

## GLOSSARY

**Access to improved drinking water supply and sanitation**

An improved water source is any form of water collection or piping used to make water regularly available and reasonably protected from contamination. Quantitatively, WHO and UNESCO define an improved source in rural areas as a source that provides 20 litres per capita per day at a distance no greater than 1000 metres. In urban areas, access to piped water or a public standpipe should be within 200 meters of a dwelling or housing unit.

Whether water quality is satisfactory will depend on its intended use (e.g. for drinking, bathing, irrigation, industrial use).

Urban areas with access to sanitation services are defined as urban populations served by connections to public sewers or household systems such as pit privies, pour-flush latrines, septic tanks, communal toilets, and other such facilities. Rural populations with access are defined as those with adequate disposal such as pit privies, pour-flush latrines, etc. Application of these definitions may vary, and comparisons can therefore be misleading.

**Balanced-Development Approach**

The Balanced-Development Approach is based on an equal consideration of the social, environmental, economic, institutional and technical costs and benefits of any intervention, and promotes action in the fields of rules, regulations, skills and knowledge.

**Basic Needs/  
Basic Services**

The concept of meeting “basic needs” was developed in the 1970s and internationally adopted to supplement economic growth as the primary target of development co-operation. The meeting of basic needs for food, water, shelter, health care and education thus became the driving force of the second and third UN Development Decades (1970s and 1980s).

Basic services refers to the minimum amount of public services that a society would like to provide to everyone. The concept of “basic services” was developed as the strategy for meeting basic needs, initially in health care and water supply; later in sanitation, household food security and education. The concept of basic services therefore also conveys the idea of facilitation via support to community mechanisms (low-cost, appropriate technology approaches; recruitment and training).

**Catchment Area**

See Watershed

**Common Good**  
See also *Public Good*

In the popular meaning, the common good describes a specific “good” that is shared and beneficial for all (or most) members of a given community. This is also how the common good is broadly defined in philosophy, ethics, and political science. However, in economics, the term “common good” is used to refer to a competitive non-excludable good.

Water should be considered as a composite good combining elements of public and private goods. Water does possess an important characteristic of a public good, i.e. non-excludability – since the consequences of denying access would be culturally and politically unacceptable to much of mankind.

Water ownership and use might be classified as “a good belonging to and managed by a community”. Water should therefore be considered as a “common good” that qualifies for both private and communal ownership and use. This would allow for a wide range of water management systems that can suit various socio-economic, ecological and ethical conditions.

**Cost Recovery, sustainable**

Sustainable cost recovery relies on a series of factors that range from tariff design to the design of an appropriate strategy, the application of sound financial management principles, the optimisation of costs and the promotion of willingness to pay. According to ADB, goals of cost recovery include good governance, financial sustainability, distributive justice, economic efficiency, and fair pricing. However, sustainability for SDC also necessitates that the ecological objectives of safeguarding the resource base are included in these goals.

**Demand Responsive Approach (DRA)**

This approach requires that consumers be involved in selecting, financing, implementing and managing water and sanitation services that meet their demands and be willing to pay. Community members make informed choices on: whether to participate in a project; technology and service level options based on willingness to pay; when and how their services are delivered; how funds are managed and accounted for; and how their services are operated and maintained. Government plays a facilitative role, sets clear national policies and strategies, encourages broad stakeholder consultation, and facilitates capacity building and learning. An enabling environment is created for the participation of a wide range of providers of goods, services and technical assistance to communities. An adequate flow of information is provided to the community, and procedures are adopted for facilitating decisions on collective action within the community.

**Drainage Basin**

See Watershed

**Drinking Water, safe**

Safe drinking water includes treated surface water and untreated water from protected springs, boreholes, and sanitary wells. WHO's norms for drinking-water quality go back to 1958. An established goal of WHO and its Member States is that: "all people, whatever their stage of development and their social and economic conditions have the right to have access to an adequate supply of safe drinking-water". In this context, "safe" refers to a water supply with a quality that does not represent a significant health risk, is of sufficient quantity to meet all domestic needs, is available continuously, is available to all the population, and is affordable.

**Ecosan Approach**

Ecological sanitation can be viewed as a three-step process consisting of containment, sanitization and recycling of human excreta. The objective is to protect human health and the environment while reducing the use of water in sanitation systems and to recycle nutrients to help reduce the need for artificial fertilizers in agriculture.

