

COUNTRY PROFILE: FRESHWATER AND SANITATION

FINLAND

2004

CONTENT

1. Status in spring 2004
 - A. Institutional capacities
 - B. Progress in water protection
 - C. Water resources management
 - D. State of waters
2. The Millennium Declaration and the Johannesburg Plan of Implementation
 - A. National activities
 - B. International and regional co-operation
3. Means of implementation
 - A. Governments
 - a. National coordination
 - b. Legislation
 - c. Programmes and strategies
 - d. Conservation of Marine and Inland Waters Ecosystems
 - B. Regional and international co-operation
 - C. Education, training and awareness raising
 - D. Information systems
 - E. Research and technological development
 - F. Financing
4. National and regional post-Johannesburg challenges and opportunities

1. STATUS IN SPRING 2004

A. INSTITUTIONAL CAPACITIES

Institutional capacities for water resources management in Finland were created at the beginning of the 1970's by establishing the water management administration. At that time first integrated water resources management plans covering the whole catchment area were drawn up. In those plans different needs for water use and protection were integrated, and a strong knowledge base for water management was established. At a later stage regional water resources development plans were drawn up by regional water and environment centres.

Water management planning has been a special duty for regional offices in different parts of the country. Earlier the task was conducted by Water Districts and Water and Environment Districts, nowadays Regional Environmental Centres are in charge. The decisions in planning have thus been taken at the lowest appropriate level, with public consultation and involvement of different stakeholders. At the local level, the municipalities have had the responsibility to safeguard the water supply and sewerage for citizens.

Sectoral water management plans have been elaborated i.a. for water protection, water supply and flood production. Research has played an important role by establishing knowledge base and instruments for integrated water resources management.

B. PROGRESS IN WATER PROTECTION

In the United Nations World Water Assessment Programme water quality indicator values were assessed in 122 countries. Finland was ranked number one in this assessment which was published in the World Water Development Report in 2003.

Efficient measures for water protection were initiated at the beginning of the 1970's. Water protection in Finland is based on long-term goals and proactive strategies. Efficient water protection and water management planning is needed since the water system in Finland is highly vulnerable due to many ecological factors.

Until 1995, water protection in Finland has been implemented mainly according to national policy-making and legislation. After Finland became a member of the European Union (EU) in 1995, the Community regulation has provided a framework for the water protection policy in Finland. The third national water protection programme was adopted by the Finnish Government in 1998, and it sets objectives up to 2005. Finland's National Programme for the Protection of the Baltic Sea was adopted in 2002.

Setting up targets and plans for water protection has been based on extensive research and monitoring. Many special research tools such as mathematical models and geographical information systems have been developed in Finland.

In order to assess the need and impacts of measures, targets for water protection programme have been prepared in co-operation with many different stakeholders. This procedure contributes also to maximum commitment of different stakeholders in concerted efforts and action.

C. WATER RESOURCE MANAGEMENT

By using the **Water Poverty Index (WPI)** the Centre for Ecology and Hydrology and the World Water Council have graded 147 countries according to five criteria: resources, access, capacity, use and environmental impact. Although Finland was graded first in this comparison, there is still a lot to be done, especially regarding eutrophication.

Compared with many other countries water resources in Finland are rich. Renewable fresh water reserves amount to an estimated 21 000 m³ per inhabitant, whereas the threshold for water poverty has been set at 1 700 m³ per person. Approximately 2,2 percent (2 300 Mm³/a) of the total amount (108 000 Mm³/a) of freshwater is used annually in Finland. Most freshwater, ca. 80 percent is used by industry. The next biggest users are households by about 15 percent. Irrigation in Finland accounts only for about 3 percent of the total freshwater consumption. Despite the fact that Finland is rich in water, shortage of water can exist regionally and locally, especially during dry summer months. It is therefore important to be prepared for exceptional natural conditions by establishing strategies to combat the harms and to adapt to these conditions.

The inclusion of sparsely populated areas in water supply systems is a great challenge. In Finland, 90 percent of the population is served by a public water supply and 80 percent by public sewerage networks.

Water consumption in Finland was at its highest level at the beginning of the 1970's. Thereafter the consumption of water both in industry and in households has decreased remarkably. Pulp and paper production, which is one of the most water intensive industries in Finland, has been able to carry out major improvement in water use efficiency so that the water consumption has dropped by 80 percent from the 1970's.

The government is also improving Finland's preparedness for extreme conditions e.g. floods. The goals are to restrict flood damage for existing housing, avoid building in flood-prone areas, improve dam safety, constantly develop effective flood defence and rescue operations, effectively utilise modern techniques and methods, as well as flood risk management at the basin level. A national working group on large floods published its final report in 2003. The report contains suggestions for the next 12 years on diminishing the potential flood damages in Finland.

D. STATE OF WATERS

High standard of water protection based on the ecosystem approach is a necessity in Finland, where a large number of water bodies exist, and where water bodies are highly vulnerable to environmental changes. Most Finnish lakes are shallow and flow rates slow. In winter, the ice cover reduces oxygen supply, and the natural organic humus load is high. On account of the cold climate, hazardous substances decompose slowly. The Baltic Sea is a shallow inland sea with brackish water and thus very vulnerable. It receives a heavy load from the coastal states, and its state is influenced by the varied uses of the sea.

In 80 percent of the lake area in Finland, the water quality is classified as excellent or good. For rivers the assessment is not quite as impressive; less than 40 percent of the total length is classified as good or excellent. The worst polluted areas are diminishing as a consequence of improved water protection in municipalities and by industry. Nevertheless, eutrophication remains the main problem both in inland waters and in marine areas. Water quality in areas which are polluted from diffuse sources, such as agriculture and dispersed settlements, has shown no obvious changes as compared with the situation in the early 1990s. In the marine areas, especially the Gulf of Finland and the Archipelago Sea show eutrophication.

Discharges of the most hazardous substances have been curbed, but the decomposition of persistent and cumulative substances in the aquatic environment is very slow. The risks with regard to water quality have clearly increased with the increase in transports of oil and chemicals on the Baltic. In future, the effects of climate change on water ecosystems and flows may become more marked.

Restoration of Finnish inland waters has aimed at improving conditions for recreation and fisheries.

In 2002 and until autumn 2003 Finland suffered exceptional drought conditions compared with the country's normal climate. This led to serious difficulties in water supply in certain sparsely populated areas. The government took special measures to alleviate the water shortages on farms. Additional support in the form of government grants were also made available to local communities needing urgent help with water supply. In connection with grants to individual property owners, an assessment was made of whether the water management system of particular properties was appropriate or whether the properties could be connected to the public water supply network. A working group has been established by the Ministry of Agriculture and Forestry to make a manual of preparation for extreme conditions in water supply and sewerage. A national study on the impacts of the drought in 2002-2003 is being prepared by the Finnish Environment Institute.

