EUROPEAN POLITIQUES ABOUT WATER MANAGEMENT (Germany & Poland)

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Content:

1. Introduction.

1.1. Environmental structure of realization the project (UPC in Terrassa).

The place of realization this project is Universitat Politècnica de Catalunya in Terrassa, Spain. The whole complex organization of this school contains...:

15 schools;
40 departments;
3 university research institutes;
3 consortial associate schools;
4 associate schools;
13 libraries.

... and in Terrassa, there are six schools, that about 5400 students are attending to. With a great number of services the campus of UPC in Terrassa has become one of the most dynamic urban university campuses. Schools of Engineering (the School of Industrial Engineering of Terrassa and the College of Industrial Engineering of Terrassa) are combined with the Schools of Optics and of Optometry and of the Image Processing and Multimedia Technology Centre (CITM). The campus of UPC gives a chance for foreign students
to realize Socrates/Erasmus scholarship, by attending to classes and laboratories (in Spanish/Catalan) or by creating final projects in English or Spanish. With the partnership of UPC and UNESCO Chair, students are also able to realize projects with a social undertone, not exactly connected with technical profile of University. (UPC 2008)

Figure 1. UPC in Terrassa.
Adam Rucki 2008.

My work is a research in European politiques about water management, with answers for many questions and doubts about water situation and resources in the world.

1.2. The reason of creating this kind of work.

Water is something, that we can’t live without. This is only a simple chemical substance but it’s essential for the survival of all known forms of life. In our lifes we use it every day, and every hour, and

usually we don't consider, how important this liquid is for us. Most of the time, we use water in liquid form, but it's around us also in solid state and as a gas – water vapor.
Each man and woman know, that the bigger part of our planet is covered by water, so they don't think about it, how much we can really use. Only a small peace of global resources are usable, because most of it is not a fresh water (without salt). In my opinion that is the reason, why people don't care and waste water every single day, because without knowledge about any topic, we can't realize the situation and make our life better.

That is the reason, why many organizations and institutions were created, to give citizens this knowledge about water situation in the world and in their region. Duty of these organizations is also to teach, how to use (manage) the water, and how to decrease pollution, which is also a product of simple life. In the internet, we are able to learn most of informations from water organization's sites, also we can read about policies, that were made to manage water resources.

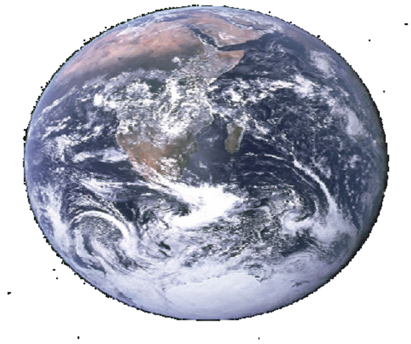


Figure 2. Earth. NASA Johnson Space Center 1972, Wikipedia 2008.

As a student of UPC, I 'am able to take together these informations and show in one publication few topics, connected with water, like resources, distribution, and Europe's legislation about water usage.

2. Target (main idea) of the project.

The main idea of this project is to show the differences between two European countries, Poland and Germany in their law structure about environment. This differences (if they are) may be caused by this, that Poland has joined European Community four years ago, and Germany is under Union's law since it's beginning, anyway, right now two of them are together under Union's law, so in many ways they should manage the same. However, if you'll look at the map, you can see that these two big countries are neighbours, so in some other ways they can be connected with themselves, also by lines of water, crossing through this part of Europe. It is good to show, how the governmets and people care about their natural resources, that are very valuable in our times. The best way to show differences is to compare water resources by numbers. That kind of informations can give a conclusion, what should be done better and in what way, the science can help in decreasing water waste or pollution.

In the big part of this project, also I wish to show some informations about water situation in the World and Europe, by giving examples of kinds and treatement of water. I would like to give answers for questions like why the management is so important, why the governments decided to create legislations and policies about water and why we – the citizens – should use our resources of water smarter, without wastes and pollution.

At last, using resources of the internet and reading materials and articles, in this project I would like to explain, which new technologies and ideas can help in water situation in the World, what are the plans for future years in building new dams and artificial lakes, to increase resources of water in each area.

3. Materials and sources of research (how did I get the informations).

For this work, the main source was internet. There are a lot of websites (official and non - official) that contains informations about water resources in the world, and countries I was writing about. I used many links from UPC site, also from UNESCO website, to find the most of the information. Additionally, the source I used were books (e-books) and publications that I recived from my supervisor.

To search for most of the topics I was interested in, I chose search engines and websites like Aquastat, where it is possible to read current data about water in the world and environmental situation. I prefered to use official websites, because data there are up-to-date.

4. The concept of "management".

4.1. What is management, how can we understand it?

Management put together planning, organizing, resourcing, leading or directing, and controlling an organization (a group of one or more people) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources, and natural resources. Management can refer to the person or people who perform the acts of management. This verb *manage* comes from the Italian language: *maneggiare* (to handle), which in turn derives from the Latin *manus* (hand). The French meaning: *mesnagement* (later *ménagement*) influenced the development in meaning of the English word *management* between the 17th and 18th centuries. (Wikipedia 2008)

Theoretical scope

The first who defined Management was Mary Parker Follett (1868–1933), who wrote on the topic in the early twentieth century as "the art of getting things done through people". One can also think of management functionally, as the action of measuring a quantity on a regular basis and of adjusting some initial plan; or as the actions taken to reach one's intended goal.

This applies even in situations where planning does not take place. From this perspective, Frenchman Henri Fayol considers management to consist of five functions:

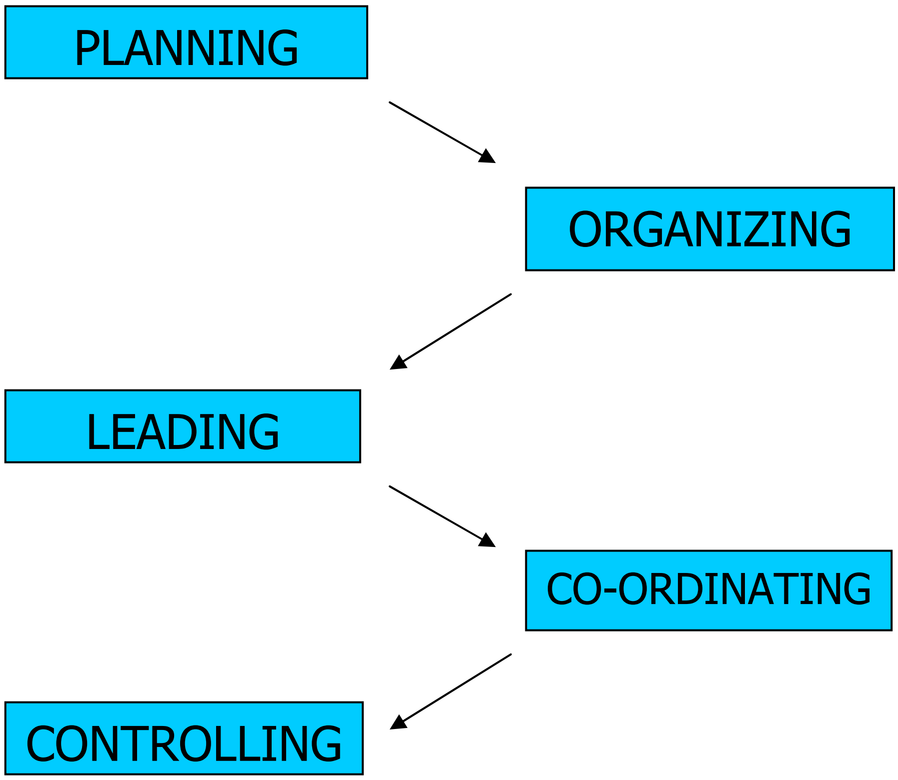


Figure 3. Functions of management, Wikipedia 2008.

Some people, however, find this definition, far too narrow. The phrase "management is what managers do" occurs widely, suggesting the difficulty of defining management, and the connection of managerial practices with the existence of a managerial cadre or class. One habit of thought regards management as equivalent to "business administration" and thus excludes management in places outside commerce. More realistically, however, every organization must manage its work, people, technology, etc. in order to maximize its effectiveness. Nonetheless, many people refer to university departments which teach management as "business schools." Some institutions use that name while employ the more inclusive term "management." Speakers of English may also use the term "management" or "the management" as a collective word describing the managers of an organization, for example of a corporation. Historically this use of the term was often contrasted with the term "Labor" referring to those being managed.(Wikipedia 2008)

4.2. Vision of environmental and water management in the world.

Environmental Management is not exactly the management of the *environment* as such but rather the management of man's interaction with and impact upon the environment. The three main issues that affect managers are:

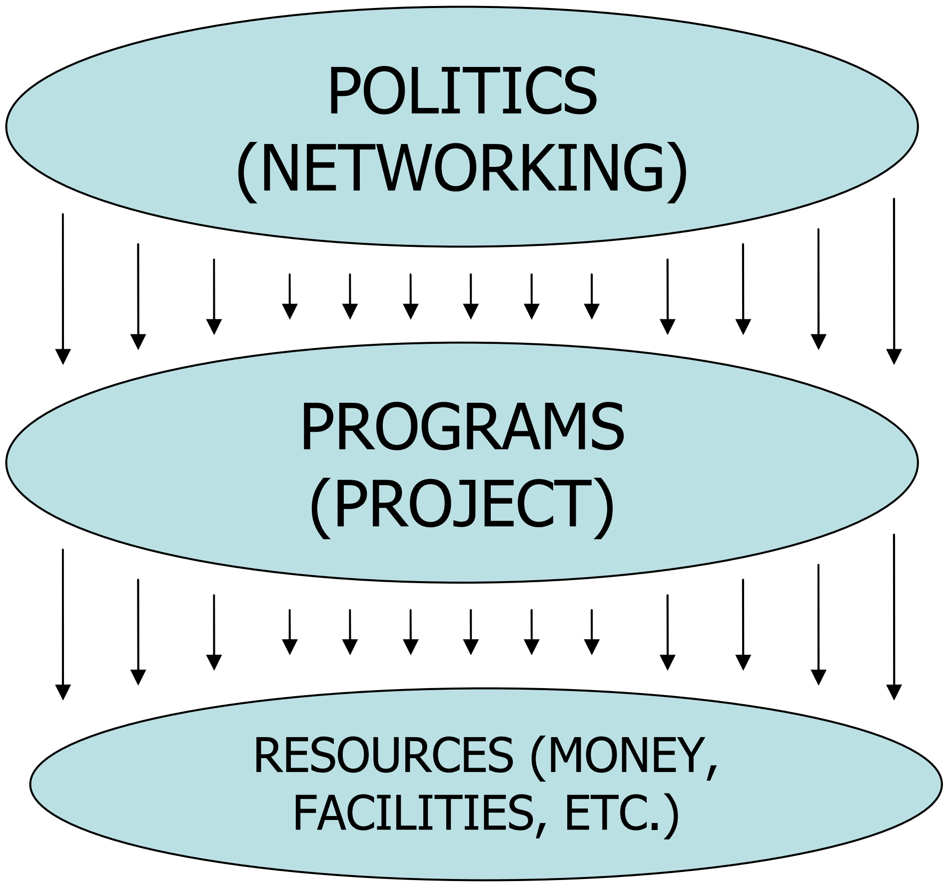


Figure 4. Structure of the issues,
Wikipedia 2008.

The need for environmental management can be viewed from a lot of perspectives. A more common philosophy behind environmental management is the concept of carrying capacity. Carrying capacity refers to the maximum number of organisms a particular resource can sustain. The concept of carrying capacity, has its roots in Malthusian theory. Environmental management is therefore not the conservation of the environment solely for the environment's sake, but rather the conservation of the environment for humankind's sake. This element of sustainable exploitation, getting the most out of natural assets, is visible in the EU Water Framework Directive. Environmental management involves the management of all components of the bio-physical environment, both living (biotic) and non-living (abiotic). The environment also involves the relationships of the human environment, such as the social, cultural and economic environment with the bio-physical environment. As with all management functions, tools, standards and systems are required. An environmental management standard or system or protocol attempts to reduce environmental impact as measured by some objective criteria. The ISO 14001 standard is the most widely used standard for environmental risk management. As a common auditing standard, the ISO standard explains how to combine this with quality management. (Wikipedia 2008)

If we speak about our main subject, we can say, that:

"Water management is the practices of planning, developing, distribution and optimum utilizing of water resources under defined water polices and regulations" (Wikipedia 2008).

It can be:

Management of water resources

Management of water treatment of drinking water, industrial water, sewage or wastewater

Management of flood protection

Management of irrigation

Figure 5. Kinds of water management, Wikipedia 2008.

4.3. Conclusion.

So now, we can realize, what really means **management**, the main word from the subject. Even if it has a lot of meanings, and its historical background provide to deeper understanding of this word, we can see how to simply use it for our needs, like management of environment, and specially management of water. When we think about management we should also realize the scheme of its work, like it was shown above, because without it, we can't make a management with good quality, and our targets will not be achievable.

5. Resources of water in the World.

Water resources are sources of water that are useful to humans. Uses of water include agricultural, industrial, household, recreational and environmental activities. All of these human uses require fresh water. 97.5% of water on the Earth is salt water, only 2.5% as fresh water of which over two thirds is frozen in glaciers and polar ice caps. The remaining unfrozen freshwater is found as groundwater, with only a small fraction present above ground or in the air. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is decreasing. Water demand already exceeds supply in many parts of the world, and as world population continues to rise, many more areas are expected to experience this imbalance in the near future.

5.1. Natural water cycle.

The water on Earth is always in movement, and the water cycle, describes the continuous movement of water on, above, and below the surface of the Earth. Since the water cycle is truly a "cycle," there is no beginning or end. Water can change states among liquid, vapor, and ice at various places in the water cycle.

The water cycle has no starting or ending point. The sun, which drives the water cycle, heats water in the oceans. Some of it evaporates as vapor into the air. Ice and snow can sublimate directly into water vapor. Rising air currents take the vapor up into the atmosphere, along with water from evapotranspiration, which is water transpired from plants and evaporated from the soil. The vapor rises into the air where cooler temperatures cause it to condense into clouds. Air currents move clouds around the globe, cloud particles collide, grow, and fall out of the sky as precipitation. Some precipitation falls as snow and can accumulate as ice caps and glaciers. Snowpacks in warmer climates often thaw and melt when spring arrives, and the melted water flows overland as snowmelt. Most precipitation falls back into the oceans or onto land, where, due to gravity, the precipitation flows over the ground as surface runoff. Runoff, and ground-water seepage, accumulate and are stored as freshwater in lakes. Not all runoff flows into rivers. Much of it soaks into the ground as infiltration. Some infiltration stays close to the land surface and can seep back into surface-water bodies (and the ocean) as ground-water discharge, and some ground water finds openings in the land surface and emerges as freshwater springs. Over time, the water continues flowing, some to reenter the ocean, where the water cycle renews itself.(USGS 2008)

The different processes are as follows:

Precipitation *- is condensed water vapor that falls to the Earth's surface. Most precipitation occurs as rain, but also includes snow, hail, fog drip, graupel, and sleet. Approximately 505,000 km³ of water fall as precipitation each year, 398,000 km³ of it over the oceans.* (CREW 2008)

Canopy interception *- is the precipitation that is intercepted by plant foliage and eventually evaporates back to the atmosphere rather than falling to the ground.* (CREW 2008)

Runoff *- includes the variety of ways by which water moves across the land. This includes both surface runoff and channel runoff. As it flows, the water may infiltrate into the ground,*

Figure 6. Canopy interception, Pidwirny, M. 2006

evaporate into the air, become stored in lakes or reservoirs, or be extracted for agricultural or other human uses. (CREW 2008)

Figure 7. Snowmelt, Wing-Chi Poon 2005.

Snowmelt *- refers to the runoff produced by melting snow.* (CREW 2008)

Subsurface Flow *- is the flow of water underground, in the vadose zone and aquifers. Subsurface water may return to the surface (eg. as a spring or by being pumped) or eventually seep into the oceans. Water returns to the land surface at lower elevation than where it infiltrated, under the force of gravity or gravity induced pressures. Groundwater tends to move slowly, and is replenished slowly, so it can remain in aquifers for thousands of years.* (CREW 2008)

Evaporation *- is the transformation of water from liquid to gas phases as it moves from the ground or bodies of water into the overlying atmosphere. The source of energy for evaporation is primarily solar radiation. Evaporation often implicitly includes transpiration from plants, though together they are specifically referred*

Figure 8. Evaporation process, Water 2008.

evapotranspiration. Total annual evapotranspiration amounts to approximately 505,000 km³ of water, 434,000 km³ of which evaporates from the oceans. (CREW 2008)

Sublimation *- is the state change directly from solid water (snow or ice) to water vapor.* (CREW 2008)

Infiltration *- is the flow of water from the ground surface into the ground. Once infiltrated, the water becomes soil moisture or groundwater.* (CREW 2008)

Figure 9. Water condensation, Thermalframe PCVu 2008.

Advection *- is the movement of water — in solid, liquid, or vapour states — through the atmosphere. Without advection, water that evaporated over the oceans could not precipitate over land.* (CREW 2008)

Condensation *- is the transformation of water vapour to liquid water droplets in the air, producing clouds and fog.* (CREW 2008)