**Ecosystem Approach**

In relation to water, the ecosystem approach is concerned with conservation, sustainable use and integrated management of ecosystems such as wetlands, forests and soils that capture, filter, store and distribute water. Its specific aims are to: (1) maintain ecosystem functions and services; (2) support livelihoods; (3) ensure equitable sharing of benefits amongst stakeholders; (4) promote adaptive management to enable people to make informed choices; (5) decentralize management, to empower people to manage their own resources; and (6) foster intersectoral cooperation, to achieve greater effectiveness through partnerships.

**Environmental Sanitation/  
Ecological Sanitation**

Environmental sanitation (ES) involves interventions to reduce peoples exposure to disease by creating a hygienic environment. This usually includes disposal of or hygienic management of excreta, refuse, wastewater and storm water, the control of disease vectors, and the provision of facilities for personal and domestic hygiene. Ecological sanitation technologies take the principle of environmental sanitation a step further, as it is structured on recycling principles and aims to maintain a closed eco-cycle. It is also a low-energy approach that uses natural processes.

**Environmental Diseases**

Environmental diseases are diseases caused by environmental risks. According WHO, childrens health is endangered by six groups of risks: household water scarcity, hygiene and sanitation, air pollution, disease vectors, chemical hazards, and unintentional injuries (accidents). Diarrhoea, caused by unsafe water, is the second biggest child-killer in the world. Vector-borne diseases include malaria (with over a million deaths a year, mainly of children under five), lymphatic filariasis, schistosomiasis, dengue fever and others.

**Environmental Flows**

“Enough water is left in our rivers and lakes, which is managed to ensure downstream environmental, social and economic benefits.” Source: Flow, the essentials of environmental flows, (IUCN 2003).

**Farming**

The practice of cultivating the land, raising stock, and fishery practices. Farming includes occupations and income-generating activities from cultivation, animal husbandry, arboriculture, fish farming, horticulture and home gardening of vegetables, fruit trees and flowers.

**Freshwater**

Naturally occurring water having a low concentration of salts, which is often suitable for abstraction and treatment to produce water for domestic, agricultural and industrial uses.

**Global Public Good**  
See also *Common Good*  
and *Public Good*

A global public good is a public good with benefits that are strongly universal in terms of countries (covering more than one group of countries), people (accruing to several, preferably all, population groups), and generations (extending to both current and future generations, or at least meeting the needs of current generations without foreclosing development options for future generations).

**Good Water Governance**

Good governance exists when interrelations and division of roles between the state, civil society and the private sector are based upon participation, transparency, non-discrimination, and the effectiveness and reliability of public affairs. As a basic source of life, water resources must be governed within a framework of shared responsibility, involving an obligation on the part of all people and institutions, both individually and collectively, to value and protect them.

Local authorities must lead the movement for responsible water governance. While water resources are amenable to public, community or private management, they need to be controlled, secured and governed by accountable public authorities, or by recognized indigenous or traditional authorities. In order to promote responsible water governance, governments must support the participation of all stakeholders as partners, with full information, in protecting watershed areas and in determining the water and environmental sanitation services that they receive.

**Household-Centred  
Environmental  
Sanitation (HCES)**

HCES is an approach to planning environmental sanitation services to overcome the shortcomings of conventional services through two components: the household as a focal point, and a Circular System of Resource Management (CSRSM). The CSRSM emphasizes water conservation, recycling, and reuse, as waste is a misplaced resource and using it reduces downstream pollution.

**Human Right**

*Water as a Human Right*

The right to water is implied in Article 25 of the Universal Declaration of Human Rights: “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family”. The right to water entitles every human being to sufficient, safe, accessible and affordable water. This right must be enjoyed equally and without discrimination by women and men. Human rights chiefly concern the relationship between the individual and the State. Governmental obligations with regard to human rights can broadly be categorized in terms of obligations to respect, protect, and fulfil.

**Respect.** The obligation to respect requires that States Parties (governments ratifying a treaty) refrain from interfering directly or indirectly with the enjoyment of the right to water.

**Protect.** The obligation to protect requires that States Parties prevent third parties such as corporations from interfering in any way with the enjoyment of the right to water.