2. THE MILLENNIUM DECLARATION AND THE JOHANNESBURG PLAN OF IMPLEMENTATION

The key focus for the work of the CSD over the next two years is set in the Millennium Development Declaration (Millennium Development Goals) and in the Johannesburg Plan of Implementation: **to halve the proportion of people without access to safe drinking water and to halve the proportion of people without access to basic sanitation.** A key element will be the short-term target to prepare **Integrated Water Resources Management and Water Efficiency Plans by 2005.**

Additionally there is a need to maintain momentum on **the 10-year framework of programmes on Sustainable Consumption and Production**, based on the outcome of the international expert meeting that launched the Marrakech process in June 2003. It is also important to reaffirm the Millennium Development Goal **to halve, by the year 2015, the proportion of people living in poverty and suffering from hunger.** All these goals contribute to the promotion of health and sustainable development.

A. NATIONAL ACTIVITIES

In Finland, environmental protection and sustainable development policies are already relatively well placed. World Economic Forum's Environmental Sustainability Index (ESI) indicates that among 142 countries compared, Finland has been ranked number one in terms of sustainability since 2000. Finland has been successful particularly in minimizing air and water pollution and in organising institutional capacity to deal with environmental problems. However, there is still a lot of work to be done.

The CSD-12 Bureau has strongly encouraged the countries to provide country experience on implementation and to share best practices and lessons learned with others. Finland has therefore prepared a folder which includes following examples of best practices on sustainable water management in Finland:

- Integrated Water Resources Management
- Efficient Water Consumption
- New Approaches for Water Protection
- International co-operation on Water Management

These experiences and practices will hopefully benefit others in considering and preparing actions on sustainable water management as a part of sustainable consumption and production.

Access to Drinking water

In 2001, approximately 90 percent of the Finnish population were served by municipal waterworks. Water services are provided at the municipal level, as close to the consumer as possible. Most waterworks and sewerage systems in Finnish towns and cities are owned by the local authorities. Users pay charges for water to cover the costs involved in supplying clean tap water and treating wastewater. Charges collected from consumers have improved the quality of water services in Finland.

Over 300 000 inhabitants in sparsely populated areas in Finland live outside the public waterworks. Water supply projects in rural areas are usually managed by small water cooperatives. The respective municipality and Regional Environment Centre usually support major infrastructure projects of a water cooperative. Separate water cooperatives may later on join and become a part of municipal water supply and sewerage network.

Those outside the networks live mainly in sparsely populated areas and get their household water from shallow private wells or bedrock bore-holes. The percentage of the population covered by the public network is high in Finland in view of the long distances involved and sparse population in rural areas.

The water from private wells is usually of fairly good quality. The main reasons for shortcomings of quality are high concentrations of iron and manganese due to geographical circumstances and e.g. high nitrate concentrations due to poor structural condition of wells.

General Plans for Water Supply and Sewerage have been prepared and implemented in Finland. In addition the Municipal Water Supply and Sewerage Development Plans are being prepared by 2004 to every municipality. The development of land use is taken into account in these plans.

Water Consumption

Water consumption in Finnish households has decreased significantly in recent years being nowadays approximately 240 litres per person per day. The peak was reached at the beginning of the 1970's when the consumption was 335 litres per person per day. The reasons behind this trend include the use of water charges, improved efficiency of domestic appliances, especially WC toilets, and renovation of water pipes.

Over 50 percent of the water served by waterworks is groundwater in Finland.

Access to sanitation

Wastewater treatment in urban areas, which account for 80 percent of the Finnish population, is of a high standard in international terms: 95 percent of organic matter, 93 percent of phosphorus, and 44 percent of nitrogen are removed. All urban wastewater is treated, mainly through biological-chemical means. All industrial wastewater is also treated. Water recycling is carried out to a high degree within industry.

In the summer time, the huge popularity of holiday settlement increases the amount of people in rural areas. It has been estimated that in rural areas phosphorus discharges to water are 50 percent higher per inhabitant than in urban areas, where homes are linked to municipal wastewater treatment plants.

In addition to the continuous improvement of the treatment efficiency of municipal wastewater treatment plants, new regulations has been adopted and technologies suitable for especially rural areas are developed. New legislation was passed in summer 2003 setting minimum standards for the treatment of wastewater from households outside sewerage networks.

All new wastewater treatment systems should meet the new legislative standards from the beginning of 2004. Wastewater should generally be treated to remove 90 percent of the organic material, 85 percent of the phosphorous content and 40 percent of the nitrogen content from the untreated wastewater. Wastewater treatment systems already in operation before year 2004 have to meet the new standards by 2014.

New legislation should reduce phosphorus loads in wastewater from rural areas by around 300 tonnes a year by 2014. This amounts to an overall reduction of 6-8 percent in total anthropogenic phosphorus emissions in Finland. The costs of improving wastewater treatment systems vary greatly according to local conditions, but the necessary investments have been estimated to amount to an average of around 3,000 euros per property. Government subsidies may be granted in certain cases.

Renewable traditional technologies in rural areas: dry toilets

The composting dry toilet is one promising example of how technology can reduce nutrient discharges to waters in the rural areas. Dry toilets also save clean water, even though in Finland the availability of water is usually not a problem. Another advantage in dry toilets is that as water is not used for flushing the toilets, the spreading of harmful diseases is minimized.

The 1st International Dry Toilet Conference was organized in Finland in summer 2003. More than 160 participants from 30 different countries took part in the four day event. The participants saw the dry toilet technology as a feasible possibility for wastewater reduction both in the developed and developing countries, especially in rural areas.

Integrated Water Resources Development Plans

In the World Summit on Sustainable Development in 2002, it was agreed that each country will develop **Integrated Water Resources Management and Water Efficiency Plans by 2005.**

In the European Union (EU) the legislative base to reach this goal is provided in the Water Framework Directive (WFD) adopted in 2000. It provides a setting within which the European Community shall develop integrated, sustainable and coherent water policies based on the ecosystem approach. The Directive ensures protection of all waters, i.e. groundwaters, rivers, lakes, and coastal waters preserving high status of water quality where it still exists and achieving good status by 2015. It is based on the river basin approach and provides mandatory participation by citizens and stakeholders and NGO's.

The implementation of the ambitious legislative framework, its objectives and targets, is now an important challenge. In 2001, the Member States agreed on a Common Implementation Strategy for the WFD to harmonise and facilitate the implementation process. The Directive is to be implemented by the Member States within a specific timeframe, step by step, including completion of guidance documents by 2006. The River Basin Management Plans for each river basin district should be completed by December 2009.

