MedWater Policy

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

Adaptation of Policy Modules to the MEDWATER Target Regions

Case Study for Fethiye Region

Deliverable of WP 6

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Introduction

Each MedWater target 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 individual sustainable water policy initiatives. Consequently, the elaborated policy modules of the Transboundary Water Policy Initiative are to be adapted to the specific conditions of each target region. In an exemplary way the 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 Targets for Sustainable Water Supply for Fethiye Region

Every water policy initiative aims to generate a strong conflict solving potential between the vital economic sectors of agriculture and tourism and in Fethiye Region also between hydroelectric enegy generating sector. **Policy targets** which promise a very efficient ratio between efforts and effects are defined. This definition is based on a careful analysis of the current water situation in the target region and the respective technical and socio-economic reform potential. Based on this analysis the most promising **policy modules** are selected which are deemed to be necessary for achieving the reform targets. With this methodology three highly important policy targets for sustainable water supply for Fethiye Region in Turkey have been developed. The policy targets and the appropriate policy modules are summarized in the following table:

Policy Module	Prevention of Illegal Drilling	Reduction of Water Losses	Stimulation of Water Export
Legislative Framework	Official Permission for Groundwater Exploitation	Water Saving Architecture e.g. Reuse of Wastewater, Rainwater Storage, Reconfiguration of Irrigation Schemes	Environmental Standards
Water Pricing Scheme	Rationalization of Subsidy Schemes	Efficient, Economic and Environmentally Sound Irrigation system	
Institutional Framework	User and Stakeholder Participation		Enhanced Cross Sector Administration Coordination
			Water Supply and Use Liberalization and Public Private Partnership
Water Infrastructure		Installation of Transparent Metering System	Water Export Infrastructure

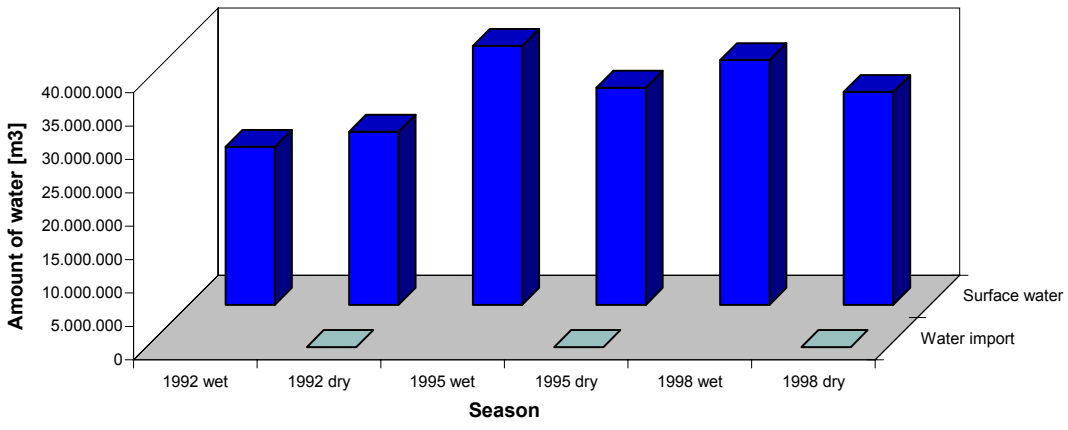
		Rehabilitation and Improvement of Water Distribution and Waste Water Treatment Systems	
Mobilizing of Financial Resources		Direct State Subsidies	Creation of Favorable Conditions for Private Investment
			Cooperation with International Development Institutions
Public Actions and Capacity Building	Public Dialogue	Training of Decision Makers and Staff	Public Dialogue
			Training of Decision Makers
International and Interregional Cooperation			International Water Trade Agreements

Policy Target: ”Prevention of Illegal Drilling”

Situation in the Region

The major economic activity in the region Fethiye is agriculture. 3910 ha of the 90km² of the region in size is irrigated farm land. The fresh water and irrigation water are mainly provided by two resources: Yaniklar and the Ören-Ayozu reservoirs. Both resevroirs are snow water storages. The following diagram shows the vast existing surface water supply.

