BACKGROUND NOTES ON FINANCING WATER RESOURCES MANAGEMENT

Policy frameworks for water financing

Identifying financing needs

Reducing the costs of achieving policy objectives

Increasing financial resources from users and beneficiaries

Improving the allocation of public resources

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POLICY FRAMEWORKS FOR WATER FINANCING

Introduction

In order to ensure the sustainability and financial long-term viability of integrated water resources management (IWRM), a clear policy framework for water financing is needed. This includes the definition of financing sources and of who shall pay, the definition of principles that guide financing (e.g. the *polluter pays principle*, the *user pays principle, cost-recovery* or *water pays for water* that guides water financing in France) and the specification of the different economic and financing instruments that ensures financial resources are collected and transferred to wherever needed.

Given the wide range of measures belonging to IWRM, an all-encompassing policy framework for financing can hardly be found. In most cases, only parts of the IWRM, in particular related to water supply and wastewater services, are covered. The implementation of the European Union Water Framework Directive, however, has stressed the importance of financing linked to sector policies (e.g. agriculture, energy or climate change) that directly support projects and actions that impact on the water system. Coherence between sector financing and the objectives and goals of IWRM becomes than central to a sound financing of the water sector.

General evidence

Financing frameworks for the integrated management of water resources, in particular when dealing with projects and actions not linked to traditional water services (drinking water, sewage collection and treatment) are rarely made explicit or presented in a comprehensive manner. Differences in the main principles advocated by specific countries are however translated into, *inter alia*, differences in the share of public subsidies or the share of infrastructure costs (investment, operation and maintenance) paid by end-users of specific services(see table below).

Shared financing of investments and operational costs in the water sector, in % (Dukhovny et al. 2009[1])

Country	Investment for water sector development		Operational costs	
	Government	Water users and municipalities	Government	Water users and municipalities
Spain	70	30	50	50
France	50	50	0	100
Canada	75	25	50-70	30-50
Japan	100	0	0	100
USA	70	30	50	50

In Europe, the polluter pays principle (PPP) is a basic principle of all European environmental policies. It is specifically referred to in the EU Water Framework Directive (WFD), which establishes clear requirements concerning financing for water management in the EU member states. In particular, the WFD specifies that Member States must ensure an adequate recovery of the costs of water services (taking into account the PPP), including environmental and resource costs. However, lower cost

[1] Dukhovny, V., Sokolov, V. & Manthrithilake, H. (eds.) (2009) "Integrated Water Resources Management: Putting good theory into real practice. Central Asian Experience", Tashkent, Uzbekistan

recovery rates can be justified on social, environmental and economic grounds, as well as due to geographic or climatic conditions. The different sectors (at least industry, households and agriculture) have to make an adequate contribution for covering the costs of the "water services". Although the WFD relates to the integrated management of water resources, there is no agreement on the definition of water services to which the cost-recovery principle applies (from a narrow definition of water services limited to drinking water and sewage to a wide definition of water services that include irrigation services, dams and impoundments for hydropower, flood protection infrastructure, etc.). In Germany, for example, only public water supply and wastewater removal is included in the definition.

Even if cost-recovery demand is limited to water supply and sanitation services, the need to consider environmental and resource costs in applying the cost-recovery principle ensures that wider issues relevant to the integrated management of water resources are addressed (e.g. water scarcity due to over-abstraction, water pollution through domestic sewage, etc.). For example, In Germany, environmental and resource costs are addressed in Germany by different economic and financial instruments, e.g. water abstraction charges, sewerage charges and compensation payments under nature protection law (Interwies 2009[2]).

Looking at selected illustrations

Illustration 1 – Financing water management in the US – using a variety of sources

Somehow similar to the EU regulation, full cost pricing of water supply and wastewater services is considered in the US as a cornerstone in the achievement of sustainable urban water management. In 2002, the US EPA developed a Clean Water and Drinking Water Infrastructure Gap Analysis which showed a significant need to replace drinking water distribution pipes and wastewater collection pipes in the 21st century. Full cost recognition and recovery through pricing together with increasing the efficiency of the sector have been identified as approaches to follow in order to respond to the investment needs (US EPA 2007[3]).

For water management areas other than water supply and wastewater services, the US EPA promotes different types of financing instruments applied in different states and local authorities. The traditional mechanism for generating revenue to raise funds for environmental protection programmes and initiatives are general taxes, selective sales taxes, and fees. A wide range of instruments within those three categories exists in the United States and can be used for financing water resource management. The instruments are applied differently in different states. Several examples will be given in the following in order to provide insight in the diversity of financing tools applied.

[2] Interwies, E. (2009) „Ökonomische Aspekte der Stillgewässer in der Wasserrahmenrichtlinie", Presentation, Radolfszell, Germany. http://www.globalnature.org/bausteine.net/file/showfile.aspx?downdaid=6891&sp=D&domid=1011&fd=2

[3] US EPA (U.S. Environmental Protection Agency) (2007) "Expert Workshop on Full Cost Pricing of Water and Wastewater Service. Final Summary Report", November 1-3,2006, Michigan State University. http://www.epa.gov/waterinfrastructure/pdfs/workshop_si_fullcostpricing.pdf

Examples of taxes used for financing different aspects of WRM in the USA (US EPA 2008[4]) include:

- Tobacco taxes: Tobacco taxes include cigarette taxes and taxes on other tobacco products. All 50 U.S. states and several U.S. territories have cigarette taxes. In 2006, the federal cigarette excise tax was USD 0.39 per pack. Some states earmark a portion of those revenues to environmental protection. The State of Washington, for example, dedicates a part of its cigarette tax revenues to water quality protection and to programs supporting projects for the recovery of salmon in rivers. Also the State of Idaho uses a portion of those revenues for water quality protection initiatives.

- Local Sales Taxes: Local sales taxes are often add-ons to state general sales and use taxes. They are usually limited to a specified time period, or a dollar collection total, and are dedicated to a specific use. The revenue stream may be used to back local general obligation or revenue bonds or to pay for a specific environmental protection program directly. The revenues from local taxes are sometimes used to capitalize local revolving funds for environmental protection purposes. They can support a multitude of environmental protection programs. Local sales tax revenues are often dedicated to initiatives such as open space acquisition, wetlands protection, or watershed protection.

Examples of fees and special charges used for financing different aspects of WRM in the USA (US EPA 2008) include:

- Hunting and Fishing License Fees: Many states in the United States charge fees for the initial awarding and the renewal of hunting and fishing licenses. The revenues from these fees are often used for environmental programs geared towards protecting fish and wild game habitat and for regulating hunting and fishing. Wisconsin is an example of a state that funds fish and wildlife conservation programs with revenues from hunting and fishing license fees. Seventy-three percent of the budget for Wisconsin's Fish and Wildlife Account comes from fees charged for hunting and fishing licenses and stamps.

- Aquifer Protection Area Fees: Aquifer Protection Area fees are charged for withdrawals of subterranean water and on-site sewage disposal within Aquifer Protection Areas. Aquifer Protection Areas are delineated around wells serving as public water supplies. For example, the State of Washington authorizes counties within its borders to establish Aquifer Protection Areas and to charge respective fees. The revenues raised are used to fund initiatives including the construction of wastewater treatment facilities and the preparation of a comprehensive plan to protect, preserve, and rehabilitate subterranean water.

- Fertilizer and Pesticide Fees: Fertilizer and pesticide fees include dealer license fees, assessment and inspection fees, and registration fees. States often use these fees to raise money for agriculture related environmental protection initiatives. Iowa and Montana are examples of U.S. states that have enacted fertilizer and/or pesticide fees. The State of Iowa charges pesticide fees authorized by the 1987 Groundwater Protection Act. A portion of the revenues raised with these pesticide fees is placed in the agriculture management account of Iowa's groundwater protection

[4] The following examples are extracted with slight changes from: US EPA (2008) "Guidebook of Financial Tools: Paying for Environmental Systems", Washington D.C., USA. http://www.epa.gov/efinpage/guidebook.htm

fund. Montana charges pesticide and fertilizer registration fees and uses the revenues it raises to fund groundwater quality monitoring work.

- Special Assessments: Special assessments are recurrent over-charges levied by local jurisdictions on subgroups of the population. Some localities levy them in the form of taxes; others levy them in the form of fees. The subgroup paying the recurrent charges receives benefits from an environmental service or improvement not enjoyed by others in the area. For example, if a community wants to finance wastewater treatment plant improvements that contribute to the cleanup of a lake, residents with waterfront property could be charged a special fee. Special fee are then used to fund water works systems, sanitary sewer systems, installation or repair of water and sewer service lines, flood protection projects, and other purposes. Minneapolis (Minnesota), Fargo (North Dakota) and Manhattan (Kansas) are examples of cities charging special fee.

Illustration 2 – Financing water management in Japan – high reliance on subsidies

Japan has suffered from severe water shortages, especially since the rapid economic and population growth that began in the 1960's[5]. The water resource management sector is characterised by a close partnership between national authorities (responsible for formulating and implementing water resources policy at the national level - water resources development, the administration of waterworks, and the protection of water quality), local governments (responsible for operating, maintaining and managing of waterworks, water treatment facilities, and water utilities), and local-level utilities. As the latter are in charge of implementing and managing the above-mentioned measures, implementation is placed close to the ultimate beneficiaries. This strengthens the links between those who provide and those who receive the service.

Financing water resource management in Japan is characterized by a high share of government subsidies at all levels. This reflects both the low ability and willingness-to-pay of the water users, as well as the recognized public goods nature of certain water-related services. The National Government finances both planning activities and most of the new constructions, either directly or indirectly. More than half of the costs associated to infrastructure construction (flood control, wastewater treatment, and agricultural water supply) are subsidized by the national government directly. For the remaining financing needs, the national government provides low interest rate loans to local governments, allowing them to pay for the construction of new facilities.

In Japan, the water-related budget in the year 2005 was 2,116,894 million yen (2.5% of the total national budget). It has been spent on flood control investments such as the construction of dams, waterworks, and related facilities (about 40%), sewage treatment systems (about 35%), agricultural water supply etc. While national government expenditures are commonly financed from general tax revenues and the issuing of general government bonds, local government investment and expenditure for these facilities is financed by the Fiscal Investment Loan Program (FILP) and the issuance of

[5] Information on the following illustration is based on: World Bank (2006) "Water Resources Management in Japan. Policy, Institutional and Legal Issues", World Bank Analytical and Advisory Assistance (AAA) Program, Washington D.C., USA

municipal bonds. The FLIP loans to local utilities are repaid from revenues of the operating facilities after their completion.

