



European
Commission

WATER for Life

EU Water Initiative

International
Cooperation -
from
knowledge
to action



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FOREWORD

Romano Prodi
*President of the
European Commission*



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Water is Life, yet over 1 billion people have no access to safe drinking water and over 2 billion lack basic sanitation. This is why leaders at the World Summit on Sustainable Development in Johannesburg, South Africa, in September 2002, called for halving these numbers by 2015. In practical terms, this means providing these essential services to 200 000 and 400 000 new people per day until the end of 2015! The EU strongly supports these goals and therefore, in Johannesburg, we launched the EU Water Initiative together with Danish Prime Minister and EU President in office, Anders Fogh Rasmussen.

It is obvious that such ambitious goals on a global scale cannot be achieved with conventional means, even with all the current aid. Scientific knowledge and innovative approaches across policies and their instruments are important for tangible headway towards these goals. It will particularly require a great mobilisation of partners ranging from governments, water agencies, water users to civil society organisations and private enterprises. Open co-ordination and co-operation at all levels from local to international will be crucial.

The second thrust of the Initiative concerns the general adoption of river basin-scale policy, planning and management, particularly for transboundary catchments. Within the European Union, we have already adopted

this approach with the EU Water Framework Directive. I am convinced that the shared goals of inter-generational fairness, equitable use and conservation of precious water resources offer ample opportunities for co-operation.

The European Union has been working on key issues related to sustainable use of precious water resources, not only within its own borders, but also in partnership with many research teams, NGOs, governments and other actors in all partner countries. It has actively participated in a variety of water-related fora and initiatives. A large number of co-operation projects channel knowledge and financial resources into addressing water problems in many partner countries. Policy dialogue with several regions, including Africa, Asia, Eastern Europe, Latin America and the Mediterranean, is being reinforced concerning crucial water and associated food security in the expectation of enhancing the effects of on-going and future co-operation projects. This brochure shows the European Commission's work on issues addressed by the Water Initiative and its commitment to pursue its goals by partnering with others. The different Commissioners involved in this subject, Philippe Busquin (Research), Poul Nielson (Development), Chris Patten (External Relations) and Margot Wallström (Environment) and their respective services, have been particularly active in this endeavour and will continue to invest in broadening these partnerships in the future.

A handwritten signature in black ink, which appears to read 'Romano Prodi', followed by a horizontal line.

POLICY FRAMEWORK

Against the backdrop of a global water crisis...

“The total volume of water on Earth is about 1 400 million km³ of which only 2.5%, or about 35 million km³, is freshwater. Most freshwater occurs in the form of permanent ice or snow, locked up in Antarctica and Greenland, or in deep groundwater aquifers. The principal sources of water for human use are lakes, rivers, soil moisture and relatively shallow groundwater basins. The usable portion of these sources is only about 200 000 km³ of water – less than 1% of all freshwater”¹. Freshwater is renewable only by snow and rainfall, at the rate of about 40-50 000 km³ per year.

With growing wealth, global consumption of water has recently been doubling every 20 years, more than twice the rate of human population growth. Yet, supply is heavily skewed as a function of wealth and power differences within and between societies and natural conditions, including ecosystems’ health. Thus, daily consumption of a person in a developing country without access to running water is typically around 20 litres, while a person with access to piped water may use in excess of 200 litres per day. Included in this high figure is pipe leakage, which may reach 50% in some cities. Conversely, it is not uncommon for women and girls in rural Africa to spend three hours per day fetching water from distant water holes and rivers.

According to the United Nations, overall about 1.1 billion people on Earth do not have access to safe drinking water and about 2.4 billion people lack adequate sanitation. An estimated 6 000 children die each day from diseases associated with poor sanitation and hygiene and one in two hospital beds in the world is occupied by someone with a preventable water-borne disease.

If current trends persisted, by 2025 the demand for freshwater is expected to rise by 56% – more than is currently available. About 70% of current demand is from agriculture, the remainder from urban, household and industrial use, and consumption.

The first response to growing demand for water supply, power and flood regulation has been to build more dams and divert more rivers. The number of large dams worldwide has climbed from just over 5 000 in 1950 to 45 000 by the end of the 1990s². Groundwater has also been tapped in order to meet the needs of irrigation agriculture, which has massively expanded particularly over the last 50 years alongside demographic growth and rapid urbanisation.

Change of land use, deforestation of mountainous regions where springs of the principal river systems of the world are located, the melting of glaciers and changing patterns of rain and snowfall, are all modifying the run-off regimes of rivers in many parts of the globe. These and other trends are usually referred to in the context of ‘global change’.



© Marc French/Panos Pictures

Haiti. Washing clothes.

Devastating floods in Central America and Mozambique in 2001, in Central and Eastern Europe, Central and Southern China and other Asian countries in 2002 have resulted in loss of lives, untold material and economic damage and pollution of important regional seas in Asia and Eastern Europe. On the other extreme, blistering droughts have hit Sudan, Ethiopia, Australia and North-western China in recent years resulting in dustbowls and rising food insecurity. Such crises are becoming more frequent and may increase the threat of regional conflicts. They put water into the news headlines and onto the political agenda, both local to global.

Record keeping for temperature started systematically in 1866. Data shows that the 14 warmest years have all occurred since 1980. In the 1990s the Arctic ice cap lost almost 20% of its mass, but only 5% of its surface, leading to a break-up at the North Pole during the summer months starting in 2000.

... growing awareness helps spell frameworks of action

Over the last 50 years in particular, the world’s finite supply of freshwater has been subjected to increasing pressures and has also suffered quality degradation in many regions. Taken together, these problems amount to a global water crisis. This crisis has been analysed and discussed at local and global level, and in governmental and non-governmental fora. In 1987, in response to this heightened interest in water, the World Commission on Environment and Development (Brundtland Commission), proposed the concept of ‘sustainable development’ and identified water as a key issue among global environmental concerns in its report “*Our Common Future*”.

At the Rio UN Conference for Environment and Development (UNCED)³ in 1992, water issues were extensively

¹ UNEP, 2002. *Global environment outlook 3*. Nairobi, Kenya

² <http://www.dams.org/> and reactions to the Report of the World Commission on Dams at http://www.unep-dams.org/document.php?cat_id=4

³ <http://www.unep.org/unep/partners/un/unced/> and <http://www.ciesin.org/datasets/unced/unced.html>

debated and incorporated in Chapter 18 of Agenda 21 and were a central piece of the Rio Declaration. Ever since, a string of thematic events has gained momentum. In 1995, the Global Water Partnership and the World Water Council were created, involving governments, international agencies, civil society and private sector. The first World Water Forum was held in Marrakech in 1997, with the second taking place in The Hague three years later⁴.

At European level, after an extensive consultation process, the European Parliament and Council adopted a comprehensive Water Framework Directive, which entered into force on 22 December 2000⁵. The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater within the EU. It aims at contributing to (a) the provision of a sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use, (b) a significant reduction in pollution of groundwater, (c) the protection of territorial and marine waters, and (d) achieving the objectives of relevant international agreements, including those which aim to prevent and eliminate pollution of the marine environment. It adopts a river basin approach and obliges Member States to make the appropriate governance arrangements, including for transboundary basins. Action structured around its implementation offers a shared learning ground within the European Union, but also experience of interest to partners in other parts of the globe.

The International Conference on Freshwater⁶ (Bonn Conference, December 2001) enabled a broad coalition of some 700 international participants to prepare initiatives on water for the World Summit on Sustainable Development (WSSD)⁷ in Johannesburg.

At the WSSD⁸ itself, an important step was taken with the adoption of a sanitation target, complementing the Millennium Development Goal on access to drinking water. Leaders also required the development of integrated water

management and water saving plans. In Johannesburg, EC President, Romano Prodi, launched the EU Water Initiative together with Danish Prime Minister and EU President, Anders Fogh Rasmussen, in order to harness commitment and concrete action to water security for the 21st century. The presidents reflected the willingness of public, private and civil society actors, all of whom were consulted intensively in the run-up to the conference, to establish open coordination to achieve the goals. The European Union has a long history of relations with partners in partner countries and is willing to invest in stepped up partnerships for water security underpinned by continuous dialogue.

The European Union is increasingly engaged in mobilising the best political, knowledge, development and economic capacities of both the partner region and Europe around addressing the specifics of the water crisis in that region. Examples of regional platforms are: Africa; the ASEM context (Asia-Europe Meetings); Eastern Europe, Caucasus and Central Asia (EECCA); Latin America, Caribbean and Europe (ALCUE); and the most water-scarce region of all, the Mediterranean. In particular, President Prodi and the President of Nigeria, Chief Olusegun Obasanjo, signed the EU-Africa 'Water for Life' Agreement at WSSD in Johannesburg, where an EU/EECCA Ministerial Declaration was also agreed. The European Commission is convinced that water issues offer fertile grounds for promoting regional co-operation, peace and prosperity.

⁴ <http://www.worldwaterforum.net/>

⁵ http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32000L0060&model=guichett

⁶ <http://www.water-2001.de/>

⁷ <http://www.johannesburgsummit.org/default.htm>

⁸ <http://www.earthsummit2002.org/es/issues/Freshwater/freshwater.htm#Human%20Right%20to%20Water>

⁹ http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=fr&DosId=172380

¹⁰ <http://register.consilium.eu.int/pdf/fr/02/st08/08958f2.pdf>

COMMISSION COMMUNICATION AND COUNCIL RESOLUTION

In March 2002, the European Commission adopted a "Communication on water management in developing countries"⁹. The European Development Council endorsed, on 30 May 2002, a common Resolution¹⁰ on this issue. These policy papers recognise the importance of addressing the global challenge of growing scarcity and decreasing quality of water resources, particularly acute in developing countries. Water is a key issue for poverty reduction, sustainable development and the achievement of the Millennium Development Goal on water. Under the overarching policy framework of Integrated Water Resources Management, based on a river basin approach, attention should be primarily devoted to:

- Ensuring a supply of sufficient, good quality drinking water, adequate sanitation and hygiene to every human being,

especially the poorest and with a clear focus on the needs of women and children, with the general objective of reducing poverty and improving people's health, quality of life and livelihood opportunities;

- Developing sustainable and equitable transboundary water resources management taking into account all relevant interests, integrating the competing needs of the various users and facilitating South-South co-operation;
- Implementing cross-sectoral coordination to ensure equitable, sustainable and appropriate distribution of water between users of different kinds. This requires the mainstreaming of water management principles into related policy areas.

PRINCIPAL INSTRUMENTS OF EUROPEAN INTERNATIONAL POLICIES

The EC's international co-operation is particularly articulate in five areas: foreign affairs, trade, development, environmental and scientific co-operation. These policy areas in turn make use of many instruments for implementation. They all rely on policy dialogue as the central pillar to create an enabling environment in partner countries and in the Union for whatever joint activities ensue. Because water is so central to the full range of human activities, and indeed for life on Earth itself, all can impact on the ability to achieve the goals of the EU Water Initiative. The annex contains a selection of projects. Web resources (footnotes) on all instruments are on p. 47.

Development co-operation instruments

At a global level, the Commission has actively contributed to summits from Rio 1992 to Johannesburg 2002 and all those in between, supported the World Water Fora and has invested political capital, knowledge and financial resources into the EU Water Initiative. Several lines of the Community budget are being used to address water and environmental problems.