**Fulfil.** The obligation to fulfil requires that States Parties adopt the necessary measures to achieve the full realization of the right to water.

“Water is fundamental for life and health. The human right to water is indispensable for leading a healthy life in human dignity. It is a pre-requisite to the realization of all other human rights.” General Comment Nr. 15 of the UN Committee on Economic, Social and Cultural Rights, adopted November 27, 2002.

**Integrated Risk and  
Disaster Reduction**

Integrated risk and disaster reduction, in addition to post disaster relief, primarily involves prevention of natural disasters. Prevention is an important component in both development cooperation and humanitarian aid. It is a long-term activity that demands coordinated cooperation among various actors. Disaster reduction includes all temporary and permanent measures that aim to prevent the threat of damage or minimize the impacts of a damaging event. It is based on risk assessment, evaluating the potential for damage, and measuring existing risk perception and coping mechanisms (including legislation). In a context where sustainable development is the overall aim, disaster reduction is a continuous process in which measures concerned with prevention, intervention, and reconstruction are equally integrated.

**Integrated Water  
Resource Manage-  
ment (IWRM)**

IWRM is a process that promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

The IWRM approach involves: an integrated, trans-sectoral approach to water, the sustainable management of water resources which ensures that water resources are available for future generations; recognition that water is a valuable resource, with its value reflected in how it is used; and a participatory approach to water resources management involving stakeholders, to ensure equity as well as efficiency in water use.

**Irrigation**

The application of water to land for agriculture or landscaping purposes, through human-made systems, to provide for plant water requirements not met by precipitation. There are three broad classes of irrigation systems: (1) gravity flow distribution; (2) pressurized distribution; and (3) drainage control systems.

**Gravity flow** systems convey and distribute water at the field level by a free surface, overland flow regime.

**Pressurized systems** include sprinkler, trickle, and an array of similar systems in which water is conveyed to and distributed over the farmland through pressurized pipe networks.

**Drainage control systems** (subirrigation) are not common but are conceptually interesting. Relatively large volumes of water percolate through the root zone and become drainage or groundwater flow. By controlling the flow at critical points, it is possible to raise the level of the groundwater to within reach of crop roots.

These individual irrigation systems have a variety of advantages and particular applications. Familiarity with each system is important in order to best satisfy the needs of irrigation projects during project formulation.

Low-cost irrigation are systems (traditional or modern) that have relative low labour and capital costs. Examples include simple drip-irrigation kits, treadle pumps, certain rope and washer pumps and other technologies currently under development.

**Irrigation,  
large-scale**

Large-scale irrigation should be defined not only in terms of size but also by its organisational structure. Characteristics of large-scale irrigation systems are: (1) formal hierarchies of open channels or pipes for delivery of irrigation water and removal of drainage water, (2) formal organisational structures with a legally constituted management institution and (3) central control of operation and management and water allocation and delivery. All formal large-scale irrigation systems comprise four functional components: (1) water source and water capture, (2) water delivery, (3) water use and (4) water disposal.

Users of large-scale irrigation systems may be smallholders, as is the case in Egypt and Sudan, where irrigation schemes are large and managed by the government. Some authors consider these schemes as small-scale rather than large-scale because of the small size of the individual holdings.

**Irrigation,  
small-scale, Micro-  
Irrigation**

Small-scale irrigation applies water to only a fraction of the soil surface, with water delivered to the plant through a network of pipes via drippers, micro sprinklers or bubblers (controlled orifice) outlets. This is often also referred to as micro-irrigation. These techniques contribute to food security and poverty alleviation by improving the water efficiency of irrigation (more crops and jobs per drop) in water-scarce regions, where rain is insufficient. This enables farmers to sustain and even improve the productivity of irrigated agriculture through the mobilization of their own local resources.

**Livelihood Approach**

The sustainable livelihood approach is an integrated analytical approach to poverty, used in development projects, research and policy-making. Its primary focus is on the needs and the opportunities of the poor as seen by the poor themselves. The starting point for analysis is survival strategies characterised by their diversity, complexity, unpredictability, and dynamics.

The aim of the sustainable livelihood approach is to shape measures and policies in a joint process of learning and reflection, including different groups of actors, in order to assist poor people in using their own strengths and potentials while also broadening their options and reducing their exposure to adverse external impacts. Empowerment of the poor is thus a central component of this approach.

