

MedWater Policy
**Policy Initiative to Overcome Water Competition between the Vital
Economic Sectors of Agriculture and Tourism in the Mediterranean**

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Adaptation of Policy Modules to the MEDWATER Target Regions

Case Study Island of Naxos

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Introduction

Each region has a particular profile and is facing individual problems. In consequence the water conflict in each region has a different character and therefore requires a specific sustainable water policy initiative. Consequently, the elaborated policy modules are to be adapted to the specific conditions of each MedWater target region. In an exemplary way water policy initiatives are formulated for each of the MedWater target regions which are:

- a) Cap Bon region in Tunisia
- b) Dead Sea Area in Jordan
- c) Fethiye Region in Turkey
- d) Jericho district in Palestine
- e) Naxos Island in Greece**

Policy Initiative for the Target Region Island Naxos in Greece

Each water policy initiative aims to generate a strong conflict solving potential and focuses on a very efficient ratio between efforts and effects. This will be achieved by highlighting the key actions for each region. Every policy initiative has to define political targets for establishing sustainable water supply in the specific region. This has to be done by a careful analysis of the current situation, the technical and socio-economic potential. Based on this analysis the most promising policy modules have to be defined for accomplishing the specific policy target. This methodology will be used in the following for the three most important policy targets for sustainable water supply on Naxos Island.

Policy Module	Enhance of Efficiency in Agricultural Irrigation	Protection of the Naxos Island Eco-system	Implementation of Desalination Technologies
Legislative Framework		Environmental Standards	
		Water Quality Standards	
Water Pricing Scheme	Progressive Taxation		Pricing Schemes
Institutional Framework	Strengthening Water Authorities and Supply Facilities	Environmental Conservation Agency	Liberalisation and Public Private Partnership
Water Infrastructure	Installation of Transparent Metering System		
	Rehabilitation and Improvement of Water Distribution System		
Mobilisation of Financial Resources	Direct Governmental Subsidies	Cooperation with International Institutions	Direct Governmental Subsidies
Public Actions and Capacity Building	Training of Decision Makers	Public Dialogue	Training and Public Dialogue
			Strengthening of R&D Capacities

Policy Target “Enhance of Water efficiency in the Agricultural Irrigation”

Situation on the Island

Agriculture has traditionally been of great importance for the Island Naxos which in spite of the decline of the last decades has remained a vital factor for the island's residents. The vast majority of water demand can be found in this sector. Tourism even though it is growing rapidly, still covers only a small percentage respecting to the demand of the agriculture sector. The annual water needs for agricultural irrigation are approximately 5.100.000 m³, while the total annual water consume for urban purposes (tourism and permanent inhabitants) is only 1.800.000 m³. These figures highlight the necessity to pay special attention to the agricultural sector when formulating the target region policy initiative.

Major agricultural products are seed potatoes; olives, grapes and tomatoes. The water need of these products is reasonable and adequate for a semi arid area like Naxos. Thus, the major water saving potential in the case of Naxos lies in the design and maintenance of the irrigation systems. Today, sprinkler irrigation is still the dominant irrigation technology on the island, supplying 95 % of the irrigated surface. Sprinkler irrigation has a very poor water efficiency of sometimes less than 50 %.

Technical option for Improving Irrigation Systems

A change from sprinkler to more efficient irrigation could bring water savings up to 50% depending on the substituting irrigation method. The most suitable option is drip irrigation which holds the potential to raise the water efficiency in the distribution system up to 80 % percent. Already now the shift to more efficient irrigation systems is underway. This process should be supported by well-designed policy modules that are stimulating an efficiency revolution in the entire irrigation sector. There are various policy modules, which are able to support this field of action.

Policy Modules Supporting this Policy Task

Policy Module “Progressive Taxation”

On Naxos Island progressive taxation systems have already been introduced for the tourist sector and private households. This system should be expanded to the agricultural sector for creating economic incentives to enhance the water efficiency of the irrigation methods. The progressive taxation should set a minimum water demand for the most prominent agricultural products (based on FAO criteria). Above this contingent the water prices should raise rapidly.

Policy Module “Strengthening of Water Authorities and Supply facilities”

A wide spectrum of administrative bodies is relevant for the management of sustainable water supply. It ranges from the local municipalities to the Prefecture and the National Ministries. Better co-operation and communication is vital for any kind of sustainable water supply. One suitable measure would be the establishment of an Island Water Network that could bring together all relevant stakeholders. The following members should participate between others: the local municipalities, the Center of Ecological Research of Naxos, the Hydrological Institute of Apiratnhos, the Co-operative of hotel owners and the Ministries of Agriculture and Environment.