It is most active on regional, national and local levels, where operational capacities, knowledge and investment to improve the situation are most needed. The Lome Convention and its successor, the Cotonou Agreement¹¹, are the main geographically bound instruments for EC co-operation with sub-Saharan Africa, the Caribbean and the Pacific – the 'ACP' states. The conventions advocate "a sustainable balance between economic objectives, the rational management of the environment and the enhancement of natural and human resources". Successive phases of the European Development Fund (EDF) have allocated significant resources to water, ranging from direct support for safe drinking water and sanitation in rural and urban settings in ACP countries to interventions with longer-term effects such as support to forest conservation, re-forestation, hygiene education, more efficient irrigation and support to integrated water resources management (IWRM) and sectoral policy frameworks. Close to €700 million are being spent in on-going projects.

Similar instruments are used to support sustainable water development in Asia and Latin America (ALA)¹², Central and Eastern European Countries (CEEC – TACIS)¹³, the Mediterranean (particularly through the MEDA Programme)¹⁴ and Russia and the other New Independent States (NIS)¹⁵. Within the MEDA Programme, for example, some €170 million goes towards the sustainable use of scarce water resources. Since 1992, the TACIS Programme has committed around €120 million to water management projects.

International scientific co-operation

From 1994 on, the Commission's international scientific research activities have been given a uniform structure (INCO) as part of the Research Framework Programmes (FP4, 1994-1998, FP5, 1998-2002). International CO-operation covers



ACP countries, Asia, Latin America (developing countries), the Mediterranean, Russia and the other New Independent States and Western Balkans. At the time of writing some 100 INCO projects¹⁶ relating to water are on-going and another 186, mostly intra-European, projects are funded through the Key Action 'Sustainable Management and Quality of Water'¹⁷ in FP5.

Under the new Sixth Framework Programme¹⁸ (FP6, 2002-2006), €315 million has been allocated to 'Specific measures in support of scientific co-operation' (INCO)¹⁹ (water being among the focal topics). Another €285 million is available to enable the active participation of teams from partner countries in all thematic priorities of FP6 and giving partners ever improved access to significant scientific knowledge of the European research community. Water is a major focus within the various areas of the thematic priority 'Sustainable Development, Global Change and Ecosystems'²⁰ as well as the thematic priority 'Aeronautics and Space'²¹ in the specific area of 'Global Monitoring for Environment and Security' (GMES).

European Investment Bank

Over the last decade, the annual finance of the European Investment Bank (EIB)²² for water and sanitation projects throughout the world averaged €2 billion. As the EU's financing institution, the EIB operates within the framework of the Maastricht Treaty on European Union. Safeguarding and improving the environment ranks among its top operational objectives. The Bank is participating in the preparations for the EU Water Initiative. It now has new means at its disposal – the Facility for Euro-Mediterranean Investment and Partnership and the Investment Facility, supported by the Commission. While EIB lending is focused on the EU and the accession countries, there is also strong emphasis on financing in the critical water sector in the Mediterranean region. Some 70% (€1.2 billion) of loans for public infrastructure over the last five years related to water supply and wastewater treatment. Its operations in the ACP countries, Asia, Latin America and the Balkans are also undergoing steady expansion. In addition, the EIB is involved in financing environmental schemes in the St Petersburg and Kaliningrad regions in Russia.

FIVE THOUSAND YEARS OF WATER WORKS SUPPORTING DIVERSE HUMAN SOCIETIES

Water management played a critical role in the rise – and collapse – of several earlier civilisations

Since water is so central to human life and more generally to the life support system of the Earth, it is worth looking at how earlier human societies coped with the challenges of food, fibre, shelter, and how their evolving social organisation enabled them to sustain a growing population and complexity.

As early as the fourth millennium BC, the Sumerian civilisation achieved highly productive agriculture on the central Euphrates River floodplain in what is now a desolate region. The surplus generated by the sophisticated irrigation farming then enabled the formation of the first cities and socio-economic specialisation, as confirmed by currently available archaeological evidence. The irrigation required complex social organisation and supported a population growing ten-fold up to an estimated 1 million inhabitants. The Sumerians were also the first to develop a written language, the cuneiform script.



Noria in Hama, Syria, from postcard restored by Aly Abbara.

Why, then, did this successful society decline? Scientists now believe irrigation techniques played an important role in the collapse of Sumer. The Mesopotamian irrigation system consisted of conducting water from the rivers by gravity onto the fields. The rivers were higher than the surrounding land because of the accumulation of transported soil. Once the water was on the fields, it could not be drained, but only percolated or evaporated. Over time, the combined effects of rising water tables and rising concentration of mineral salts spoiled the soils. By about 2 300 BC the fields supported only a fraction of their former production. The tale of salt damaged crops is told on Mesopotamian cuneiform tablets. Food scarcity eventually undermined this great civilisation.

The early development of irrigated agriculture, demography and social organisation, city development and trade involved the Mesopotamian heartland to Egypt, the Fertile Crescent, in what is today the Near East and Eastern Mediterranean, the Indus Valley and Northern China. It supported a great diversity of civilisations and high levels of innovation, particularly the initial networking of cities.

A thousand years later, the Maya civilisation in Central America emerged in the first millennium BC and flourished from 250 AD, based on sophisticated agriculture. Raised plots of earth on which maize and other crops grew, were surrounded by water supply canals. The surplus enabled the development of cities with impressive stone temples and palaces. In order to produce food for the rapidly growing population, hillsides were deforested, leading to increasing erosion and landslides. Archaeological evidence shows anaemia symptoms from skulls and bones of the later period as well as progressive depopulation. No stone building was constructed after 822 AD. Over-farming, deforestation with subsequent soil erosion and loss of productivity were instrumental in spelling the complete demise of this society by 900 AD.

It is not known whether these civilisations fully understood the reasons for their decline or not. But somehow they were not able to muster the social and technical knowledge required to maintain a balance between their society and the natural resources at their disposal. The ensuing lack of food, however, provoked a range of effects, from famine leading to shrinking population to outward migration.

During these times, the global human population was much lower than today. Estimates of population for different periods from ancient to modern times are²³:

Period	Range of world population	Mid-range of world population
Neolithic (10 000 BC to 4 000 BC)	4 to 7 million	5 million
Ancient (4 001 BC to 1 200 BC)	10 to 50 million	25 million
Classic (1 201 BC to 930 AD)	50 to 250 million	150 million
Modern (after 930 AD)	250 to 9 300 ^a million	5 000 million

^a = latest UN population projection for 2050

²³ Adapted from Modelski, G. & W.R. Thompson, 1996. *Evolutionary pulsations in the world economy*, at www.faculty.washington.edu/modelski/WEPULSE.html

Learning from our predecessors in earlier civilisations

Over hundreds of years if not millennia, ingenious hydraulic works serviced a range of water needs, foremost for food production, but also for flood control, transport, direct human consumption, improving micro-climates and supporting industrial activities on different scales. These together with increasing degrees of sophistication in knowledge organisation and transmission, and social organisation have served our predecessors well and supported increasing human populations.

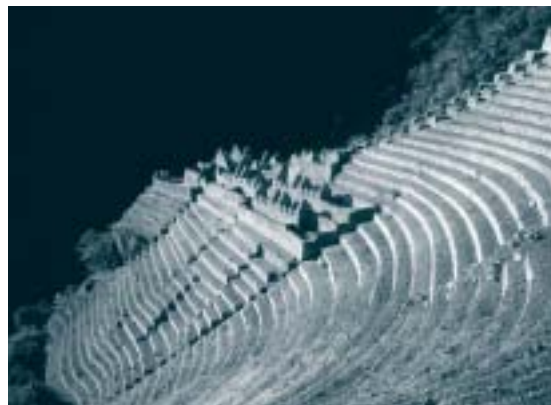
We can look at some outstanding achievements in harnessing water resources for food and socio-economic development in history and learn from these to help deal with today's challenges. Among the examples are the 'tanks', small reservoirs impounded by a dam across a seasonally flooded depression, which are still widespread in India and Sri Lanka. These date back to ancient times for enabling irrigated agriculture. An EC development project operating between 1984 and 1996 in Tamil Nadu with a budget of €65.8 million, involved lining the main irrigation and drainage canals and carrying out other essential maintenance work. During a later phase, much more



The 'Kasria' of the Ouled Said Oasis in Adrar, Algeria, serves to distribute the waters of the ancient foggara in an equitable way.

emphasis was placed on farmer participation and response to their expressed needs in order to enable economically viable and sustainable tank modernisation. Responsibility for operation and maintenance was turned over to water user organisations, which in turn increased equity of water distribution.

The most sophisticated forms of water harvesting consist of groundwater tapplings, including the famous *qanats* originating in Iran some 3 000 years ago. *Qanats* or *kariz* are tunnels dug into uphill aquifers conducting water by gravity to use in lowlands. The system spread to the Middle and Near East as far as Algeria (*foggara*), Morocco (*khottara*) and into Andalusia (*madjirat*), but is also known from China and sites in Mexico, Peru²⁴ and Northern Chile. These systems were enabled by strong community organisation and were sustainable because they could only withdraw as much as was replenished through



Cuzco Region, Peru. Winay Wayna Inca ruins.

the water cycle. Until the advent of cheap motor pumps, particularly since the 1970s, these tunnels were maintained and functional. They still account for significant shares of water supplies in Iran and elsewhere.

While much of Europe was under the medieval feudal system and had lost touch with its earlier achievements, Abd Al Rahman I of the Umayyad Caliphate reached Spain in the mid-700s. He became the first Caliph of Al-Andalus, which occupied most of the Iberian Peninsula and set up the Umayyad Dynasty that ruled for over 300 years. The Berber, or Moors as they were called in Europe, imported irrigation systems from Syria and Arabia, turning the dry plains into a rich agricultural region.

Meltwater from the mountains was canalised for percolation into the lower ranges so that water could be gravity-fed in early summer to irrigate elaborate hill-side terraces and lower areas. This system still exists in the Alpujarra region in Spain, though changing lifestyles have led to rural exodus, insufficient maintenance and partial collapse.

The Moors complemented traditional olives and cereals by fruits and vegetables, rice, henna and cotton introduced from Africa and India. Fertilisation allowed high productivity. Landscaping and gardening provided pleasant micro-climates during the summer heat and some of the most beautiful gardens still in existence today.

Extensive knowledge exchange existed between the civilisations through time and space, as exemplified through the network of Buddhist monasteries lining the 'Silk Roads' between 100 BC and about 1 500 AD and long-range communication through Islamic pilgrimage to Mecca, also favouring trade. The ability to innovate, organise, share and apply knowledge seems to have been a key factor in determining how societies coped with change, either brought about by demands on self-organisation in greater communities or with environmental, political and economic developments exemplified in their investment into water management.

²⁴ Laureano, P., 2001. *Atlante d'Acqua. Conoscenze tradizionali per la lotta alla desertificazione*. Milano, Bollati Boringhieri, 424 p.

BALANCING PEOPLE AND NATURE – INTEGRATING APPROACHES

This section explores recent experience addressing the challenges posed by the need for food and safe water in partner countries and regions, home to 80% of the world's population. Particular emphasis will be placed on various forms of international EC co-operation. At last count, 261 transboundary river basins exist where two or more states share water resources²⁵. They cover 45.3% of the global land area (except Antarctica). Because of the great variation between regions, emphasis will be placed on regional approaches as a functional scale at which many problems and challenges need to be approached. Some principles and focal areas cut across regions and can influence where the EC investment into international co-operation on water issues goes. Similar principles apply to river basins within national boundaries.