A further aim is to minimise both the external and internal negative influences of policies, institutions, etc., that threaten the sustainability of poor people's livelihoods.

### **More Crops and Jobs per Drop**

The "more crops and jobs per drop" strategy is in line with the objectives of the World Water Vision presented at the Second World Water Forum in The Hague, March 2000. It is also one of the primary objectives of integrated water resource management. It implies greater food production per unit of water applied, and thus more sustainable livelihoods for women and men through ensured access for all to the food required for healthy and productive lives.

Maximising water productivity means not only maximising agricultural production per drop of water but also maximising the number of rural jobs that can be created with limited water resources. The value of water, in other words, is both the food it can produce and the income it can create.

For SDC the "More Crops and Jobs per Drop" concept is only acceptable if it takes into account environmental and social aspects, both of which are prerequisites to achieve sustainability.

### **Payments for Environmental Services (PES)**

Environmental services are generated by natural assets (sun, soil, water, plants, other living organisms and the atmosphere) and their interaction, providing humankind with economic, ecological and socio-cultural benefits. They include:

**Provisioning services:** The products obtained from ecosystems, including, for example, genetic resources, food and fibre, and fresh water.

**Regulating services:** The benefits obtained from the regulation of ecosystem processes, including, for example, the regulation of climate, water, and some human diseases.

**Cultural services:** The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values.

**Supporting service:** Ecosystem services that are necessary for the production of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.

These benefits are usually not priced. The hydrological services provided by forests, such as clean and regulated water flow, and reduced sedimentation, for example, are only noticed when natural disasters, flooding, siltation of reservoirs and scarcity of water, occurring as a result of unsustainable land-use exert considerable costs on the user.

Land owners/managers typically receive no compensation/payment for such services and consequently do not consider them in making land-use decisions.

Payment schemes for environmental services (PES) are flexible and direct compensation mechanisms by which service providers are paid by service users. PES schemes in watersheds usually involve the implementation of market mechanisms to compensate upstream landowners in order to maintain or modify a particular land use, which is affecting the availability and/or quality of the downstream water resources.

**Polluter Pays Principle**

The Polluter Pays Principle is based on an economic approach to pollution control, designed to ensure that the polluter bears the cost of pollution damage and/or the costs incurred in controlling pollution – otherwise known as abatement costs.

The OECD describes it as “the principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment”.

**Poverty**

Poverty is multifaceted and cannot be restricted to a lack of income alone (the poverty line in developing countries is generally defined as an income of one U.S. dollar per day per capita) or to inadequate food consumption (e.g. a minimal calorie intake). Poverty has a qualitative as much as a quantitative aspect. Generally speaking, poverty means privation and lack of well-being. Poverty cannot only be defined from the outside, the poor themselves must also be involved, i.e. understanding poverty requires both intimate and external knowledge. Only if all dimensions and perceptions of poverty are considered, will the individual, social and primarily cultural diversity of human lives also be recognized.

**Pro-Poor**

Focusing activities on the low-income segments of society, which often have inadequate access to water and other resources or services. “Pro-poor” implies that the overall aim is beneficial towards the poor, while “poverty focused” implies a greater degree of targeting.

**Precautionary Principle**

The precautionary principle provides guidance for governance and management systems in response to uncertainty. The most widely accepted and cited version of the precautionary principle in the environmental context is Principle 15 of the Rio Declaration, which states:

“In order to protect the environment the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.

In general terms, the precautionary approach involves a shift of emphasis in governance of environmental risk, from reacting to clearly defined problems as they arise, to recognising uncertainty and ignorance, anticipating harm, preventing problems, taking cautious action, and monitoring potential impacts.

**Private Sector Participation (PSP)**

see also *Public-Private Partnerships (PPP)*

The participation of the private sector in delivery of water supplies, irrigation and wastewater services has attracted much attention as a solution to systemic problems of service delivery.

The basis for advocating PSP is the recognition that private commercial companies tend to operate services with greater efficiency and less waste than government-run utilities, while managing to recover their costs. The level of development and the suitability of private sector institutions in different settings will strongly influence the form of participation.

Options are wide-ranging, from minimum private sector involvement, which could consist of contracting out the management of certain major installations; to full divestiture of responsibility for capital investment, operations, and commercial risk to autonomous water companies.