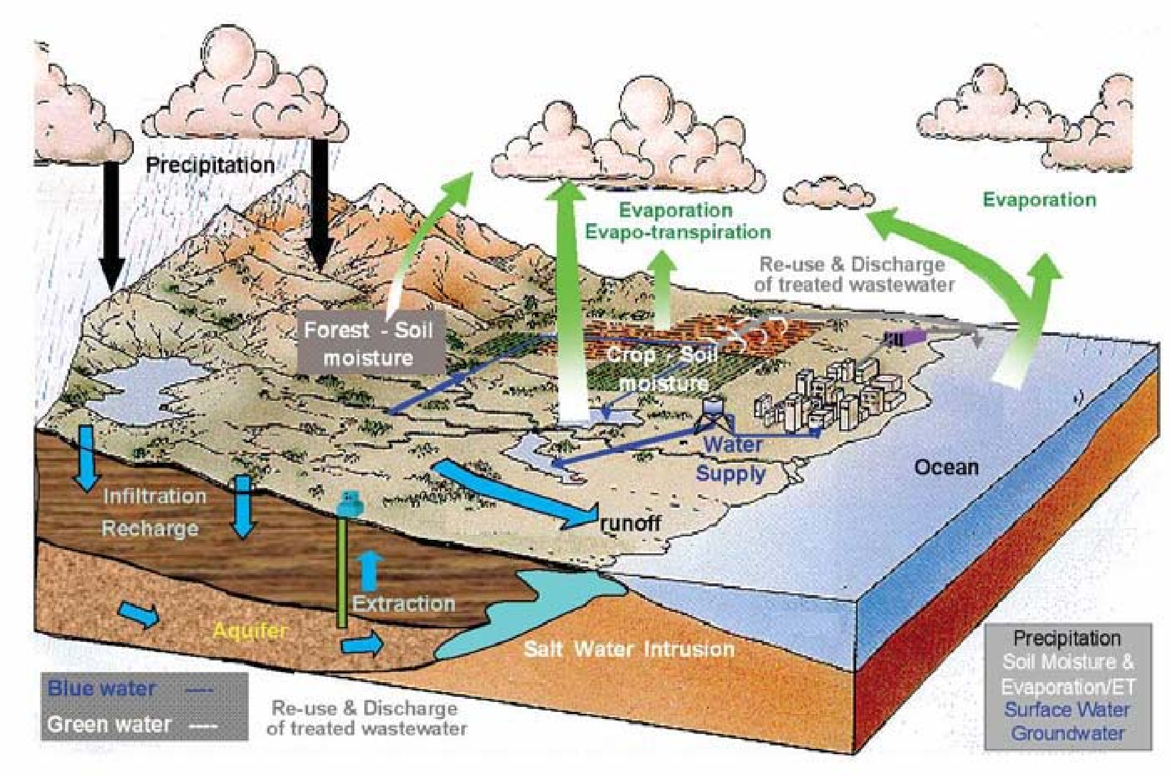


Figure 10. Natural water cycle, Unesco 2008.

Reservoirs

In the context of the water cycle, a reservoir represents the water contained in different steps within the cycle. The largest reservoir is the collection of oceans, accounting for 97% of the Earth's water. The next largest quantity (2%) is stored in solid form in the ice caps and glaciers. The water contained within all living organisms represents the smallest reservoir. The volume of water in the fresh water reservoirs, available for human use, are important water resources. (Wikipedia 2008).

Reservoir	Volume of water (10^6 km³)	Percent of total
Oceans	1370	97,25
Ice caps & glaciers	29	2,05
Groundwater	9,5	0,68
Lakes	0,125	0,01
Soil moisture	0,065	0,005
Atmosphere	0,013	0,001
Streams & rivers	0,0017	0,0001
Biosphere	0,0006	0,0004

Table 1. Volume of water stored in the water cycle's reservoirs,
Pidwirny, M. 2006.

Floods

A flood is an overflow of an expanse of water that submerges land, a deluge. In the sense of "flowing water", the word is applied to the inflow of the tide, as opposed to the outflow or "ebb". It is usually due to the volume of water within a body of water, such as a river or lake. It can also occur in rivers, when the strength of the river is so high it flows right out of the river channel. These of course, are not applicable in such instances as sea flooding. (Wikipedia 2008)

Droughts

A drought is an extended period of months or years when a region notes a deficiency in its water supply. Generally, this occurs when a region receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage.

Causes:

Rainfall is related to the amount of water vapour in the atmosphere, combined with the upward forcing of the air mass containing that water vapour. If either of these are reduced, the result is drought. Factors include:

- Above average prevalence of high pressure systems;

- Winds carrying continental, rather than oceanic air masses (ie. reduced water content);

- El Niño (and other oceanic temperature cycles);

- Deforestation;

- Climate change has a substantial impact on agriculture throughout the world, and especially in developing nations. (Bolonkin A. 2007)

5.2. Water resources on Earth. World water distribution.

According to the data of global water resources based on different calculation methods, we can show a few important facts aboud water on Earth (Shiklomanov in Gleick - 1993):

I. The total volume of water on **Earth** is about 1,4 billion km^3.

II. The volume of total freshwater resources is about 35 million km^3 - 2.5% of the total volume.

III. 68,9% (about 24 million km^3) of freshwater resources is in ice form and permanent snow in mountainous regions: **Arctic** and **Antarctic**.

IV. Next 30,8% is stored underground, as **groundwater** (it's about 8 million km^3) - shallow and deep groundwater, up to 2 000 metres, soil moisture, swamp water and permafrost. It's important, that is about 97% of all the freshwater that is potentially available for humans.

V. Only about 105.000 km^3 (0,3%) of world's freshwater is in lakes and rivers.

VI. The total usable freshwater supply for ecosystems and humans is ONLY about 20.000 km^3 of water, which is less than 1% of all freshwater resources, and ONLY 0.01% of all the water on Earth. Below in this paragraph there is a graphic visualization of world water distribution. (IGES 2003)

Previous checked in another source (to compare), we can give some important data by numbers in table:

Water source	Water volume (cubic kilometres)	% of freshwater	% of total water
Oceans, seas	1.338.000.000	-	96,5
Ice caps, Snow	24.064.000	68,7	1,74
Groundwater	23.400.000	-	1,7
- Fresh	10.530.000	30,1	0,76
- Saline	12.870.000	-	0,94
Soil Moisture	16.500	0,05	0,001
Ground Ice	300.000	0,86	0,022
Lakes	176.400	-	0,013
- Fresh	91.000	0,26	0,007
- Saline	85.400	-	0,006
Atmosphere	12.900	0,04	0,001
Swamp Water	11.470	0,03	0,0008
Rivers	2.120	0,006	0,0002
Biological Water	1.120	0,003	0,0001
Total	1.386.000.000	-	100

Table 2. An Estimate of global water distribution,
Gleick, P. H., 1996.

According to the table, the diagrams shows the differences in size of water resources in the world. There are two types of diagrams – for total water resources and for freshwater only:

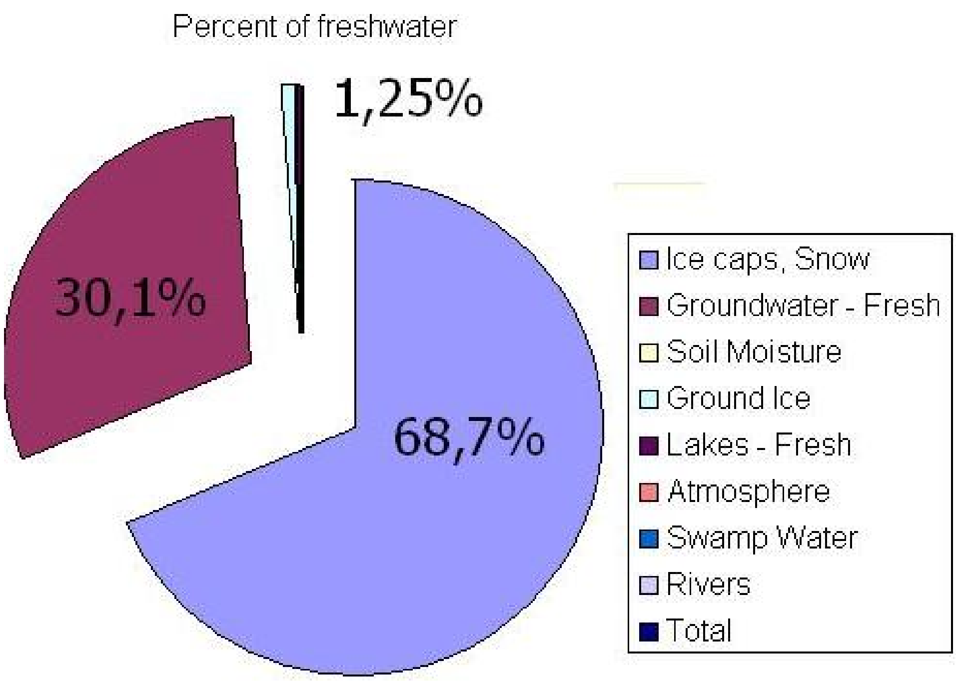


Figure 11. Freshwater distribution by percents,
Gleick, P.H. 1996.

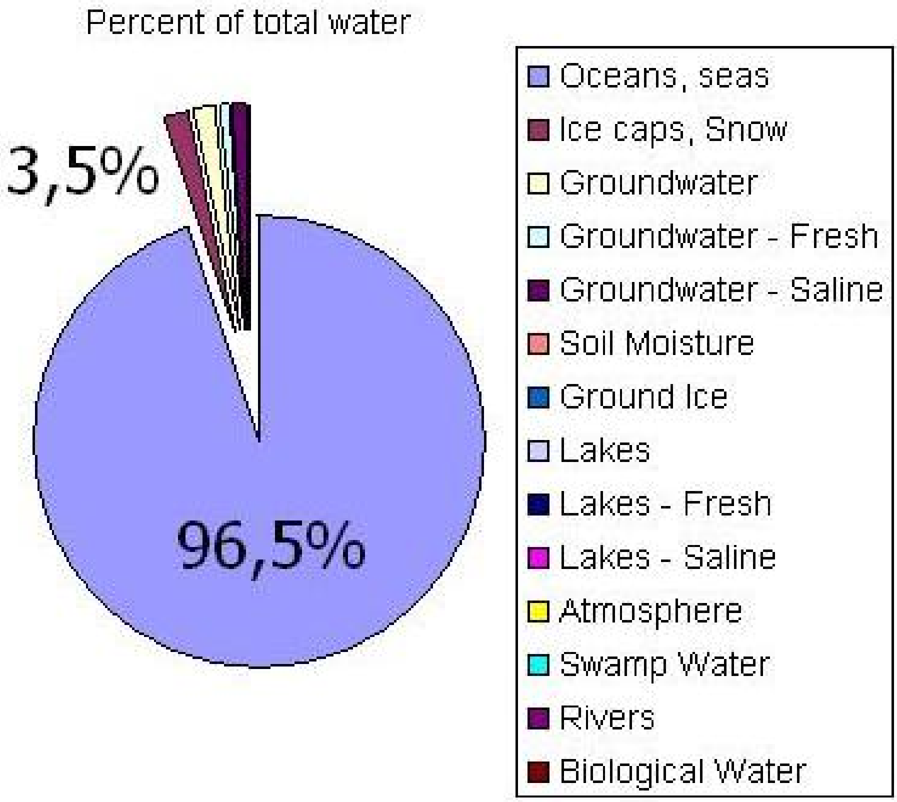


Figure 12. Total water distribution by percents,
Gleick, P.H. 1996.