Therefore, this section will look first at some of the structuring and policy approaches, then at safe water and basic sanitation, which are crucial for human health and quality of life. It will also address water for food production (farming systems) and domestic and urban/industrial consumption. The final part discusses how the multiple and often conflicting demands can be brought in line with what natural ecological systems can support through more generalised adoption of integrated and basin-approaches, and how the EU Water Initiative should work towards achieving its very ambitious goals.

Development co-operation puts emphasis on functional 'focus areas'

Until recently, development co-operation on water-related activities in ACP countries often meant drinking water supplies and basic sanitation. This was a valid priority during the Water Decade, with improvements in public health and disease control as the key motivation. In other regions, namely the New Independent States (NIS), the focus was on pollution of shared catchments. Investments in irrigation were categorised as agricultural development, while dams and major public works

where categorised as transport, power or infrastructure projects. The talk was – and sometimes still is – of a 'water sector', when no such unified sector exists. The convergence of many trends briefly alluded to above into what is now perceived as a global water crisis requires rethinking and a much more integrated approach to policy, planning and action, modulated in a way that allows compatible action from local to regional.

The EC's development co-operation has found it helpful in most regions to regroup different kinds of activities, in which water is central or in which water-related investments are important, into four 'Focus Areas'. These address functions rather than technical aspects in isolation: one cross-cutting focus area called "Water resources assessment and planning" (WARP) and three specific societal functions, namely "Basic water supply and sanitation services" (BWSS), particularly in rural and marginal urban areas, "Municipal water and wastewater services" (MWWS), addressing major urban installations and their management, and "Agricultural water use and management" (AWUM).



Dedougou, Burkina Faso. Water well built with foreign aid.

© Jan Banning / Pictos Pictures

²⁵ http://www.transboundarywaters.orst.edu/publications/register/register_paper.html

²⁶ http://europa.eu.int/comm/development/publicat/water/en/frontpage_en.htm

DEVELOPMENT COOPERATION GUIDELINES

'The guidelines for water resources development co-operation'²⁶ provide a unified framework against which such co-operation is being developed using instruments such as the European Development Fund (EDF) and technical and economic co-operation with Latin America, Asia and Mediterranean regions (ALA-MED). The guidelines are centred around Project Cycle Management (PCM) and underpinned by policy principles applicable at a programming

and project level that reflect the wider range of issues now considered essential for effective water resource management and use. Six sub-principle groupings are considered namely: management and institutional, social, economic and financial, environmental, information, education and communication, and technical. A checklist approach offers guidance for resolving dilemmas and difficulties contained in the practical implementation of policy principles.

More generally, the EC's approach to co-operation for the equitable, efficient and sustainable use, stewardship and management of water resources means that policy and practice should meet a set of guiding principles. Voluntary co-operation needs to be based on mutual respect and underpinned by continuous interactive dialogue. Policy-makers can learn some principles from systems which served various societies well over extended periods of time. A few of these stand out. They are increasingly recognised by governments and organisations involved in development co-operation as crucial for reversing the global water crisis into an opportunity for positive change in order to meet the goals set by global political decision-makers and adopted by the EU Water Initiative. Among the guiding principles, equity, sustainability, transparency and accountability are perhaps the most critical. In addition, blending old and new, and ensuring citizen participation have proven to be the most effective ways to get widespread acceptance for new and necessary innovation. This has been the experience in innumerable co-operation projects and formally confirmed by research²⁷.

An integrated approach to water resources management (IWRM)

The broad picture emerging from abundant case material in practically all regions of the globe is that large centralised systems, which require very substantial capital investment, complex management and often with a single focus, are becoming less attractive for new investment. Such systems may be large dams, irrigation schemes or even huge urban water systems. The strain on resources that has built up to substantial levels in many parts of the world has left few opportunities for the cheap development of ample untapped resources. Their negative effects in terms of destroying essential habitat and negatively impacting freshwater fish biodiversity²⁸ is well-documented, as is the case with specific land habitats being transformed and thereby threatening the survival of many rare plants and animals.

Existing water schemes have significant efficiency reserves when it comes to reducing losses through technical measures, such as better maintenance of pipes and canals. Various types of adjustments to give water users a higher stake in allocation and management have been shown to hold great potential for realising higher efficiency. These include sub-dividing grand irrigation schemes into smaller components with an ability to time and target flows that are more in tune with crop needs and reducing the disadvantages of downstream plots, thus raising overall productivity. In addition, habitat restoration enticed by socio-economic valuation of wetlands for water purification will have other induced effects, such as biodiversity conservation. Other implications, for example, on public health, need also to be considered.

The scale of mismatch between supply and demand requires an overall rethink and restructuring well beyond technical efficiency measures, although these will play a most necessary and useful role. New schemes in many regions are likely to be of a smaller scale, especially if they are to be primarily or

exclusively financed by private sector investment, which tends to be deterred from very high capital outlay with very long pay-back times. The historic track record of such schemes shows that delays and cost overruns are habitually encountered in big schemes and that these have a significant impact on their overall profitability.

Emphasis is not only on increasing efficiency, but also on reuse and recycling. This applies to industrial processes, in aquaculture, but also to the smart sequencing of water uses, for example, using domestic 'wastewater' to water public gardens or for peri-urban agriculture. Much research is going on in this direction, but is only slowly translating into innovation. Favoured by greater emphasis on education and training, this will open new investment opportunities of high knowledge content, requiring more modest capital requirements. In coastal zones, desalination will also increasingly be an option as cheap supplies of wind power or solar energy become available.



© EC Delegation in Niger

Example of a cement tube well in Azelik Village, Upper Niger.

Policy formulation and judicious use of fiscal and other incentives for policy implementation will determine the speed and degree of adoption of new approaches. The more the approach to water use and management is perceived as being 'owned' by communities – rather than being imposed from outside or being perceived as such – the more effective the policy and its implementation will be. The specific options will have to be analysed in relation to each region and locality in relation to its environmental conditions, economy, social organisation and body of formal and customary laws and regulations, not to mention projected or actual influence through globalising trade and developments in renewable energies.

Much more integrated approaches to water resources management are thus slowly emerging. They take into account not only the engineering, but also environmental, socio-cultural, economic, financial and institutional dimensions. The EU is

²⁷ By way of examples: <http://www.nuffic.nl/ciran/ikdm/2-1/articles/dialla.html> (Dialla: soil and water conservation in Burkina Faso); http://www.geocities.com/jacinta_palerm/noruega.html (J. Palerm-Viqueira, Self-management's mobilisation capacity in irrigation in Mexico); http://www.inpim.org/Library/rab_phil.pdf (N. Raby, Participatory irrigation management in the Philippines: National irrigation systems. EDI Participatory Irrigation Management Case Studies Series, 65 p.)

²⁸ <http://www.fishbase.org> – see also IUCN Red List of endangered species

committed to this approach, particularly for national and trans-boundary river basins and has enshrined it in the recent legislation of the Water Framework Directive. Partner regions have made political commitments in favour of developing IWRM approaches, for example, in the Accra Declaration adopted by the African Ministers Conference on Water (AMCOW) and in the New Partnership for African Development (NEPAD). In addition, countries in Eastern Europe and the South Caucasus are particularly interested in harmonising their regulatory approaches with EU legislation and thus adopt the IWRM approach and principles of the EU Water Framework Directive. Particularly in transboundary river basins, integrated water resource management is seen as a catalyst for peace, security and sustainable socio-economic development.

...more investment in education, research and innovation will be required in the future

This paradigm change will require important investments in interdisciplinary research in order to increase understanding and quantification of the factors influencing the way societies relate to their natural resource base, particularly water. Multiple

interfaces with all parts of society need to be developed or better articulated to strengthen the innovative impact of research in societies. The combination of increased quantity and quality of societal investment in knowledge and its uptake is a critical part in re-balancing the value of knowledge, learning and spiritual comfort on the one hand and material consumption on the other.

Another on-going thematic network composed of four Indian and three European partners looks into policy options of water management in agriculture, industry and domestic contexts. The “*Thematic Network on sustainable policies for promoting ‘water conservation technologies and practices’*” (SUSTAIN WATER)²⁹ analyses the sustainability initiatives which have a bearing on water-related policy issues, in order to provide policy and decisions-makers with suggestions for new models for enhancing sustainable development within the context of water quality and its availability.

²⁹ <http://www.sustainwater.com>

³⁰ <http://www.geog.ox.ac.uk/~prinwass/>

BARRIERS FOR PRIVATE SECTOR INVOLVEMENT

An on-going interdisciplinary research co-operation on “Barriers and conditions for the involvement of private capital and enterprise in water supply and sanitation in Latin America and Africa: Seeking economic, social, and environmental sustainability”³⁰ (PRINWASS) investigates the increased but uneven expansion of private capital investment in the water sector of developing countries. It analyses the existing theories being applied in water improvement programmes in the 1990s underpinning this expansion. Available data suggest that inequality in the access to water and sanitation services in Latin America may have worsened as a result of the highly uneven private investment flows in the sector. These have been concentrated in the wealthiest areas of



Water figured prominently at the World Social Forum in Porto Alegre, Brazil, in 2003.

a few countries. In addition, most of this investment has been in water supply while sanitation has received minimal attention. Sustainability of water supply and sanitation services (WSS) goes beyond environmental considerations and entails dimensions such as equity, economic viability, policy and public accountability. These receive particular attention in the case studies supporting the analysis.

The collaboration is developing an indicative framework of strategy and processes for sustainable WSS in developing countries. These guidelines take into account the roles of the state (national, regional, and local government levels), civil society (user associations, citizen movements), market forces (privatised water utilities), and their interrelations (public-private partnerships, other

forms of private sector involvement in WSS). The project mobilises a growing number of partners (originally eight, currently 13) and associated organisations, in Africa and particularly in Latin America and Europe. These reach beyond research centres to include educational institutions, foundations, international organisa-

tions and NGOs, and interact with public authorities, citizen groups, water utilities and other stakeholders. A series of workshops and participation in conferences, in addition to publications and the project’s popular website allow for the wide circulation and debating of the research results and ‘testing the waters’ for adjusting policy and management.

SAFE WATER AND SANITATION – COST-EFFECTIVE APPROACHES THAT WORK

During the 1980s the United Nations spearheaded an 'International Drinking Water Supplies and Sanitation Decade' to bring water and sanitation to the millions of people in developing countries without access to these basic services. Fifty litres of clean water a day are considered necessary to stay healthy – for drinking, washing, cooking, sanitation and personal hygiene. And yet in 55 countries, this standard is still not met. A decade later, despite considerable effort, demographic growth and particularly rapid urbanisation have outstripped developing countries' capacity to build pipelines, develop distribution, drainage and management systems, dig latrines, bore, pump, and connect users to the water supply, and treat, recycle, and re-use waste safely. As convenient and easily accessible water resources are exhausted by thirsty and often inefficient irrigation, wasteful city infrastructure (40% losses in distribution systems throughout the world are not uncommon) and industries, there is less opportunity for cost-effective building and operating new engineering works.