However, introducing marketplace economics into public health engineering has implications which have provoked considerable controversy, especially after a long period in which provision of water and sanitation infrastructure has been primarily regarded throughout the world as a public service to be provided from the public purse, or at least heavily subsidised.

The key issue is how to set up institutional arrangements that allow the commercial sector freedom to introduce marketplace efficiencies while guaranteeing access to services to those communities – by definition the poorest and least able to exercise influence politically or in the marketplace – who are already underserved and most at risk from public health hazards.

In private sector participation processes, the state remains the owner of water resources. It can delegate the distribution and sanitation management of water to private companies, but must retain the responsibility of guaranteeing social equity among the services provided.

### **Privatisation**

A process in which the government transfers state-owned industries (e.g. water, electricity) to the private sector. This usually involves an offer for sale of shares in an industry to the general public.

### **Public Goods**

see also *Common Good and Global Public Goods*

In common usage, “public good” is often incorrectly associated with “common good,” or with such value-based goals as social equity, social justice and environmental sustainability. Its definition in economic theory is narrower, more precise, and contrasted specifically to “private good.” A private good is one whose individual consumption is both excludable (my use of the good is not dependent on others use) and rivalrous (my use of the good could preclude use by another). This characterizes most market-based commercial/commodity exchanges.

A public good is one that is non-excludable (all people have unimpeded access to it and can profit from it) and – in its pure form – non-rivalrous (the individual consumption of the good does not restrict that by another individual).

Strictly speaking common pool resources such as water do not qualify as public goods since their use is not non-rivalrous and use by one person does affect the use by others.

### **Public-Private Partnerships (PPP)**

see also Private-Sector Participation (PSP)

An agreement between the public sector and a private sector entity, whereby both parties share risks, responsibilities, and in some cases investments.

Inviting the participation of the private sector has recently been recognised as a means of making water supply and sanitation services more efficient and cost-effective, while raising revenue to improve long-term sustainability and generate investment for new infrastructure. Privatisation of public water companies can release public funds for other development activities and reduce administrative burdens. Developing countries can also benefit from the know-how of commercial companies specialised in public services management. The involvement of the commercial private sector can help to underline the value of the natural resource and – given appropriate incentives – can also encourage measures to protect and conserve freshwater supplies.



- A balanced partnership between public authorities and the private sector requires that their respective roles be clearly defined within a legal framework. The level of development in the country, including the level of skills and capacities within the commercial sector, and the nature of institutions in water-related sectors, will strongly influence the form of public-private partnerships.
- Public-Public Partnerships (PUP)** A public sector company assists in the development of another public sector operation. The use of “twinning” as a mechanism of capacity building provides a prototype for PUPs. The public sector has a key role to play in the sustainable development of the world’s water services for all of its citizens – rich and poor. The general notion of public-public partnerships (PUPs) is a form of international cooperation and action whereby existing, experienced public service agencies partner others to help them build capacity, on the basis of mutual, not for profit, support. Given the difficult conditions for privatisation in most developing countries, capacity building, know-how transfer and financing through co-operation with state-owned enterprises and with state agencies from other countries is a particularly promising alternative.
- Rainfed Agriculture** A farming system in which crop water needs are met by natural precipitation.
- Scarcity** An area is experiencing water scarcity when annual water supplies drop below 1,000 m<sup>3</sup> per person. Water scarcity is grouped into three categories: physical water scarcity, economic water scarcity, and little or no water scarcity. If the primary water supply (PWS) of a country exceeds 60 percent of its potentially utilizable water resources (PUWR), it faces physical water scarcity. Even with the highest efficiency and productivity, the country will not be able to meet the demands of its domestic, industrial and agricultural sectors, nor satisfy its environmental needs. Water will be diverted from agriculture to other sectors and food will have to be imported, while costly investments will have to be made in desalination plants. Countries facing economic scarcity have sufficient PUWR to meet the additional PWS, but have to increase their PWS through storage and supply systems by more than 25 percent. Most of these countries will face serious problems, both financially and in terms of capacity, in increasing their PWS by these levels. They need to put considerable efforts into improving the efficiency of their water use by applying a policy of sustainable management of water resources.
- Stakeholder** Individuals or representatives of a group who have an interest in a particular decision. This includes people who influence a decision, or can influence it, as well as those affected by it.
- Subsidiarity Principle** “Responsibilities for water related services and resource management need to be decentralised to the lowest appropriate administrative level according to the concept of subsidiarity.” The intent of this principle is to discourage the perpetuation of centralised command structures in authorities responsible for water resource management. Such structures, seen as disciplined and managerially accountable, tend to inhibit participation by stakeholders in decision-making on service delivery. However, the “lowest appropriate administrative level” should not be a level without the resources, clout or technical expertise to take informed and effective decisions.