B. INTERNATIONAL AND REGIONAL COOPERATION

In the Finnish development cooperation the water sector has played an important role. From its start in early 1970's a total of about 340 million euros has been used for water and sanitation. The value of ongoing projects is 43 million euros or about 10 million euros per annum. This means that about six percent of the total development aid has been allocated to the water projects. The Finnish assistance to the water and sanitation sector was evaluated in 2001. In general, the evaluation proved the assistance successful.

Today, Finland's role in development cooperation is defined by a New Development Policy Programme, adopted by the Government of Finland in February 2004. In this context, development policy means consistent action in all those fields of international cooperation and national politics which has an influence on the position of developing countries. International development cooperation is one of the essential tools of the development policy. Finland's objective is to increase the amount targeted to development cooperation. Among the key principles in the new development policy programme are: commitment to the targets and values of the UN Millennium Declaration, the principle of sustainable development, promotion of different partnerships for development, and respect of the responsibility and the right of decision of developing countries and their citizens. Finland is striving for diminishing the proportion of people living in extreme poverty and preventing environmental threats. At the country-level, Finland's work with her partner countries is guided by developing countries' own poverty reduction strategies (PRSPs). With regard to sectoral, thematic or procedural policy definitions, PRSPs are considered while drafting the plans of implementation.

At the regional level, Finland is a contracting party to the Convention on the Protection of the Marine Environment of the Baltic Sea Area, and party to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Finland has bilateral agreements on transboundary waters with Sweden, Norway and Russia. Since 1991 Finland has had an environmental assistance programme with Eastern European countries where the emphasis has been on investments and technical assistance related to water protection. Finland participates in the Northern Dimension Environmental Partnership of the European Union which has a fund for environmental projects.

3. MEANS OF IMPLEMENTATION

A. GOVERNMENTS

a. National coordination

The Ministry of the Environment is in charge of water protection and environment policies. The Ministry sets targets for water protection, develops environmental legislation, and oversees international co-operation. (www.environment.fi)

The Ministry of Agriculture and Forestry is in charge of management of water resources, including development of water supply and sewerage, flood control, dam safety, drainage and irrigation, multipurpose regulation of river systems, permit holder's obligations, maintenance of hydraulic structures and combating sudden floods and ice jams. (www.mmm.fi/english/)

The Ministry of Agriculture and Forestry and the Ministry of the Environment manage the Finnish Environment Institute and Regional Environmental Centres in a result-oriented way.

The Finnish Environment Institute (FEI) produces information and solutions to support ecologically sustainable development. FEI conducts at the moment research programmes on integrated river basin management, on the protection of the Baltic Sea and on environmental technology. (www.environment.fi)

Finland's 13 **Regional Environmental Centres** implement water protection and water management measures and supervise the enforcement of legislation in respective areas. They also process environmental permits for medium-sized industrial plants and other activities subject to a permit. (www.environment.fi)

In addition to the Regional Environment Centres, **Environmental Permit Authorities** decide on environmental permits for activities having major environmental impacts, for activities taking place under the Water Act, or which have been initiated or promoted by a Regional Environmental Centre. The environmental permit authorities will also deal with most water pollution compensation claims. (www.environment.fi)

Municipal environmental authorities promote and supervise environmental protection on a local level. They also issue environmental permits needed by smaller plants and facilities.

Ministry for Social Affairs and Health is responsible for the preparation of legislation on the quality and supervision of household and bathing waters. At the local level, household and bathing waters are supervised by municipal health officers. (www.stm.fi > in English)

Since 1987 Finland has striven systematically to promote sustainable development and water issues have been dealt with as a part of this work. In 1993 the **Finnish National Commission on Sustainable Development** (FNCSO) was established to promote and co-ordinate the implementation of sustainable development at different levels. To give political impetus the Commission is chaired by the Prime Minister and composed by five other ministers. The work in the FNCSO has provided an important forum for multi-sectoral co-operation, involvement of different stakeholders and a broad debate about sustainability. (www.environment.fi > Sustainable development in Finland)

The Finnish Government's Programme for Sustainable Development was published in 1998. In addition, various ministries and other organisations have prepared their own strategies for sustainable development. An extensive interactive assessment process of the Government's Programme for Sustainable Development took place in 2000-2002. The Evaluation Report of Sustainable Development in Finland was published in

spring 2003. In order to assess the impact of national sustainable development policy, Finland has published national sustainability indicators. These are supplemented in the annually published Report on Natural Resources and the Environment, which is appended to the national budget.

b. Legislation

The Pollution Control Legislation was revised in Finland in 2000 by passing the **Environmental Protection Act**, updating and harmonizing existing legislation and permitting procedures. The use of water resources and areas is regulated in Finland by **Water Act** from 1961. Measures and structures that have an effect on water systems or groundwater resources are usually subject to permit according to the Act. Water Act is now being revised (2004).

The **EU Water Framework Directive (WFD)** from year 2000 gives guidelines for the water management policy for many years to come. In Finland, the Act on organizing **River Basin Management Planning** will be adopted in 2004.

Specific legislation on water management has been adopted by the EU in the form of different Directives. **The Urban Waste Water Treatment Directive** from year 1991 protects the environment from the adverse effects of discharges of urban waste water, including industrial discharges. **The Nitrates Directive** from year 1998 aims at protecting water against pollution by nitrates from agricultural sources. **Directive on the Protection of Groundwater Against Pollution Caused by Certain Dangerous Substances** was revised in 1980. A number of Directives set emission controls and quality standards for the most hazardous substances discharged to water. **The Bathing Water Quality Directive** from year 1976 sets binding standards for bathing waters to protect the bathers from health risks and to preserve the environment from pollution. Proposals for its revision are currently under consideration by the member states. The implications and implementation of the WFD is introduced more closely in Chapter 2.

Water Services Act came into force in 2001. It superseded the Act on Public Water and Sewerage Plants and the Act on Sewage Charge. In the new act there are i.a. legal provisions of general development and arrangements of water services. Rights and obligations of municipalities, water supply and sewerage plants and their customers are described in the Act. Also charges and agreements in water supply and sewerage are addressed. Regulations on joining water and sewer systems of water utilities are included. In the Water Services Act water services are seen more as basic services that need to be made available for everyone, than just municipal engineering. The act aims at guaranteeing the availability of water supply services in both urban and rural areas. The municipal water services are being incorporated, and in this connection it is important to secure the consumer interests, reasonable payments, equality and compatibility of payments with the real costs of water services. The Ministry of Agriculture and Forestry has published guidelines for implementation of the Water Services Act.

(www.mmm.fi/english/landwater/water_resources/water_services_act.htm)

Waste Water Decree for Sparsely Populated Areas came into force in January 2004. It sets now stronger requirements for waste water treatment in properties outside water and sewer systems. According to the new decree the equipment used has to be adequate in the refinement efficacy. In addition the property owner has to be aware of the waste water treatment system; its' use and maintenance in his/her own property.