Subsidies are distinguished according to relevant national laws, cabinet orders and municipal by-laws which establish also the proportion that should be paid by national and local governments, respectively. Flood control, for example, is seen as a public good, which justifies its supply by the national government. Also subsidies for sewage water are justified on the same basis, as they encourage public hygiene, flood control and water conservation. The financial contribution to water supply for the agricultural sector is explained by its importance for the development of the economy and a stable supply of food in Japan.

Subsidies as a percentage of total expenses in Japan (World Bank 2006)

<table>
<tr><th rowspan="2">Objective of expenses</th><th rowspan="2">Financing institution</th><th rowspan="2">Financing resources</th><th colspan="5">Category of expenses (basic law on subsidies)</th></tr>
<tr><th>Flood Control (river law)</th><th>Sewerage water (Sewerage water law)</th><th>Domestic Water (Water supply law)</th><th>Industrial Water (Industrial Water Supply Business law)</th><th>Agricultural Water (Land Improvement Law)</th></tr>
<tr><td rowspan="5">Construction of new facilities or expansion of existing facilities</td><td>National Government</td><td>Tax and Government Bond Issuance</td><td>70%</td><td>50% or 55%</td><td>33% or 50%</td><td>40% or less[1]</td><td>67%</td></tr>
<tr><td rowspan="2">Local Government</td><td>Municipal Bond issuance[2]</td><td>30%</td><td>45% or 40,5%</td><td>---</td><td>---</td><td rowspan="3">33%</td></tr>
<tr><td rowspan="2">Fiscal Investment and Loan Program</td><td>---</td><td>---</td><td>---</td><td>---</td></tr>
<tr><td rowspan="2">Water Utilities (Beneficiaries)</td><td>---</td><td>---</td><td rowspan="2">67% or 50%</td><td rowspan="2">60% or more</td></tr>
<tr><td>Water Tariff Revenue</td><td>---</td><td>5% or 4,5%</td><td>---</td></tr>
<tr><td rowspan="3">Operation, Maintenance and Management cost</td><td>National Government</td><td>Tax and Government Bond Issuance</td><td>55%</td><td>---</td><td>---</td><td>---</td><td>55% or less</td></tr>
<tr><td>Local Government</td><td>Local Tax and Local Allocation Tax[3]</td><td>45%</td><td>---</td><td>---</td><td>---</td><td>22.5% or more</td></tr>
<tr><td>Water Utilities (Beneficiaries)</td><td>Water Tariff Revenue</td><td>---</td><td>100%</td><td>100%</td><td>100%</td><td>22.5% or more</td></tr>
</table>

[1] No specific number is stipulated by the Industrial Water Supply Business Law. The law establishes a general basis of subsidies by the national government. The number is given by the cabinet order for the Japan Water Agency Law.

[2] In principle, local governments should pay out of revenues other than local bonds (or local government debts). However, they are allowed to use local bonds as financial resources for fiscal expenditure in cases where it is desirable for potential residents to share the cost for construction or other projects or where a large amount of expenditure is required immediately in a time of disaster.

[3] In principle, local governments should pay out their own financial resources from their own revenues such as local taxes. However, in fact, some local governments in rural area do not have enough tax revenue, while local governments in urban area such Tokyo have excessive tax revenues. Therefore, national governments established the system for adjusting such distortion called the Local Allocation Tax System. The national government collects and redistributes a certain portion of local tax revenue, thereby securing general finances, which are available for any kind of expenditure, for local governments with limited tax revenues.

As a consequence of this high level of subsidies, almost all water users pay a water price which makes water services cheaper than they really are. This has a negative effect on the efficiency of the water use and on the incentiveness of existing water tariffs.

Illustration 3 – Water Resources Policy in Brazil

In Brazil, the Law on Water Resources Policy (from 1997) resulted from several years of discussions and policy process involving the principal water using sectors in the country[6]. The law introduced a new National Water Resources Policy with the following main features: the adoption of the watershed as the planning unit for water use; the introduction of the multi-use concept (all users will have equal access to water); the recognition of water as a limited, finite and vulnerable good; the recognition of the economic value of water which is therefore entitled to be charged for (following the *user pays principle* and the *polluter pays principle*); and finally decentralized and participatory management, in which individual users, civil society and other social organizations will be able to influence the decision making process.

The Law on Water Resources Policy introduced also the development of Water Resources Plans as a new instrument. The Water Resources Plans are long-term plans with a planning horizon compatible with the implementation period of programs and projects for the analysis of the current situation of water resources, the balance between future demand and availability, and guidelines and criteria for charging fees for the use of water resources.

Other instruments of this new policy were the classification of water bodies into classes according to the predominant uses of water, awarding use rights for water resources, charging fees for the use of water resources, compensation payments to municipal districts, and the introduction of a Water Resources Information System. The system for awarding water resources use rights is intended to ensure quantitative and qualitative control over water uses. Charging fees for the use of water resources is intended to recognise the economic nature of water asset and to indicate its real value. Revenues from charges are invested in priority in river basins where they have been generated. They are mobilised to finance studies, programs, projects and works included in the Water Resources Plans. They are furthermore contributing to administrative expenditures of agencies and entities in the National Water Resources Management System. The latter contribution is limited to seven point five percent of the total amount brought in by water charges.

In 2000, the Brazilian Water Agency (ANA) has been created for implementing the National Water Resources Policy. It has administrative and financial autonomy and it is attached to the Ministry of Environment. ANA is responsible for, amongst others, collecting, distributing, and investing revenues generated by the water user charges. It proposes furthermore to the National Water Resources Council the establishment of incentives, including financial ones, for the conservation of the quality and quantity of water resources.

Other relevant actors in the National Water Resources Management System include the River Basin Committees – which establish the fee-charging mechanisms for the use of water resources and suggest the amounts to be charged, and the Water Agencies – which are charging the water use fees. The Water Agencies are furthermore analyzing and issuing expert opinions on projects and works to be financed by the generated resources. They forward their ideas to the financial institution

[6] This illustration is based on the two following laws: National Water Agency (Brazil). Law n° 9.433 dated January 8, 1997. Published in the Federal Government Gazette (Diário Oficial da União) on January 9, 1997. And: National Water Agency (Brazil). Law n° 9.984, of July, 2000.

responsible for the management of the resources, and monitor the financial management of the funds brought in within their area of operation.

Key messages and emerging issues

- The cost-recovery and user-pays principles are well established in several countries for services linked to water supply and sewage collection and treatment. However, in other areas of IWRM, they are so far less often applied. The possibilities of increasing its use should be further evaluated.

- Policy frameworks for financing all components of WRM are hard to find, given the wide range of activities included. It is worth considering putting more efforts in this direction.

- Because of the inter-sectoral nature of IWRM, financing IWRM will rely on financial sources from both the water sector and other economic sectors (in particular for promoting good practices in these sectors and limit their pressures on aquatic ecosystems). The mechanisms and processes developed for ensuring coherence between water and sector policies, and thus financing IWRM, should be further investigated and analysed.

IDENTIFYING FINANCING NEEDS

Introduction

Identifying financing needs in the different areas of integrated water resource management (IWRM) is a pre-requisite to searching for financing sources and resources. However, this is not an easy task, as a result of the complex character of IWRM, of the diversity of sectors and water users concerned and of the importance of "soft" financing needs in particular for management activities (e.g. planning, monitoring, evaluation, research, etc.). Indeed, not all the actions needed for a sustainable water management can be easily identified and their costs assessed in any given country. Indeed, different institutions are usually involved in IWRM and relevant budgets or cost calculations are dispersed and rarely based on common formats. Finally, for an overall assessment of the financing needs for IWRM both public and private expenditures need to be taken into account, whereas the latter is usually less easily accessible[7].

General evidence

Due to its ideally integrative nature, water resource management includes very different issues which all have to be considered when analysing overall financing needs. In a first step, those different issues should be identified – including for example flood management, water governance, water-related ecosystem management, research, etc. Information on costs or expenditures, respectively, can then be brought together from different sources. The budgets of institutions involved can give a first insight in current expenditures. However, costs of water management are rarely singled out completely, but overlapping categories for several are environmental issues are frequently used. This applies in particular for the "soft" parts of IWRM – e.g. governance, public participation, monitoring – if they are considered at all (see the box below for a small example of financing coordination in the water sector – in this case concerning water monitoring programmes).

[7] For example, promoting best practices in the agriculture and industry sector that limit pressures on water resources can have direct and indirect costs for individual economic actors. Assessing these costs can prove difficult in particular when new processes and innovative practices for which limited cost information is available need to be considered.

Financing of the Virginia Water Monitoring Council (VWMC)

Initiated in 1999, the VWMC has the mission to promote and facilitate coordination, collaboration, and communication among water monitoring programs throughout the Commonwealth of Virginia. The VWMC has about 250 members from over 150 organizations (e.g. government agencies, citizen groups, industry etc.). One aim of the VWMC is to encourage the effective and efficient use of monitoring resources (e.g. labour, finances) and to facilitate the transfer of water monitoring information. In the financial year 2003-2004, the VWMC had administrative expenses of about 15 890 USD. Most of the funding has been provided by the Virginia Water Resources Research Center (see table below), which provides also administrative support to the VWMC.

Financing source	Amount
Virginia Water Resources Research Center	USD 10,840
U.S. Geological Survey	USD 2,500
Virginia Department of Forestry	USD 2,000
VWMC Conference	USD 330
VWMC Individual Member Contributions	USD 120
Total	**USD 15,890**

Sources: VWMC (Virginia Water Monitoring Council) (2009) "The Virginia Water Monitoring Council", http://acwi.gov/monitoring/ppt/salt_lake_0309/younos_nwqmc-vwmc-031009.pdf; VWMC (2004) "Major Accomplishments of 2003-2004", http://www.vwrrc.vt.edu/vwmc/AnnualReports/2004%20Annual%20Report. pdf

Apart from these difficulties, it has to be kept in mind that looking at expenditures alone only gives a rough estimation of the actual costs, as they are – in particular in the public sector – reflecting the availability of financial resources rather then the actual costs and financing needs. Furthermore, cost-effectiveness approaches are not always apply, leading to potential cost over-estimates. In the following, a few examples provide information on current or planned expenditures for IWRM, including expenses for water related research at European level, the costs of the European Water Framework Directive related programme of measures in three selected cases and the budget of the American Environment Protection Agency.

Looking at selected illustrations

Illustration 1 – Financing the programme of measures in Germany

In Europe, the programmes of measures (PoMs) and river basin management plans (RBMPs) requested by the European Water Framework Directive (WFD) can provide good insights in both the costs of sustainable IWRM (with the aim of reaching the good status of water bodies) and financing sources. In Germany, the RBMPs have been established at the level of the Länder. The task of the competent authorities was to estimate how much the different measures would cost, and to identify existing financing options. Furthermore, authorities had to assess whether costs are proportionate and whether they can be financed by the end of the first RBMP (i.e. 2015). The following table indicates the yearly financial requirements for the whole implementation period of the WFD, from 2010 to 2027, for the German land Hesse[8]. The average financial needs amount to 130.5 million € per year.

