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in

El Moujabber M. (ed.), Shatanawi M. (ed.), Trisorio-Liuzzi G. (ed.), Ouessar M. (ed.), Laureano P. (ed.), Rodríguez R. (ed.).  
Water culture and water conflict in the Mediterranean area

Bari : CIHEAM

Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 83

2008

pages 205-212

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=800936>

To cite this article / Pour citer cet article

Shatanawi M., Shammout M., Naber S., Aboul-Fotoh N.Z., Eddin Abdin A., Sedky S., Candela L., Domingo F., Berbel J., Alarcón J.J., Laureano P., Tamoh K., Von Igel W., Escobar Soler M., Trevisiol E.R., Cambuzzi T., Baldo G., Pra Levis F., Rodríguez R. **Conceptual frame of water conflicts in the Mediterranean.** In : El Moujabber M. (ed.), Shatanawi M. (ed.), Trisorio-Liuzzi G. (ed.), Ouessar M. (ed.), Laureano P. (ed.), Rodríguez R. (ed.). *Water culture and water conflict in the Mediterranean area*. Bari : CIHEAM, 2008. p. 205-212 (Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 83)



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# Conceptual frame of water conflicts in the Mediterranean

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## I - Introduction

Conflict is a normal social phenomenon that occurs because individuals and groups that have different needs and prospective, but it can be an important force for positive change when handled constructively. Disputes over water have been for a long time an issue associated with providing water for human settlements, irrigation and animal watering. Historically, there is clear evidence that water scarcity is potential source of conflicts of use (between major sectors (users), regions or countries). At present, innumerable communities are threatened by a scarcity of water, which is a problem facing the maintenance and further development of their prosperity and well-being and of international stability. In the Mediterranean area, water scarcity is a source of conflict in management, allocation, policy and privatization.

Water conflict can be mitigated based on scientific evaluation, participation, public dialogue and integration. It has been agreed by many water scientists and policy makers that knowledge and awareness must be built within the formulation of a common conflict prevention frame rather than a conflict resolution frame. Accordingly, conceptual frame of water conflict within MELIA project could be constructed based on understanding and considering all interlinks among technical, environmental, economic, social interests as well as the levels of conflict of nations vs. nations or users vs. users. To achieve this goal, relevant partners in MELIA and various categories of players have introduced several research papers related to water conflict and have been uploaded within MELIA site <http://www.meliaproject.eu/> in order to help in formulation of the relevant conceptual frame.

Furthermore, the conceptual frame of water conflict is based on research papers presented at the first workshop of the project. Most of the partners and other members highlighted the major problems, causes, solutions to local, regional and trans-boundary issues of water conflicts. They have also identified reasons and measures that could be taken to overcome the water conflict for various uses. Therefore, this report highlights the main features of the conceptual frames of

water conflict in the Mediterranean countries which have extracted from uploaded papers and the following workshop papers:

- An Overview of the Main Water Conflicts in Spain: Proposals for Problem Solving; by L. Candela, F. Domingo, J. Berbel and J J. Alarcón
- Assessment of Grass Roots Irrigation Water Conflicts through Governorates Profiles; by N. Aboul-Fotouh, A. E. Abdin, and S. Sedky
- Water Conflict Among Sectors and Environmental Uses in Jordan; by M. Shatanawi, M. Shammout, S. Naber
- Traditional Knowledges Role for Security and Mitigation of Water Conflicts; by Pietro Laureano – Ipogea
- Analysis of water use patterns and conflicts in the Sa Pobla plain and Alcudia bay (Majorca, Spain); by K. Tamoh, W. Von Igel, M. Soler and L. Candela
- Examples of good governance to avoid conflicts in water sector: Venice lagoon and Bacchiglione river case studies; by Erich Roberto Trevisiol, Tullio Cambruzzi, Giuseppe Baldo and Francesco Pra Levis

## II - Basic concepts

Conflict is omnipresent throughout the history of humanity where it is constantly noticed about community members or institutions confronting one and other, controversy between institutions or organizations and tensions between countries or large social groups of a country (Ormachea, 2001). Although this statement from Ormachea is very true, and that every lay man can observe and would easily agree with it, the following are some definitions of the concept in order to have a better framework when analyzing a conflict.