The protection of waters is based on the Polluter-Pays Principle (PPP). Economic instruments are used to promote technological innovation, for example user charges for sewage treatment and charges on pesticides.

c. Programmes and strategies

Integrated water resources management and the high standard of water protection based on the ecosystem approach are necessities in Finland, because the water bodies are vulnerable to environmental changes. Water management is based on long-term planning, goal setting and wide cooperation with different stakeholders. Knowledge base for planning has been established by research and monitoring. Various tools have been developed, including use of mathematical models and geological information systems.

Integrated water resources management plans covering the whole Finland were drafted as early as in the 1970's and at the beginning of the 1980's. The aim of these plans was to create medium and long-term guidelines for regional water management and to provide a knowledge base for decision making for different

interest parties. One example of recent activities is a project "Integrated river basin management –a network for optimized water management, rehabilitation and protection of aquatic ecosystems in Karjaanjoki area ". This project was started in 2001 and it ends at the beginning of 2005. It has been financed mainly by national funds and the EU Life environment funding. The aim of the project is to restore and to improve the good ecological condition of the river basin and to revive the water ecosystem. A network has been created between different stakeholders, and citizen participation is encouraged. (<http://www.karjaanjokilife.fi>)

National water protection programme

Since the beginning of the 1970's, three national water protection programmes, adopted by the Council of State, have been drawn up. In these programmes quantitative targets for the most important polluters (e.g. industry, agriculture and municipalities) are defined. Also, measures to combat adverse effects on water quality and ecosystems have been identified. Also achievements of these targets have been monitored. Progress has been achieved step-by-step. In the target setting the environmental impacts, available technology and costs have been taken into account.

The third national water protection programme, approved by the Government in 1988, sets targets for the year 2005. The long-term goal of the programme is to avert the adverse effects of the human activities on the Baltic Sea and the inland surface waters. The main objective of the programme is to reduce the eutrophication of the waters. A special target is to reduce nutrient discharges by about 50 percent from the level of the early 1990's. As a result of these reductions in pollution, the water quality will be improved in many lakes and coastal areas. Moreover, the ecological diversity of shore habitats and aquatic environments in sea areas, lakes and rivers will be safeguarded.

Water protection programmes have influenced the development of local water protection measures. Wastewater treatment in urban areas, where about 80 percent of the Finnish population live, is of a high standard in international terms. About 95 percent of both organic component and phosphorus, and about 50 percent of nitrogen are removed. Also the discharges from industrial sources have decreased dramatically compared to the situation in the beginning of the 1970's. The areas where the water quality is poor in Finland have decreased considerably.

The Water Protection Programme for the year 2005 has identified the need to reduce pollution coming from households in rural areas. About a fifth of the Finnish population live outside the centralized sewage treatment system. New legislation was therefore passed in summer 2003, setting minimum standards for the treatment of wastewater from households outside sewerage networks.

Finland's Programme for the Protection of the Baltic Sea

In 2002, Finland published a Programme for the Protection of the Baltic Sea, where the main aim is to reduce eutrophying discharges from Finland and the adjacent regions. The reduction requirements for domestic discharges are based on the national water protection programme and particularly bear on reducing the load from agriculture, municipalities and dispersed settlements. This will have a beneficial effect on the state of Finland's coastal waters.

It is of prime importance that the effluents from St. Petersburg are reduced so that eutrophication can be diminished in the Gulf of Finland. The first step was the building of the south-eastern sewage treatment plant, in which Finland took part as a member of an international consortium. Finland supported investments by a total of 10 million euro. This building work has already started and will be finished in 2006. The next step will be to have efficient sewage treatment for the northern parts of the city.

Another important goal is to improve oil-combating capacity and maritime safety especially in winter, not only in Finland but also in Russia and Estonia.

One aim of this programme is also to reach a favourable protection status for regionally and geographically representative marine and coastal sites. The habitats and species representing marine and coastal areas are to be protected and preserved so that they remain biologically and regionally representative. In order to achieve these goals, more accurate information is required especially for submarine areas. A programme for inventorying such is at present being drafted.

In the protection of the Baltic Sea it is important to have clear priorities in reducing the discharges of hazardous substances. This requires a knowledge base to make it possible to assess discharges, occurrences and impacts, and to plan the required reduction measures. A very topical issue is the high dioxin concentrations in specific fish species, which exceed the limits set by the European Union. Finland is at present working on a programme for chemicals.

The Academy of Finland coordinates a research programme on the Baltic Sea (2003-2005) which focuses on reducing problems caused by eutrophication and hazardous substances, protecting biological diversity, and promoting sustainable use of natural resources.

The Ministry of the Environment is engaged in a revision of the national water protection programme and is also working on an action programme for the implementation of the Programme for the Protection of the Baltic Sea.

The Water Resources Strategy

The Water Resources Strategy of the Ministry of Agriculture and Forestry from 1999 is concerned with the water management duties in the administrative sector of the Ministry. The objective is that the use of water resources would be socially, economically and ecologically sustainable. The strategy covers the water supply of the communities and areas with scattered settlement as well as use and management of watercourses. The vision and targets of the strategy have been set until 2010. The most important targets of the strategy are:

- Activities of water resources authorities are efficient, impartial and reliable.
- Cooperation with interest groups is efficient and meets the requirements of the society.
- Water services satisfy the needs of the inhabitants, industries and recreational activities.
- Usability of water resources and the ecological state of watercourses are good.
- Benefits of hydrological regulations and other water resources development projects materialise with reduced risk, the management of watercourses is successful and the invested capital is secured.
- Precautionary measures and flood prevention are efficient and dependable, dams are safe and basic drainage is in order.
- Research and development activities are internationally competitive and serve practical purposes.
- Finland is an efficient co-operation partner in international water issues relying on its spirit of enterprise and initiative.
- Adequate resources and skilled personnel aware of the needs of the customers are available for the management of water resources.

The Strategy is being revised in 2004. (www.mmm.fi/english/landwater/natural_resources/)

Regional water resources development plans

Regional water resources development plans were drafted by regional water and environment centres in cooperation with other stakeholders in the late 1980's and in the early 1990's.

Also, regional **water protection plans** have been drawn up to improve water quality and usability. To provide safe drinking water and sewerage, the municipalities have nowadays to draw up **development plans for water supply and sewerage**.

d. Conservation of Marine and Inland Waters Ecosystems

In 1982, the Council of State made a decision-in-principle on a **Waterfowl Habitats Conservation Programme** of importance as waterfowl habitats. This programme aims at preserving the programme sites in as natural state as possible. Activities that will considerably affect their natural state and the protection aims, such as draining, water regulation and other construction works, are to be prohibited when necessary. The bird sanctuaries protection programme includes 287 areas with a total area of about 83 500 hectares, of which 58 000 hectares water. The protection of about 38 percent of these areas has already been implemented.