The Earth is named as the "watery planet" because when viewed from space it appears blue. This blue color is caused by reflection from the oceans which cover roughly 85% of the Earth. Because water is much denser than any gas, this means that water will flow into the "depressions" formed as a result of the high density of oceanic crust. Since the low density rocks of the continental crust contain large quantities of easily eroded salts of the alkali and alkaline earth metals, salt has, over billions of years, accumulated in the oceans as a result of evaporation returning the fresh water to land as rain and snow. As a result, the vast bulk of the water on Earth is regarded as saline or salt water, with an average salinity of 35‰, though this varies slightly according to the amount of runoff received from surrounding land. In all, oceanic water, saline water from marginal seas, and water from saline closed lakes amounts to over 98% of the water on Earth, though no closed lake stores a globally significant amount of water. Renewable saline groundwater is believed to total at least 100km^3 globally. The remainder of the Earth's water constitutes the planet's fresh water resource. Typically, fresh water is defined as water with a salinity of less than 1 percent that of the oceans - below around 0.35‰. Water with a salinity between this level and 1‰ is typically referred to as marginal water. The planet's fresh water is also very unevenly distributed. Today the distribution is approximately as follows: (Wikipedia 2008)

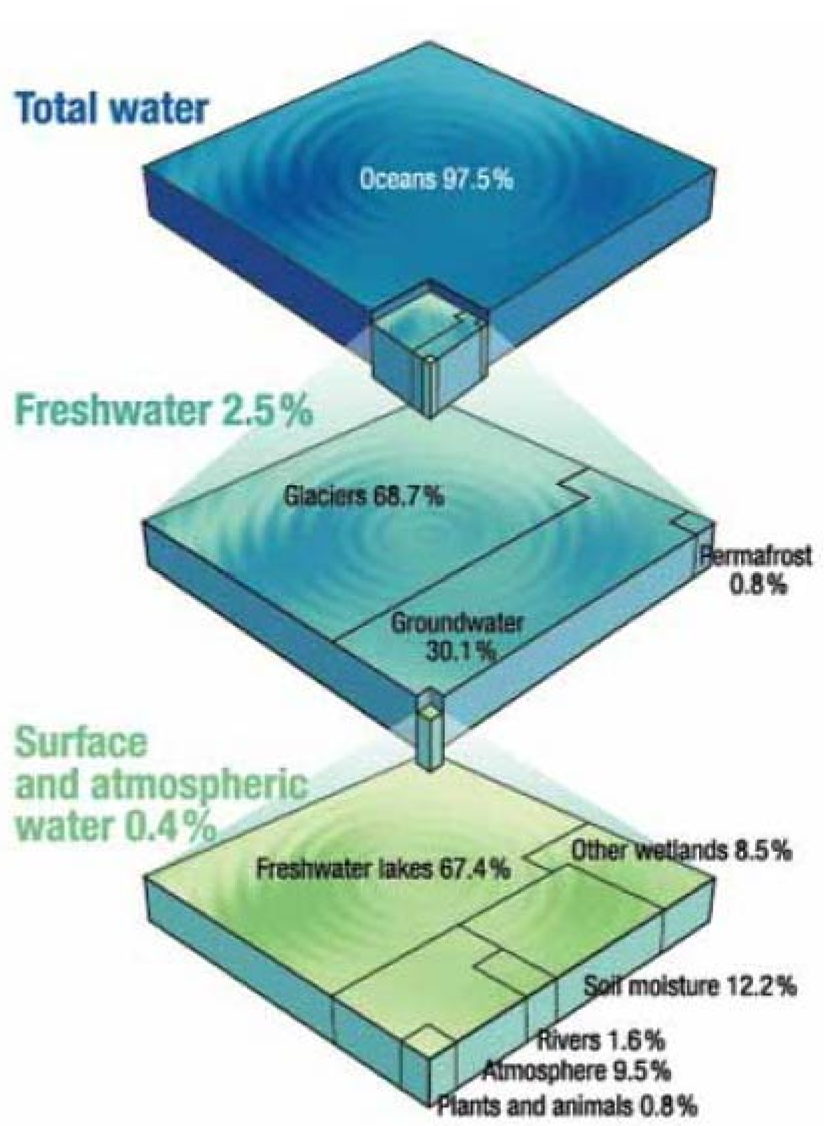


Figure 13. Global distribution of the world's water,
Unesco 2008.

Of these sources, only river water is generally valuable. Most water in lakes is in very inhospitable regions such as glacial lakes of Canada. Although the total volume of groundwater is known to be much greater than that of river runoff, a large proportion of this groundwater is saline and should therefore be classified with the saline water above. There is also a lot of fossil groundwater in arid regions that has never been renewed for thousands of years. However, fresh groundwater is of great value, especially in arid countries such as India. Its distribution is broadly similar to that of surface river water, but it is easier to store in hot and dry climates because groundwater storages are much more shielded from evaporation than are dams. Because groundwater recharge is much more difficult to accurately measure than surface runoff, groundwater is not generally used in areas where even fairly limited levels of surface water are available. (Wikipedia 2008)

Continent or region	Renewable river water (km^3)	Percent of World total [%]
Sub-Saharan Africa	4000	9,2
Middle East and North Africa	140	0,32
Europe	2900	6,7
Asia (excluding Middle East)	13300	30,6
Australia	440	1,01
Oceania	6500	14,9
North America	7800	17,9
South America	12000	27,6

Table 3. Distribution of river water,
Wikipedia 2008

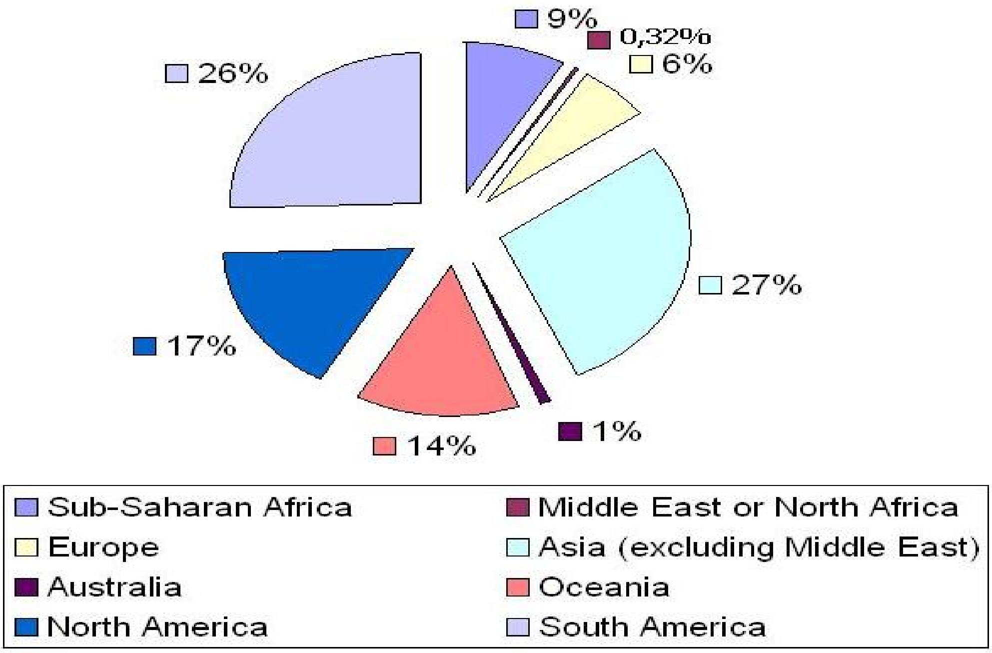
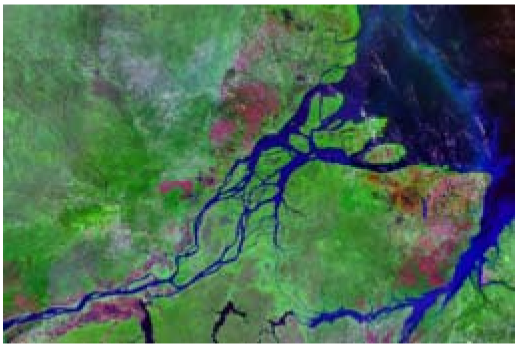


Figure 14. Distribution of river water by percents,
Wikipedia 2008.