The concept of conflict over water is mainly linked to the unequal distributions of water between people, groups or nations and it is a normal social phenomenon that occurs because individuals and groups who have different needs and prospective. Conflict, however, can be an important force for positive change when handled constructively. Conflict means disharmony of interests, dispute over incompatible interests, or a difference in preferred outcomes.

A simple definition presented by Huggins when studying watershed management is that conflict “is a situation where actors have *incompatible goal*” (Huggins, 2004), which include status, power and/or resources. According to this definition, conflict is manifested in purposeful behavior by the protagonists, in order to capture more of the scarce resources or to overcome the strategies of other protagonists.

An alternative framework makes the distinction between *disputes* and *conflicts* based on the differences in the nature of the goal identified by Mwagiru *et al.* (1998). They reserve the former term for situations where actors disagree about their interests and therefore a *dispute* is over a specific quantifiable need, a resource that is tangible and thus negotiable. A *conflict* is something qualitatively different, arising from disagreements over values. Values include perceptions of rights, of which cannot be negotiated. The important difference between a conflict and a dispute, according to authors supporting this view, is that while a dispute can be settled through arbitration or through court processes, conflicts can only be resolved by a change to perceived underlying injustices or inequalities (Huggins, 2004).

CEMDA (2005) defines conflict as: an interactional process between two or more parties concerning one or more issues, which is born, grows, develops and can transform, disappear and/or dissolve, and sometimes stay relatively stationary putting much more emphasis on the dynamic characteristic of conflicts. Analysts have noted that the Chinese character for ‘conflict’

has 2 symbols – one for danger and one for opportunity (Slim, 1996). There are authors who also remind us that “Great accomplishments can occur at a time of great change (Kitay, 1998).

### **III - Causes of water conflict**

The papers have reported some of the main causes of water conflict in cases located in Spain, Egypt, Jordan and Italy. These causes are concentrated in the following:

#### **1. Climate and Water Distribution**

- The distribution of rainfall varies considerably with location, and variable topographic features.
- Limited water resources where rainfall is the main source of water like in Jordan.
- Water supply is influenced by variability in rainfall pattern which vary from year to year.
- Inequality and unfairness in water distribution is at the heart of water conflict. In Spain, Renewable water resources value is unevenly distributed along time and space.
- Droughts, as a consequence of temporal irregularities of precipitation are common in all areas originating a temporal water resources deficit. For example, climatic conditions of Majorca have as a pattern recurrent cycles of two to four dry years.
- Spatial climatic situation generates an imbalance between river basins of the North and those of the South, which affects both the quantity and the quality of water available, generating a conflict of interest among users within the river basin and between different river basins as in the Spain case.
- Drop in base flow for the basins like that of the Yarmouk River in Jordan.

#### **2. Water Use and Demand**

- Population growth and demand: As the population increases the demand for water increases as well. In Jordan, the population grew from an estimated at 586,200 people of 1952, to about 5.6 million in 2006, and still increasing at 2.4 percent per year.
- Urban water demand was considered stable except in big cities, like Madrid/ Spain.
- High demand compared to supply due to high population growth, urbanization, and increased agricultural and industrial activities.
- Sectors demand on water resources. Jordan is facing severe and growing concern regarding the availability of water and meeting the rapidly growing demand for water resources, due to population growth, industrialization, expanding irrigation projects, and improving standards of living. These factors have led to increasing water use and overexploitation of groundwater.

In Spain, Water demand from agriculture and tourism is concentrated during summer. This situation has originated a conflict regarding water rights and use between stakeholder groups with varying intensity along time. The development of the conflict is related to the steady tourism growth, loss of natural ecosystems and decrease of agricultural activity in central Spain along the past decades. Some sectors of the population have the feeling of growing socioeconomic injustice produced by the gap in social welfare between the developed (tourist) coastal zones and the less developed (agricultural) inland zones. This is a representative example of conflicts between one of the most demanding sectors (domestic/tourism vs. agriculture) implying environmental impacts.

- Lack of reliability of urban water supply. As the case of Spain, on the majority of the Spanish territory faces conflict either due to the lack of regulation (North) or restrictions (South and central).
- A great concern on recreational uses demand (leisure, landscape, reservoirs) has raised up during the last years, although recreational uses in the planning and administration of the water domain has not usually been an important objective.
- Disputes over irrigation water are often entangled in complex layers of social, economic, political and technical factors between individual community members, families, and various other social and administrative groups.
- When it comes to external conflict between farmers and water authorities, the perception of the factors by the farmers is very different from that by the water authorities. Each tends to blame the other as Egypt case.