Turkey, Fethiye region - Water supply



The supply of high quality surface water is ensured for today and for the near future. As the following figures show, water prices are compared to the other MedWater regions extremely low. There are separate irrigation (farming) administrations for each reservoir. The irrigation administrations supply water to their members during only the

day time through circular open channels. The investment of the water supply infrastructure is carried out by State Water Works. The administrations determine their selling prices only taking into consideration the operation and maintenance costs. Excluding the initial investment costs for the users, therefore employed water prices are very low compared to prices employed in other target regions. This is the existing subsidization policy employed in Turkish agriculture. Despite to the water supply and low water prices, there are still illegal water drilling in the region for the following reasons:

The irrigation administrations only supply water during day time. However, especially in the green house agriculture (the 90% of the agricultural activity of the region is green house agriculture), water is mostly needed at night time.

- The temperature of open channel water is too low (3˚-6˚C) for green house agriculture during winter period because water in green houses is used for dual purposes; for heating the house and for irrigation. The temperature of well water is 12˚-14˚C in winter. Therefore, drilling could not be prevented unless the configuration and operational scheme of the open channel water supply are rationalized in accordance with the actual conditions in the region.

	Water Prices for small scale irrigation in Euro	Water Prices for large scale irrigation in Euro	Water prices for tourism projects in Euro
Island of Naxos	0,026	2,93	2,93
Dead Sea Area	0,18	1,92	1,6
Jericho District	0,16	0,48	2,24
Cap Bon Region	0,01	0,092	0,58
Fethiye Region	0,0034	0,0034	0,27

It is a fact that the environmental, social and economic long-term consequences of the intense groundwater exploitation are harmful. The groundwater tables are reduced quickly and deteriorated by sea water intrusion. The destruction of the local groundwater sheds is endangering the fragile eco-systems of the semi-arid Fethiye region. Moreover, illegal drilling prevents further development of the irrigation and distribution system, because there is no requirement to reach higher efficiency.
At the same time, water policy must recognise that farmers in the region are under a high pressure. The competition from the tourist sector for land and labour sources and the global competition in the agriculture endanger the agricultural future of the region. The necessary reforms in water supply have to include measures to ease the economic and practical burdens for the farmers and ensure the long-term economic viability of their investments as well as provide water at the right time with the characteristics suitable for regional agricultural practices.

Technical Option: Prevention of Illegal Drilling

The basis of the vast surface water supply in Fethiye region allows a sustainable water supply of the region, when certain technical options for enhanced water efficiency are taken. The drilling of non renewable groundwater can be replaced by a more efficient use of the surface water. A set of policy steps is necessary to approach the problematic sustainability of water.

Policy Modules Supporting This Task

Policy Module: “Official Permission for Groundwater Exploitation”
The right to drill is coercively linked to an official permission. However, it should not be expected that the farmers will purchase the official irrigation water, as long as the supply regime and the characteristics of the water do not match with their requirements. If the drilling should be prevented, the solution will be to provide a flexible, sustainable irrigation water with the required characteristics to the farmers.

Policy Module: ”Adaptation of General Subsidies”
The current direct and indirect subsidies are to be evaluated and reformed. In spite of the low water prices compared to other regions, the farmers in the region are using more costly well water in green houses. The green house agriculture constitutes the major profit generating agriculture in the region.

Policy Module: “User and Stakeholder Participation “
The farmers, state staff and the water supply organisations, together, might find the best solution for the region. Therefore they should be imbedded in the decision making structure.

Policy Module: “Public Dialogue”
The awareness for the dangers of the overexploitation of the groundwater tables is very low. Farmers have the idea that water is abundant in Fethiye region. Thus, an information campaign should directly address farmers and inform about the negative consequences. Furthermore, residents of the regions are to be informed and made aware about the negative future effects of illegal drilling on the environment, social and economic circumstances. One additional result of the increased understanding of the problems of the drilling of the local population is its effect on the decision maker’s initiative to develop rationale solutions for the problem.