© Alistair MacDonald

'Smoky Mountain' waste dump in Bangkok, Thailand.

Instead, new investment should, where necessary, adopt new approaches that are more cost-effective and address at least some of the limitations identified with conventional waterworks and their management. In water-scarce areas, analysis of the different functions may help reduce water wastage, for example, by replacing it by other media for heat exchange and the

transport of sewage. In peri-urban and rural areas, community-based approaches, including awareness campaigns, public health and hygiene training and appropriate sanitation technologies, have demonstrated their ability to bring about tangible improvements. End-user participation has invariably been important to success. Such lessons need to be taken into account in planning future co-operation for water supply and sanitation.

The EC supports innovation and appropriate action on the ground

The EC is supporting partner countries in their efforts to increase water efficiency in existing water supply and sanitation systems, including appropriate technology transfer, institutional reform, incentive and cost-recovery schemes based on a more appropriate valuation of water for different life support and socio-economic functions. The principal aim is to devise appropriate modalities for bringing sustainable water and sanitation services to vulnerable or formerly excluded segments of the population. EC-sponsored research has generated a wealth of knowledge founded on traditional practice and adapted to specific climatic, environmental and socio-economic conditions. EC development co-operation has also been very active in this field in many countries. Better linkage between all forms of international co-operation and to partner country's own crucial efforts can boost progress towards the Johannesburg and EU Water Initiative goals. The few examples provided do not even begin to illustrate the range of on-going progress and opportunities for further progress in partner countries (see Annex and websites for more examples).

A large number of aid projects address drinking water supply and sanitation directly and have a concrete impact on providing such services to literally millions of people. Learning from past experience and implementing "The guidelines for water resources development co-operation" (see page 9), recent projects embed technical considerations in crucial policy support and management capacity-building. Practising community participation is critical to sustainability. Examples include on-going and planned water projects in Chad, Mauritania, other Sahel countries, Ethiopia, Uganda and several other East and Southern African countries, Tunisia, and island states such as Samoa, Dominican Republic and Grenada. In Mauritius (Indian Ocean) several EDF projects, in place since 1998, address improvements to sewage treatment and strengthening the capacity of the newly-founded Waste Water Management Authority. By 2003, another project will rehabilitate the sewerage system in Mwanza on the Tanzanian shore of Lake Victoria, thus improving the quality of water discharge into the lake. This is expected to reduce the instances of water-borne diseases. In the case of "Basic water and sanitation services in Uganda", sponsored from EDF resources, a partnership with NGOs was supported to strengthen community-based development. Since 1990, grants

have been provided to 16 NGOs for 29 different activities, from gravity-fed supplies to spring protection, hygiene education and capacity-building for local organisations to strengthen their self-help potential.

Currently through TACIS, the EC supports major water supply and waste water treatment investment projects in the NIS (St. Petersburg, Kaliningrad, South Ukraine). In Albania alone, in the Western Balkan region, the Commission is currently implementing six projects in water and sanitation services (WSS) funded with a grant of €28 million. Between 1991 and 2001, the EC water portfolio in the country amounted to €41 million.

Europe has accumulated considerable experience in innovative approaches to using rainwater collection, initially through an international research collaboration³¹. INCO enabled partners from developing countries to take part in the International Conference on Rainwater Catchment Systems, which took place in Germany in September 2001, in order to share knowledge demonstrating that rainwater harvesting is a valid contribution to alleviating water scarcity, particularly for household water security. The goal of linking practitioners, researchers, water policy-makers, manufacturers, clients/prospective users was successfully achieved. In addition, participants included rainwater harvesting as part of the 'World Water Vision' and prepared inputs for the International Conference on Freshwater, held in Bonn at the end of 2001, and the WSSD in Johannesburg in September 2002, thus offering a mechanism that 'gives a voice' to partners.

Learning in Europe...

"Potable water distribution management" (POWADIMA)³² is a modelling and monitoring approach towards reducing critical leakage and energy usage, and thus future demand on water resources. Reduced demand may result in deferring or avoiding heavy capital investment. This project tests the feasibility of improved monitoring of water networks to enhance control and management, and explores cost-effective approaches that can be adapted to different institutional and economic contexts. Acquired knowledge is complemented by other intra-European collaborations such as "Assessing infiltration and exfiltration on the performance of urban sewer systems" (APUSS)³³. Various other on-going projects work on the development of integrated decision support systems for the rehabilitation of water supply (CARE-W³⁴), sewer (CARE-S³⁵) and wastewater services (SWAMP³⁶, AQUAREC³⁷). Research is also targeted at future developments in compliance with the Water Framework Directive (CD4WC³⁸) based on more integrated modelling and performance indicators adapted to local contexts and the sustainability of urban water systems, including the impact of pollution (AISUWRS³⁹). At the same time, projects are combined in clusters, such as CITYNET⁴⁰, in order to promote integration of on-going research and its wider dissemination and application. Stakeholder participation ranging from research institutes to end-users provides an opportunity for testing new knowledge and orienting work to respond to real needs.

... and learning and acting together with partners in other regions...

"Development of cost-effective reclamation technologies for domestic wastewater and the appropriate agricultural use of the treated effluent under (semi-)arid climate conditions" (CORETECH)⁴¹ is a research collaboration between three Southern Mediterranean and three European research teams signalling a major paradigm shift towards considering domestic wastewater as a resource. Treatment and re-use will address several concerns concomitantly, such as health risk, agricultural soil improvement. Treatment will be scaled to low-grade applications (in cotton production, trees and animal fodder) requiring only plain, low-cost techniques and reduced energy demand. It is just one example of a systems perspective adapted to local conditions in the Southern Mediterranean.



© Alkisar/MarcDonald

Children playing and washing in a canal, Indonesia.

"Sustaining changes in hygiene behaviour (Working towards higher effectiveness of water, sanitation and hygiene promotion programmes)"⁴² recognises that changes in hygiene behaviour are crucial to the health impact from water and sanitation facilities. This Concerted Action brings together experiences from three continents to help understand the conditions under which changes in hygiene behaviour promoted by various projects

³¹ <http://eng.warwick.uk/dtu/rwh/eu.html>

³² http://dbs.cordis.lu/cordis/cgi/srchidadb?ACTION=D&SESSION=&DOC=1&TBL=EN_PROJ&RCN=EP_RCN:52968&CALLER=EN_UNIFIEDSRCH

³³ <http://www.insa-lyon.fr/Laboratoires/URGC-HU/apuss>

³⁴ Computer-aided rehabilitation of water networks
<http://www2.unife.it/care-w/>

³⁵ Computer-aided rehabilitation of sewer networks –
<http://www2.unife.it/care-w/cares/index.html>

³⁶ <http://www.swamp-eu.org>

³⁷ <http://www.ex.ac.uk/cws/paquarec.htm>

³⁸ Cost-effective development of urban wastewater systems for Water Framework Directive compliance

³⁹ <http://www.uni-karlsruhe.de/~ibk/FORDAT/PROJEKTE/ka8176.htm>

⁴⁰ <http://www2.unife.it/care-w/citynet1.html>

⁴¹ <http://www.medaqua.org/forum/CORETECH.html> and
<http://home.birzeit.edu/eng/projects.htm>

⁴² http://dbs.cordis.lu/fep/cgi/srchidadb?ACTION=D&SESSION=281962003-13&DOC=1&TBL=EN_PROJ&RCN=EP_DUR:36&CALLER=PROJ_INCO2

and initiatives take place and are sustained. Analysis of field research is generating new insights, which are being widely disseminated thanks to active participation of management agencies, educational establishments and NGOs. The African partners in Uganda and Ghana are also associated with development co-operation projects and will help to translate research insights into innovative action.

This is just the latest project in a move to promote and enable the integration of water, sanitation and hygiene considerations into the strategic planning and practical management of health care services. Other work between Brazilian, Turkish, Israeli and European teams showed the health hazards of toxic

cyanobacteria⁴³ (part of the natural phytoplankton in freshwaters and the sea). Documented incidents have grown exponentially over the last 50 to 100 years in many parts of the world, often in relation to eutrophication (overfertilisation from non-point sources and ensuing water quality degradation and health hazards).

⁴³ <http://www.linecyano.org/>

⁴⁴ <http://www.fen.bris.ac.uk/engmgt/swg/research/aquapol/html/project2.html>

MASIBAMBANE, A WATER SERVICES SUPPORT PROGRAMME IN SOUTH AFRICA

A three-year water services sector support programme (WS-SSP) in South Africa is supported by the South African government, the European Commission and the bilateral aid programmes of four EU Member States – UK, The Netherlands, Ireland and France – to the tune of about 2 220 million Rand (€334 million, including an EC budget support grant of €75 million). The objective of the programme is to provide basic water supply and sanitation services through a variety of activities including the support of strategic policy development, water and sanitation services provision to selected poor rural communities in three provinces (Northern Province, KwaZulu Natal and the Eastern Cape). The project also provides institutional support to assist various levels of public sector institutions, with an emphasis on stakeholder dialogue. In some instances new institutions such as district councils, catchment management agencies and community structures will be established. Good governance and continued coordination among various actors are recognised as being critical to the sustainability of the programme and its effects. The main expected results include:

- Reviewing and updating policy and legislation for the water and sanitation services sector in South Africa, orienting the sector towards consumer-driven interventions.
- Providing approximately 2.4 million people in the Northern Province, KwaZulu Natal and the Eastern Cape with sustainable water and sanitation services.
- Including health and hygiene education in all infrastructure projects.
- Improving the technical, managerial and administrative capacity of key role players (specifically the capacity of Local Government and Department of Water Affairs and Forestry (DWAFF) structures, Water Service



© European Commission (EPRD/RSA)

Authorities and Water Service Providers, but NGOs and private sector will also be involved).

- Strengthening the sector's integrated planning and coordinated management.
- Establishing a gender unit within the water services chief directorate of DWAF.

An INCO research collaboration between several Southern African and European teams that looks into "The policy implications of contamination of rural water between source and point-of-use in Kenya, South Africa and Zimbabwe" (AQUAPOL)⁴⁴ has found that costly water supply infrastructure alone, often confined to urban settings, does not achieve enhanced health outcomes in vulnerable groups, for example, children in poor rural households. Cultural practices or lack of information are shown to lead to contamination between point of source and use and thus greatly diminish the effects of such investments. The project is producing trying to find the right balance between 'hardware' and 'software' in water policy formulation, implementation and education that will be very useful for the Masibambane WS-SSP and other efforts in the region.

CATCHMENT BASIN APPROACHES – STRATEGIES FOR RECONCILING MULTIPLE DEMANDS

River basin approaches are increasingly advocated in national and international fora and form the foundation of recent EU internal legislation, such as the 2000 Water Framework Directive. A worldwide assessment of transboundary relations over the last 50 years suggests indeed a strong preference for co-operation, despite some well-known and highly publicised conflicts⁴⁵. The available evidence also suggests that acute conflict often centres on such factors as quantity and infrastructure (for example, dams and reservoirs). Other frequently cited factors, such as climate, basin water stress, relative power or dependence on freshwater resources for agriculture or power generation, seem not to have statistically significant correlation with conflict. Conversely, high population density in the catchment, low *per capita* GDP and overall unfriendly relations between countries hint at some conflict potential, particularly when associated with rapid change.