Finland has 49 internationally classified wetlands covering a total of about 800 000 hectares. The Finnish Ramsar sites are good examples of the Finnish wetlands and include some of the most valuable areas in the archipelago and along the coast, also lakes and mires of importance as bird habitats.

In 1990, the Council of State made a decision-in-principle on the **Shore Conservation Programme**. The programme aims at preserving, in an state exempt from development, the most valuable shore areas in the country, which have value in their natural state. This programme includes 127 shoreline areas of national value. Of these areas, 29 lie along the coast and 98 inland. The protected maritime shoreline has a length of about 1 500 km, which corresponds to 4 percent of the total. The protected lake and river shorelines have a total length of 6 500 km, which corresponds to about 5 percent of the total. The protection of about 80 percent of these shoreline areas has already been implemented.

The rapids protection legislation came into force in 1987 and exempts 54 rapids from waterpower development. In 1983, a separate act was issued to protect the river Ounasjoki, and in 1991, an act to protect the river Kyröjoki, from waterpower development.

In 2001, Finland set up seven **seal protection areas** with a total area of about 19 190 hectares. These areas have been established in order to protect seals, especially the grey seal, to safeguard their living environments against disturbances, to promote scientific seal research and the monitoring of seals, and to preserve marine habitats.

The present **Natura 2000 network** in Finland comprises 262 sites where at least half of the area is water. The marine sites number 54, with a total area of 464 830 hectares. The inland sites with lakes and rivers number 208 and have a total area of 456 618 hectares.

In connection with its 1998 decision on Natura sites, the Council of State decided that 22 Natura sites were to be indicated as **Baltic Sea Protected Areas (BSPA)** in accordance with the Helsinki convention on the protection of the Baltic Sea. This network of protection areas is aimed at protecting the marine environment. The BSPA sites proposed by Finland comprise marine and coastal areas of natural value. Geographically, they represent both coastal and outer archipelago, marine areas, and important bird sanctuaries.

B. REGIONAL AND INTERNATIONAL COOPERATION

Co-operation with neighbouring countries

Finland's environmental assistance has focused on the neighbouring countries: Russia and the Baltic states. Also Poland has been supported through a special eco-conversion arrangement. During the last 12 years approximately 85 million euros have been allocated to the water sector, covering technical assistance and investments in wastewater treatment, groundwater protection and protection of the receiving water bodies.

The reduction and prevention of polluting discharges from neighbouring areas affecting the environment in Finland and the Baltic Sea is one of the main objectives in this co-operation. Thus, water protection is one of the priorities. The Finnish aid has been used mainly to rehabilitation of wastewater treatment plants and sewerage. Harmonization with EU regulations and standards is also important. Besides investment support Finland's activities include capacity building and operational performance improvements in wastewater treatment plants. Training of environmental authorities in water protection and co-operation in research and monitoring of the Baltic Sea have been useful in meeting the overall objectives.

Cooperation on transboundary waters

Finland shares waters with all her neighbouring countries and has long experience of joint-management of transboundary waters. Co-operation with the Soviet Union started as early as 1964 with the agreement which was later continued with Russia. An agreement with Sweden was concluded in 1971 and with Norway in 1980.

Finland has good experiences and results from transboundary water cooperation. The agreements have provided a good basis for joint management and protection of shared water resources and the joint commissions have served as good forums for working together. The co-operation has increased mutual trust and understanding and knowledge of each other's circumstances. Commissions' tasks depend on the agreement. The Finnish-Swedish river commission is a joint permit authority in water issues. It also has tasks in fishing issues. The agreement made with Sweden in 1971 is currently being revised. The Finnish-Russian commission makes initiatives and statements that are linked with use, treatment and protection of

transboundary watercourses, monitoring and surveillance of the water quality, fishing conditions, prevention of water deterioration, hydraulic engineering and regulation of river systems within the transboundary watercourses.

The environment ministers of the UN Economic Commission for Europe (UNECE) region made a decision in the 5th "Environment for Europe" conference in Kiev in 2003 to start preparing an environmental strategy for the countries of Eastern Europe, Caucasus and Central Asia (EECCA). Water management, including transboundary issues, is an important sector for the EECCA countries. The ministers also adopted plans regarding the EU Water Initiative's EECCA component which would support the strategy. Work on the strategy will start with the Kiev+1 meeting to be held in October 2004 in Tbilisi, Georgia.

The UN ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992) provides an important framework for promoting transboundary water management and protection across the region. It is estimated that there are 160 major transboundary rivers and some 20 international lakes in the ECE region which comprises 55 countries including also the Central Asian states.

Finland is actively engaged in the work under the Convention and is currently a lead country for the work on monitoring and assessment. The Convention's work programme is directed to promote Integrated Water Resources Management activities related to the EU Water Initiative in the EECCA countries and also the water/transboundary issues of their environment strategy.

The Convention's Protocol on Water and Health is an instrument aiming at the reduction, control and prevention of water related diseases through adequate and proper water management. The Protocol is expected to enter into force this year and its future work programme is currently being prepared.

International co-operation

The Ministry for Foreign Affairs is in charge of channelling the official development assistance from Finland. With regard to aid policy, the Ministry is organised on regional basis, and Africa is the major recipient region of the Finnish aid. In order to achieve the objectives of the United Nations' Millennium Declaration and the Millennium Development Goals, especially in southern Africa and in Southeast and South Asia, a strong commitment, additional resources and expertise in different levels are needed. The European Union has proved its commitment by launching partnership initiatives in the area of water and sanitation. In addition, New Partnership for Africa's Development (NEPAD) and Africa's Minister's Council on Water (AMCOW) have introduced their own agreements.

Progress in achieving the objectives requires notably the execution of existing governmental commitments, programmes and regulations. Problems are manifold: ability and resources of the public administration, uncertainty of the linkages between water and poverty, finance and management of investments and, particularly, establishment and guidance of operational preconditions for external actors like consumer communities and private sector. Implementation of the objectives requires additional resources both in developing countries and in donor organisations. One step forward is the increased participation of the private sector. In order to attain a reasonable use of water in Africa it is necessary to agree upon multinational use of water resources as well as harmonisation of the legislation.

According to reports compiled from Finland's long-time development cooperation partner countries, the state of water services and sanitation is still not adequate in most of them: in Ethiopia, Kenya, Nepal, Nigaraqua, Mosambic, Zambia, Tanzania and Vietnam. Africa's situation in water services and sanitation is badly off in general.