Subsidiarity must not be allowed to mean abandonment of responsibility; rather it should encourage the mobilisation of resources and inputs at all levels, as well as capacity building to allow greater decentralisation of decision making on a progressive basis.

**Transboundary Waters**

The waters of a number of major rivers are shared between two or more countries in the developing world. There are 261 watersheds which cross the political boundaries of two or more countries. These international basins cover 45 percent of the earth's land surface, affect about 40 percent of the world's population, and account for approximately 60 percent of global river flow. In some cases, the geographical basin includes not only more than one single national territory, but several autonomous states within one of the countries. Generalized legal principles for the management of transboundary waters are currently defined by the Convention on the Non-Navigational Uses of International Watercourses, ratified by the UN General Assembly in 1997. Although the idea of the international river basin organisations (RBOs) enjoys the support of international organisations, particularly UN bodies, it has so far met with only modest success. This is not surprising, since a high degree of common purpose is required to reach agreement over the sharing of the waters of large international rivers. However, since this is a potential cause of conflict, notably in the Middle East, efforts to bring the various countries and states together to plan water resources development on a mutually agreed basis clearly need to be emphasised. The International Network of Basin Organisations (INBO) exists to promote such mechanisms, which could become a catalyst for inter-state co-operation.

**Virtual Water**

The concept of Virtual Water was coined to replace the term "embedded water", which had little impact.

Virtual water is the amount of water required for the production of food or other products. This amount can range from 10 000 litres per kg for beef, to 800 litres per kg for milk.

Trade in virtual water allows countries with water scarcity to import products that consume high levels of water and export products that consume low levels, thus making water available for other purposes.

Including virtual water as a policy option requires a thorough understanding of the impact of virtual water trade on the local, social, environmental, economic and cultural situation. Local, national and regional food security should be enhanced by appropriate agreements in agricultural products trade, while respecting a nation's right to food sovereignty.

**Wastewater**

(1) A combination of liquid and water-carried pollutants from homes, businesses, industries or farms; a mixture of water and dissolved or suspended solids.

(2) Water for which, because of quality, quantity or time of availability, disposal is more economical than use at the time and point of its occurrence. Waste water to one user may be a desirable supply to the same or another user at a different location. Also referred to as Domestic Wastewater.

**Water-Borne Diseases**

The term water-borne disease is often used loosely, to describe all diseases carried and transmitted by water. Strictly speaking, water-borne diseases are those in which the infectious agent is itself carried by water: diarrhoeal diseases including typhoid, cholera and dysentery; and infectious hepatitis. Other diseases are water-washed: skin diseases and eye diseases; or water-related,

in which case the disease is spread via an organism living in water, such as schistosomiasis (via snails) and guinea-worm. These may be insect related, in which case they are spread by an insect that breeds in water or inflicts bites near it, as in the case of sleeping sickness (tsetse fly), malaria and yellow fever (mosquito), or river blindness (black fly).

Other diseases are spread by poor sanitation; pathogens in human excreta remain exposed or are washed into waterways. These include all diarrhoeal diseases and parasites such as hookworm and roundworm. Lack of hygiene plays an enormous role in the incidence of these diseases, with the exception of water-related diseases.

### **Water Conflict**

Water resources have rarely, if ever, been the sole source of violent conflict or war. But this fact has led some international security „experts“ to ignore or belittle the complex and real relationships between water and security. Conflicts currently arise in relation to the following:

**Control of water resources** (state and non-state actors): in this case, water supplies or access to water are at the root of tensions.

**Use as a military tool** (state actors): water resources, or water systems themselves, are used by a nation or state as a weapon during a military action.

**Use as a political tool** (state and non-state actors): water resources, or water systems themselves, are used by a nation, state or non-state actor for a political goal.