In addition to environmental, engineering, economic, regulatory and legal aspects, social dimensions are crucial to sustainable approaches. In particular, socio-economic and anthropological research has documented – as confirmed by development co-operation – the different ways in which technological choices impact on different groups in societies, be they distinguished by gender, ethnicity, age, education or wealth. Focusing on people and leaving room for participation are therefore key principles of sustainable water management that can reconcile multiple demands through fair allocation.

Supporting decision-making for integrated river basin management in Europe

Characteristic of the work in river basin management at European level is CATCHMOD (Integrated catchment modelling)⁴⁶. This is a 'cluster' project acting as an integration platform for various research projects and 150 European institutions. It specifically aims at harmonising work on modelling tools needed by water authorities to improve integrated water resources planning and management at river basin scale. Its results are also intended to support the implementation of the Water Framework Directive, and other key EU policies (for example, agriculture, regional development) and provide, among others, a better understanding of the role of stakeholders' participation, the impact of institutional mechanisms and the importance of risk assessment methodologies.

Another example is the DANUBS⁴⁷ project, which focuses on nutrient management in the Danube basin and its impact on the Black Sea. It pursues an interdisciplinary analysis of the Danube catchment, the Danube River system and the mixing zone of the Danube River in the Western Black Sea in order to contribute to sound political decision-making and a more effective river basin management.

The Black Sea Basin has been seriously damaged by agricultural and industrial pollution, including nutrients and wastewater discharges that are carried by the Danube. Their combined effects have affected the eco-system, biodiversity, fishery and tourism activities. TACIS has allocated €10 million to the Black Sea Environment Programme (BSEP), making it one of the main contributors. Current activities comprise assistance to the Regional Activity Centres in the NIS countries to strengthen monitoring, priority-setting for pollution reduction, biodiversity conservation, and data and information exchange. It also plans to co-fund with international financial institutions a waste-water treatment plant in the Black Sea region.

How to improve conditions in the Caspian and Aral Sea basins

The Caspian and Aral basins are two other large areas affected by deteriorating environmental and health conditions with negative impacts on socio-economic activities.

The Caspian basin is threatened by pollution from the Volga and other rivers (the Kura, for example) as well as spillages from the oil and other industries, which affect biodiversity



© Dieter Telemans / Panos Pictures

Between Muynak and Ucgay, on the shores of the Aral Sea, Uzbekistan. Women pushing a pram along a track beside what remains of the Aral Sea.

⁴⁵ <http://www.transboundarywaters.orst.edu/projects/bar/>

⁴⁶ http://www.info.wau.nl/eesd1_1/

⁴⁷ <http://danubs.tuwien.ac.at/>

(especially valuable sturgeon species), fisheries and tourism. High levels of pesticides and evidence of continued use of DDT are a particular source of concern for the exposed population. TACIS has supported the Caspian Environment Programme (CEP), helping to establish the CEP framework and carrying out the main part of the technical research required to develop the Caspian Strategic Plans. Current activities focus on the management of fish resources, pollution reduction and prevention. TACIS also supports preparation and financing of investment in water projects.

Since 1962, diversion of water resources from the mighty Amu Darya and Syr Darya rivers has shrunk the Aral Sea to a fraction of its original size. These rivers used to replenish the Aral Sea in Central Asia with about 50 km³ per year. The water has been diverted into the development of massive irrigation schemes, primarily for cotton cultivation and rice paddies in Uzbekistan and Turkmenistan and, to a lesser degree, Tajikistan and Kazakhstan in Central Asia. By 1995, the remaining water supplied by the two rivers amounted to a trickle, just 2 to 3 km³. Between 1960 and 1995, the lake's surface area shrank from 64 500 km² to less than 30 000 km². It also dropped 19 meters and its salinity tripled. More than 50 lakes in the Amu Darya delta dried up and its wetlands shrank from 550 000 hectares to less than 20 000 hectares. By now, the Karakum and Kyzylkum deserts meet on the Aral's former seabed.

Receding lake waters left behind ghost towns from what were once fishing communities (commercial fishing ceased in 1982), a saline dust bowl, health problems and uncounted social distress for the 5 million people living in the region around the lake. Numerous research collaborations have analysed the context and continue to provide knowledge for remedial action. Selected projects address some key aspects: "Desertification in the Aral Sea region: A study of the natural and anthropogenic Impacts" (ARAL-KUM)⁴⁸. "Crop irrigation management for combating irrigation induced desertification in the Aral Sea basin" (CIRMAN-ARAL)⁴⁹, focuses on developing strategies for water saving through improved irrigation scheduling and field practices, thus reducing water demand for agriculture, improving control of drainage water and soil and water salinity. "Prevention of land degradation in the Aral Sea region undergoing disastrous desertification by increasing tolerance of symbiotic nitrogen fixation



Example of a small dam aiming at reduction of erosion by flash floods, Tunisia.

(SNF) to salinity" (PLADADINFIS)⁵⁰, aims at reducing land degradation in Kazakhstan and Uzbekistan.

TACIS has supported the Aral Sea Basin Programme through the "Water resources management and agricultural production in Central Asian Republics projects" (WARMAP). More than €10 million has been committed for that purpose and these have contributed to the preparation of inter-state agreements on water management, the creation of a regional information system (WARMIS) and the analysis of water use and farm management (WUFMAS).

Water-stressed Mediterranean seeks to develop basin approaches

The area of highest water stress in the world is the Southern Mediterranean. A region with a very young and still fast-growing population by any standard, it has the lowest *per capita* availability of water and the highest actual use of all potential freshwater resources. Unsurprisingly, water is among the priorities in scientific, technical and economic co-operation between Europe and Mediterranean partner countries. This is underpinned by various forms of policy dialogue, in particular the Barcelona Process, also known as the EURO-MED Partnership⁵¹, which is currently being rendered more dynamic. It is recognised that basin-wide approaches hold the greatest promise for strengthening co-operation rather than conflict over water. At the same time, it is understood that water management includes not only technical and environmental dimensions, but that it also requires much greater attention to its economic, social and political dimensions.

A number of other scientific co-operation projects reflect the need to base future co-operation on multifaceted analysis and knowledge. The "INCO project cluster for water resource management in the Mediterranean" (MEDAQUA)⁵² is composed of some 30 projects linked through workshops and frequent exchanges in order to increase cross-fertilisation, outreach and thus impact.

MEDA⁵³ is the principal instrument for implementing the Euro-Mediterranean Partnership and one which can amplify the knowledge generated through joint research. Its activities in relation to the sustainable use of scarce water resources focus mostly on environmental dimensions and agricultural water use, which account for the lion's share of overall demand. It is particularly active with numerous projects in Egypt, Tunisia and Morocco.

⁴⁸ <http://ksk-mhi.narod.ru/Aral/Aral800.htm> and <http://modb.oce.ulg.ac.be/Colloquium/2003.html>

⁴⁹ http://www.icwc-aral.uz/cont_en/partner/copern/

⁵⁰ http://www.gm-unccd.org/FIELD/Multi/EU/Kaz/PJ_Prev.htm

⁵¹ http://europa.eu.int/comm/external_relations/euromed/

⁵² <http://www.medaqua.org/>

⁵³ http://europa.eu.int/comm/external_relations/euromed/meda.htm

PROTECTING MOUNTAINOUS UPSTREAM AREAS



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A panoramic view of Mardi watershed together with Mardi Mountain and Mt. Machhapuchhre in the background.

As part of the natural water cycle, most rivers originate in mountainous areas and whatever happens upstream will affect regions further down in the basin. Upstream regions and their fragile ecosystems are particularly important for water storage, groundwater replenishment and flood control, but render many other important goods and services. They are fundamental for the overall hydrological regime of the affected countries and often have great spiritual, cultural and historical value for people, not only of the mountain regions themselves. The rise in temperature over the last decades has set in motion a significant shrinkage of mountain glaciers, a process which accelerated during the 1990s. For example, with the shrinking of its ice cap by 33% between 1989 and 2000, Mount Kilimanjaro in Tanzania will be ice-free by 2015 if current trends persist.

Already a relatively modest rise of 1 to 2°C results in a shift of precipitation from snow to rain. In the past, at lower temperatures, much of the abundant winter precipitation would fall as snow, compact into ice in the glacier and then released gradually during the seasonal melting of the dry summer months. Now, a high percentage comes down as rain leading to much more frequent flash floods and longer dry period during the rest of the year. These patterns are observed in all major mountain ranges, from the Alps, the Andes, the Himalayas to the Rocky Mountains. The ice sheet in the Himalayas is the third biggest in the world, after the Antarctic and Greenland, and all of the



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The view of Mardi watershed from the valley: forest, grazing land and cultivated lands are major land uses in the watershed.

great rivers in Asia originate there – the Indus, Ganges, Mekong, Red River, Yangtze and Yellow rivers. Tangible effects on the water regime may thus be expected for a number of Asian countries, including Bangladesh, China, India, Pakistan, Thailand and Vietnam. Together these countries account for half of the global population.

Changes in land-use pattern, particularly deforestation in the upper regions, overgrazing and other interventions are increasingly recognised as additional, more local, drivers in increasing desertification and changing flood behaviour downstream. They compound the global change effects sketched above. An INCO research collaboration between three European and three Asian partners is currently working on “An interdisciplinary approach to analyse the dynamics of forest and soil degradation and to develop sustainable agro-ecological strategies for fragile Himalayan watersheds” (HIMALAYAN DEGRADATION)⁵⁴.



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The view of irrigated rice terraces that are prevalent in the valley floor and in hill slopes.

This project adopts a systems approach linking recent histories of socio-economic development through bio-economic models to land-use scenarios. In selected watersheds, GIS models of the recent trajectory of land use will be derived through remote sensing to give a baseline for future predictions. Field experiments, household surveys and participatory research will be used to define sustainable management strategies aimed at avoiding further land degradation. The major outputs of the project will be models linking development with land degradation and recommendations for sustainable land management practices in the Himalayan region.

Applying accumulated knowledge from past research and practice in Vietnam, several donors have entered into a partnership in support of the country’s “Forest Sector Support Programme” (FSSP). The EC is contributing substantially to the programme. The EC has also allocated €57 million to three major development and conservation projects for the upland areas (including irrigation and basic water supply and sanitation): the “Social forestry and nature conservation project”, the “Cao Bang-Bac Can rural development project” and the “Son La-Lai Chau rural development project”.

⁵⁴ http://dbs.cordis.lu/fep/cgi/srchidadb?ACTION=D&SESSION=38962003-1-3&DOC=7&TBL=EN_PROJ&RCN=EP_DUR:48&CALLER=PROJ_INCO2

SUSTAINABLE LOWLAND-USE AND IRRIGATION

With a projected human population of over 9 billion by 2050 and already strong strains on water resources to meet today's requirements for food and drinking water, the need for innovation is overwhelming. Indeed, after four decades of growth fuelled by international research and co-operation, the global harvest began to falter in the second half of the 1980s. Between 1950 and 1984, *per capita* grain production had grown from 246 kg to 345 kg. Throughout the 1990s the global production hovered around 300 kg per person and, luckily, prices did not increase in a consistent manner. Thanks to a combination of new seeds, fertiliser and pesticides, high-yield farming doubled the world's grain production between 1960 and 2000, thus keeping in tune or slightly ahead of demographic developments. More than 90% of this overall increase came from irrigated land with water use increasing from about 1 500 km³ to 2 500 km³.