[8] Information on the PoM in Hesse is stemming from: Gräfe, A. (2009) „Finanzbedarf und Finanzierung", Hessisches Ministerium für Umwelt, Energie, Landwirtschaft und Verbraucherschutz, Power point presentation,

Yearly financing needs for the implementation of the measures for reaching good status of water bodies in Hesse for the period 2010-2027 (in million €) (Gräfe 2009)

Position	Designation	2010 – 2015	2016 – 2027	Average financing needs per year
1	**Groundwater**	**24.0**	**19.5**	**21.0**
1.1	in water protection areas	1.2	4.3	3.3
1.2	outside water protection areas	22.8	15.2	17.7
2	**Surface water bodies - Hydromorphology**	**65.3**	**35.1**	**45.2**
2.1	Water bodies outside of federal waterways	59.6	30.7	40.4
2.2	Measures on federal waterways	5.7	4.4	4.8
3	**Surface water bodies - Substances**	**122.0**	**35.1**	**45.2**
3.1	Point sources	19.3	-	6.4
3.2	Diffuse sources (erosion of phosphorous)	16.0	35.5	29.0
3.3	Salty effluents	86.7	-	28.9
	Total costs	**211.3**	**90.1**	**130.5**

Measures have to be financed by those responsible for their implementation (following the principle of cost recovery of water services by water users). In certain cases – if foreseen by law or if incentives for a rapid, voluntary implementation of measures seem appropriate – the federal state will provide additional financial aid. Furthermore, the following financing sources or instruments have been identified:

- European and German national funds: ERDF (European Regional Development Fund), EAFRD (European Agricultural Fund for Rural Development), German Joint Task for the Improvement of Agrarian Structures and Coast Protection
- Cross compliance under the Common Agricultural Policy
- Municipal financial equalisation
- Compensation measures under German law / trading with ecological points
- Effluent charges
- Fishing charges
- General budget funds

A second example can be provided for the German land Baden-Württemberg[9], which differentiated the financing needs of the PoM according to point sources, agriculture related measures and hydro-morphology. As can be seen in the table below, different financing sources exist for the different types of pressures. Total investment costs have been estimated at 780 million €, whereas ongoing costs amount to 1,697 million €/year.

http://www2.hmuelv.hessen.de/imperia/md/content/internet/wrrl/4_oeffentlichkeitsbeteiligung/offenlegung2008_bwpl_mp/informationsveranstaltungen/finanzbedarf_neu090324.pdf

[9] Information on the PoM in Hesse is stemming from: Bley, J. (2009) "Maßnahmenprogramm Wasserrahmenrichtlinie – Vorgehensweise in Baden-Württemberg", Umweltministerium Baden-Württemberg, Power Point Presentation, http://www.netzwerk-laendlicher-raum.de/fileadmin/sites/ELER/Dateien/05_Service/Veranstaltungen/2009/WRRL/Bley_TagungLandwirtschaftundWRRL_03_2009.pdf

Cost and financing information for the programme of measures in Baden-Württemberg (Bley 2009, adapted)

Type of pressure	Point sources	Agriculture	Hydromorphology (structure, continuity, minimal flow)
Cost information	- Municipal point sources: Yearly costs for sewage disposal: 1.6 billion € Total investment costs: 400 million € (200 million € for wastewater treatment plants, 200 million € for treatment of rainwater) - Industrial point sources: little need for action, individual cases	97 million €/year – composed of: - Compensation for market relief and cultural landscape (MEKA) – 75 million €/year - Regulation on protected areas and compensation (SchALVO) – 22 million €/year	Total investment costs: 380 billion €, composed of: - 320 million € (Land (35%) – 111 million €; Municipalities (27%) – 85 million €; Private (operator of hydropower plants) (38%) – 122 million €) - 60 million € for federal water ways
Potential financing sources	Sewage charges, support through the subsidy guidelines for water management, Municipal Environmental Fund → 40 million/year	Existing programmes are used for financing agricultural measures, complemented by specific advice: MEKA and SchALVO → 97 million €/year	- Structure: EAFRD, EFF (European Fisheries Fund), Municipal Environmental Fund, lottery funds, Ecological accounts → 8 million €/year - Continuity of hydropower plants: Application of the Renewable Energy Law - Federal water ways → 10 million € The rest will depend on negotiations between national ministries and the Land.

Illustration 2 – Financing water research at European level

As mentioned before, collating information on the financing of the "soft" water management issues is a difficult task. Water related research is often performed by different institutions and frequently included in broader programmes of research focused on the environment. It is therefore difficult to single out water-research in existing research budgets. At the European level, the ERAWATCH[10] project tried to shed light on financing water research based on the analysis of water research policies in Europe, including their financing needs[11]. The analysis showed that the water research landscape in Europe involves large amounts of money, which is mainly invested by the European Commission. The 6th Framework Programme for example (clearly not limited to water research!) has a budget of 17.5 billion € for a 6 year period. But also private organisations – from large multi-national companies to individual businesses – are contributing financially to public projects, hoping to obtain commercial advantages (better products, more competitiveness, etc.).

[10] http://cordis.europa.eu/erawatch/index.cfm

[11] The following information on research funding at European level is taken from: Lack, T. (2004) "Analysis on Water Research Policies in Europe. Overview of the Water Research Landscape in EU 25", ESTO Study No. 3, Erawatch, unpublished

Water related research at European level is principally driven by policy issues, as for example the Water Framework Directive or the European Marine Strategy Framework Directive. Selected European research programmes and initiatives are presented in the table below, including information on their budget.

Budget information for selected European water-related research programmes and initiatives (Lack 2004, adapted)

Type of programme or initiative	Financing information
6th Framework Programme a) Sustainable development, global change and ecosystems b) Research for policy support	a) Indicative budget of 2 120 million €, of which 700 million € for global change and ecosystems b) Indicative budget of 555 million €
GMES (Global Monitoring for Environment and Security) a) Funding of operational services implementation b) Implementation of operational space systems c) Implementation of operational in-situ systems d) Data Integration and information management	a) 183 million € (2004-2006) b) Total budget: 415 million € (2004-2006); 1575 million € (2007-2013) c) 10 million €/year (2004-2006); 50 million €/year (from 2007) d) 5 million € (2004-2006); 200 million €/year (from 2007)
EUWI – Water for Life – EU's Water Initiative - Examples of RTD projects: a) CLIMED - Effects of climate change variability in water availability and water management practices in Western Mediterranean b) WERRD - Water and ecosystem resources in regional development : balancing societal needs and wants and natural resources systems sustainability in international river basins systems c) WADI - Water supply watershed planning and management: an integrated approach	Contribution of the European Commission: a) 578 500 € b) 800 000 € c) 1 000 000 €
Joint Research Centre (JRC) a) JRC Integrated Scientific Area "Water quality and aquatic ecosystems b) JRC Integrated Scientific Area "Monitoring and assessing ecosystem sustainability"	a) total budget of 35 million € b) total budget of 26 million €
COST – European cooperation in science and technology: 200 actions involving nearly 30,000 scientists from more than 40 different countries. Four actions are running in the field of water.	The volume of national funding is estimated at more than 2.0 billion € per year and an average of € 80 000 per action.
EUROHARP – Towards harmonised procedures for quantification of catchment scale nutrient losses from European catchments	Contribution of the European Commission: 4 million €
HarmoniRiB - Harmonised Techniques and Representative River Basin Data for Assessment and Use of Uncertainty Information in Integrated Water Management	Contribution of the European Commission: 2,560,000 €
CLIME – Climate and Lake Impacts in Europe	Contribution of the European Commission: 3,450,000 €
HarmoniCA - Harmonised Modelling Tools for Integrated Basin Management	Contribution of the European Commission: 3,800,000 €
ASTHyDA - Analysis, Synthesis and Transfer of Knowledge and Tools on Hydrological Drought Assessment through a European Network	Contribution of the European Commission: 320,000 €

Whereas the listing above shows the large financing resources allocated to water related research at European level, the following table indicates the expenses for research and development projects for one Member State namely Hungary[12].

Financial resources of public sector research for the period 1997-2005 (from Ijjas et al. 2004, adapted)

Year	All environment and nature protection (in €)	- from this water management (in €)	- from this wastewater technology (in €)
1997	3 078 000	937 000	29 000
1998	3 464 000	837 000	71 000
1999	7 588 000	886 000	328 000
2000	10 819 000	3 018 000	603 000
2001	13 756 000	2 053 000	298 000
2002	38 980 000	5 636 000	688 000
2003	18 232 000	4 101 000	19 000
2004	1 379 000	336 000	19 000
2005	795 000	305 000	19 000
Total	**98 091 000**	**18 109 000**	**2 074 000**

For water management research, about 18 million € have been spent in Hungary for 810 projects from 1997 to 2005. Regarding wastewater technology, about 2 million € have financed 55 individual projects. To cover these costs, several financing channels exist in Hungary for research and development projects:

- National Scientific Research Fund (OTKA): Finances basic and groundwork research projects
- Government agencies: Finance projects from the state budget which have been identified by the competent ministry
- Water Fund: Can finance research-development projects
- Water agencies: Place contracts for minor applied research projects
- Industries, farming operations and service companies operating under market conditions: Potential clients of the research institutions in the water sector
- International aid programs (e.g. PHARE): Can support research activities

However, the capacity of the resources available for financing is rather small and keeps declining in terms of actual value.