Policy Module “Installation of Transparent Metering System”

The introduction of a metering system with a counter for every agriculture property unit is a very important measure. Proper metering allows billing the water supply in reference to the real quantities consumed. Moreover, accurate metering is a crucial tool for raising the understanding for the individual water consumption patterns. Such an understanding requires that the individual consumption is directly visible and

clearly measurable. On the other hand, the metering systems allow to credit water efficiency measures with positive monetary effects. The installation of a reliable and just metering system is a part of water supply infrastructure that should be implemented and maintained by governmental bodies.

Policy Module “Rehabilitation and Improvement of the Water Distribution Systems”

On Naxos Islands as in many MENA regions huge amounts of water are lost due to the poor status of the distribution systems. Inadequate and obsolete technologies and leakage are causing water losses of more than 30 %. These losses endanger the economic profitability of the water utilities. Leakage prevention, mature technologies and a better maintenance have to be assured. Only covering and framing distribution channels, sources and wells can prevent important losses by evaporation and percolation. The refurbishment should where ever possible link to traditional methods e.g. by using natural stones.

Policy Module “Direct Governmental Subsidies”

The financial investment for the implementation of a new irrigation system exceeds the economic strength of a farming unit. Therefore, direct public financial incentives are required e.g. cheap investment loans by the local administration. These incentives should support the hardware installations as well as training activities. Transparent and short application processes are required for these funding sources. The financial sources should be generated by reducing the deficits of water supply utilities by a progressive taxation system.

Policy Module “Training of Decision Makers”

Information and specific knowledge about innovative irrigation system, their maintenance and effects on the agricultural techniques is indispensable for this efficiency reform. Therefore an information campaign explaining the different systems and highlighting the positive aspects of the changes (especially the reduced water and energy consumption) is essential. An important PR tool could be to affiliate the agricultural decision makers of Naxos with farmers abroad which are familiar with the advantages and requirements of the reform and its results. Possible illustrative examples and partners might be the participating regions of the MEDWATER project.

Policy Target “Protection of the Ecosystem on Naxos Island”

Situation on the Island

The looming water crisis is having a steadily increasing negative influence on the Island of Naxos. Especially negative is the influence of the water competition on the indigenous ecosystem of the Island. Large scale changes of the local fauna and flora will have a long lasting impact on the local ecosystem and therefore also on local life quality and economical activities. The agricultural but also the tourist sector are directly depending on a sound condition ecosystem. Tourists visiting Naxos are not only coming for sunbathing but also for the beauty of it's nature. Hiking, mountain biking and other outdoor activities would eventually loose their enchantment. Dried out wells and lowered ground water level will effect originally fertile spots like ponds and forests on the Island. As a consequence will migrating birds not stop over anymore or special flours disappear. First effects have already been detected; dried out ponds, traditionally used by migrating birds as a feeding ground, had the abundance of Naxos by these birds as a consequence.

Options for the Protection of the Ecosystem on Naxos

The protection of any ecosystem is a particularly complex task which is asking for a wide set of measures. Each sector needs to be involved and specific measures for each ones contribution are to be defined. The modules below will not be able to solve the entire problematic, but they define the crucial initial steps necessary to make a protection possible.

Policy Modules Supporting the Policy Task

Policy Module: “Environmental Standards”

The disposal of waste water, but also water supply with unconventional resources such as waste water, brackish or salt water contains significant dangers for polluting the fresh water sources and consequently the environment in general. A comprehensive legislation is to be formulated to ensure that water disposal and unconventional water supply stations operate without any harm to the environment, particularly to the local ecosystems.

Policy Module: “Water Quality Standards”

Low quality standard of water seriously endanger the local ecosystem. On one hand drinking water sources for wild animals run the risk to be contaminated and on the other hand vegetation will be directly effected by contamination or over fertilization. Moreover, it creates serious health risks for the population. Thus, it is a high legislative priority to create quality criteria for water disposal and water supply. These criteria should address all kinds of chemical and organic pollutants.

Policy Module: “Environmental Conservation Agency”

An agency responsible for the protection of the environment in general but especially for the protection of the local ecosystems is to be created. The agency should not only be responsible for nature protection on Naxos, but for a larger area such as the complex of the Cyclades Islands. Only by covering a larger area the agency will reach the necessary size, equipment and staff for operating effectively. Furthermore the Environmental Protection Agency should take over the cooperation of the different agencies being responsible for individual aspects of the environmental conservation, such as the water and agriculture institutions.