Even within these regions, there can be huge variations. For example, as much as a quarter of Australia's limited renewable fresh water supply is found in almost uninhabited Cape York Peninsula. Also, even in well - watered continents, there are areas that are extremely short of water, such as Texas in North America, whose renewable water supply totals only 26km³ in an area of 695.622km², or South Africa, with only 44 km³ in 1.221.037 km². The areas of greatest concentration of renewable water are:



Map 1. The Amazon river, Wikipedia 2008.

The **Amazon** and **Orinoco** Basins: a total of 6.500 km^3 or 15% of global; (Wikipedia 2008)

Amazon River (South America) is the largest river in the world by volume with total flow grater that flows of next ten greatest rivers combined together.

South and Southeast **Asia**: 8.000 km^3 (18%) of global runoff. The most important river basins are: **Brahmaputra** Basin: 900 km^3. (Wikipedia 2008)

Map 2. Brahmaputra River in Tibet, Wikipedia 2008.

This is one of the major rivers in Asia. It flows across Tibet to the Himalayas and to Arunachal Pradesh (state of India). With long of 2900 km, the river is an important source of irrigation and transportation.

Yangtze Basin: 1.000 km^3:

This river that is crossing China is the longest in Asia and the third longest in the world (1. Nile, 2. Amazon). Total long is about 6300 km and flows from Qinghai Province into East China Sea.

Map 3. Yangtze River in China, Wikipedia 2008.

Figure 15. Yangtze River in China, Wikipedia 2008.

Figure 16. Irrawaddy (Ayeyarwady) River in Burma, Wikipedia 2008.

Irrawaddy Basin: 500 km³: (Wikipedia 2008)

The location of this river is in Burma (Asia). It divides country from north to south and flows into Indian Ocean. Before land communication tracks, this river was known as "Road to Mandalay", so it was very important transportation way. Total length of this river is 2170 km and its watershed is 411.000 km².

Mekong Basin: 450 km³

The Mekong is the 12th longest river in the world, and 7th in Asia. Total length is about 4880 km and drains an area of about 810,000 km² (Wikipedia 2008). The river flows through the 5 countries, starting with China, than Burma, Thailand, Laos, Cambodia and Vietnam.

Map 4. Mekong River Basin, Wikipedia 2008.

Figure 17. Mekong River, Wikipedia 2008.

In **Canada**, there is about 10% of world's river water and large resources in lakes. The biggest rivers are: **Mackenzie** river: 250 km³, **Yukon** river: 150 km³. (Wikipedia 2008).

Siberia resources of water are in: **Yenisey**, with over 5% of world's fresh water in basin, just after the Amazon, also in **Ob** river: 500 km³ and **Lena** river: 450 km³. (Wikipedia 2008).

Map 5. Yenisey River Basin, Wikipedia 2008.

In **New Guinea**, the largest resources of water stay in rivers **Fly** and **Sepik** with total over 300 km³ in area of only 150,000km². (Wikipedia 2008)

Water Withdrawal and Consumption:

Freshwater use depends on few criterias like population, physiography, and climatic characteristics. Below the diagram which is showing actual situation about water withdrawal and consumption in the world, divided by continents, and with forecast till 2025.

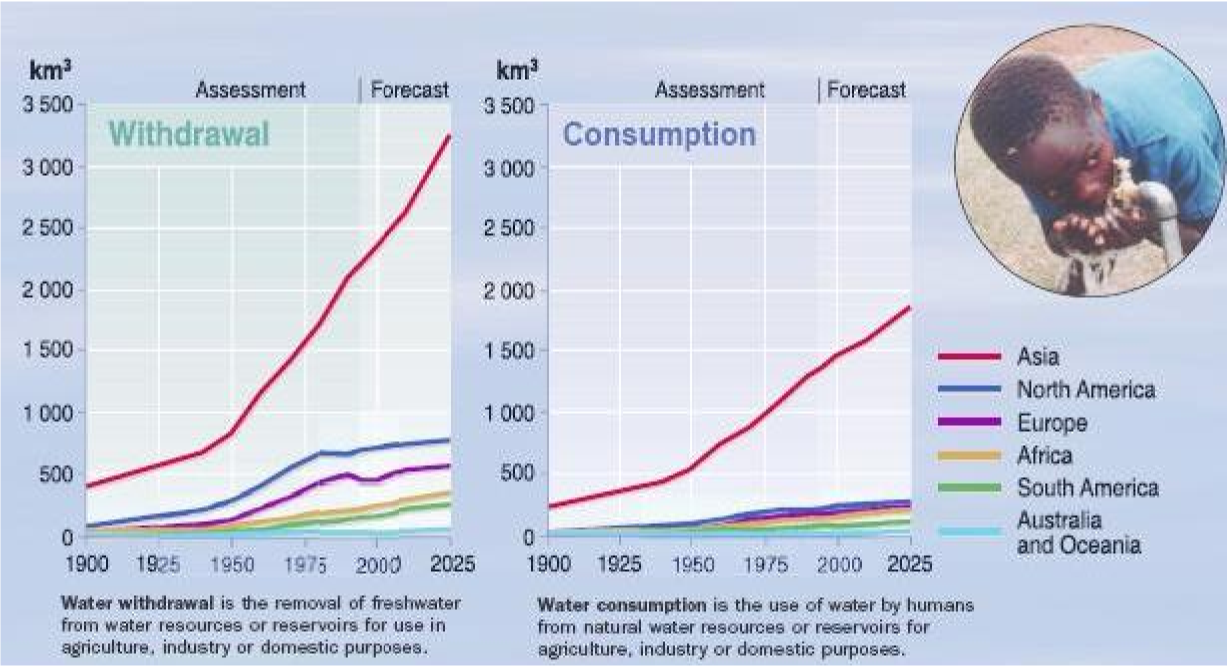


Figure 18. Global water withdrawal and consumption.
Rekacewicz P. 2002.

I. The diagram shows, that Asia is the top leader with water withdrawal (about 58%) and consumption (70%), and this may be caused by this, that area of this continent is also very big, and it has the biggest irrigated lands. Annual global freshwater withdrawal is still growing up, and today it's almost 3000 km^3 in Asia, and about 4500 km^3 of total withdrawal. It is known, that over 50% of total withdrawal is taken by consumption (total), what is also shown in the diagram above. (Rekacewicz P. 2002)

II. It is expected, that in the near future (about 10 years) annual global water withdrawal will grow up, by about 10-12%, and this tendency will stay for another future decades, reaching approximately over 5200 km^3 by 2025. It will be an increase by 1,4 times since 1995. Water consumption is also expected to grow, but at a slower rate of 1,30 times (2002). This smaller rate may be caused in my opinion by higher awareness of citizens, to save water resources. (Rekacewicz P. 2002)

III. In the future decades, the most intensive growth of water withdrawal is expected in Africa and South America (increasing by 1,5 – 1,6 times), and the smallest growth probably will take place in Europe and North America (1,2 times) (Harrison and Pearce, 2001). It's probably because Europe and North America have their infra-structure at the stabile lever, and they don't need to change it next years. (Rekacewicz P. 2002)

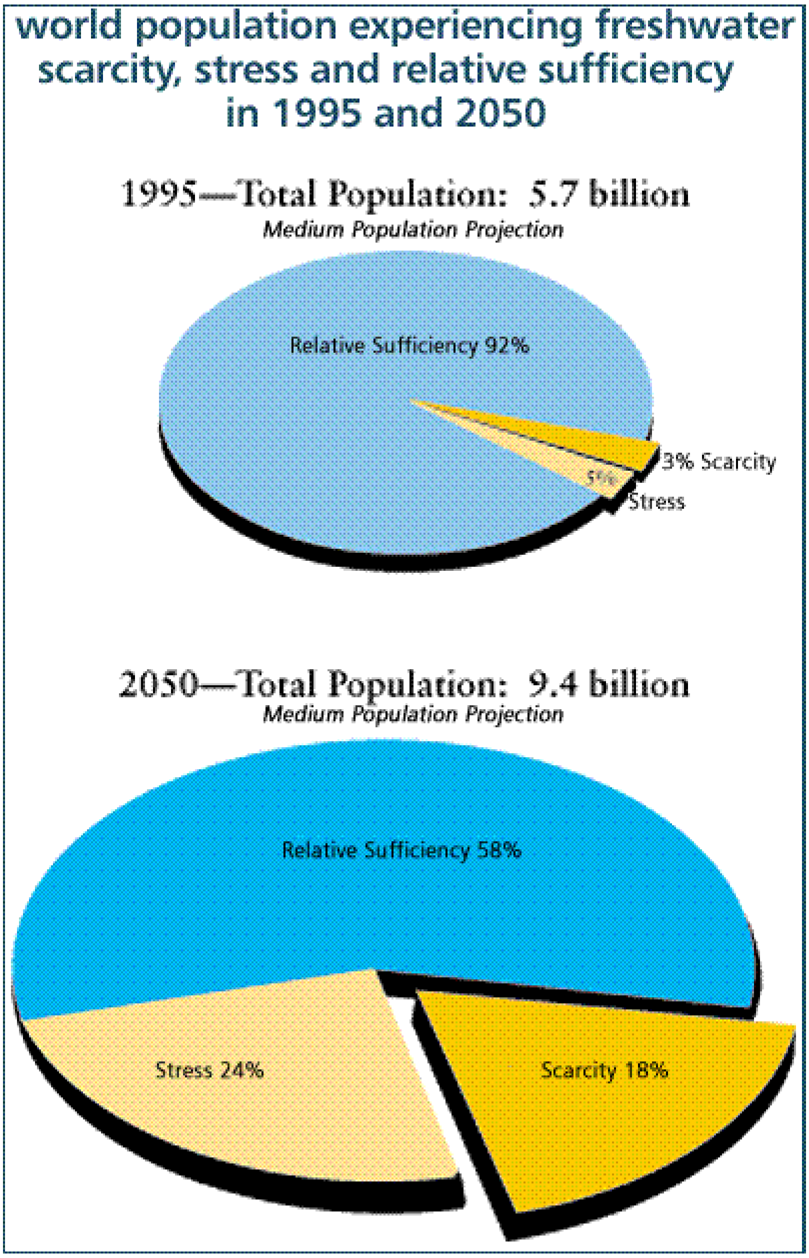


Figure 19. The way of water stress and scarcity changing, since 1995 and prognosis for 2050, ITT Industries 2008.