Illustration 3 – Financing "Clean and Safe Water" in the US and ensuring compliance – The EPA budget for the financial year 2010

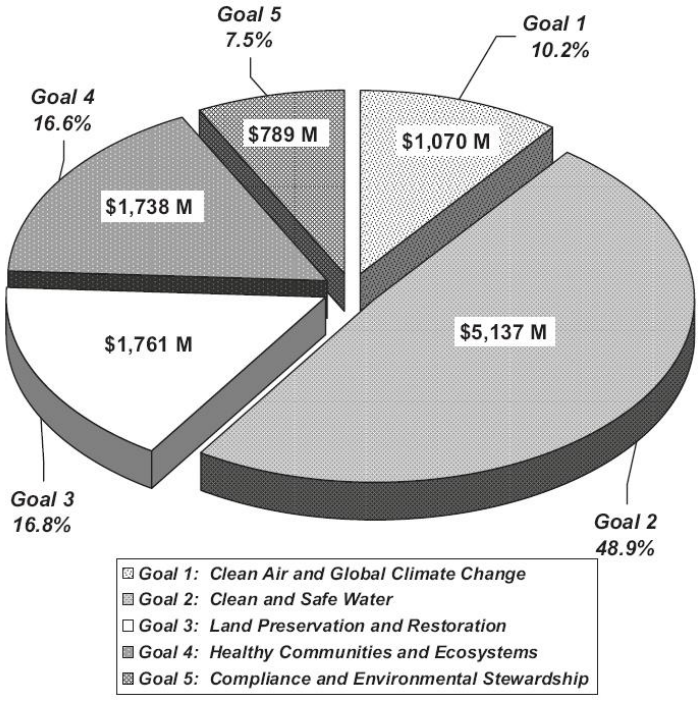
For the financial year (FY) 2010, the U.S. Environmental Protection Agency (EPA) requested USD 3.9 billion for "Clean Water and Drinking Water State Revolving Funds" (SRFs) for funding water

[12] The information provided is stemming from: Ijjas, I., Ijjas, Z. & Strosser, P. (2004) "Analysis on Water Research Policies in Europe. Hungary National Report", ESTO Study No. 3, Erawatch, unpublished

infrastructure projects[13]. This represents about 40% of the total budget request of USD 10.5 billion[14] experiencing a 157% increase as compared to the previous year. The Clean Water and Drinking Water SRFs provide grants to states to capitalize their own revolving funds. The SRFs generate funding for loans even without Federal capitalization, as repayments and interest are recycled back into the program. "EPA estimates that for every Federal dollar invested, approximately two dollars in financing is provided to municipalities" (EPA 2009).

Also the restoration of the Great Lakes basin, which holds 20 % of the world's fresh surface water, forms part of the EPA budget. For 2010, USD 475 million are foreseen for programs and projects that target the most important problems in the region, e.g. aquatic invasive species or nonpoint source pollution. Another USD 35.1 million are planned for the Chesapeake Bay program, which shall help to reduce pollution, to restore aquatic habitat restoration and to ensure that water quality objectives are achieved as soon as possible.

For the financial year 2010, a total of USD 76 million are foreseen by the EPA for research on ecosystem services – including water related services – to human and ecological wellbeing. The focus of the activities will lie amongst others on measuring, monitoring and mapping ecosystem services at multiple scales over time. For ensuring compliance and enforcement of environmental law, EPA budgets about USD 600 million. The table below shows the share of the budget foreseen for the different goals of EPA, including Goal 2 "Clean and Safe Water", with nearly 50% of the budget and Goal 5 "Compliance and Environmental Stewardship", having a 7.5% share.



Share of the different EPA Goals in the budget for 2010 (EPA 2009)

[13] The following information is based on: EPA (2009) "EPA Budget in Brief. FY 2010", USA – If not noted otherwise.

[14] The following information is provided from the proposed budget. From the USD 10.5 billion requested USD 10.3 million have been finally enacted (EPA (2009) "EPA budget in brief. FY 2011").

For Goal 2, the following table gives the distribution of the requested budget for the financial year 2010 among the different main categories.

Requested budget for the financial year 2010 for the goal "Clean and Safe Water" (EPA 2009)

Category	FY 2010 – requested budget
1 – Protect Human Health	USD 1,827,503,000
2 – Protect Water Quality	USD 3,168,934,000
3 – Enhance Science and Research	USD 140,865,000
Total Goal 2	**USD 5,137,302,000**[15]

Illustration 4 – Costs of agricultural measures in the Programme of Measures in Latvia

The programme of measures of the Latvian river basin management plans includes a set of measures linked to the agricultural sector[16]. Activities foreseen consist among others of manure storage practices, the development of fertilisation plans, the establishment of buffer strips around surface water bodies and the building of individual wastewater treatment plants and water re-use in large dairy farms. In total, the costs of the agricultural measures have been estimated at 11 million € investment costs and 8 million € for annual running costs. For the period 2012-2015 around 40 million € of financing sources are needed.

Next to private financing, in particular financing from the public funding for environment protection and public financial support to agriculture have been identified for financing water related agricultural measures in Lithuania. The latter includes agro-environmental funding sources (the 2nd pillar of the agricultural financial support system under the Common Agriculture Policy) and the possible re-allocations from other programs (e.g. support for the development of the agricultural sector). In total, public financial support to agriculture (also non-water related) amounts to an average of 340 million € per year, with 52 million € funding under the 2nd pillar. Part of the measures will also be covered by the cross-compliance requirements of the common agricultural policy.

For most of the measures, mixed financing is foreseen. For the establishment of manure storage facilities for example, investment costs will be covered by public and private sources, whereas running costs have to be covered by private sources alone. For fertilisation plans, large farms have to finance themselves privately whereas small farms will also receive public funding. Financial incentives might be provided for implementing the measures, - in the form of loans with lower interest rates and tax reliefs for the agricultural sector.

Key messages and emerging issues

- Information on financing needs for water resource management is rather dispersed and not always easily available. In particular, limited information is available on the "soft" IWRM issues.

[15] USD 4,896,505,000 have finally been enacted for the financial year 2010 (EPA 2010).
[16] The following information stems from: Pakalniete, K. (2009) "Financing measures for the agriculture sector in Latvia", Presentation held at the information and training session to the Lithuanian EPA on "Implementing the economic obligations of the EU WFD), June 29, 2009, Vilnius, Lithuania

- The costs and financing sources of the WFD programmes of measures, which should provide recent and comprehensive information on financing needs, are not yet overall publicly available as they are not always included in the river basin management plans. It might still be too early, and political processes not yet consolidated. It is unclear whether coherent cost estimates will be provided for all RBMPs. A quick review of draft RBMPs stresses that the costs of water management, monitoring and research are not systematically calculated and presented: indeed, some RBMPs focus only on the investment costs of infrastructure projects.

- Efforts should be undertaken to establish more “transparency” in the current expenditures in water resources management.

- Assessing financing needs requires looking at all costs and at both public and private financing. The costs imposed on the private sector, and financing that might be required for supporting some of these costs, is rarely analysed.

REDUCING THE COSTS OF ACHIEVING POLICY OBJECTIVES

Introduction

The challenges linked to water resource management require large investments. It is therefore essential to explore various means for reducing costs while reaching the objectives set. Several approaches are mobilised to help reducing costs, such as: the weighting of alternatives and the target of the intervention in the water cycle (point-of-source *versus* point-of-use measures); the consideration of soft measures (training, awareness raising, economic instruments) instead of purely engineering based/infrastructure-driven measures; or the application of cost-effectiveness analysis (CEA) for identifying the cheapest way of achieving given objectives.

General evidence

In Europe, all European Member States have recently faced the difficult choice of selecting measures for achieving the environmental objectives of the European Water Framework Directive. Although carrying out a cost-effectiveness analysis (CEA) as indicated in the WFD might be the best way to approach the weighting of alternatives and support the selection of measures, CEA was rarely applied in practice. For selecting measures included in the Programme of Measures (PoM) of the River Basin Management Plans (RBMPs), member states were rather falling back on expert judgement or (local and/or national) working groups helping the selection of the right set of measures. In a few cases, cost-effectiveness ratios for comparing potential measures were estimated, e.g. in Belgium, Germany, Spain, the Netherlands and the UK (Grandmougin et al. 2009[17]) although how these ratio were used for selecting measures was not always clear.

The scope to reduce costs via the application of CEA is, however, limited through existing legislation. Indeed, there are measures and projects that are compulsory and specified by law (e.g. the construction of wastewater treatment plants for municipalities of above 10 000 inhabitants). And even if these projects entail very high costs, they need to be implemented. Furthermore, CEA is most relevant when comparing potential measures from different sectors. Thus, in countries where policy decisions are taken for individual sectors separately, there will be more limited scope for CEA. Institutional conditions, and cultural background, might also influence the actual choices between alternative projects and reduce the potential for CEA. If organisations in charge of selecting measures and implementing policies have a strong engineering culture, they might give less attention to “soft” measures (e.g. awareness raising or the use of ecosystem functions and services) as opposed to traditional infrastructure development.

Whatever the approach to reducing costs is, uncertainty in both costs and effectiveness has to be taken into account. There should therefore be the possibility to check the chosen approach for its actual appropriateness and to revise it after a certain time. Financing research activities can also help

[17] Grandmougin, B., Mattheiß, V., Kervarec, F., Strosser, P., Dworak, T., Fleischmann, N. & Thaler, T. (2009) „International comparison of the implementation of the WFD in EU Member states“, ACTeon & Ecologic, Report prepared for the Dutch Ministry of Transport, Public Works and Water Management, *unpublished*

reducing uncertainty on the expected effects of measures and therefore help reducing costs in the long term.

Looking at selected illustrations

Illustration 1 – Cost-effectiveness analysis in Malta

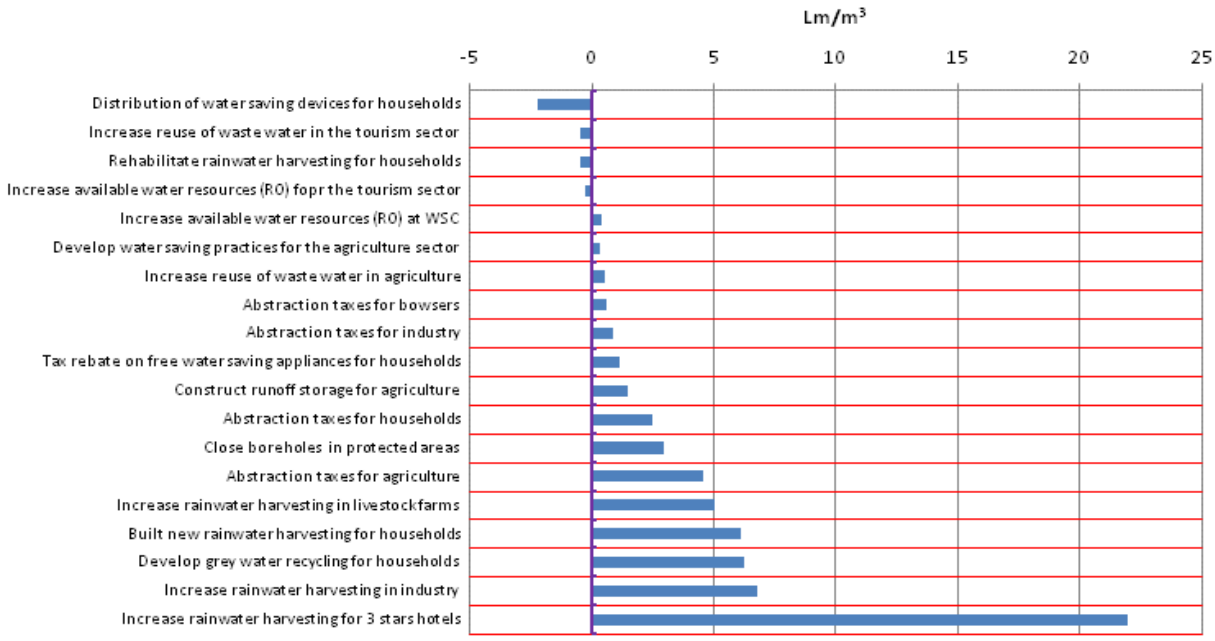
In the framework of a Twinning light project between the Malta Resource Authority (MRA) and the French Ministry of Ecology and Sustainable Development (MEDAD) the attempt was made to develop a cost-effective draft programme of measures for restoring groundwater resources in Malta[18]. The project followed several steps: After an analysis of pressures on groundwater resources, potential measures have been identified. Already existing or planned actions have been taken into account, and also preliminary measures proposed or implemented in other member states helped to refine the list of potential measures. The identified activities included both technical, regulatory, research and awareness raising approaches.