Achieving the development targets related to water is connected to various uses of water. Assistance is needed to improve the quality and availability of drinking water, improve sanitation, and increase knowledge of water use in the environment, in food production, and for other productive purposes. Projects in question could be those focused on catchment areas by providing assistance and cooperation to integrated water resources management models, to the benefit of population in the rural areas and population living in urban slums.

It is of utmost importance to perceive water as a part of the whole and assess projects from the perspective of sensible use of water and education of basic hygiene.

In the Development Policy Programme of Finland gender aspects are to be taken seriously in all planning and implementation of the programmes including policy negotiations at all levels. For follow-up purposes all statistical information should be gender disaggregated.

Water and sanitation are not directly mentioned in Finland's Development Policy Programme, nor is there any defined framework for the aid. The extent of the development aid is dependent on the weight the recipient countries put on water and sanitation in achieving the above mentioned targets. Finland has, in any case, good preconditions to contribute, if necessary, to the development of water services and sanitation in developing countries. It has been assessed in Finland that water and sanitation projects have been well-managed. Moreover, external country-based assessments on the water sector prove these projects successful.

The main emphasis in the Finnish development cooperation in water sector has been on the improvement of the availability of clean water, e.g. construction of the latrines and education of hygiene. In Vietnam, Finland has supported in cooperation with the World Bank the development of the water and sewerage system in the city of Haiphong.

The amount of assistance has been decreasing accounting at the moment to approximately six percent of the bilateral aid. Commitments to carry on the assistance in immediate future have done or will be done with the Governments of Egypt, Ethiopia, the Kuvulai river commission established between the Governments of Namibia and Angola, the Mekong river commission in the Region of East-Asia, Nepal, the Palestine area and Vietnam.

Minor, but significant cooperative programmes Finland has with Global International Water Assessment (UNEP-GIWA) and some other water-related international organisations.

C. EDUCATION, TRAINING AND AWARENESS RAISING

The roles of different Ministries and other governmental bodies in education and training for sustainable development and sustainable consumption can be described in the following way:

Ministry of the Environment and the Finnish Environment Institute

- formulate environmental policy
- promote integration of sustainable development into education and consumption
- produce environmental information for education purposes
- contribute to the availability of information for consumers
- support other authorities in environmental awareness activities

Regional Environment Centres

- produce regional environmental information
- co-operate with local and municipal authorities, schools and NGOs.

Ministry of Education and the National Board of Education

- formulate education policy
- promote integration of sustainable development into the curricula and teaching at all levels and for all types of education
- develop the steering mechanisms: national core curricula, qualification requirements, evaluation, range of supporting
- develop measures (materials, further training of teachers and staff)
- participates in co-operation projects.

In the promotion of sustainable development, training and education play an integral role in all spheres of society. It increases the awareness of the general public with regard to the significance of sustainable development and clarifies its contents. A raised awareness should be reflected in lifestyles, production, consumption and the public administration, so that environmental, economic and social sustainability will prevail for generations. The promotion of sustainable development in training and education should be based on an integrated approach to economic, social and environmental developments.

Sustainability studies can be pursued throughout the full education cycle in all subjects and sciences, but need not necessarily be dealt with as a separate subject; instead, a multi-disciplinary approach is recommended.

In basic education, global environmental and development problems should be discussed. The main emphasis should be on living environments in Finland, on the state of the environment in Finland and around the Baltic Sea, and on ways and means of public participation to improve the state of the environment. Curricula for basic education should be drafted so as to make all teachers and subjects contribute to the adoption of sustainable lifestyles. Secondary education should aim at a deeper knowledge of the functioning of ecosystems, the variety of the environment, and the principles of sustainable development. In vocational education, environmental protection should be part of the know-how, and the basic issues in sustainable development should permeate all training and education. Sustainability is an increasingly vital element in education and in everyday praxes.

In the twenty universities in Finland, issues pertaining to sustainable development are to some extent met with by between 40 and 45 percent of all students. There is also separate education, frequently focusing on environmental protection, on sustainable development, and as part of other studies. A special challenge is to introduce, on a permanent basis, these issues into economic and social studies, so that they become part of the basics taught.

The expertise of teachers is important with a view to the significance of sustainable development. During the last few years, sustainability has been an integral element in all supplementary training provided for teachers.

In the education sector, the promotion of sustainable development is included in strategies and guidelines for this field of administration. The Ministry of Education has also set up a number of working groups, the most important of which is the group for promoting sustainable development in education. This group also works with the national implementation of the Baltic 21 E programme. In Finland's international cooperation with developing countries, the importance of training and education has increased. One of the main aims is to promote the process Training for All, which is part of the Johannesburg Action Plan.

At its meeting in spring 2004, the Finnish National Commission on Sustainable Development will set up a sub-committee to promote education for sustainable development in Finland.

Water and sanitation as a theme in education

Finnish schools have numerous national and international projects which focus on water. Some take part in the UNESCO Baltic project, which aims at improving the state of the Baltic Sea and finding work methods suitable for schools. The international Globe project deals with surface waters and hydrology. The Nature-watch programme, coordinated by WWF, studies waters and promotes the exchange of research results. The project Water for Life – Water Cycles is a regional environmental education project for students 12-16 years old, focused on water and water resources, natural water cycles, and the human impact on water resources.

Education for research and academic expertise related to water and sanitation is provided at several universities. It is possible to study water management techniques for communities and industry, issues of institutional guidance and management, construction in or on water, hydrology, limnology and hydrobiology. Water quality as an issue of hygiene and environmental health is part of studies in medicine and health care. There are four universities providing specialised studies in water and sanitation as a municipal, international and international cooperation issue.

In matters related to water and sanitation, Finnish universities are part of global networks, and this cooperation includes a number of developing countries. Cooperation with the countries in East Africa began as early as the 1970s.

Education on water issues in developing countries

Finland needs to strengthen training, research and know-how related to water issues in developing countries, particularly for the younger generation. This calls for a long-range action plan.

Finland's strengths in international cooperation in water issues will probably continue to be provision of Finnish expertise and assistance to promote integral planning of the use of water resources, development of administration and legislation, and building up capacity in developing countries. Important instruments include clearing houses and the transfer of information on good praxes, data and monitoring systems, and research.

The training provided by participation in individual projects remains important. Finland has implemented capacity-building projects in developing countries and countries in transition, for example in Kosovo, Thailand and Kampuchea.

D. INFORMATION SYSTEMS

Integrated water resources management and high standard of water protection based on ecosystem approach are necessities in Finland, because the waterbodies are vulnerable to environmental changes. Water management is based on long-term planning, goal setting and wide cooperation with different stakeholders. Knowledge base for planning has been established by research and monitoring. Tools, including use of mathematical models and geographical information systems have been developed.