Despite some progress, much of this irrigation is still inefficient and salinisation of irrigated land is a growing problem in many countries. In Uzbekistan and Turkmenistan up to 80% of the irrigated soils may have suffered salt damage already. While percentages are much lower in major grain producing countries such as China and India (15 and 17% respectively), the absolute area affected is higher because of their size. The gradual fall, since the late 1980s, of *per capita* irrigated area, the existing strains on both the quantity and quality of surface and sub-surface waters, combine with the encroaching effects of global change.

A research collaboration between European and key Chinese institutions is developing a "Policy decision support for sustainable adaptation of China's agriculture to globalisation" (CHIN-AGRO)⁵⁵. China is facing challenges to its food production as its population grows, prospers and wants more animal protein in their diet. The country has recently joined the World Trade Organization (WTO) and needs to re-examine its agriculture, land and water management policies. All scenarios explored so far show demand for grains, other crops, livestock and forestry products exceeding national/regional production capacity even with innovation. Policy-makers and planners the world over

are thus concerned that change in the environment and market fluctuations may provoke significant shifts in production locations and create great social and political instabilities.

Experts are divided over the implications, for example, for grain prices and the ability to feed the world population in the medium run. Food security is defined as "access of all people at all times to enough food for an active, healthy life". It is not a simple function of production. As has been amply demonstrated by Nobel Prize-winning economist, Amartya Sen⁵⁶, it depends, perhaps primarily, on the purchasing or other control power of men, women and children in order to access the food. Long-term food security remains a top priority of EC co-operation policy.



A large number of research co-operation projects have looked for solutions to problems associated with drought and irrigation efficiency and degradation in all developing regions of the world. They range from rainfall analysis and forecasts as one avenue to more strategic irrigation management in the Southern and Eastern Mediterranean, research into water management, drought and/or salinisation-resistant crops in the Mediterranean, Africa and Asia. Their 'big sisters' are rural development projects picking up on appropriate and relevant solutions according to the local or regional context.

⁵⁵ <http://www.iiasa.ac.at/Research/LUC/>

⁵⁶ Sen, A., 2000. *Development as freedom*. New York, Anchor, 366 p.

UPGRADING IRRIGATION SYSTEMS IN SOUTH SUMATRA

Irrigation plays an important part in the production of rice, the most important food crop for both subsistence and cash incomes in the Indonesian island of Sumatra. The EC is making an important contribution to a project designed to upgrade and expand the Punggur Utara system of irrigation canals in the district of Central Lampung Regency. The EC contributes €29.3 million to the total cost of €34.5 million. In addition to lining parts of the existing primary and secondary canal system over distances of 45 and 82 km respectively, the project is constructing tertiary canals to service 14 000 hectares, increasing water

discharged through the system from 26 to 65 m³ per second. Meanwhile, the operations and maintenance capacity of local user groups is being strengthened through an extensive training programme. Local engineering capacity is being enhanced through on-the-job training during canal construction and lining activities. In addition, agricultural extension services are being enhanced and the needs of women are receiving special attention through support to existing mass movement schemes, such as the Programme for Family Nutrition Improvement (PPGK).

URBANISATION AND WATER

Urbanisation processes date back more than 5 000 years in human history, but have attained unprecedented levels over the last 50 years. According to the UN Human Settlements Programme⁵⁷, in 1800 only 2% of the global population lived in cities and by 1950 already 30% was urbanised. By 2000, 47% of the world's population was estimated to live in cities, while projections for 2030 suggest this percentage may climb to 60%. Urbanisation rates in developing countries outstrip those in industrialised countries, with Africa – still predominantly rural (37.5% of urbanisation in 2000) – showing the highest annual growth rates at almost 4.9%.

In 1975, five mega-cities had populations in excess of 10 million inhabitants – Tokyo (19.8 million), New York (15.9), Shanghai (11.4), Mexico City (11.2) and Sao Paulo (10). By 2000, their ranks had swelled to 19, a large majority of them in developing countries. In addition, the world today has 370 cities with between 1 and 5 million inhabitants. Many of the inhabitants of these big cities live in slums and have no or inadequate access to running water. Thus, the benefits of urbanisation are very unequally shared and providing citizens with access to adequate water and sanitation services remains a major challenge. Clearly, at this scale, the cities' water demand has major implications for upstream surface waters and aquifers, and its effluents or recycling capacity impact significantly on downstream water quantity and quality.

Social organisation and the political economy of water systems enter also into the equation in major ways. Integrated research and innovation will be critical to the ability to satisfy the needs of cities in ways that minimise upstream and downstream effects. Several recent regional dialogue workshops debated key factors in urban water management embedded in IWRM, such as one on Sustainable Development and Urbanisation in Latin America⁵⁸ and the Changsha Water Conference, organised in the context of Asia-Europe Meetings (ASEM) Science and Technology dialogue.

⁵⁷ <http://www.unchs.org/> - see also <http://www.longman.com.au/atlas/compweb/bn/bn-2001-3/bn-urban.htm> for a quick overview

⁵⁸ <http://walcue.iai.csic.es/> particularly in association with <http://europa.eu.int/comm/world/lac/st.htm>



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THE WORLD'S LARGEST INTEGRATED WETLAND IN SHENZHEN

The city of Shenzhen has built the world's largest integrated two-stage wetland to clean the Longgang River, which contains the unfiltered effluents of about 20 000 inhabitants and their industries. The river feeds into the drinking water supplies of the city of Hong Kong. This wetland, at an investment of 5 million Chinese RMB (about €700 000) is currently the world's largest two-stage wetland with 20 000 m² surface and a cleaning capacity of 5 000 to 7 000 tons per day, sufficient for the wastewater load outside the rainy season. Regular operation has started in October 2001.

The two-stage wetland technology for surface water treatment was developed in an international co-operation (INCO) research project between European and Chinese teams. The two-stage wetlands are constructed within two concrete basins, which are filled according to a well-studied scheme with various kinds of gravel, sand and

plants. The water flows downwards in the first basin and upwards in the second. The wetlands clean the water completely of nitrogen, phosphorous, heavy metals and other common unwanted substances in the wastewater. The outflowing water is clean and can be prepared by standard processing for drinking.

Shenzhen is already using two such wetlands and, satisfied with the results, is now planning an even larger wetland. It claims that the installation of a constructed wetland costs about half that of a conventional water treatment plant. Furthermore, they cost almost nothing to maintain. Other cities like Shanghai, Wuhan, and Hangzhou are soon to follow. The Chinese Academy of Sciences (CAS) has examined the results of the INCO project and plans to propose the Chinese participants for an award. This could mean additional research funds from the Chinese government.



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Shenzen integrated wetlands are an example for other Chinese cities.

SMALL TOWNS WATER SUPPLY PROJECT GHANA

November 26, 2002 – Kokofu, Ghana, 250 km north west of the capital Accra: As every week, M. Ansah, Technical Manager at the Water and Sanitation Development Board (WSDB) of Kokofu, checks the state of the water meters of the 13 public standpipes and 50 private connections connected to the water distribution network. Under the accountant's supervision, he collects the water sales revenue from the water vendors. The cost of water is 100 cedis per 18-litre bucket (€0.68 per m³). The average daily consumption rate here amounts to 11 litres per person. Thanks to this regular revenue collection, the WSDB has so far operated the system for 10 months, and in this space of time has managed to construct 10 additional private connections and providing transport to the operating staff. The bank account is currently credited with 15 million cedis (€1 700).

Out of the revenue from the water sales, 10% are allocated to maintenance, 10% to small-scale sanitation projects and hygiene education, and 5% to the extension of the water supply system. The efforts of the community and their representatives since the beginning of the project (consultations, 5% contribution to investment cost) are

The peri-urban interface, with its often dynamic development of food, energy demand and production, habitat restoration and vibrant socio-economic structures, has attracted increasing research and policy attention, but is still poorly understood. "Women, well-being, work, waste and sanitation: Action research on alternative strategies of environmental sanitation and waste management for improved health and socio-economic development in peri-urban coastal communities in South Asia" (4WS) and "Sustainable farming at the rural-urban interface – An integrated knowledge-based approach for nutrient and water-recycling in small-scale farming systems in peri-urban areas of China and Vietnam" (RURBIFARM)⁵⁹ are just two on-going research test beds responding to some of the above-mentioned challenges. When successful, such research precedes investment.

⁵⁹ <http://www.mv.slu.se/Vv/rurbifarm/Abstract.html>



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Excitement in the village about the first flow of clean piped water brought by the EC project.

paying back. During the four years of operation so far, public works and oversight have been established combined with private management in two towns. Capacity-building efforts ranging from book keeping, system maintenance, technical monitoring, management techniques to hygiene education was directed at all levels, from community via district to regional water and sanitation administration.

This example is replicated in the 25 small towns in the Ashanti, Brong-Ahafo and western regions included in this project and serving a total population of 3 10 000 people. The project is currently preparing the implementation of five additional systems to serve eventually, within the available €15 million allocation, a population of 350 000 in 30 towns. It is just one example of practicing locally adapted 'public-private partnership' – so far quite successfully.

COASTAL ZONE MANAGEMENT

Coastlines are the product of the interplay between rivers and land-based sediments fertilising the sea, and the sea accreting or eroding materials from the beach, estuary or cliff. Upstream interventions affecting river flow quantities and quality, such as dams, irrigation schemes and conventional aquaculture clearly, affect the balance of materials exchanged between the land and the sea. A well-studied case is the erosion of the Nile Delta following the closure of the Assuan High Dam in Egypt. Coastal zones are important reservoirs of biodiversity and in addition to a few existing parks, recent decisions at the Johannesburg World Summit on Sustainable Development demand the establishment of additional protected areas to restore degraded aquatic ecosystems as much as possible.

On the side of the sea, coastal zones are the source of an estimated 95% of marine fish, invertebrate and algae production, not to mention the important role they play in maritime transport and as sources of offshore petroleum and gas. On the side of the land, coastal zones are home to almost two-thirds of the human population and associated socio-economic and recreational activities. Because of the resulting heavy demand on freshwater resources, including coastal freshwater aquifers, saltwater intrusion is a major problem, particularly in arid and semi-arid regions.

Integrated coastal management should provide a mechanism for negotiating acceptable levels of use among often conflicting demands on limited resources, however, despite virtually hundreds of projects, the true integration of knowledge and associated management remains a challenge for future work. A few examples may illustrate useful attempts to move forward in this direction.

EUROCAT⁶⁰ is a project dealing with the interaction of river catchment coastal zone systems to changing material fluxes, under various geographic and socio-economic conditions across Europe. In order to identify these differences and their relevance for a better management strategy at catchment level, four coastal seas (Mediterranean Sea, Baltic Sea, North Sea) and eight associated catchments, characterised by relevant environmental and management issues, are the subject of various research studies.

"Measuring, monitoring and managing sustainability: The coastal dimension" (COASTIN) in India⁶¹ was a research collaboration between seven partners (three Indian and four European, coordinated by TERI, Goa) that made good progress towards developing a system for integrated analysis of the bio-geophysical and human dimensions of coastal resource use. It examined the policy and institutional matrix in which coastal development occurs and worked to provide knowledge tools in support of decision-making. Socio-economic, legal and demographic factors and indicators were matched with ecological dimensions such as vulnerability maps of coastal aquifers, coastal vegetation

stress. This allowed researchers to assess the vulnerability of coastal areas subjected to tourism development, or planned for other types of economic development and to raise awareness among planners and other stakeholders about the options available within safe limits.