The selected measures have been put together in a database, and information on their costs, their expected efficiency, etc. has been collated. The types of costs taken into account include (i) investment costs, (ii) operation and maintenance costs, (iii) administrative costs, (iv) other relevant and indirect costs and (v) cost-recovery mechanisms currently in place for each potential measure. A discount rate has been applied for estimating annualised costs for each individual measure.

Based on this, a CEA has been carried out for three different scenarios and cost-effectiveness ratios have been calculated (see figure below). Measures were subsequently ranked according to their ratio. This approach was, however, limited to measures aimed at restoring the quantitative status of groundwater in Malta and did exclude measures already compulsory by law as well as measures which are seen as a pre-condition to effective water management (e.g. an effective regulatory framework or an enhanced knowledge base). During the whole analysis, interactions with experts and stakeholders took place. The CEA included also a sensitivity analysis in order to take the uncertainty of the different factors and the parameters mobilised for the analysis into account (OIEAU 2007[19]).

[18] The information on this illustration is mainly based on the following document: MRA (Malta Resources Authority) & MEDAD (French Ministry of Ecology and Sustainable Development) (2007) "Towards a draft programme of measures for restoring groundwater resources in Malta", Final report, Twinning light project: MT2004/IN/EN/07TL, *unpublished.* If other sources are used, they are indicated.

[19] OIEau (2007) "Malte: Développement du programme de mesures pour les eaux souterraines maltaises au titre de la directive cadre européenne sur l'eau", http://www.oieau.fr/IMG/article_PDF/article_1176.pdf



Ranking of potential measures for restoring groundwater quantitative balance based on cost-effectiveness ratio (negative value means net monetary gain from implementing measure) (Lm = Maltese Lira) (MRA & MEDAD 2007)

The CEA looked at all measures linked to the quantitative status of groundwater, independent from the sectors they apply to and selected amongst others the distribution of free water saving devices to households, the rehabilitation of existing rainwater harvesting systems in the domestic sector, the implementation of individual wastewater treatment and recycling for hotels, or the increased reliance on reverse osmosis in the public water supply. A cost-effective combination of measures was then compared to alternative scenarios giving more reliance on desalination. In addition to costs, these scenarios were compared in terms of distributional effects and additional environmental impacts (in particular linked to energy consumption and green house gas emissions).

Illustration 2 – Point-of-source versus Point-of-use measures – Voluntary agreements in Germany

Another approach to reduce costs in the water resource management sector – in particular concerning water quality issues – is the shift from point of use measures to point of source measures. Changing agricultural practices to reduce pollution with fertilizers and pesticides instead of treating water before use can be shown as one example, which illustrates at the same time the beneficial interaction between water-related and agricultural policy. One way to induce changes in agricultural practices is the establishment of voluntary agreements between farmers and water companies, whereby the latter are providing advice and financially support farmers for agreed production methods that reduce pressures on water resources[20].

[20] This illustration is mainly based on Heinz, I. (2008) "Co-operative agreements and the EU Water Framework Directive in conjunction with the Common Agricultural Policy", Hydrol. Earth Syst. Sci., 12, p. 715-726. Other sources are indicated if used.

In the context of voluntary cooperative agreements (CAs), both parties are interested in minimising the costs and environmental pressures. Whereas farmers benefit from the modernization of farming methods, the interest of the water companies to support the agricultural sector in the conversion to more sustainable farming practices (e.g. intercropping, reduction of fertilisers and pesticides, conversion to permanent grassland, etc.) lies in the prevention of costly remedial measures (such as water treatment, closing wells and conveyance or remote water resources). It can be assumed, that CAs implement the most cost-effective changes in farming practice, as they are tailored to the site-specific conditions and environmental problems in the catchment. As all relevant farmers located in the catchment area are involved, the contracts can contribute to integrated water resources management. In some EU Member States, such agreements are already in place for more than 20 years. A recent European study revealed that the greatest number of such CAs can be found in Germany (being 435; compared to only 1 in the UK and 70 in France[21]). The agreements involve more than 30 000 farmers and cover an area of 0.8 Mio ha (see also Heinz et al. 2002[22]).

Voluntary agreements can be made even more effective through financial assistance from the revenues of water abstraction charges. By that, small water companies can afford to finance voluntarily-agreed commitments, such as compensation payments to farmers, paying agricultural advisers and monitoring services. Such a funding system can be found, for example, in the German Bundesland Lower Saxony. In another Bundesland, North Rhine-Westphalia, such abstraction charges have been recently established: those water companies who have established voluntary agreements with farmers can compensate their expenditure with charge exemptions.

The table below shows two examples of cooperative agreements in Germany, illustrating the range of benefits that can be achieved (from 0.10 to 0.18 Euro/m^3).

Two examples of cooperative agreements in Germany (Heinz 2008, adapted)

Name of the cooperative agreement	10^6 m^3/year	Euro/year	Euro/m^3
CA "Viersen"			
Groundwater abstraction	5.5		
CA expenditure of the water company		395 000	0.07
Saved costs in water treatment		648 000 to 972 000	0.12-0.18
Economic net benefit		More than 253 000	
CA "Stevertalsperre"			
Water abstraction	100		
CA expenditure of the water company		480 000	0.005
Saved costs in water treatment		1 000 000 to 1 500 000	0.10 to 0.15
Economic net benefit		More than 520 000	

However, the establishment of voluntary agreements requires institutional, but also cultural preconditions. In the UK, for example, CAs are not widespread as water companies do not have the right to pass on costs, such as compensation payments, to consumers through water charges (although their water charges would decrease, once the changes in practice showing effect).

[21] Similar voluntary agreements can of course also be found outside Europe. See e.g. the example of New York City paying for ecosystem services in its supplying watershed (e.g. Salzman, J. (2005). "Creating Markets for Ecosystem Services: Notes From the Field", 80 NYU LAW REVIEW 870 (14/06/2005). http://www1.law.nyu.edu/journals/lawreview/issues/vol80/no3/NYU302.pdf).
[22] Heinz, I., Andrews, K., Brouwer, F. & Zabel, T. (2002) „Voluntary arrangements to cope with diffuse pollution from agriculture and their role in European water policy", in: *Water Science and Technology*, Vol 46, No 6-7, p. 27-34

Furthermore, UK regulators rely more on mandatory rules to meet the polluter pays principle and have strong reservations against paying polluters not to pollute (Richardson 1998, cited in: Heinz 2008).

Relying on changing agricultural practices instead of treatment processes has different uncertainty. Treating water has the advantage that the compliance with standards (e.g. pesticide concentration in drinking water) can be achieved with a high degree of certainty. The preventative approach by employing CAs might be less certain due to unexpected events in the water catchment area. Furthermore, lag times might exist between the time the measures are taken and the time improvements in the aquatic environment are recorded, a problem for areas where immediate action is required to meet statutory drinking water quality or where the limited availability of water resources does not allow for temporary measures (such as closing wells or water blending).

Illustration 3 – Wetlands providing cost-effective wastewater treatment functions – Examples from the United States

Instead of employing advanced technical installations for water management, as for example sophisticated wastewater treatment plants, making use of processes occurring in natural ecosystems can represent one alternative to reduce costs. Sewage treatment functions – in particular tertiary treatment processes – can be found in different natural and semi-natural systems, including land treatment, floating aquatic plants and constructed wetlands (UN 2003[23]). Aquatic and terrestrial ecosystems are for example used for sewage treatment in a number of locations throughout Latin America and the Caribbean. They provide both low cost sanitation and environmental protection (UNEP *after 1995*[24]).

Natural treatment systems represent the most cost-effective option in terms of both construction and operation, if certain conditions are met (EPA 1993[25], UN 2003). In particular the availability of sufficient land is important, making e.g. constructed wetlands frequently well suited for small communities and rural areas. Operating costs, such as energy, are minimal compared to other treatment methods (UN 2003, EPA 2000[26], CAWT 2010[27]). However, those systems require frequent inspections and constant maintenance to ensure smooth operation. Furthermore, natural biological systems can produce effluents of variable quality depending on the time of year and type of plants, although they can handle fluctuating water levels (EPA 2006, UNEP *after 1995*). Mechanically-based technologies, on the other hand, are easier to construct and to operate, as they are offering a more controlled environment which produces a more consistent quality of effluent, being one reason why communities still tend to this solution, although it is generally linked to high costs and require more skilled personnel for its operation (UNEP *after 1995*). The Centre for Alternative Wastewater Treatment (CAWT 2010) provides some cost estimates for capital costs, comparing ecologically based and traditional systems (see table below), favouring clearly natural systems. Two examples from the United States where natural treatment systems have been chosen will be presented in the following.

[23] UN (United Nations) (2003) "Waste-water treatment technologies: A general review", New York, USA
[24] UNEP (after 1995) "Sourcebook of Alternative Technologies for Freshwater Augmentation in Latin America and The Caribbean", http://www.unep.or.jp/ietc/Publications/techpublications/TechPub-8c/treat.asp
[25] EPA (United States Environmental Protection Agency) (1993) "Constructed Wetlands for Wastewater Treatment and Wildlife Habitat. 17 Case Studies", EPA832-R-93-005, Ohio, USA
[26] EPA (2000) "Constructed Wetlands Treatment of Municipal Wastewaters. Manual", Ohio, USA
[27] CAWT (Centre for Alternative Wastewater Treatment) (2010) "Benefits of Constructed Wetlands", http://www.flemingc.on.ca/CAWT/index.cfm?page=benefits

Comparison of capital costs of ecologically based and traditional wastewater treatment systems (CAWT 2010, adapted)

Type of System	Cost range (1997)
Ecological	US $ 126 to $ 303 per m^3 treated per day
Traditional	US $ 593 to $ 741 per m^3 treated per day

In 1990, in Phoenix, Arizona, city managers were confronted with the need to improve the performance of a wastewater treatment plant to meet new state water quality standards. As the costs of upgrading the plant were estimated at US $ 635 million, managers started to look for a more cost-effective way to provide the required treatment services to the plant's wastewater discharges. According to the results of a preliminary study, a constructed wetland system would sufficiently clean the discharged water. At the same time, it would provide high-quality habitat for birds, including endangered species, and protect downstream residents from flooding, while requiring lower costs than updating the existing treatment plant. Consequently, the 12-acre "Tres Rios Demonstration Project" has been started in 1993 and receives now about 7.6 million litre of wastewater per day (EPA 2006[28]).