### **3. Rapid Development in the Irrigation Projects**

If at the beginning of the 20<sup>th</sup> century agricultural production was one of the most important inputs to the economy, from the socio-economic point of view an intense process of adjustment in the sector has been produced since the last 50 years and at present, over 30% of agricultural income comes from EU subsidies, as in the case of Spain.

Million hectares for the traditional irrigable area was tripled, especially in the mildest parts of the Spain, and the water resources demand increased in all regions especially in the driest ones.

Current agricultural demand in Spain accounts for 70% approximately of total water resources demanding new supply sources for this continuous increase.

Water resources continue to be limited and the conflicts over their distribution as much as between regions as between local users are more and more important. This fact may be aggravated considering future climate change predictions, although specific measures from the technologic point of view have been taken (i.e. drop irrigation) and of non-conventional water application (treated wastewater and desalinated water) in many coastal areas.

### **4. Overlap/ Lack of Responsibilities**

- Overlap of responsibilities between different institutions.
- Competitions among different users and sectors are increasing.
- Power and dominance of powerful owners of the new land areas.
- Fragmentation of properties, increasing the number of stakeholders.
- Need for more efforts and involvement of the agriculture cooperative societies.
- Lack of trust.
- No perception of shared interest.
- Lack of communication and exchange of successful experiences as well.

### **5. Insufficient Maintenance**

- Poor maintenance of the network.
- Unlined of watercourses and leakage/seepage.
- The low capacity of the irrigation network and its inability to absorb any additional allocations (capacity constraint).

## **6. Inadequate finance**

- Water/Economic insecurity.
- Financial resources are often not sufficient to complete plan for river basin management (low investment in wastewater treatment). Therefore, Effluent from wastewater treatment plant has modified the basins discharge, but it has greatly degraded the water quality.
- Research is limited and fragmented.

## **7. Poor Management**

- Insufficiency of water intakes.
- Brevity of irrigation time allowed per feddan as in Egypt case.
- Ineffectiveness of the fines imposed on unauthorized rice-growing.
- Incompetent and unaccountable water engineers (poor management).
- Low water levels.
- High rate of water waste by farmers.
- Increased reclamation of land area, uncoupled with parallel water allocations.
- Increase ineffectiveness of local and traditional conflict resolution mechanisms.
- Overgrazing, deforestation, land fragmentation, and other land use changes have influenced the pattern of flood.

## **8. Lack of Law Enforcement**

- Bribery and nepotism like the case of the Bahars.
- Transgression by the fountainheads farmers against irrigation water.
- Acts of transgression by the farmers.
- Rapidly increasing rice-growing (illegal).
- Building bricks factories from agricultural soils.
- Use of unauthorized water-pumping machines.
- The uneven (unfair) distribution of water amongst farmers and villages.
- The gradual disappearance of gravity irrigation and increased independence on individual pumps.
- No single river basin authority has been set formally by law.
- Difficulties in the enforcement of water laws and regulations.
- Over abstraction of groundwater has resulted in water quality deterioration of some wells. In Majorca, Spain, it is widely accepted that there are plenty of illegal wells (11.000 legal and 23000 under administrative control, (Rodriguez, 2004, pers. comm.)) and total extractions from wells are unknown. This situation fosters a behavior where private interests are pursued (and achieved by those with the larger political and/or economical power) without regulation and in detriment of general public interests.
- Pollution of surface water from domestic and industrial effluents as well as solid wastes.

## 9. Lack of awareness

- Lack of awareness amongst farmers about availability of water and allocation systems and pollution control.
- Change in farmers' life styles (e.g. they watch satellite channels instead of irrigating their land during the night).
- Waste disposal into canals and water contamination.
- Passage of watercourses into the inhabitants' blocks.
- Some farmers inability to 'dialogue' constructively and 'negotiate' effectively increases the opportunities for misunderstanding and thus conflict.
- Public awareness programs are improving and are done in collaboration between government and NGOs.
- Traditional knowledge is in danger and its disappearance would not only cause the loss of people's capability to keep and pass on the artistic and natural heritage, but also of an extraordinary source of knowledge and cultural diversity from which appropriate innovative solutions can be derived today and in the future.