Policy Target: ”Reduction of Water Losses”

Situation in the Region

The region of Fethiye has abundant surface water resources. As a consequence no efforts have been made so far to avoid water losses. This can be seen on the figure of water demand which is in Fethiye region almost threefold as high as in other MedWater target regions:

Target region	Irrigated area (ha)	Total water consumption [m³]	Water consumption per ha [m³/ha/day]
Island of Naxos	1.270	5.177.100	11,17
Dead Sea Area	1.700	18.384.000	29,63
Jericho District	2.990	20.090.000	18,41
Cap Bon region	19.800	177.800.000	24,60
Fethiye region	**Network A 2.069**	**23.408.784**	**31,00**
	Network B 1.048	**14.484.144**	**37,87**

An important source of water losses can be found in the distribution systems. There are two distribution systems one is fed by Yaniklar reservoir and one by Ören-Ayozu

reservoir. Two farming associations are responsible for the distribution of the water. The distribution system works by gravity. There are two open channels conveying the water away from the reservoirs and lead into a distribution net with closed pipes. As there is no storage facility in the network, the flow intensity changes with the amount and intensity of precipitation. Surplus water in the irrigation system, is not stored, but flows directly into the sea. This set-up is not only responsible for large water losses, the organically and chemically polluted effluents also pollutes the coastal regions. Furthermore, rainwater, which can not be captured in the reservoirs, drains off and evaporates or trickles away. (unfortunately no dependable figures could be reached during the study).
In the region, there are two hydroelectric plants operating with the water in the irrigation distribution systems. In other words, the water surplus of the irrigation area is directed to the energy plants. However during the high agricultural seasons, the entire water is devoted to the agriculture and the energy plants are not operating. The existing scheme is a plan to improve the water usage efficiency under existing supply/demand conditions. The scheme may be efficient as long as the region's energy demand could be met under the existing operational system. However, if it could not be met and if the continuous operation of the energy plants would be necessary, then the consideration of a different policy alternative to overcome the competition between the agriculture and hydroelectric energy sector would be inevitable.

Options for Reducing the Water Losses

The amount of quality water losses in Fethiye is very high. Major tool is an improved water storage and management system that is based on the real water demands and not on the currently available quantities. The water demand in parallel has to be reduced by reconfiguring the irrigation schemes. Finally, leakage and evaporation in the water distribution systems has to be reduced drastically. Policy Modules for supporting this important political task could be:

Policy Modules Supporting this Task

Policy Module: ”Water Saving Architecture e.g. Rainwater Storage, Reuse of Treated Wastewater”
Water saving and water storage facilities are to be included in any new construction in the tourist, agriculture and energy sectors. Farmers have to install ponds and roof cisterns for the collection and use of rainwater. Tourist resorts have to include rainwater collection facilities into the architectural design, so that no additional water supply for garden irrigation will be necessary. These architectural conditions should be defined as prerequisite for any construction permission. The treated wastewater should also be stored and used for garden irrigation, etc.

Policy Module: “Flexible, Efficient and Environmentally Sound Irrigation System”
The ninety percent of the farming units in the region are using drip irrigation systems. In the drip irrigation, water efficiency of more than 90% could easily be achieved. Regarding this policy, there is not much to be done in the region. What is to be elaborated is a broad, continuous (available day and night), but flexible distribution system to fit to the requirements of the farmers.

Policy Module: “Installation of Metering System”
The installation of the metering system in all the sectors (now it only exists for private households) is a basic tool for the reduction of losses. The metering system makes inefficient use and water losses traceable. Particularly, the way of water charging can be reformed: Today, the fees for the irrigation water supply are based on the size of

the irrigated area, not on the real quantities consumed. Such a pricing system contains no incentives for water saving and therefore urgently has to be replaced. The installation of the metering system should be a state initiative that is implemented by the water supply authorities.

Policy Module: “Rehabilitation and Improvement of Water Distribution System”
The major tool for the reduction of the water losses is the rehabilitation and improvement of the water distribution system. There are three major elements of the distribution system, which are to be improved. First, the open channels are to be covered to avoid losses by evaporation and contamination by intrusion of organic substances or liquid fertilisers. Secondly, the existing pipes are to be controlled for leakage and improved if necessary. Pipes are to be sealed to entirely avoid trickling. Thirdly, water surplus due to stronger precipitation is to be collected and stored in reservoirs, so that elusion into the sea is eliminated. These efficiency measures should be designed and implemented by a state initiative. They are valid investments in both the tourist and agricultural future of Fethiye region.