Another example can be given from the city of Arcata, in California. In 1972, a new federal legislation in California required from the small city Arcata to comply with the water quality standards for their wastewater discharges into the Humboldt Bay. Instead of investing into a regional sewage processing plant, the city decided to use the wastewater to create and nourish a wetland – situated on a former landfill – which at the same time provides wildlife habitat and recreation possibilities for the community. Whereas Arcata's share of the construction of a regional sewage plant was estimated to be about US $ 10 million, developing the wetland treatment functions cost only US $ 5 million. Also the annual maintenance of the latter is lower, being about US $ 500 000 instead of US $ 1.5 million. The marsh treats today the sewage from about 19 000 persons (Suutari *after 1999*[29]).

Emerging issues

- Whereas cost-effectiveness analysis can rather easily be applied to quantitative and qualitative water issues, its application meets clear challenges when dealing with ecological and morphological issues. Indeed, the effectiveness of actions is more difficult to assess as the entire habitats and biodiversity are considered. However, ecological and ecosystem issues will gain importance in the future.

- A indicated above, CEA might not be relevant under specific institutional and policy making frameworks.

[28] EPA (2006) "Economic Benefits of Wetlands", Ohio, USA
[29] Suutari (after 1999) "USA – California (Arcata) – Constructed Wetland: A Cost-Effective Alternative for Wastewater Treatment", http://www.ecotippingpoints.org/our-stories/indepth/usa-california-arcata-constructed-wetland-wastewater.html

INCREASING FINANCIAL RESOURCES FROM USERS AND BENEFICIARIES

Introduction

Depending on the country and the type of activity, different mechanisms can be proposed for financing water resource management (WRM). Part of the financial sources are stemming from the national or regional public budgets, being fed by general taxes. Another part, which is gaining importance over years, comes from users and beneficiaries of the different elements of WRM. The range of instruments used for the latter is quite large, ranging from instruments being applied directly in the water sector to instruments applied to other sectors (e.g. urban development, agriculture, energy, etc.) but contributing financially to the water sector. Both approaches correspond to the *cost-recovery principle* as well as to the *user pays principle* and the *polluter-pays principles*. Also, the *beneficiary pays principle* can be applied. Different instruments and different applications for financing WRM based on contributions from users and beneficiaries will be illustrated in the following paragraphs.

General evidence

Next to taxes, traditional financing instruments in the water sector include water tariffs and charges. They are applied in the form of water supply and sewerage/wastewater tariffs, paid mainly for public water services, and as – for example – water abstraction or effluent charges (an illustration of individual abstraction charges in selected EU countries is given in the table below).

Examples of abstraction charges in selected EU countries (Mattheiß et al. 2009)

Country	Source of water	Unitary rate
Denmark	All sources of water	0.67 €/m^3 for domestic users only
Finland	All sources of water	1.34 €/m^3 in average but depending on the municipality
France (Seine-Normandy – basic rate)	Surface water - on volume abstracted - on volume consumed Groundwater - on volume abstracted - on volume consumed	 0.00071 €/m^3 0.04 €/m^3 0.024 €/m^3 0.04 €/m^3
Hungary	All sources of water	0.007 to 0.02 €/m^3 depending on the use
The Netherlands	Groundwater Drinking water	Charge depends on the province (varying between 0.81 and 2.54 cent/m^3)

Financing instruments were initially focussed on water quantity and water quality issues. However, more recently, instruments targeting other environment issues such as ecological quality, river morphology or the management of excess water are becoming more important. The table below provides a small selection of economic/financial instruments applied to the water sector in Europe, illustrating the diversity of instruments and financing mechanisms that have been developed and implemented in different EU Member States.

Selection of economic instruments applied in the water sector (Mattheiß et al. 2009, adapted)

Instrument	Objective(s)
Water abstraction charges in the Baltic countries	To modulate abstraction according to the value of the water abstracted, i.e. in relation to the quality and scarcity of the water from a given source in a given region. To apply the polluter-pays principle more firmly. To collect financial resources.
Financing substitution reservoirs for farmers to access good quality water in the Boutonne river basin (France)	To ensure a sufficient, good quality and more reliable supply, a drinking water company finances storage reservoirs for farmers in exchange of their boreholes and groundwater abstraction rights.
The pesticide tax in Denmark	Reducing the total consumption of pesticides in the agricultural sector. Responding to public concerns on the use of pesticides.
The native woodland scheme in Ireland	Protecting and expanding native woodland resources, including the improvement of water quality through native riparian woodland development
Compensating for "Damage to fish" - the Fish Compensation Fund in Latvia	Internalising environmental costs caused by morphological pressures and re-establishing damaged fish resources.
Financial compensation for environmental services (France)	Making water abstractors participate to the costs of ecological flow support by dams.
Support for the building of greenroofs to reduce storm water runoff	Promoting the construction of green-roofs as a technique to reduce storm water run-off.
Income tax reduction for rainwater collection and reuse in France	Reducing stormwater runoff and encouraging rainwater reuse

The diversity of existing economic and financial instruments shows that solutions are available or can be developed for many water related environmental issues. However, some efforts should be put into the analysis of the effect of combining several instruments in order to reach financing targets.

Looking at selected illustrations

Illustration 1 – Restoring water-related ecosystems in the US using market mechanisms

In several countries, e.g. the Western United States, south-eastern Australia, Chile and Mexico, water markets exist in which water rights can be traded, leading to water being steadily used for higher-value economic purposes[30]. At the beginning, the regulations of those markets did not allow to buy and allocate water to the environment in order to restore altered natural hydrological flows. Also water gains through efficient use of water could not be left to the environment, but were implicitly reallocated to the next water user.

[30] The following information is based on: Aylward, B. (2009a) "Using Markets to Restore Water-Related Ecosystem Services", Power point presentation held at the ONEMA Workshop on Economic Instruments to Support Water Policy in Europe, 09-10.12.2009, Paris, France; and: Aylward, B. (2009b) "The Role of Voluntary and Market-Based Initiatives in Freshwater Ecosystem Restoration", document prepared for BEF (Bonneville Environmental Foundation), Bend, USA

However, the awareness on the beneficial water use of ecosystems – e.g. to support fish, wildlife, water quality and recreation – rose in the course of the 20th century. In the existing water market based systems, only two possibilities were available to take the upcoming recognition of the environmental services of aquatic ecosystems into account and to put water back into the ecosystems:

1. Administrative reallocation: The government takes back water user rights and reallocates them.

2. Market-based reallocation: The government provides a favourable framework (including legal and economic incentives) for a market in which water users participate voluntarily in the reallocation of water rights.

As the first approach is rather unpopular, politicians favoured the second one and establish ecosystem or instream uses as a legal, permitted "beneficial use". However, even if the right conditions are set, it might take a long time until the new system makes an impact. Money is needed to fund the transaction costs and the water acquisitions. In Oregon, for example, the Oregon Water Trust, which was the first non-profit organization which purchased water rights to restore stream flow, was only created six years after the passage of the Oregon Instream Water Rights Act in 1987. At the beginning, the trust only used private funds to obtain water rights. However, as the system evolved, water rights for instream use were no longer held by trusts, but in the name of the state. Also, public funding – including funding compelled by legislation – became more and more important (e.g. hydropower producers which were obliged to invest in salmon restoration, as a mitigation of their impact).

The water trust movement – funded by governments and regulation – is still spreading. In the Columbia Basin, for instance, the Bonneville Power Administration has participated in over 200 instream flow transactions and restored 230 cubic feet per second for a total of 4.3 million acre-feet instream. However, the level of activity varies from state to state. In Oregon, about USD 50 million have been invested in instream rights from 1994 to 2007. Despite this positive development, the sums invested from the public side stay relatively small compared to the task which they intend to fulfil. Therefore, new approaches to attract private money are necessary. Two recent approaches are presented in the following.

In Oregon's Deschutes Basin, the Deschutes River Conservancy and a regulated, municipal water supply company launched the so-called "Blue Water Program". Customers of the water supply company were given the opportunity to add a monthly amount to their water bill. These funds are turned over to the Deschutes River Conservancy for supporting instream leasing of water rights. Although only 2 % of the customers decided to support the system, the generated income provides almost 6% of the Conservancy's budget for leasing water rights.

Another example is the Water Restoration Certificates (WRC), which have been launched in 2009 by the Bonneville Environmental Foundation (BEF). They are working with voluntary credits which environmental buyers can purchase, with the aim to reduce the residual water footprint through flow restoration. 1 WRC equals 1,000 gallons of water restored to rivers and streams that are certified by the National Fish and Wildlife Foundation as being critically dewatered. Similar to carbon offset payments, WRCs allow purchasing water and environmental benefits independent of the location (so-called offsite mitigation) – as respective mitigation options might not be in place where the damage takes place.

Illustration 2 – Ecologically friendly hydropower plants – economic incentives and financing in the form of higher electricity tariffs in Germany

Hydropower plants and their constructions constitute significant alterations of the morphology of river beds, but several measures exist to mitigate the negative effects of the plants. In Germany, a specific instrument has been implemented in order to financially compensate plants which have been constructed with a specific consideration of the environment[31].

In Germany, electricity operators are obliged to connect facilities which produce renewable energy to their net and to remunerate them according to the German Renewable Energy Sources Act (EEG). The EEG from 2000 (amended in 2004 and 2008) fixes remunerations for energy produced through hydropower plants according to certain conditions. Higher remunerations are paid, if – in accordance with the European Water Framework Directive – a good ecological status of the water bodies linked to the hydropower plant has been reached after the building or the modernization of the plant. Alternatively, the ecological status must have significantly improved, when compared to the previous situation.

Several criteria are applied to decide whether the favoured tariff is applicable to the facility. The criteria look for example at the biological continuity of the river, the presence of areas with shallow water and guaranteed low water flows. Furthermore, the hydropower plants have to comply with certain requirements concerning their location: New plants must be built in a spatial relation to fully or partly existing barrages or weirs.

The remuneration paid to the energy providers varies with the energy output of the plant. A difference is made between plants generating up to and including 5 MW and plants generating more than 5 MW as well as between modernized and new plants (see tables below).