The Environmental Data System is being developed as a basic tool to provide information on the environment for all users of environmental information. The Environmental Data System is a GIS-based information system. All data is bound up to co-ordinates. This enables map presentations and makes it possible to combine data from different databases.

The water components of the Environmental Data System are ready. The information system on hydrology and water management contains data on the spatial and temporal division of water resources. The information system on the status of surface waters contains i.a. the results of physical-chemical analysis from water quality monitoring (regular monitoring 5000 sites).

Information on water services

National statistics on water services are collected from an information system containing different registers on waterworks and wastewater treatment plants and from the information system on supervision and loading data. At the moment a new information system is being prepared as part of the Environmental Data System and it should be ready in 2004.

Sustainable Development Indicators (SDIs)

A special Finnish set of sustainable development indicators (SDIs) was published in 2000, but work on developing these indicators began already in 1996, and is still continuing. Wide-ranging participatory processes and consultations have resulted in a set of indicators that are widely appreciated and have been used as a model for similar initiatives around the world.

During the international process Finland took actively part in the testing of 134 UN developed SDIs and reported on 58. Testing involved collecting data and compiling expert comments on the suitability of the indicators. Besides involving a number of Finnish stakeholders in the process, Finland also worked closely with its nominated twinning partner, South Africa. The experiences gained from the international exercise were extremely useful in developing Finland's national SDIs. Many of the participants in the UN process also contributed to the national process, so Finland was able to take good advantage of their previous experience. The core task force working on the indicators, the indicator network, involved several ministries and research institutes.

The national indicator development process involved over a hundred stakeholders during the period 1998-2000, resulting in the publication of "Signs of Sustainability", which portray a total of 83 indicators of sustainable development. This book was published in three languages, both in print and on the Internet.

Efforts to further improve the national set of SDIs were launched in 2001. An extensive study to compile comments from the main users of the indicators took place over the following two years, involving interviews with 40 high-level politicians and civil servants. Responses to the indicators have generally been

positive. The main conclusion was that decision-makers themselves do not generally use indicators, but rather they wish to use the indicators to convey information to others.

The importance of easy access, timeliness of data, policy relevance and wide distribution was recognised. The national indicator list has been modified to contain fewer indicators, with more focus on the interlinkages between the different dimensions of sustainable development.

Currently the SDIs are produced for three different audiences. The first one is the Finnish National Commission for Sustainable Development (FNCSO). According to its working programme 2003-2007, each of its meetings will have a specific theme and indicators relevant to those themes are produced in small leaflets. The method enables timely and policy relevant indicators to be distributed at the meetings.

At the moment following indicators related to water are used: water consumption (both surface and groundwater), eutrofying emissions, reports on (disturbing) algal blooms and PCB concentrations in fish.

The Ministry for Agriculture has prepared a strategy and general indicators for monitoring and managing the amount and use of renewable resources (first set in 1999). With the aid of these indicators it is possible to gather nationally reliable data on renewable natural resources and obtain information on pressures and threats, including qualitative and quantitative trends for the resources. The set of indicators consist of the following Finnish renewable natural resources: arable land, agricultural plants and domestic animals, production methods and quality of the products, renewable energy sources, fur farming, products from forests and peat land, game husbandry, reindeer husbandry, fisheries and water resources. The rural landscape (countryside) and biodiversity is also considered an important natural resource as well as social, cultural and economic impacts of agriculture on the farmers and the viability of the rural areas. The indicator system is now (2004) being tested and new indicators for water resources management will be developed.

Monitoring of water resources

Monitoring of water resources in Finland has been implemented principally on three different levels: Finnish Environment Institute (SYKE) has been responsible for the national monitoring networks, which are used to get an overall picture of the general status of water bodies. There are altogether some 250 lakes and 190 rivers, which belong to this national water quality network. Additionally, SYKE takes care of the hydrological monitoring networks.

The other monitoring level is the regional monitoring, which follows the water courses, their status and possible trends with a more detailed network, where the needs of the region and especially the polluted areas are taken into account more precisely. The regional monitoring is implemented by the regional environmental centers.

The third level of monitoring is the operational monitoring, which is focused to the polluted water bodies and which is paid for by the polluters according to the polluter-pays-principle. The co-ordination of all the three monitoring programmes is duty of the regional environmental centers. In reporting phase the results of all the different programmes are discussed together.

The authority which is responsible for the environmental monitoring strategy is the Ministry of the Environment.

A summary report on monitoring activities is published at three year intervals. An extended summary: Environmental Monitoring in Finland 2003-2005 is available on the website of the environmental administration (<http://www.ymparisto.fi>).

Sustainable Development in the Internet

The website of Finland's environmental administration has recently been revised (<http://www.ymparisto.fi>). The extensive home page for sustainable development can be found from the front page of the revised website in Finnish, Swedish and English. The SD pages include general information, recent news and major events on sustainable development in Finland, detailed information on the Finnish National Commission on Sustainable Development as well as on the Finnish Government's programme for Sustainable Development

and its evaluation report. In addition, updated information on local, regional and international processes and sustainable development follow-up mechanisms, including indicators, are available to all website visitors.

E. RESEARCH AND TECHNOLOGICAL DEVELOPMENT

The main ministries responsible for research policy are the Ministry of Education, which is responsible for science policy, and the Ministry of Trade and Industry, which is responsible for technology policy. These ministries allocate almost 80 percent of public research funding. Science and Technology Policy Council is the main advisory body to the Finnish government and its ministries. The Academy of Finland and the National Technology Agency (TEKES) are the main public research funding organisations. Research in the public sector is mainly performed in universities and state research institutes.

The Academy of Finland in collaboration with end-users and policy makers, establishes research programmes in scientifically important areas of research and in nationally important areas requiring scientific knowledge. The research programmes are for a fixed period and they are often funded and managed in collaboration with the sectoral authorities concerned. At the moment there are two on-going programmes dealing with water: the **Baltic Sea Research Programme** and the **Programme for Sustainable Use of Natural Resources**. Recently concluded programmes include research on global change, biodiversity, environment and health and remote sensing.

The main institutions where fresh water research is conducted are the Finnish Environment Institute (SYKE), Regional Environment Centres, the National Technology Agency (TEKES), the Technical Research Centre of Finland (VTT) and several universities.

SYKE has at the moment research programmes on **environmental technology**, on integrated river basin management and on the protection of the Baltic Sea. The 22 projects of the technology programme include i.a. projects on eco-efficiency and treatment of waste water and drinking water. The **integrated river basin management programme** includes 23 projects dealing with assessing the state of catchments and water bodies, the effects of loading and the methods for reducing the load. The results will be used e.g. in the practical implementation of the EU water framework directive. **The Baltic Sea programme** includes 33 projects on the themes of ecological impacts of nutrient loads, assessment of the environmental protection measures, changes in the quality of coastal waters, diversity of the marine and coastal nature and emergency response measures.