Water Scarcity:

Water scarcity affects many regions of the world. Here are some facts about it, because this is a very important issue about water *resources:*

I. *"About one-third of the world's population lives in countries suffering from moderate-to-high water stress - where water consumption is more than 10% of renewable freshwater resources."* (UNEP 2008)

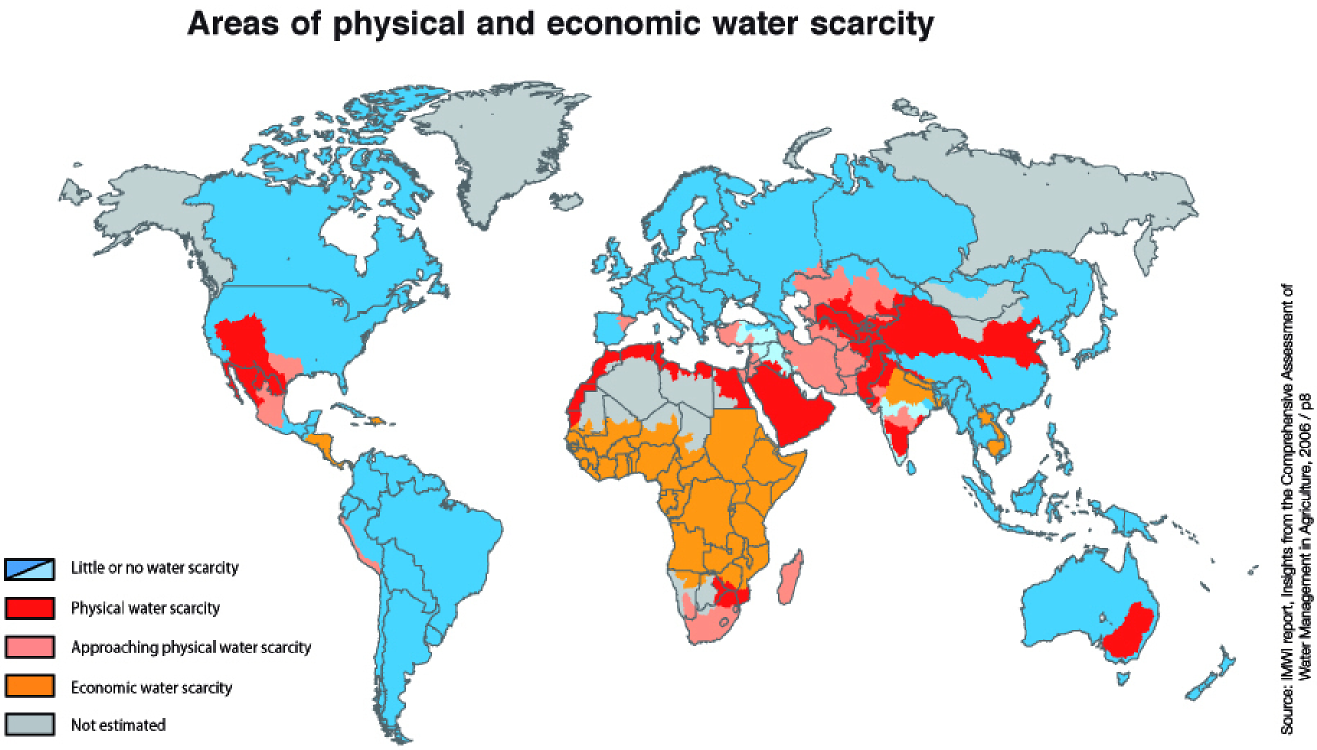
II. *"Some 80 countries, constituting 40 percent of the world's population, were suffering from serious water shortages by the mid-1990s and it is estimated that in less than 25 years two-thirds of the world's people will be living in water-stressed countries."* (UNEP 2008)

III. *"By 2020, water use is expected to increase by 40 percent, and 17 percent more water will be required for food production to meet the needs of the growing population."* (UNEP 2008)

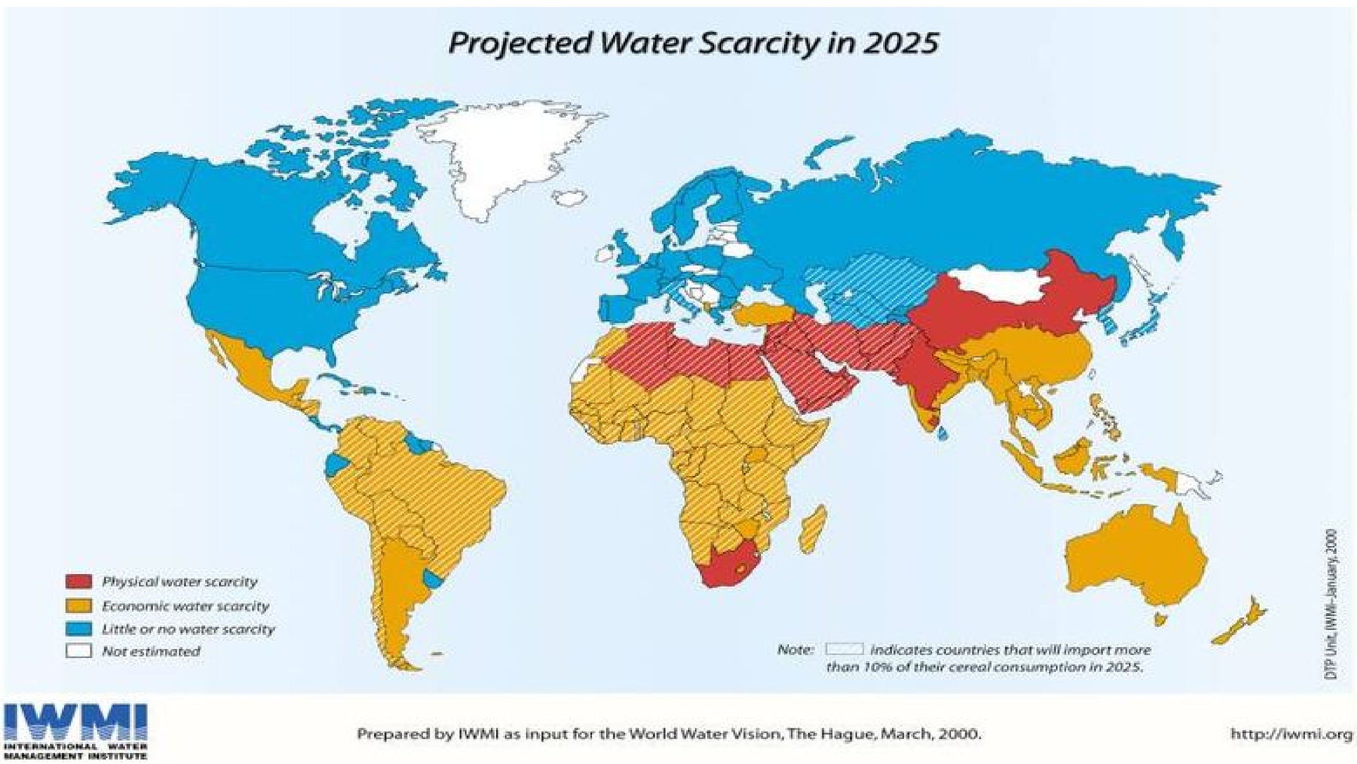
IV. *"The three major factors causing increasing water demand over the past century are population growth, industrial development and the expansion of irrigated agriculture."* (UNEP 2008)

Definitions of Water Stress and Scarcity:

"An area is experiencing ***water stress*** *when annual water supplies drop below 1 700 m3 per person. When annual water supplies drop below 1 000 m3 per person, the population faces* ***water scarcity****."* (UNEP 2002).



Map 6. Actual water scarcity,
IWMI 2006.



Map 7. Projected water scarcity in 2025,
IWMI 2006.