Policy Module: “Cooperation with International Institutions”

The Environmental Conservation Agency should take over the coordination of applications for international projects in the field of environmental protection. One possibility would be EU projects in the field of ecotourism or the protection of endangered migrating birds etc. On the one hand this will have a positive impact on the financial possibilities of environmental protection projects and on the other hand on the transfer of know-how and experiences with this kind of projects.

Policy Module: “Public Dialogue”

For a successful protection of Naxos’s ecosystem a Public Dialogue with the population, tourist and agriculture sector is indispensable. Information about the specific characteristics of the fauna and flora on the Island, as well as the direct influences of the looming water crises on the ecosystem is to be provided. Especially information about effects on the ecosystem already ascertained is to be transmitted tourists, farmers and local population to raise awareness about the situation’s severity. Public Dialogue with the tourist sector is imbedding a particular advantage for tourism companies, as environmental friendly policies of a hotel can eventually turn into a marketing potential.

Policy Target: “Implementation of Desalination Technologies»

Situation on the Island

Even with a drastic enhance of water use efficiency and enlarged storage capacities it is obvious that the natural resources will be insufficient to cover the entire water demand in the near future. At the same time the island’s important water resources of brackish and seawater is still not exploited at all. A prominent example is the under-sea water spring of Ai – Dimitrios that is estimated to produce approximately 200 m³/h of brackish water and is so far completely unexploited. Thus, an important policy target of sustainable water supply is to stimulate the exploiting these abundant brackish and seawater resources. Priority should be given to brackish water that can be exploited with significantly smaller amounts of energy and financial efforts.

Technical Options for Enhanced Exploitation of Brackish Water Resources

Various mature desalination technologies exist for seawater and brackish water desalination. For decentralized applications such as required on Naxos Island the most mature and cost effective desalination technology is Reverse- Osmosis (RO). For decentralized applications this technology still requires approximately 10 kWh/m³ of fresh water. Thus, the capacity of the current energy supply of the island does not allow a large- scale implementation of the non-conventional water resources. The additional energy generation capacities should make full use of the rich renewable energy sources of the island particularly solar radiation and wind. Thus, the two technology recommendations for desalination units on the Island of Naxos are:

- 1) PV-RO is a promising solution especially for small-scale desalination and for stand-alone operation. PV-RO could offer solutions for single home or hotel units.
- 2) WEC-RO offers larger scale production of desalinated water than PV-desalination. A WEC-RO system could therefore be designed to serve a number of farming units or a combination of hotels, homes and farming units.

Policy Modules Supporting the Policy Task

Policy Module: “Pricing Schemes”

For ensuring public acceptance it is important to have the same water prices for desalination water as for other conventional sources. Under certain prerequisites such as long transport and high pretreatment requirements for conventional water sources, desalination can be the low-cost option for additional water supply. Feasibility studies will analyse under which expenses the underwater spring and other brackish and saline water sources could be exploited

Policy Module: “Liberalisation and Public Private Partnership (PPP) ”

A tight collaboration of private and public sector would be supportive in the case of the renewable energy based desalination systems. Private companies can bring in two major contributions: Specific expertise and financial resources. Favourable for these PPPs is the fact that on Naxos a private water supply market already is established which has a similar pricing level as the public supply.

Between the many types of PPP designs the most appropriate has to be selected for every individual desalination project. It should be ensured that the private company takes over service and maintenance for the plant. Particularly, hotel resorts or strong agricultural units could operate the desalination plant themselves or at least hold shares of the possessing entity.

Policy Module: “Direct Governmental Subsidies”

The implementation cost of decentralised desalination systems is still very high. Particularly, the first pilot plants require extensive preparation and testing periods and though cannot easily operate on economically viable terms. Thus, direct governmental subsidies are important incentives for the construction of desalination units. Very helpful is governmental support which targets the planning and testing phase for example by cheap direct loans provided by the local municipality or the national state.

Policy Module: „Training and Public dialogue”

The option of desalination requires accompanying public dialogue and training activities. The training expenses should be enclosed in the public funding schemes.

Policy Module: „Strengthening of domestic R&D Capacities”

Naxos has as most other MEDA countries long lasting experience in coping with the water scarcity. Based on this traditional knowledge domestic research and development work should be supported by national, regional or international institutions and a knowledge transfer among the regions facing water problems should be fostered.