An earlier approach explored in South-east Asia and Africa led to the development of a rules-based expert system 'SimCoast', which allows stakeholder participation to modulate rules to adjust the conceptual framework to local conditions. Following an exploratory and development phase to facilitate clarification and negotiation processes, the tool will shortly be used during the inception phase of the "CHARM Project" in Thailand starting in the first half of 2003. This aims to design and establish a coastal habitats co-management framework in two southern Thai locations.



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Coastal fishponds, Bulacan Province, central Luzon, Philippines.

"Mediterranean coordination and dissemination of land conservation management to combat land degradation for the sustainable use of natural resources in the Mediterranean coastal zone" (MED-COASTLAND-NET)⁶² is another approach to bring to bear knowledge on land degradation management (LDM) acquired through previous research and traditional practice on coastal protection and sustainable use. This thematic network coordinated by CIHEAM in Bari, Italy, assesses the interactions among major factors of resources management such as soil, water, biota, human activity, cultural resources, soil erosion and land degradation, with a view to developing guidelines for LDM. By partnering with research teams, administrations, agricultural and other user groups from virtually all riparian countries of the Mediterranean, the project will ground its work, information structuring and dissemination in participatory approaches and will be mindful of the needs of different stakeholder groups. It expects to provide an effective framework to assist coastal and land use planning in the region.

⁶⁰ <http://www.iiu-cnr.unical.it/EUROCAT/project.htm>

⁶¹ <http://www.teriin.org/teri-wr/coastin/discuss.htm>

⁶² http://dbs.cordis.lu/lep/cgi/srchidadb?ACTION=D&SESSION=28062003-1-3&DOC=1&TBL=EN_PROJ&RCN=EP_DUR:48&CALLER=PROJ_INCO2

THE WAY FORWARD

The above trends and examples show convincingly that more commitment and action is needed from everyone to achieve water security – in quantity and quality – for the Earth, its ecosystems and its human inhabitants, today and for future generations.

Action, and in most cases new and innovative approaches, are needed to tackle urgent and long-term priorities in providing water services, expanding sanitation coverage and hygiene education, meeting the urban challenge, achieving water and food security, protecting water ecosystems and their biodiversity, managing floods and coastal areas.

As water resources become scarcer, the long list of related global issues with significant bearing on the sustainable future of the planet become increasingly critical – the impact of climate change, the potential impact of the water cycle, the occurrence of extreme events like floods and droughts, the variability of access to water for human and ecosystem health and food security, the impact of trade on agriculture and industrial products that include or impact on water substantially.

The EU spends an average of €1.4 billion per year on water-related development aid and is ready to deliver additional resources according to the Monterrey commitment. This will be in response to the countries' prioritisation in the context of Poverty Reduction Strategies and other national sustainable development plans.

Through the Water Initiative, the European Union is reconfirming its commitment to contribute to meeting the Millennium Development Goals, namely the targets on water and sanitation and support IRWM and the development of water efficiency plans by 2005. The EU believes that integrated water resources management (IRWM) with strong public participation, transparency and accountability is a key approach to reaching these targets.

In response to demand from partner regions, the European Commission and EU Member States are forging strong partnerships with regional partners under the EU Water Initiative. Initial activities are already on-going and scheduled in Africa, Eastern Europe, Caucasus and Central Asia (EECCA), the Mediterranean, the ASEM context and Latin America. Thus, several regional multi-stakeholder dialogue platforms have been set up or are in the process of being developed.

A shift in thinking is necessary: to recognise that all water users have a responsibility; to apply a real integrated approach in which all actors co-operate, for example, in integrating land and water management, in preventing water pollution; to move towards a sustainable water behaviour, from a supply approach to one dominated by demand management; and to introduce the need for valuing water by increasing the perception of its

preciousness in all its uses. Pricing of water services is necessary to ensure financial sustainability. However, meeting the basic needs of the poor and vulnerable groups requires the design of appropriate tariff structures and collection systems.

Key objectives of the Water Initiative

Therefore, progress towards achieving the targets set by the EU Water Initiative is largely dependent on the pursuit of the following universally recognised key objectives.

- The reinforcement of political commitment towards action and innovation oriented partnership

To meet the challenge, the policy profile of water should be higher on national and regional agendas. The primary responsibility for ensuring equitable and sustainable water resources management are integrated in development strategies rests with governments, and ownership is essential to achieve results.

- The promotion of improved water governance, capacity-building and awareness



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Good governance, political and sectoral reforms are necessary. Awareness-raising, institutional strengthening and capacity-building activities, and expanding the knowledge base, are essential to support planning and decision-making, while ensuring participation of all stakeholders and ownership of policies and strategies. Applying a consistent sectoral approach to support partner countries and regions also ensures better coherence and coordination between different efforts.

- Improved efficiency and effectiveness of water management through multi-stakeholder dialogue and coordination

The evidence above suggests that partnerships between public, private and civil society actors are the most adequate way to ensure improved efficiency and effectiveness of water management. Such partnerships have to be promoted, ensuring that they remain equitable, transparent, safeguard consumers' and investors' interests and maintain high standards of environmental protection.

- Strengthened co-operation through promoting river basin approaches in national and transboundary waters

The opportunities for co-operation are many. This is most effective at river basin level, both in national and transboundary waters. Conflict prevention and peace-building, which are political priorities for the EU, include sustainable and equitable management of shared natural resources, such as water. Based on its own experience and on the analysis of the correct scale of intervention, support to regional activities is recommended where a clear commitment to regional collaboration exists.

- Identification of additional financial resources and mechanisms to ensure sustainable financing

Often, mainstream financial markets do not provide financing instruments to developing countries. And when they do, they provide them under unfavourable or even prohibitive conditions. When programmes or projects in developing countries are barred from accessing mainstream sources of finance, Official Development Aid (ODA) has a clear role in 'unlocking' this access. While ODA is often used to provide funding and technical support, it should – and can – through innovative instruments, leverage additional financing.

A modular approach

In recognition of regional specificities and the similarity of scales in identified problems and operational capacities, the Water Initiative will develop in a modular way with strong regional focus.

In Africa, following on the signing during WSSD of the 'Africa/EC strategic partnership on water affairs and sanitation', two working groups have been established to address the priorities related to the provision of water and sanitation, and integrated water resources management issues (IWRM), at national and transboundary levels. In a spirit of ownership, open coordination and in harmony with other efforts (such as NEPAD, EU/Africa Dialogue), the EU partners are working with the African Ministerial Council on Water (AMCOW), central and local governments, civil society, private stakeholders and multilateral agencies to contribute to the achievement of water-related Millennium Development Goals and targets in Africa.

As far as the countries of Eastern Europe, Caucasus and Central Asia are concerned, a EU-ECCA Strategic Partnership on Water for Sustainable Development was agreed by ministers at the WSSD. A working group has been set up to address water supply and sanitation, and integrated water resources management aspects. Ministers have committed to implement WSSD targets and obligations in their region and apply integrated river basin approaches in transboundary water courses. The work is closely linked with the development of an EECCA environmental strategy by the NIS countries. An action plan is expected to be presented at the Pan-European Kiev Environmental Ministerial Conference in May 2003.

Following on WSSD, a Mediterranean and a Latin American component are being developed. Recognising the central issue of finance, a specific working group within the EU Water Initiative has been established with the objective of increasing the efficiency and catalytic role of ODA. It should also promote sectoral and budgetary support, where applicable, promote cost recovery policies, which are sensitive to the poor, develop innovative and sustainable financial mechanisms, and attract additional financial resources. Initial activities include the assessment of financing needs and the identification of current sources. A central focus will be on showing how development aid can increasingly be used as a catalyst for triggering other sources of financing for water. Reducing overlaps in the allocation of funds and maximising their effectiveness represents a key challenge.

A specific research component has also been established to address the important contribution of research to the achievement of water-related targets. By way of example, the ASEM (Asia-Europe Meetings) water platform is mentioned. Its roots go back to a ministerial meeting in October 1999 in Beijing, when science and technology ministers of the 25 ASEM countries⁶³ and the European Commission agreed on a list of priorities for intensifying scientific and technological co-operation in areas of joint interest to promote sustainable socio-economic development. Water, forests, aquaculture, sustainable biodiverse food production and clean technologies were among the priorities singled out for immediate follow-up.



ASEM Workshop on Water Management Issues.

At a regional conference on water challenges in Changsha, Hunan Province, China in June 2002, some 250 participants from different backgrounds from almost all ASEM countries met to discuss effective methods to link knowledge with action. They unanimously adopted the Changsha Declaration⁶⁴ on

⁶³ Austria, Belgium, Brunei Darussalam, China, Denmark, Finland, France, Germany, Greece, Indonesia, Ireland, Italy, Japan, Korea (Republic of), Luxembourg, Malaysia, Netherlands, Philippines, Portugal, Singapore, Spain, Sweden, Thailand, United Kingdom and Vietnam and the European Commission.

⁶⁴ http://www.brgm.fr/ASEM2002/Resumes/Changsha_Declaration_Final%20versionb.pdf

how best to harness water in the context of sustainable socio-economic development, but also declared basic water needs a human right. This was formalised in November 2002 at international level by the Committee on Economic, Social and Cultural Rights of the UN Economic and Social Council⁶⁵.

As a result, an ASEM Waternet Multi-Stakeholder Platform is being set up. Coordination on the Asian side is ensured by China (Ministry of Science and Technology⁶⁶), on the European side by France⁶⁷ and Portugal⁶⁸, and overall facilitation by the European Commission⁶⁹. Vietnam has expressed interest to contribute to coordination on the Asian side. The ASEM process is built on a framework of respectful, open co-operation between equal partners. The platform will promote and enable interdisciplinary networking between the various ASEM partners (public authorities, private sector, civil society and scientific community). It will constructively interact with existing networks in order to mobilise the strengths of the different partners synergistically towards meeting the targets of the Water Initiative.

The European Research Area (ERA) open to the world

Knowledge and learning, societal mobilisation and innovation are recognised as critical for future socio-economic development and the ability of directing appropriate investment for coping with the challenges highlighted in this brochure. Europe is willing to share its experience and face the global and regional challenges together with partners in different parts of the globe and has thus opened the Sixth Research Framework Programme to partners in third countries⁷⁰.

In this context, it is important to reiterate European Research Commissioner Philippe Busquin's perspective on the international dimension of ERA: "Science and technology have already made an outstanding contribution to socio-economic development in Europe and elsewhere. Indeed, science has always been an international endeavour. But today its international dimension is more important than ever for the transition towards sustainable development and shared prosperity."

European Development Commissioner Poul Nielson's remarks to the European Parliament also demonstrate the conceived role of research in development co-operation: "I agree that sustainable improvement of human well-being now depends crucially on knowledge, its production, distribution, ownership and wise application. Research carried out domestically and internationally is vitally important for the production of knowledge that a country can use for its development."