**Terrorism** (non-state actors): water resources, or water systems, are either targets or tools of violence or coercion by non-state actors.

**Military target** (state actors): water resource systems are targets of military actions by nations or states.

**Development disputes** (state and non-state actors): *water resources* or water systems are a major source of contention and dispute in the context of economic and social development.

### **Water Course**

see also *Transboundary Waters*

A system of surface waters and ground waters, constituting a unitary whole by virtue of their physical relationship, and normally flowing into a common end point.

### **Water Cycle**

The paths water takes through its various states – vapour, liquid, solid – as it moves through oceans, the atmosphere, as groundwater and in streams, by means of precipitation, infiltration, evapotranspiration and condensation, constitute the water cycle.

### **Water Governance**

Water governance refers to the range of political, organisational and administrative processes through which communities articulate their interests, their inputs are absorbed, decisions are made and implemented and decision makers are held accountable in the development and management of water resources and delivery of water services.

### **Water Ownership**

It is important to distinguish between ownership of water, and the right to have access to water and use it. Regulation of the resource can only arise out of the recognition, explicit or implicit, that the government has the right to manage the resource for the public good. Most governments expressly own water, and the protection of the resource is therefore a public function to which individual rights are subservient.

The right to use water is based either on customary or statutory claims. In order to be regulated, these must be clearly identified. Customary rights may include the right to expropriate, use or trade water; based on these can be built systems of community ownership or use and water charges. While building upon existing systems is often the surest and most acceptable route to implementation, systems based only on customary rights may not be able to assure efficient and equitable allocation of a scarce resource.

A system of water law needs not only mechanisms of ensuring access to water (water rights) but also a system of obligations regarding usage and control of the levying of water charges by individuals (restriction of rights).

### **Water Resources**

Distinction is made between renewable and non-renewable water resources. Non-renewable water resources, including so-called fossil waters, are not replenished at all by nature, or require a very long time for replenishment. Renewable water resources comprise groundwater aquifers and surface water such as rivers and lakes. They are recharged through the hydrological cycle, but can be overexploited.

Freshwater resources can be subdivided into blue and green water. **Blue water** refers to the water flows in groundwater and surface water (river, lakes). It represents the water that can be withdrawn e.g. for irrigation or is available for *in-situ* water use like navigation. In areas without enough green water in the soil to achieve satisfactory crop growth, crops can be irrigated with blue water.

**Green water** is defined as the fraction of water that is evapotranspired, i.e. the water supply for all non-irrigated vegetation. Green water can be called either productive with respect to plant production (if transpired by crops or natural vegetation) or non-productive (if evaporated from soil, open water or interception in the canopies of trees and plants).

### **Water Transfer**

Water transfer is the act or process whereby water is brought into an area or region which would not naturally receive it. Typically, it refers to the artificial transport of water through aqueducts, canals, or pipelines from one water basin, drainage area, or hydrographic area to another, which affects natural surface and groundwater drainage and flow patterns in both the water exporting and importing areas.

In terms of a Water Banking or Water Marketing concept, actions to move water from areas of low use to areas of high use place a more realistic monetary value on water as a scarce economic commodity and result in enhanced economic efficiency. However, considerable public concern and controversy surround this practice. Concerns focus primarily on issues relating to altering the natural flows of surface and ground waters, adverse environmental and habitat impacts on water exporting areas, limitations placed on the long-term growth and development of the water exporting region or hydrographic area, the potentially adverse hydrologic effects on groundwater (water table and aquifer) conditions in the exporting area, and the dependency of water-importing areas on continued diversions and water importations.

**Water Users Association**

Water Users Associations normally comprise a formal, usually legally bound group of water users, often located around a particular canal or borehole, with responsibility for managing and maintaining the part of the system that serves them. These Associations exist as a result of government determination, often with donor support, to devolve some of the responsibility for the management and maintenance of irrigation or domestic water and wastewater services from central governments onto users. Motivated by the search for efficiency and cost savings, Water Users Associations can be seen as a form of privatisation, with the government agency adopting the role of service provider rather than operator.

Water Users Associations are also a means of community participation and community ownership of management and operation. In principle, their creation should lead to greater user commitment and reduced government intervention.