Remuneration for plants up to and including 5 MW

Part of production	New plants (€cents/kWh)	Modernized plants (€cents/kWh)
Until 500 kW	12.67	11.67
500 kW to 2 MW	8.65	8.65
2 MW to 5 MW	7.65	8.65

Remuneration for increased power production for plants > 5 MW

Augmentation of production	Expanded plants (€cents/kWh)
Until 500 kW	7.29
Until 10 MW	6.32
Until 20 MW	5.80
Until 50 MW	4.34
Over 50 MW	3.50

[31] The following information is based on: BMU (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit) (2008) „Erneuerbare Energien 2007“, Berlin, Germany; BMU (2008) „Vergleich der EEG-Vergütungsregelungen für 2009“; Bundestagsbeschluss zum EEG vom 06.06.2008, Berlin, Germany; and: BMU (2005) „Leitfaden für die Vergütung von Strom aus Wasserkraft“ Berlin, Germany

The remuneration is paid for 20 years. Smaller plants are paid higher remunerations per kWh than bigger plants to ensure their profitability. Plants producing more than 5 MW are – after their modernization – only paid for the increased part of production. The rates decrease every year for 1%.

In 2007, the predominant part of the hydropower produced in Germany stemmed from plants which were not remunerated with the higher tariffs. In order to increase incentives, the rates for small hydropower plants were increased in 2008. In 2006, the electricity consumer paid in average 0.5 cent/kWh for the promotion of renewable energies. As all the costs are allocated to the consumers, no government financing is involved.

Illustration 3 – Financing WRM from the agricultural sector – subsidies for establishing buffer strips in Norway and Sweden

The water sector does not stand alone, but is closely linked to other sectors which are exercising pressures on aquatic ecosystems. It is therefore not surprising that measures, which are financed in other sectors to mitigate their negative impacts, also influence the water sector and form part of water resource management activities. This is the case for sustainable agricultural practices. As an example, financing in the European context[32] of riparian buffer strips around surface water bodies will be described below. The establishment and management of buffer strips can help to respond to several water management problems simultaneously, for example improving water quality, nature and landscape as well as preventing floods.

In the European Union, the recent "health check" of the Common Agricultural Policy introduced a new water-related "Good Agricultural and Environmental Standard" to be implemented by 2010. It includes the mandatory establishment of buffer strips along surface water bodies. The requirements specify in particular restrictions in the use of fertilisers near water courses.

Already today, the establishment of riparian buffers strips in Europe is financially compensated for example in Belgium, France, Germany, Denmark, Norway, Sweden and Switzerland. In EU Member States, voluntary buffer strips can be established under national or regional Rural Development Programs (2nd pillar of the CAP). In Non-EU Member states like Switzerland and Norway, they are regulated by national legislation.

In Norway, riparian buffer strips have to have a width of at least 2 meters if farmers want to get the full size production subsidy from the state, whereas voluntary riparian buffer strips need a minimum width of 6m in order to be recognized. In the first two meters, no cultivation is allowed. In areas with erosion risks, the country governor can furthermore establish regional requirements for tillage practices or other measures. The voluntary buffer strips have to be covered with grass by early autumn and the use of fertilizer is restricted. In Sweden, as a second example, riparian buffer strips are a purely voluntary measure, i.e. they are not linked to other subsidies. In order to receive financial compensation, buffer strips have to be at least 6 m wide and 20 meters long. No use of fertilizers or pesticides is allowed.

[32] The following information is based on: Berglund et al. (2009) "International review on payments schemes for wet buffer strips and other types of wet zones along privately owned land. Summary of national actions and three case studies", report prepared for the Dutch Ministry of Transport, Public Works and Water Management, unpublished; – if not stated otherwise.

In both countries farmers receive continuous payments to maintain the area converted. They are based on average rates and aim to compensate the income forgone or the extra effort a farmer has. In Sweden, payments amount to about 100 €/ha, whereas the amount varies in Norway, depending on the area, from 800 to 1600 €/ha.

In Norway, water-related agricultural measures can be financed from different institutions. One is the SMIL-payment (Special Environmental measures in Agriculture), which is managed by local municipalities. Each municipality specifies the type of measure it will support. Furthermore, also Regional environmental programs exist. Every county has established a payment scheme to meet pollution and landscape problems in agriculture. Finally, there are also national payment schemes for more general measures and requirements which are equal for the whole country (see also Holen 2009[33]).

Key messages and emerging issues

- A wide variety of economic and financing instruments is currently applied in the water sector in Europe. These instruments can help to complement public funds for financing IWRM.

- The current financial crisis and policy developments (e.g. the European Water Framework Directive) promote the search for innovative financing instruments and a balance contribution of polluters, users and beneficiaries.

- Paying more attention to overlapping between different policies – e.g. water and agricultural policies – can help to create synergies and to save financing needs.

[33] Holen, S. (2009) "Economic incentives for wet zone management in Norwegian agriculture. Traditional subsidies or payments for environmental services (PES)?", presentation held at the Workshop on "Economic instruments to support water policy in Europe", 9th of December 2009, Paris, France

IMPROVING THE ALLOCATION OF PUBLIC RESOURCES

Introduction

Under financial constraints, improving the allocation of public resources represents a permanent challenge in the water sector but also in each sector targeted by public policy. Improving allocation requires understanding the current allocation of financial resources within the water sector, along with policy processes and criteria which are applied for taking decisions and deciding on allocation. This includes analysing institutions involved in allocating and managing financial resources. Overall, improving the allocation of public resources requires a high degree of transparency that is difficult to find.

General evidence

It is particularly difficult to find evidence on the process and criteria supporting the allocation of financial resources to the water sector. In particular, there is limited information on how the general budget is allocated between individual sectors and public policy, in particular water policy and its different sub-components (water quality, flood control, management, monitoring and evaluation, etc.). Indeed, this process is strongly politically driven with unclear pre-defined rules and principles. However, examples of the allocation of public financial resources can be found at lower scale. When defining the programme of measures required under the European Water Framework Directive, for example, countries applied different criteria for prioritising measures under their given financial constraints. In Lower Saxony, Germany, for instance, only measures for priority water bodies would be financed, as financial resources are limited. Criteria applied to choose water bodies include their affiliation to water-dependent FFH-protected areas or to the network of protected water courses, the classification of their potential for biological renaturation and their importance for supra-regional fish migration[34]. In the Czech Elbe river basin district, measures to be financed addressing contaminated sites were chosen depending on the importance of the sites targeted by proposed measures (e.g. concerning an area in or close to a NATURA 2000 site or a drinking water source), the possibility to implement the measure promptly and its strategic importance for regions, municipalities or water users (e.g. linked to strategic objectives in regional strategic documents etc.) (Grandmougin et al. 2009[35]).

However, the attempt to improve the effectiveness of the allocation of public financial resources should not concentrate on the water sector alone. Also the interferences with other sectors (e.g. agriculture, energy, climate change, etc.) will need to be considered and to be evaluated as a whole. This aspect will also be looked at in one of the following illustrations.

[34] http://www.google.de/url?sa=t&source=web&ct=res&cd=21&ved=0CAUQFjAAOBQ&url=http%3A%2F%2Fwww.lkcelle.de%2Fdownload%2Fwasserrahmenrichtlinie.ppt&rct=j&q=finanzierung+wasserrahmenrichtlinie&ei=82CCS63eEtKy4Qa61YCDBw&usg=AFQjCNG0kdAD1FY0YJxl8kR8GXrZFACF3w

[35] Grandmougin, B., Mattheiß, V., Kervarec, F., Strosser, P., Dworak, T., Fleischmann, N. & Thaler, T. (2009) „International comparison of the implementation of the WFD in EU Member states“, ACTeon & Ecologic, Report prepared for the Dutch Ministry of Transport, Public Works and Water Management, unpublished

Looking at selected illustrations

Illustration 1 – Synergies between agricultural and water related policies

When looking at the allocation of public resources and the interference between different sectors, the agricultural sector and its impact on the water sector deserve particular attention. Due to a partial overlapping of agricultural and water related policies, some coordination work is necessary in order to allocate resources effectively. In Europe, the Common Agricultural Policy (CAP) on the one hand and the Water Framework Directive (WFD) on the other hand represent the current leading policies in the two sectors. In particular since 2004 activities are underway to address interrelations between the two. A Strategic Steering Group has been created and started to work on several, overlapping issues: e.g. cross-compliance, rural development, water pricing, etc. (Ribeiro et al. 2008[36]). In the following, a small insight will be given in the parts of the CAP which have a particular influence on WRM.

Since the CAP reform in 1992, the focus of the European agricultural policy lied not anymore only on food production, but included also so-called agri-environmental measures to protect the environment. Farmers were provided financial incentives for voluntarily pursuing environmental protection objectives. To support this, the EU provided co-financing of 50 or 75% from the funds of the European Agricultural Guidance and Guarantee Fund (EAGGF) to its member states. Since 2002, the principle of cross-compliance links the farmer's right to receive subsidies to the compliance with certain standards, including good agricultural and environmental (including water-related) conditions. Furthermore, the EU's Rural Development (RD) policy has been evolved as part of the CAP, amongst other things in response to – in particular – urban pressures on the natural environment. The RD policy has been brought under a single funding and programming instrument: the European Agricultural Fund for Rural Development (EAFRD) (Herbke et al. 2006[37]).

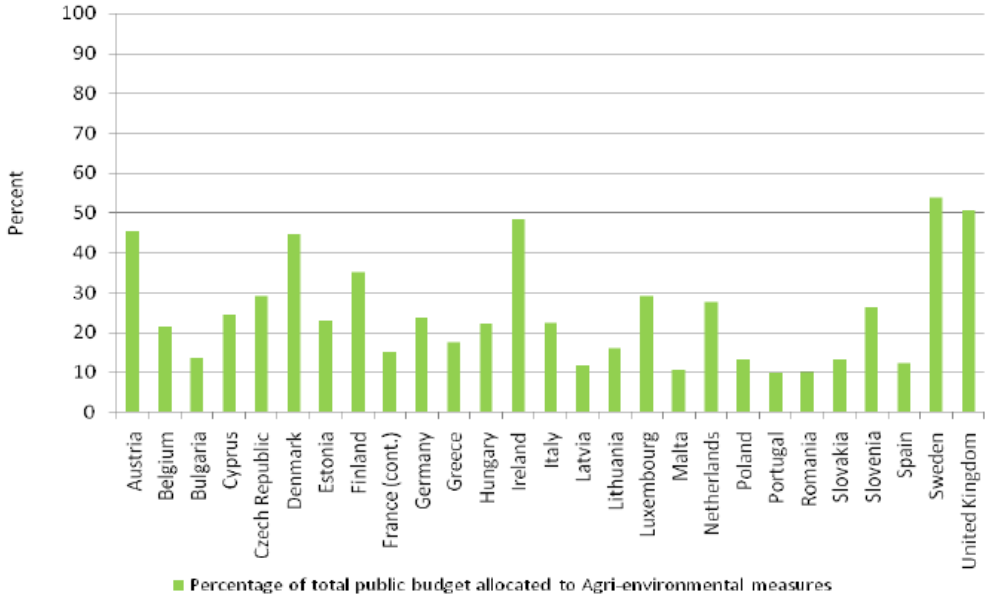
Under the Rural Development Programmes (RDPs), which have been established by the EU Member States, several measures are linked to water management (e.g. "NATURA 2000 on agricultural land and payments linked to WFD", "Agri-Environmental measures", "Use of advisory services" and "Modernisation of agricultural holdings"). The different actions can have positive impacts on different aspects of water management (pollution, alteration of hydrological regimes, soil erosion…) (Dworak et al. 2009[38]).