Policies and Institutions for Water Management

The Commission for Sustainable Development has reported that many countries lack adequate legislation and policies for efficient and equitable allocation and use of water resources. Progress is, however, being made with the review of national legislation and enactment of new laws and regulations. Concern has also been expressed about the growing incapacity of national hydrological services and agencies, particularly in developing countries, to assess their respective water resources. Many agencies have experienced reductions in observation networks and staff despite increases in water demand. A number of response measures have been undertaken, including the World Hydrological Cycle Observing System. Its main objective is to contribute to the improvement of national and regional water resource assessment capabilities. Many different kinds of organisations play a role in water policy decisions, from national governments to local community groups. Over the past decades, however, there has been growing emphasis on increasing the participation and responsibility of small, local groups and an acknowledgement that communities have an important role to play in water policy. The Ministerial declaration (The Hague in March 2000) called for 'Governing water wisely: to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources'. The private sector has recently begun to expand its role in water management. Private water companies are increasingly serving the needs of growing cities by taking over contracts from public agencies to build, own and operate some or even all of the municipal system. At the same time, concerns have been growing about how best to ensure equitable access to water for the poor, finance projects and share risks. (UNEP 2008)

5.3. Kinds of water.

5.3.1. Surface water.

By this we can understand water in a river, lake or fresh water wetland. Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation, and sub-surface seepage. Although the only natural input to any surface water system is precipitation within its watershed, the total quantity of water in that system at any given time is also dependent on many other factors. These factors include storage capacity in lakes, wetlands and artificial reservoirs. All of these factors also affect the proportions of water lost. Human activities can have a large impact on these factors. Humans often increase storage capacity by constructing reservoirs and decrease it by draining wetlands. Humans often increase runoff quantities and velocities by paving areas and channelizing stream flow.

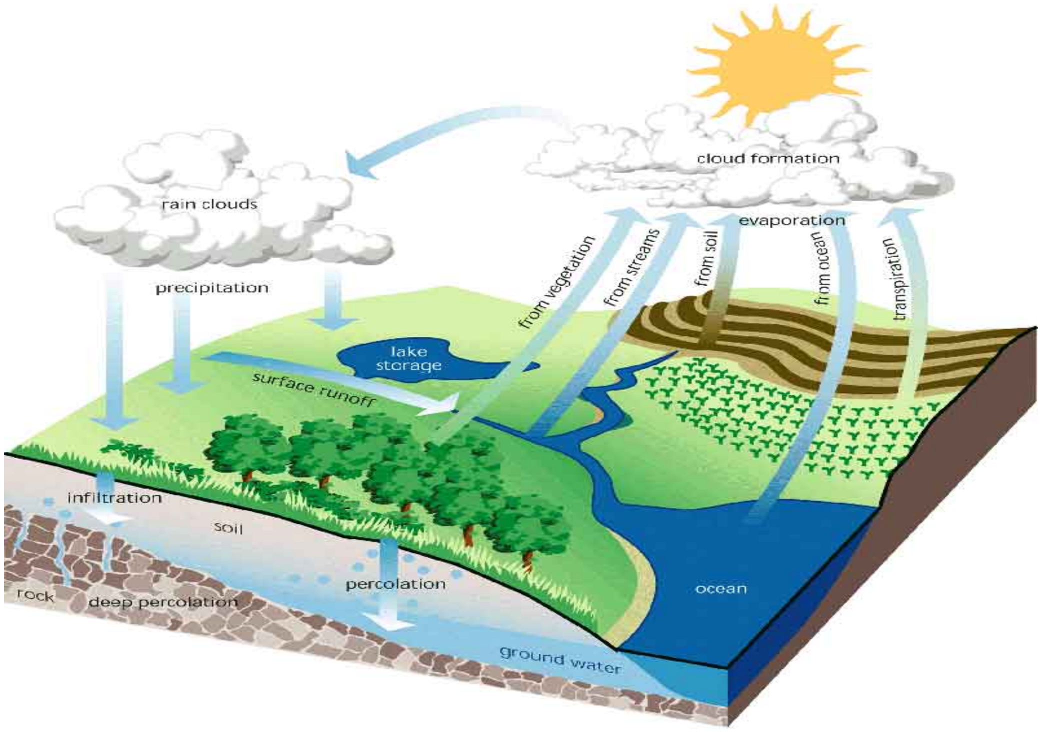


Figure 20. Surface water,
OWL Foundation 2004.

Some human water users have no constant need for water. For example, many farms require large quantities of water in the spring, and no water at all in the winter. To supply such a farm with water, a surface water system may require a large storage capacity to collect water and release it in a short period of time. Other users have a continuous need for water, such as a power plant that requires water for cooling. To supply such a power plant with water, a surface water system only needs enough storage capacity to fill in when average stream flow is below the power plant's need. Nevertheless, over the long term the average rate of precipitation within a watershed is the upper bound for average consumption of natural surface water from that watershed. Natural surface water can be augmented by importing surface water from another watershed through a canal or pipeline. It can also be artificially augmented from any of the other sources listed here, however in practice the quantities are negligible. It is known, that the country with the biggest fresh water supply is Canada, followed by Brazil and Russia. (Wikipedia 2008)

5.3.2. Sub-Surface water.

Also called groundwater, is fresh water located in the pore space of soil and rocks. It is also water that is flowing within aquifers below the water table. Sometimes it is useful to make a distinction between sub-surface water that is closely associated with surface water and deep sub-surface water in an. Groundwater water can be thought of in the same terms as surface water: inputs, outputs and storage. The critical difference is that due to its slow rate of turnover, sub-surface water storage is generally much larger compared to inputs than it is for surface water. This difference makes it easy for humans to use sub-surface water unsustainably for a long time without severe consequences. (Wikipedia 2008)

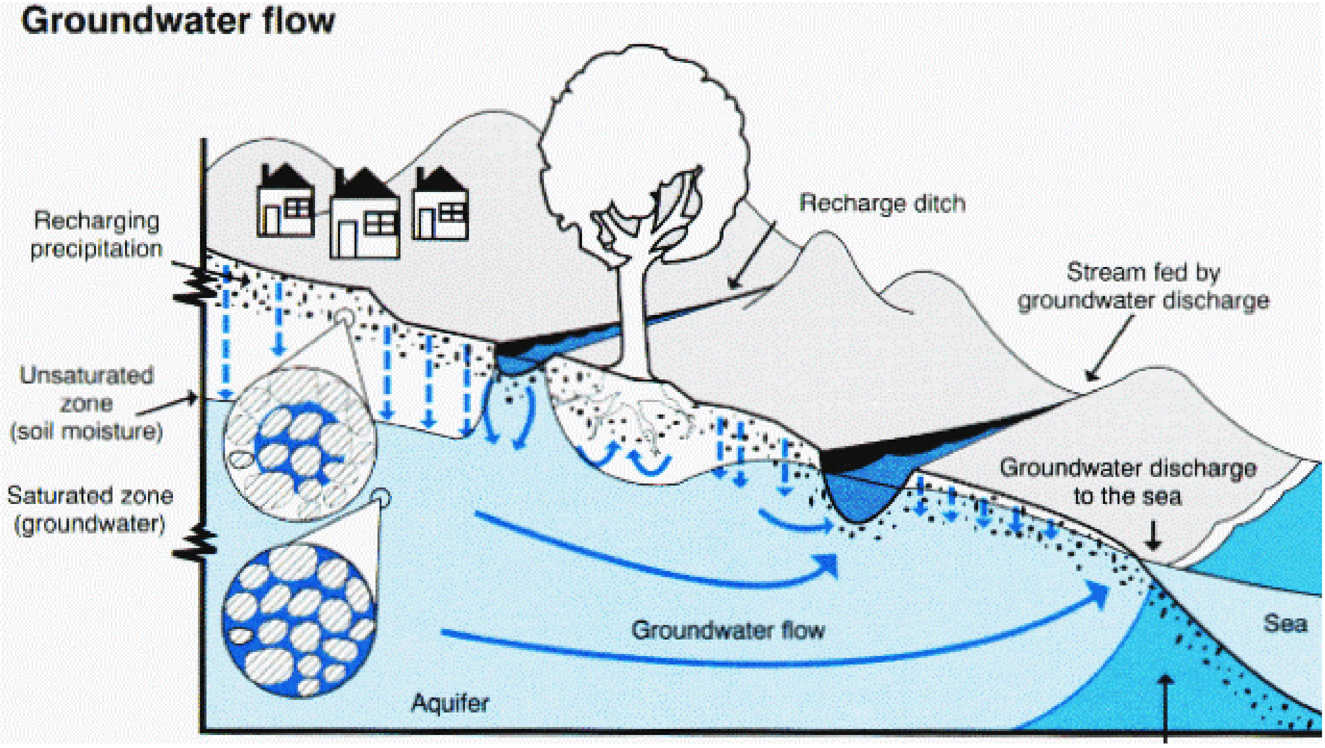


Figure 21. Typical groundwater flow in nature,
Montana State University 2006.

The natural input to sub-surface water is of course seepage from surface water. The natural outputs are springs and seepage to the oceans. If the surface water source is subject to substantial evaporation, a sub-surface water source may become saline. In coastal areas, human use of a sub-surface water source may cause the direction of seepage to ocean to reverse which can also cause soil salinization. Humans can also cause sub-surface water to be "lost" through pollution. Humans can increase the input to a sub-surface water source by building reservoirs or detention ponds. Water in the ground are in sections called aquifers. Rain rolls down and comes into these.

5.3.3. Desalination and frozen water.

Desalination is an artificial process by which saline water is converted to fresh water. The most common desalination processes are distillation and reverse osmosis. Desalination is currently expensive compared to most alternative sources of water, and only a very small fraction of total human use is satisfied by desalination. It is only economically practical for high-valued uses in arid areas. The most extensive use is in the Persian Gulf.

Several schemes have been proposed to make use of icebergs as a water source, however to date this has only been done for novelty purposes. Glacier runoff is considered to be surface water. (Wikipedia 2008)

5.4. Fresh water storage.

Some runoff water is trapped for periods, for example in lakes. At high altitude, during winter, and in the far north and south, snow collects in ice caps, snow pack and glaciers. Water also infiltrates the ground and goes into aquifers. Groundwater later flows back to the surface in springs, or more spectacularly in hot springs and geysers. Groundwater is also extracted artificially in wells. In many parts of the world, the fresh water is in short supply.