All available co-operation policies and instruments in support of the EU Water Initiative

This brochure shows the concepts, instruments and examples of harnessing knowledge, capacity-building and action towards

the goals of the Water Initiative. Resources of the Sixth Framework Programme for Research are available to high-quality international research co-operation, coordination and outreach to this effect⁷¹. Possibilities exist in several thematic priorities, particularly in the 'Global change and environment' and in the 'Specific measures in support of international co-operation'. Moreover, both on-going and planned development co-operation projects and activities respond to the challenge and mobilise know-how and significant financial resources to the task set by the Water Initiative. In the near future, through the EDF alone, close to €600 million will be mobilised for water projects in the near future.

Announcing the EU Water Initiative at the 2002 World Summit on Sustainable Development in Johannesburg, EC President Romano Prodi said: "The water crisis is a crisis in governance. We will promote better water governance arrangements and transparency, building on stronger partnerships between governments, civil society and the private sector. Our experience shows that effective public services are a basis for sustainable water governance. It is a priority for us to increase the transfer of knowledge and know-how through institutional capacity-building, targeted research and scientific co-operation."

"We are convinced that progress in water policy means progress in all three pillars of sustainable development – social, economic and environmental. Business as usual is not an option to solve this crisis. We need to stand close together with our partners to overcome their serious water and sanitation problems. That is why the EU decided to make water a top priority for this summit."

And, we might add, for concerted follow-up action in the years to come.

⁶⁵ 21st Session, Geneva, 11-29 November 2002, http://www.world-watercouncil.org/download/UN_the_right_to_water.pdf for preliminary text and <http://www.unhchr.ch/html/menu2/6/cescrnote.htm#29th> on adoption of General Comment No.15 (2002) 'The right to water (Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights)

⁶⁶ <http://www.most.gov.cn> and http://www.csonline.com.cn/gb/content/2002-06/11/content_141139.htm

⁶⁷ <http://www.brgm.fr/ASEM2002/1stasem.htm>

⁶⁸ <http://www-dh.lnec.pt/Gias/english/news.html>

⁶⁹ <http://europa.eu.int/comm/research/iscp/> and http://europa.eu.int/comm/external_relations/asem/asem_summits/asem4/4.htm

⁷⁰ http://europa.eu.int/comm/research/iscp/newsletter/agreements_en.html#01

⁷¹ http://www.cordis.lu/fp6/sp1_wp.htm

FURTHER READING:

- Chambers, R., 1988. *Managing canal irrigation: Practical analysis from South Asia*. Cambridge, Cambridge University Press
- European Commission, 2000. *EU Water Framework Directive*. Luxembourg, O.J. and http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32000L0060&model=guichett
- European Commission, 2000. *The guidelines for water resources development cooperation*. Brussels, European Commission, http://europa.eu.int/comm/development/publicat/water/en/frontpage_en.htm
- European Commission, 2002. *Capitalising on people and institutions. Ten years of EC scientific cooperation for the transition towards sustainable development*. Luxembourg, Office for Official Publications of the EC, 23 p.
- European Commission, 2002. *Managed land ecosystems. Ten years of EC scientific cooperation for the transition towards sustainable development*. Luxembourg, Office for Official Publications of the EC, 23 p.
- European Commission, 2002. *Healthy societies. Ten years of EC scientific cooperation for the transition towards sustainable development*. Luxembourg, Office for Official Publications of the EC, 23 p.
- European Commission, 2002. *Aquatic ecosystems. Ten years of EC scientific cooperation for the transition towards sustainable development*. Luxembourg, Office for Official Publications of the EC, 23 p.
- European Commission, 2002. *Communication to the European Council and Parliament on water management in developing countries*. Brussels, European Commission, http://europa.eu.int/prelex/detail_dossier_real.cfm?CL=fr&DosId=172380
- European Council, 2002. *Resolution on water management in developing countries*. Brussels, SEC/2002/288, <http://register.consilium.eu.int/pdf/fr/02/st08/08958f2.pdf>
- Gleick, P.H. (ed.), 1993. *Water in crisis: A guide to the world's freshwater resources*. New York, Oxford University Press
- Gleick, P.H., A. Singh, and H. Shi, 2001. *Threats to the World's Freshwater Resources. A Report of the Pacific Institute for Studies in Development, Environment, and Security*, Oakland, California, in cooperation with the United Nations Environment Programme.
- Groenfeldt, D., 1991. *Building on tradition: Indigenous irrigation knowledge and sustainable development in Asia*. *Agriculture and Human Values*, 7(1-2):114-120
- Laureano, P., 2001. *Atlante d'acqua. Conoscenze tradizionali per la lotta alla desertificazione*. Torino, Bollati Boringhieri, 424 p.
- Pereira, W., 1993. *Tending the earth: Traditional sustainable agriculture in India*. Bombay, Earthcare Books, 315 p.
- Ronan, C.A., 1978. *The shorter science & civilisation in China: I. An abridgement by Colin A. Ronan of Joseph Needham's original text*. Cambridge, Cambridge University Press, 326 p.
- The World Commission on Environment and Development, 1987. *Our common future*. Oxford, Oxford University Press, 400 p.
- UNEP, 2002. *Global environment outlook 3*. Nairobi, Kenya, United Nations Environment Programme <http://www.unep.org/GEO/geo3/english/index.htm>
- Yoffe, S.B., 2001. *Basins at risk: Conflict and co-operation over international freshwater resources*. Dissertation, Oregon State University, 125 p. + 13 appendices (<http://www.transboundarywaters.orst.edu/projects/bar/>)

Web resources on funding instruments (p.6):

- ¹¹ Cotonou Agreement:
http://europa.eu.int/comm/development/politique_en.thm
- ¹² Asia and Latin America (ALA):
http://europa.eu.int/comm/development/country/la_en.htm (for Latin America) and
http://europa.eu.int/comm/development/country/a_en.htm (for Asia)
- ¹³ Central and Eastern European Countries (CEEC-TACIS):
<http://europa.eu.int/comm/enlargement/pas/phare>
- ¹⁴ MEDA Programme :
http://europa.eu.int/comm/development/country/meda_en.htm
- ¹⁵ Russia and the other new Independent States (NIS) :
http://europa.eu.int/comm/external_relations/ceeca/tacis/index.htm
- ¹⁶ International S&T cooperation (INCO-FP5):
<http://www.cordis.lu/inco2/home.html>
- ¹⁷ Key Action Sustainable Management and Quality of Water (FP5): <http://www.cordis.lu/eesd/>
- ¹⁸ Sixth Framework Programme:
<http://www.cordis.lu/fp6>
- ¹⁹ Specific measures in support of scientific cooperation (INCO-FP6):
http://europa.eu.int/comm/research/fp6/inco/index_en.html
- ²⁰ Sustainable Development, Global Change and Ecosystems (FP6):
http://europa.eu.int/comm/research/fp6/p6/index_en.html
- ²¹ Aeronautics and Space (FP6):
http://europa.eu.int/comm/research/fp6/p4/index_en.html
- ²² European Investment Bank:
<http://www.eib.org>

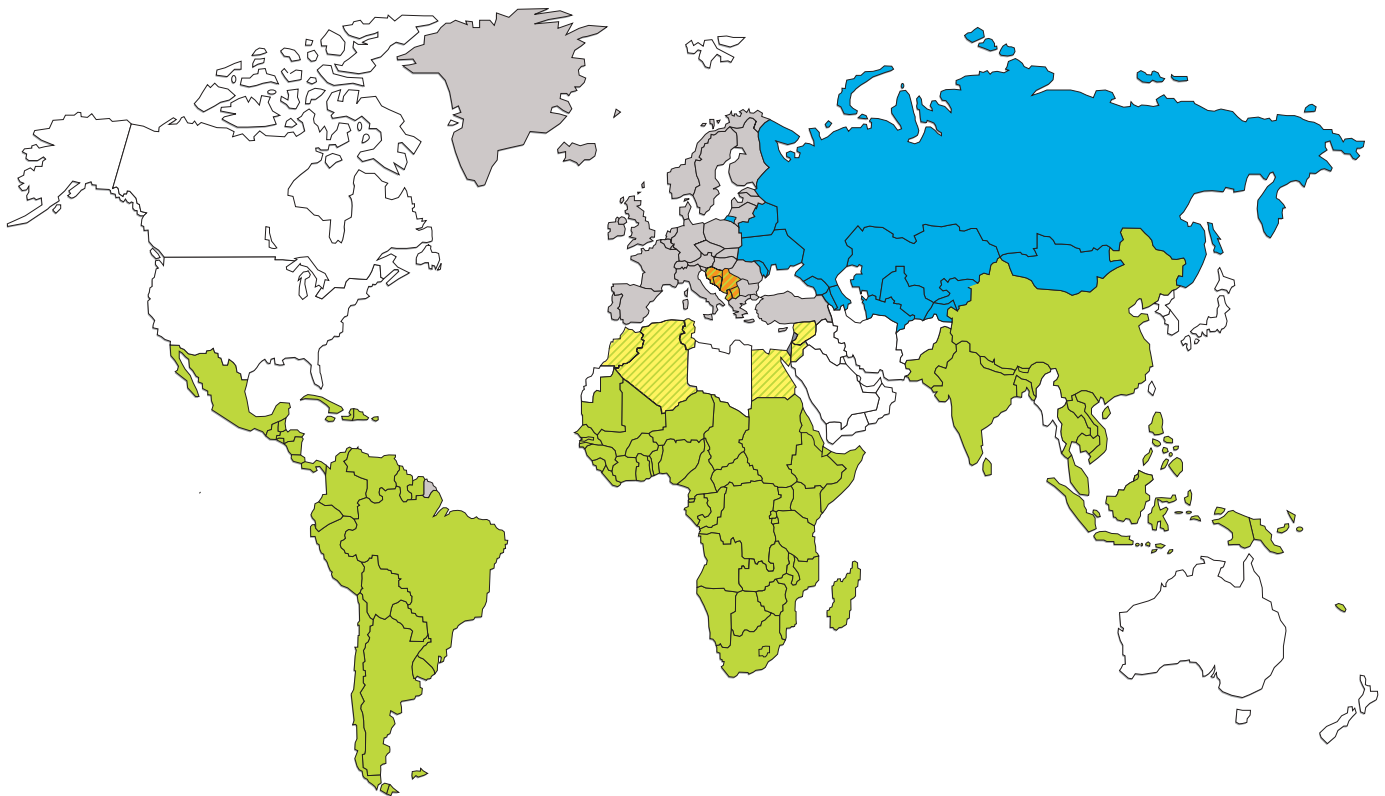
For additional information:

- <http://europa.eu.int/comm/research/>
<http://europa.eu.int/comm/development/>
<http://europa.eu.int/comm/environment/>
http://europa.eu.int/comm/index_en.html
<http://www.jrc.org/>
<http://www.intas.be/>
<http://www.eea.org/>
<http://www.worldwaterforum.org/>
<http://www.johannesburgsummit.org/>
<http://www.unep.org/>
<http://www.wto.org/>



INTERNATIONAL RTD COOPERATION IN FP6 (2002-2006)

Target Countries of 'Specific measures in support of International Cooperation' (INCO)



Data valid: 01.01.2003



European Union/Associated States ⁽¹⁾/ Overseas Countries & Territories



Developing Countries



Mediterranean Partner Countries



Western Balkan Countries



Russia and the other NIS

(1) Some agreements are not yet into force

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