Regarding the expected budget importance of the different measures, two are particularly important: the application of agri-environmental measures and the modernization of agricultural holdings; both impacting potentially on the water environment. As can be seen in the figure below, more than half of the EU member states allocate more than 20% of their total public budget to agri-environmental measures, Sweden and the UK spend even more than 50% (Dworak et al. 2009).

[36] Ribeiro, M.M., Dworak, T., Campling, P., Vranken, L. & Berglund, M. (2008) „WFD meets CAP – Towards the First River Basin Management Plan", Conference summary from the 18/19 September 2008, Bonn Germany

[37] Herbke, N., Dworak, T. & Karaczun, Z. (2006) „WFD and Agriculture – Linkages at EU Level. Analysis of the Policy and Legal Linkages between CAP and WFD", Berlin, Germany

[38] Dworak, T., Berglund, M., Liesbet, V., Campling, P., Kampa, E., Ribeiro, M.M. & Thaler, T. (2009) „WFD and Agriculture Linkages at the EU Level. Summary report on an in-depth assessment of RD-programmes 2007-2013 as regards water management", report for the European Commission, Berlin, Germany and Vienna, Austria



Importance of agri-environmental measures within the total public budget in the different Member States (Dworak et al. 2009)

Agri-environmental measures (AEMs) in the RDPs can be applied in various ways and address a broad spectrum of environmental pressures. AEMs impacting on water belong to the following categories: Input reduction, organic farming, integrated farming schemes, multi-objective measures (e.g. buffer zones, extensification), soil erosion measures, management of wetlands and water saving measures (Dworak et al. 2009).

The support measure for the modernization of agricultural holdings has several aims, including improving the economic performance of farms, but also the environmental status of the holdings. Several farm investments can be beneficial for the water sector, including for example increased irrigation efficiency or better manure storage capacities. However, other investments might lead to an unsustainable intensification of the agricultural sector (Dworak et al. 2009).

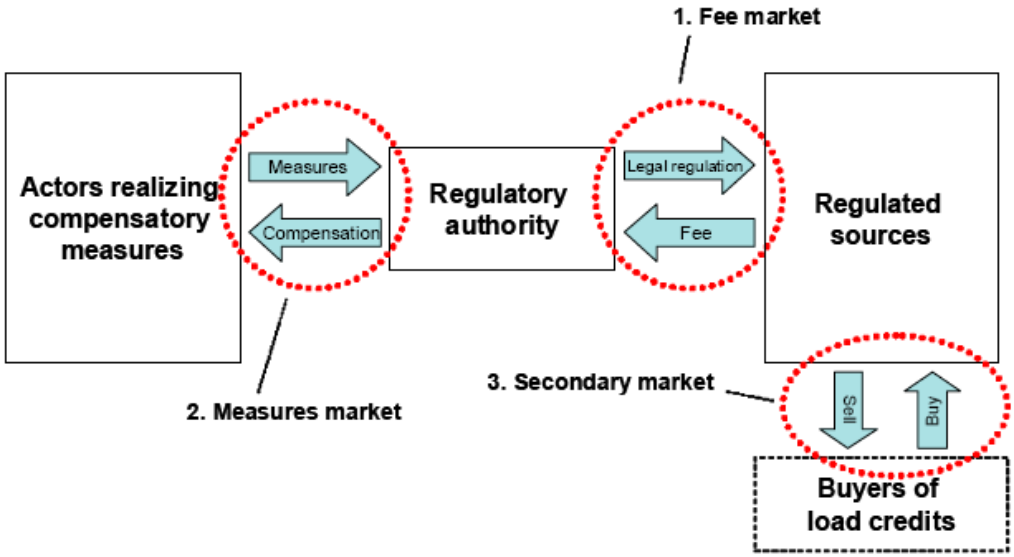
The initiative LEADER can be mentioned as a special instrument which forms part of the rural development policy of the CAP. It promotes regional networks of local groups which act as platforms at the interface between local actors, administrations and professional organisations. LEADER projects are supporting the rural development policy and provide the possibility to create a bottom-up approach, also in areas of the WFD. It represents one example of financing participatory processes in water management (Dworak et al. 2009).

Illustration 2 – Improved allocation of resources through the proposed pollution fee system in Sweden

In the Baltic Sea region, the Baltic Sea Action Plan has been signed in 2007 to take action against pollution. However, current policies have so far not generated cost-effective pollution reductions and

eutrophication remains a problem[39]. In particular the sector-specific approach limits the possibilities of implementing low cost measures first. Also the question of how to manage diffuse sources has not been solved yet.

Sweden has set itself the objective to find a system to achieve load reductions at the lowest possible costs. They are currently developing a cross sectoral fee system that allows for trading of nitrogen and phosphorus pollution permits. The proposed system includes three interconnected markets (see figure below), which will be shortly described in the following.



Proposed fee system (SEPA 2009)

The *fee market*: In a first step, discharge sources are regulated through caps in the fee market, which allow for a certain amount of nutrients being discharged without having to pay a fee. For any amount of emission that exceeds the allowed quantity, dischargers can either implement measures to meet the regulations or pay a fee. The latter gives them the right to emit a certain load during a specific time period. Actors involved in the fee market include hence a regulating authority and the regulated sources. The fees paid to the authority are used to finance "compensatory measures".

The *measures market*: So-called compensatory measures compensate for the amount of discharges on the fee market that exceeds the sum of individual caps. The measures are contracted by the regulatory authority in the measures market and "carried out by market agents that can achieve reductions in excess of their cap or by those who can mitigate emissions to the sea through unregulated activities that do not generate emissions, e.g. mussel farming and wetlands" (SEPA 2009). The compensations are financed by revenues obtained in the fee market. The level of the fee in the market is determined by the compensations paid on the measure market.

[39] Information on this illustration is based on: Karlsson, L. (2009) "Fee system to reduce nutrient loads to the Baltic Sea", presentation held at the ONEMA workshop on Economic instruments to support water policy in Europe. Paving the way for research and future development, 9-10 December 2009, Paris, France; and: SEPA (Swedish Environmental Protection Agency) (2009) "Proposal for a Permit Fee System for Nitrogen and Phosphorus", Report 5968, Stockholm, Sweden, http://www.naturvardsverket.se/Documents/publikationer/978-91-620-5968-2.pdf

The *secondary market*: Following the two initial markets, a secondary market is created where discharge rights can be traded directly between different stakeholders. This market has the aim to further promote the cost-effectiveness and flexibility of the system.

The regulating authority is a key player in the system. It manages the contact with the fee payers and is responsible for using the generated revenues to finance compensatory measures.

Although the transaction costs of the system might be increased compared to the current system, it is expected that the approach will allow allocating financial resources more effectively to those which are able to reduce pollution at the lowest costs. So far, the system has not yet been tested. The challenge still remains to design it in a way to optimally respond to the legal, environmental and economic conditions.

Illustration 3 – Public private partnerships – Promoting wastewater investments in Romania

In order to improve the allocation of public resources, matching them with private resources under public private partnerships (PPPs) has several advantages. More money is made available for investments in the water sector. But also management might benefit from efficiency gains, if transferred to a private entity. The involvement of private investors and operators that allows risk sharing is an effective method for accessing expertise and technology. In the light of those advantages, the application of PPPs has grown over recent years (European Commission 2004[40]).

The water and wastewater sector is particularly suitable for PPP as large amounts of investments in infrastructure are needed with long term contracts being provided. Experiences with PPPs exist already for many years in the water sector, with different levels of responsibility being transferred to the private party. Concessions and joint ventures are the most common contract types encountered.

In Romania, where the recent accession the European Union required the compliance with the existing European environmental legislation (in particular the Urban Wastewater Treatment Directive), the establishment of PPPs in the water and wastewater sector has helped to respond to high financing needs, as public owners of water infrastructure had low or no resources for investments. The reduction of costs, the improvement of efficiency and finally the effectiveness in achieving environmental compliance were other advantages seen in the establishment of PPPs (Ciomos 2005[41]).

The Constanta water and wastewater project in Romania is a good example in this regard. The possibility to install a PPP was explored with – amongst others – the aim to extent the coverage of water and wastewater services, to reduce water losses, to improve efficiency and to comply with EU environmental standards. Investments of around 200 million Euro over a 20 year period were estimated.

[40] Information on this illustration is stemming from the following source, if not marked differently: European Commission (2004) “Resource book on PPP case studies”, Brussels, Belgium

[41] Ciomos, V. (2005) “Financing municipal waste water services – the example of Romania”, presentation held at the IDCED conference on Public-Private Partnership in the Municipal Water and Waste Management Sector Potentials and Opportunities for Co-operation in the Enlarged EU, 28-29 November 2005, Leipzig, Germany

Previously operated by RAJAC, an inter-municipal company which is owned by the Constanta County Council[42], it was decided to consider different options for management including the involvement of private operators and risk sharing between public and private sectors. A Special Purpose Company (New Co) was created with the County Council holding about one third of its shares, an important aspect for public acceptance of the PPP. This provided the County Council with an opportunity to get a share in the long-term profits of the company. The operation and maintenance responsibilities for all existing water and sewerage services were transferred to New Co. However, the County Council still rested responsible for enforcing regulations. A tender process was started with the bidding criteria including the compliance with effluent charge quality standards, the reduction of water losses and the percent of households connected to wastewater services. The final contract agreement between the two partners included joint venture and concession contracts. A concession fee has been paid to the County Council at the closing of the deal and smaller annual concession fees have been agreed on. The management of the service has been delegated for a 20 years period.

Key messages and emerging issues

- More transparency is needed concerning the allocated amounts for water resource management and the criteria used for allocation.

- Public Private Partnerships provide a valuable solution for increasing the investment capacity for infrastructure projects, but have to be created with care.

- Putting efforts in detecting interferences between different sectoral policies can help improving the allocation of public resources as a whole.

[42] "RAJAC undertakes water catchment management, water treatment, the supply and distribution of water and the collection and treatment of waste water for the City of Constanta and six neighbouring municipalities with a population of 747,000, increasing to over 1 million during the tourist season in June-September" (European Commission 2004)