Policy Module: “Direct State Subsidies”
The closing of groundwater supply is bringing additional expenses for the farmers. Those have to be compensated by the improvement of water use efficiency. These measures include own surface water storage devices and improvement of green house structures and technologies. For these improvements the order and magnitude of the investment required is often above the economic strength of the farming units. Thus, additional state subsidies would be required to support the farmers in such difficult transition periods.

Policy Module: “Training of Decision Makers and Staff”
Local administrations are to be informed about the need and the positive effects by a shift from groundwater supply to the better use of the strong surface water sources of the region.

Policy Target: “Promotion of Water Export”

Situation in the Region

The region Fethiye has a strong surface water supply which is caused by the high mountain range surrounding the region. This makes the Fethiye region a unique exemption in the arid regions of the Mediterranean Basin. When the designed measures for enhanced water efficiency are implemented, the region will have a surplus of high quality surface water. Thus, the interregional trade of this water surplus could be an excellent support of the economic profitability of the region and would be an additional incentive to enhance the domestic water use efficiency.

Technical Option

Water is a heavy and delicate element. Therefore, most means of transport are expensive and difficult. Already common is the transport by large vessels. Many Mediterranean Islands with water deficits are getting water supply this way. The ship transport however raises expenses up to 7 Euro per m^3 and requires a water disinfecting before use. Another feasible option for water transport is the construction of pipelines and conveyors. While the first ones are costly in erection and operation but a very efficient transport, the latter is cheaper however causes large water losses by evaporation and percolation.

Policy Modules Supporting this Policy Task

Policy Module: “Environmental Standards”
Before promoting the water export of the Fethiye water resources, a clear legislation, defining environmental standards has to be set up. The legislation has to make sure that the export is not causing additional stress on the groundwater resources and keeping sufficient water sources for the regions ecosystems like wetlands and coastal regions. Finally, sufficient water has to be reserved for the underprivileged parts of the domestic society.

Policy Module: “Enhanced Cross Sector Administration Coordination”
Crucial for the stimulation of the water export is a tight collaboration of the different sectors of administration. All the tangent administrative departments are to be involved, such as the water department of the municipalities with a high abundance of water, the environmental department and the economic department.

Policy Module: “Water Supply Liberalisation and Public Private Partnership”
The involvement of the private sector into water export is auspicious. Private companies from another Mediterranean region are likely to have water export specified knowledge and experience. The current practice to hand over of the export services to experienced companies should be continued. .

Policy Module: “Water Export Infrastructure
Water export needs basic distribution and transport facilities. An evaluation process has to be lanced to figure out the most promising option for Fethiye. Depending on the export destinations transport by pipes, covered conveyers or by vessels are to be considered. The creation of this export infrastructure could well be on the basis of Build-Operate-Transfer schemes.

Policy Module: “Co-operation with International Development Institutions”
The necessary investment in infrastructure requires large financial resources which the government can only mobilise in close co-operation with international financing institutions. For obtaining the support of these financial organisations the set-up of cost efficient export projects with the aim to improve the water supply and consumption efficiency in the entire region could be suggested.

Policy Module: “Creation of Favourable Conditions for Private Investment”
Private investment is particularly important in the case of water export stimulation as it is involving high costs, such as for the erection of the transport infrastructure or for the training of specific staff. Therefore the existing conditions for the private investment are to be promoted. It has to be guaranteed that economic yield of private investment could be expected.

Policy Module: “Public Dialogue”
As establishment of the water export is bringing considerable change for the domestic population. Information about the plans and the individual elements are to be provided to the public. Promising for the residents is the fact that yields of export are going to influence positively the prosperity of the region, on which they have a direct influence when reducing the vast losses of water. Direct communication with the public about the interdependence of water export, water losses and prosperity of the regions is therefore indispensable.

Policy Module: “Training of Decision Makers”
For a smooth introduction of water export into the economic activities of Fethiye, further training of decision makers and potential staff is crucial. On one hand local administration of the respecting department has to receive further education. On the

other hand staff for the new economic sector has to be provided. Further education for local work force ready to change their professional activity has to be provided either by public or private institutions.

Policy Module: “International and Interregional Water Trade Agreement”

Fethiye has to come to international or interregional trade agreements with their target export regions. The selection of these regions has to recognise a suitable transport option and should orientate on the buyers regions water supply needs. A general demand assessment has to be lanced before the regions are selected.