## IV - Water conflict mitigation measures

### 1. Water transfer

- Experiences with greater or minor success of structural actions to interconnect river basins in order to alleviate the territorial imbalance have a very old tradition in Spain. The possibility of water transfer (interbasin imports) was included as a tool to solve the water deficit situation in the South and Eastern Spain. In case of Jordan, Conveyance of Disi water to Amman, and Red Sea- Dead Sea Canal may also help in mitigating water conflict.
- Balancing water demands in critical areas (basically Mediterranean coastal zone) by means of interbasin water transfers.
- Integrated Water Management, with the objective of preventing land degradation, protecting the quality of the freshwater resource, protecting biodiversity and continuing sustainable use.

### 2. Policy, strategy and action plans

- Adopting policies for irrigation, groundwater, surface water, wastewater, etc. will reduce water conflicts. Example from case of Jordan that the policy statements set out the Government's policy and intention concerning groundwater management aiming at development of the resource, its protection, management and measures needed to bring the annual abstractions from the various renewable aquifers to the sustainable rate of each. Government efforts for groundwater management policy were concentrated on resource exploration, monitoring, quality, development, allocation of groundwater, legislation, institutional arrangement, technology transfer, public awareness and on private sector participation. Another example from Italy that the protection and safeguard of the water resource in terms of quality and quantity are the main targets of the Water Master Plan.
- Formulate desertification strategy.

### **3. Better management of existing water resources**

- Better management of water desalination and treated wastewater reuse.
- Implement water banks procedures in basins.
- Better assessment of temporal and spatial natural recharge (groundwater and runoff) in some of the critical river basins. (Climate change appears to be an extra element of added uncertainty).
- Increase water availability through groundwater recharge and promoting water harvesting when appropriate.
- Improvement of water saving techniques, conjunctive or alternate surface-groundwater use, integrated management of conventional and non-conventional water resources, and application of demand management measures.
- Managing and handle disputes: In Egypt, the common reactive ones are: avoidance, coercion, negotiation, mediation, arbitration, and adjudication, and the pro-active ones are known to be: fostering productive communication, collaboration amongst diverse interests, and addressing underlying causes of conflict.
- Conflict's management through strength-weakness analysis for neighbors, local leaders, customary councils (Arbitration), water users associations, community development organisations, irrigation engineer, and police and the court of law.
- Optimization of water at farm level through improvement of irrigation systems.
- Construction of dams to utilize available surface water.
- Reduction in groundwater extraction for irrigation and municipal use by enforcement of law.
- Implementation of law by force (Police of Environment).
- Maintenance is needed as rehabilitation of pipe networks.
- Reallocation of water to high value products (industry and Municipal).

### **4. Development of hydrological plan**

- Implementation of a number of different plans especially in overexploited aquifers, in order to allow hydrologic functions recovery.
- Water desalinization.

### **5. Environmental Considerations and Cost- Benefit Analysis**

- Implementation of a number of different economic measures, to reduce water abstraction especially in overexploited aquifers.
- Additional Waste Water Treatment Plants (WWTP) within the basins.
- Upgrade and expansion of existing WWTP's.

### **6. Awareness in field of water**

- Specific public participation programs of different sectors on water policy options in order to harmonize societal needs and technical measures.
- Encourage crops for rain fed farming and the social and economically efficient use of the water.



- Design a program for integrated rural development.
- Develop community involvement in water policy development and sustainable water management.
- Farmer education is an essential component of a successful water conservation program of supporting agriculture since it will facilitate adoption of improved technology.
- Public awareness programs in the field of water conservation. The educational and training program may include the following actions. Communications, including public information and education campaigns using local mass media, public relations, events, brochures, information materials and other tactics to ensure that the farmer community is well informed, and that individuals are motivated to take their share of responsibility.

## 7. Ancient Water Techniques for Security and Sustainable Future

- Innovative use of ancient water techniques in Agriculture as drainage ditches that have been spread in the Apulia district of Daunia 6,000 years ago when Neolithic communities built more than 3,000 villages surrounded by trenches in the shape of a crescent.
- Innovative use of ancient water techniques in urban settlement and architecture as composting.
- Production and landscape. In particular the typical food production such as oil, cheese and wine safeguards both the aesthetic and environmental quality of the landscape, since the old production systems are possible thanks to the maintenance of traditional techniques of soil management. In this same field, the growing dissemination of organically controlled agricultural productions and meats shows even more interest in traditional techniques of husbandry and breeding.

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