A large amount of research and development has been conducted in Finland on the regulation of watercourses during last 15 years. Better knowledge of the ecological, social and economic impacts of regulation and improved forecasting and planning methods have provided new potential for alleviating the adverse impact of regulation. These development projects will greatly help to implement the EU Water Framework Directive in Finnish water bodies.

The main research area in Finland in the field of water supply and sewerage has been the problems of water services in sparsely populated areas. There has been a few significant research programmes in recent years e.g. The Water Services 2001 Technology Programme (1997-2001) completed by TEKES (www.tekes.fi) and the research programme of environmental health by the Academy of Finland (www.aka.fi). The implementation of EU Water Framework Directive is supported by several research projects. Water protection in agriculture is supported within the framework of the governments' decision in principal for the goals of water protection until 2005.

The Water Services 2001 Technology Programme (1997-2001) completed by TEKES (the national technology agency) was targeted at development of the Finnish water services sector. The main aims of the programme were to improve the technological competitiveness of water services businesses, increase readiness to introduce new technologies at water and sewage works, bring onto the market new products designed to satisfy water service needs in rural areas, and promote research and development in the field of Finnish water services. The programme comprised 39 different projects approximately 50 percent of which industrial research and development projects and the remainder applied research projects.

The Academy of Finland finances many water-related research projects, some of them being part of the Unesco's International Hydrological Programme (IHP) coordinated by the Academy: "Sufficiency of water resources and vulnerability of water environment as a global issue – analysis of the interaction of

urbanization, population growth, climate change, poverty and food production", "Urban hydrology", "Water and Development research", "Typology of Urban Water Conflicts" and "Integrated Water Resources Management in West Africa".

The Ministry for Foreign Affairs channels basic research through the Academy of Finland, but also finances applied research both directly and as part of its a part of its multilateral and bilateral cooperation.

F. FINANCING

In 2003, the Finnish government targeted 874 million euros for the environmental expenditures. Budget proposal for 2004 is 925 million euros. Within the allocated fees and taxes in 2003, water protection was given 8 million euros, which is also a proposal for year 2004. In addition to government financing, the Finnish municipalities target financial resources for the environment. In 2002 the total cost of environmental protection in municipalities was 608 million euros, of which 164 million was investments and 444 million operating costs. The biggest environmental expense items for municipalities are sewerage and wastewater treatment.

The Agri-Environmental Programme (1995-1999) and the Horizontal Rural Development Programme (2000-2006) incorporate environmental aid divided between basic measures and additional measures. About 91 percent of the farmers are committed to the new environmental aid system. It has been estimated that in the long-term, the environmental subsidy to be provided to agriculture in 1995-2006 will reduce the phosphorus and nitrogen load on watercourses. The environmental subsidies for agriculture was 306 million euros in 2003.

Government subsidies for water supply and sewerage investments are given for community water supply measures including measures for preparedness in emergency situations, incentives for regional co-operation and water supply and sewerage development in rural areas. In 2003 the amount of subsidies was 5,7 million euros.

The aim of financial government support in rural areas is to encourage investments to public water supply in order to reduce loadings (improvement of sewage treatment is required), reach the EU-directive quality standards of drinking water and support the growth of economic life and employment.

The "water user pays" principle is implemented in Finland. Water utilities collect a fee from water consumption [approx. 0,90€/m³ (2002)] and from waste water treatment [approx. 1,40€/m³ (2002)]. The fee from waste water treatment used to be under public law, but now in the new Water Services Act (2001) it is under private law as the fee from water consumption has been. Fees should correspond to the real costs of water services and they may provide only fair return on capital. Water utilities have to announce the fees.

The municipal investments on water supply and sewerage were about 0.24 billion euros in 1999. The investments in waterworks were about 0,11 billion euros, and in sewerage 0,13 billion euros.

4. NATIONAL AND REGIONAL POST-JOHANNESBURG CHALLENGES AND OPPORTUNITIES

As regards integrated planning of water resources, the most important project is the implementation of the European Union framework directive on water policy. National water protection policy has to be built up so as to achieve, by the year 2015, a good state of both surface waters and groundwaters. To reach this goal both the national water protection programme and the Finland's Programme for the Protection of the Baltic Sea should be implemented in full. For the time after 2005, new water protection goals have to be worked out. They should include the safeguarding of surface water and groundwater quality, bearing in mind the need for water use.

Economic and other instruments should be developed so as to combat the deterioration of water bodies, promote water protection and efficient use of water, and promote sustainable water resources management. Especially in the drafting of the new 2006-2007 Horizontal Rural Development Programme for the European Union, more effective water protection in agriculture should be highlighted, in addition to the measures needed to preserve biological diversity.

More research-based information and indicators are needed for setting water protection goals and for monitoring goal achievement. This will make it possible to assess the need for water protection and the guidance of water protection measures, including their effects and impacts. Integrated planning of water resources also requires methods which makes a comprehensive impact assessment possible while granting an active participation by the general public. It is also necessary to find indicators which make it possible to assess not only environmental but also social and economic impacts.

The planning of the use of water resources should be made taking increasingly into account biological diversity and ecosystems, and this also requires more basic data. Water and health, life-cycle approach and resource efficiency are other important viewpoints.

In order to ensure the conservation of marine and inland waters ecosystems it is important to emphasize joint action and synergy benefits between the UN Convention on Biological Diversity and the RAMSAR Convention. The CBD/COP-7 meeting in February 2004 pointed out the need to collect reliable research information on inland waters and to create national assessment methods. Furthermore, the COP-7 requested the parties to include the targets and relevant measures of the Programme of Action, including appropriate timetables, into national strategies on biological diversity by 2005. In Finland, this will be taken care of while revising the national programme on biological diversity by 2006. The implementation of the programme of inland waters will partly take place by the national implementation of the European Union's Water Framework Directive, partly by national enforcement of the RAMSAR Convention and by developing the NATURA 2000 network.

In Finland, it is important to improve water protection technology to make it suit especially Finnish conditions. Some main challenges are improvement of de-nitrification of municipal wastewaters, new small-scale sewage systems suitable for dispersed settlements and holiday housing, and methods and technology serving the combating of environmental damage and restoration of waters. Eco-sanitation is one of the future local action models.

Finland should take part in activities promoting the implementation of the undertakings at the Johannesburg summit on sustainable development. This particularly refers to improved water supply and management in developing countries and EECCA countries, integrated planning of water resources, and cooperation on transboundary waters. In water protection it is important to strengthen the ecosystem approach. Since the effects of the climate change, globally, are bigger than anticipated, forecasting models should be improved and strategies worked out so as to make it possible to adapt to this change.

+++