**Water Use Categories**

Water use categories are defined in relation to IWRM by the Global Water Partnership (GWP).

**Water for People** refers to the drinking water sector and to sanitation services;

**Water for Food** refers to the farming sector including livestock and fisheries and rainfed or irrigated cultivation of food, feed or fibre crops;

**Water for Nature** refers to the source of water as well as to the availability of water for nature and for the preservation of ecosystems (wetlands, coastal, marine and terrestrial ecosystems);

**Water for Other Uses** refers mainly to the use of water for industry, energy and transportation.

IWRM considers the water use of all the different categories together as well as the effects of each category on the others.

**Water User Rights**

The following types of rights can be identified in an analytical sense (the summary is not exhaustive):

**Absolute water ownership right.** Water belongs to the property on which it is found and is part of the real estate. The owner of the property also owns the water. He may use it for any purpose whatsoever (*ius utendi et abutendi*).

**Absolute user right.** Water is owned by somebody else or another institution, often by the state as part of the public domain. The right to use, however, in its purest sense is absolute. It is not attached to land or dependent on a specific extraction point; it can be leased, sold, inherited or mortgaged, and is not restricted to any type of effective and beneficial use. The owner can hold it as an object of speculation. Only very few legal systems, e.g. in the Western United States and in Chile, have a water right concept close to these absolute user rights.

**A relative user right** may have some of the restrictions mentioned above. Often, it is attached to land and specific extraction points; it cannot be sold or transferred, mortgaged or inherited. It is restricted to a certain type of beneficial and effective use: agriculture, cattle watering, drinking water supply. Non-use can constitute loss of use rights, either temporary or indefinite. This is a very common type of right and found all over the world.

**A water permit** (concession, licence) is acquired through administrative allocation or authorisation. It may have time limitations on use and it may be subjected to charges or fees, either for use or as a contribution to the water management services.

The legal status of a right can have far-reaching consequences in terms of ability to trade, transfer or inherit a right, or to use it for collateral or as a secure investment. It is more difficult to attach conditions (time, charges, suspension) to ownership and absolute user rights than to relative user rights, permits and concessions. More often than not, the Constitution of a nation protects ownership rights and absolute rights to the extent that compensation is required in case of expropriation. A water right may be expressed in volumetric terms ( $m^3/s$  or  $l/s$ ), as a share of the stream or canal flow, or as a share of the water available in a reservoir, a lake or an aquifer. A water right may also be expressed in terms of shifts or hours of water availability from a certain intake. It is also possible to express a water right as a percentage of storage capacity. A water right may be applied by simple diversion, or by extraction through mobile or fixed pumping installations.

### **Watershed**

The definitions of watershed, catchment area or drainage basin vary considerably. The terms are often used synonymously and refer to the various sizes of areas in which water is drained towards a specific point or area. The European Environment Agency, for example, defines the three terms as follows:

**Catchment area:** an area from which surface runoff is carried away by a single drainage system-; the area of land bounded by watersheds draining into a river, basin or reservoir.

**Drainage basin:** the area of land that drains water, sediment and dissolved materials to a common outlet at some point along a stream channel.

**Watershed:** the land area that drains water to a particular stream, river or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. The watershed for a major river may encompass a number of smaller watersheds (micro-watersheds) that ultimately combine at a common point.

### **Watershed Management**

Watershed Management is an iterative process of integrated decision-making regarding uses and modifications of lands and waters within a watershed. This process provides a chance for stakeholders to balance diverse goals and uses for environmental resources, and to consider how their cumulative actions may affect long-term sustainability of these resources. Watershed management requires use of the social, ecological and economic sciences. Common goals for land and water resources must be developed among people of diverse social backgrounds and values.

Of principle concern is management of the basin's water budget, that is the routing of precipitation through pathways of evaporation, infiltration, and overland flow. As a form of ecosystem management, watershed management encompasses the entire watershed system from uplands and headwaters, to floodplain wetlands and river channels.

### **Wetland**

In general a wetland is a low-lying area such as a marsh or swamp, that is saturated with moisture.

Ramsar gives another definition of wetlands: "Areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static, flowing, fresh, brackish or salty, including areas of marine water, the depth of which at low tide does not exceed six meters".

Under normal circumstances, wetlands support a prevalence of vegetation, typically adapted for life in saturated soil conditions.