnerships between local authorities and neighbouring (local) universities or research institutions to compensate the lack of scientific and technical means and expertise;
- In particular, participation of universities and research institutions in the creation of specific instruments for the intercommunality, adapted to the local context, both technical and managerial;
- Conversely, financial investments in these institutions for applied educational programmes: e.g. master and PhD degrees;
- Short and longer term internships offered to students in intercommunality technical services;
- Professional training: participation of intercommunality technical services staff in intensive short courses offered by universities, research institutions or international organizations.

### *6.2. Orientations and new directions for research in support of intercommunalities*

- Stimulate a multidisciplinary research in the institutional, political, legal and financial domains of interest for the small and medium intercommunalities,
- In the same spirit, promote the integration of human and social sciences in the engineering studies (e.g. studies on urban water conflicts and on the perception of the users about the quality of the urban water services),
- Applied research programmes addressing issues relevant to the intercommunality coping with the local problems and needs,
- Strengthen the communication mechanisms between the local authorities, the technical services and the scientific researchers through a dialogue platform where decisions are made based on the technical and scientific advice and support of the different stakeholders.

## 7. CONCLUSION

In this paper, we have underlined that in order for municipalities associated in small and medium-size intercommunalities to achieve sustainability of their water management some specific developments and adapted instruments are necessary to cope with limited financial resources and scarce technical skills. We have shown two successful case studies where beneficial partnerships have been established between the intercommunality wishing to respond to water demands of its population and the local groups of research that provided the necessary technical and scientific knowledge and expertise for a better management and decision-making processes within the intercommunality. The methods and instruments applied in these two cases could be adapted to other small and medium-sized intercommunalities facing different technical services problems. We proposed some orientations, experimented through our own case studies, to support research and technical cooperation between the local authorities, the water managers at the technical services and the scientific community.

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