Tides

Tides are the cyclic rising and falling of Earth's ocean surface caused by the tidal forces of the Moon and the Sun acting on the oceans. Tides cause changes in the depth of the marine and estuarine water bodies and produce oscillating currents known as tidal streams. The strip of seashore that is submerged at high tide and exposed at low tide, the intertidal zone, is an important ecological product of ocean tides. (Wikipedia 2008)

5.5. Use of fresh water.

Uses of fresh water can be categorized as ***consumptive*** and ***non-consumptive*** (sometimes called "renewable"). A use of water is consumptive if that water is not immediately available for another use. Losses to sub-surface seepage and evaporation are considered consumptive, as is water incorporated into a product. Water that can be treated and returned as surface water, such as sewage, is generally considered non-consumptive if that water can be put to additional use.

5.5.1. Household.

It is known that fifteen percent of world - wide water use is for household uses. These include ***drinking water***, ***bathing***, ***cooking***, ***sanitation***, and ***gardening***. Basic household water requirements have been estimated by Peter Gleick at around 50 liters per person per day, (without water for gardens).

5.5.1.1. Drinking water.

Water of sufficient quality to serve as drinking water is termed potable water whether it is used as such or not. Although many sources are utilized by humans, some contain disease and cause health problems if they do not meet water quality guidelines. Water that is not harmful for human beings is called safe water. The available supply of drinking water is an important criterion of carrying capacity, the population level that can be supported by Earth. Typically water supply networks deliver single or multiple qualities of water, whether it is to be used for drinking, washing or landscape irrigation. One counterexample is urban China, where drinking water can be optionally delivered by a separate tap. In the United States, public drinking water is governed by the Safe Drinking Water Act.

Acces to drinking water

Earth's surface consists of 70% water. Water is available almost everywhere if proper methods are used to get it. As a country's economy becomes stronger a larger percentage of its people tend to have access to drinking water and sanitation. Access to drinking water is measured by the number of people who have a reasonable means of getting an adequate amount of water that is safe for drinking, washing, and essential household activities. As of the year 2006, there is a substantial shortfall in availability of potable water in less developed countries. As of the year 2000, 27% of the populations of lesser developed countries did not have access to safe drinking water. Many nations have water quality regulations for water sold as drinking water, although these are often not strictly enforced outside of the developed world. The World Health Organization sets international standards for drinking water. A broad classification of drinking water safety worldwide can be found in Safe Water for International Travelers. In addition, close to 3 billion people did not have access to adequate sanitation facilities.

While the occurrence of waterborne diseases in developed countries is generally low due to a generally good system of water treatment, distribution and monitoring, waterborne diseases are among the leading causes of morbidity and mortality in low - and middle - income countries, frequently called developing countries. (Wikipedia 2008)

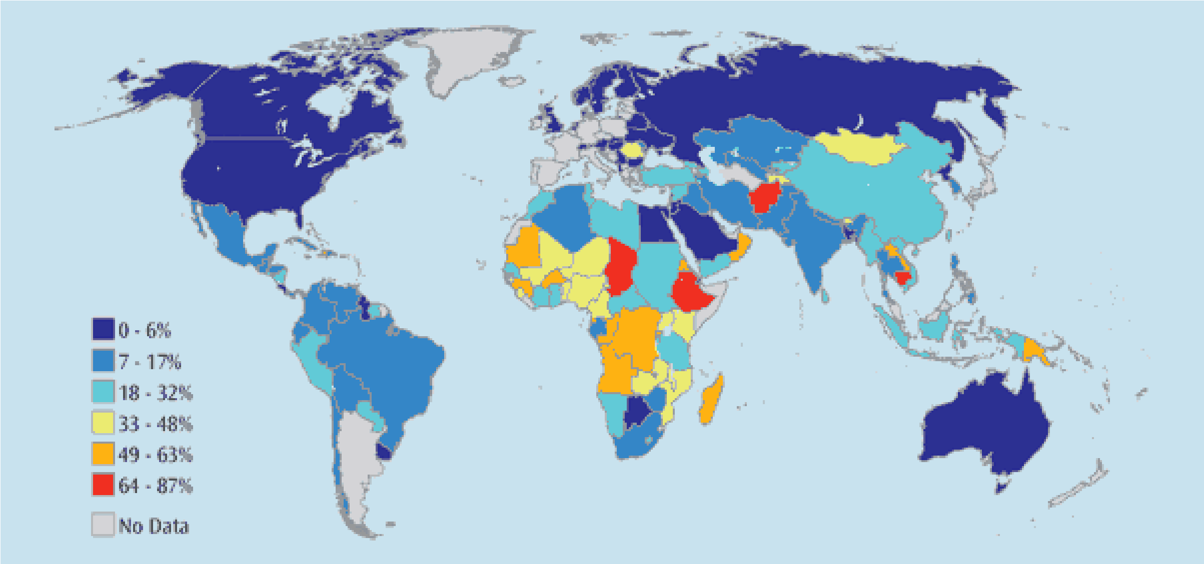


Figure 22. Percentage of population without reasonable access to safe drinking water, Earth 2008.

5.5.2. Industrial.

About 15% of water use in the world is industrial. Major industrial users include power plants, which use water for cooling or as a power source, ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a solvent. The portion of industrial water usage that is consumptive varies widely, but as a whole is lower than agricultural use. (Wikipedia 2008)

5.5.3. Agricultural.

It is known that 69% of world - wide water use is for irrigation, but 15 - 35% of irrigation withdrawals being unsustainable. Various irrigation methods involve different trade-offs between crop yield, water consumption and capital cost of equipment and structures. Irrigation methods such as most furrow and overhead sprinkler irrigation are usually less expensive but also less efficient, because much of the water evaporates or runs off. More efficient irrigation methods include drip or trickle irrigation, surge irrigation, and some types of sprinkler systems where the sprinklers are operated near ground level. These types of systems, while more expensive, can minimize runoff and evaporation. Any system that is improperly managed can be wasteful. Another trade - off that is often insufficiently considered is salinization of sub-surface water. Aquaculture is a small but growing agricultural use of water. Freshwater commercial fisheries may also be considered as agricultural uses of water, but have generally been assigned a lower priority than irrigation. (Wikipedia 2008)

5.5.4. Environmental.

Environmental water use is very small but growing percentage of total water use. This kind of water usage includes artificial wetlands, lakes intended to create wildlife habitat, fish ladders around dams, and water releases from reservoirs timed to help fish spawn.

Like recreational usage, environmental usage is non - consumptive but may reduce the availability of water for other users at specific times and places. For example, water release from a reservoir to help fish spawn may not be available to farms upstream. (Wikipedia 2008)

5.5.5. Recreation.

Recreational water use is usually a very small but also growing percentage of water use in the world. Recreational water use is mostly tied to reservoirs. Release of water from a few reservoirs is timed to enhance whitewater boating, which also could be considered a recreational usage. Other examples are anglers, water skiers, nature enthusiasts or swimmers. Recreational usage is non – consumptive type. Golf courses are often targeted as using excessive amounts of water, especially in drier regions. It is, however, unclear whether recreational irrigation has a noticeable effect on water resources. This is largely due to the unavailability of reliable data. Additionally, recreational usage may reduce the availability of water for other users at specific times and places. For example, water retained in a reservoir to allow boating in the late summer is not available to farmers during the spring planting season. Water released for whitewater rafting may not be available for hydroelectric generation during the time of peak electrical demand.

5.6. Conclusion.

Maybe the "water resources" issue is not strictly connected with the topic, but it's also very important, because it is in some part the reason of creating this project. If we look at data that are from different years, we can see that water resources on Earth are not the same, even after just few years. Why is that? Mostly, it's because of humans activity in the world, not only using the water for basic life, but also for industry. The thing that is worth to note is that not everyone knows, how small resources of freshwater we really have, even if we see the water every day, for example while looking at the ocean. If we look at diagrams, we can see at once that only about 2,5% of total resources of water is usable for humans, and other life forms. More than that, less than 1% of all freshwater is available, because the rest is in the form of ice, snow and groundwater, what means I practice, we are not able to use it. This small piece of freshwater, that is in our lakes and rivers should be treated correctly, to decrease constant looses of the volume of water per person in the world every year. Because of bad management (or no management at all) we can't expect, that the situation will be better. We can only reduce all looses and pollution to the level that will make possible to keep rational resources of water at the areas taken by humans. The worst thing is, that for the next twenty years, forecasts of water resources says that at the areas with good water condition these days, like Europe or United States, will be a descent to the lower class in water availability. And what about the areas, where today is difficult to provide enough water to the citizens? With this knowledge and doubts we can realize, why the issue of water management is so important, and why all the legislations and policies were made, not only in Europe, but in the whole world.

6. European Community.

6.1. History of European Community.

In this paragraph, in short way I would like to show, how the European Community was created, what decisions were made after II World War to keep Europe in peace and how the different countries were engaging to the Union. Also, very important thing is that the first day of existence of European Community, was the beginning of collective management (environmental, for example) for many countries, that were separated until this day.

The modern - day European Union is a direct result of a determination among European politicians to prevent future violent conflicts in Europe after World War II. The original aim was to tie countries together by forging closer industrial and economic cooperation. Since then, the EU's responsibilities have grown in response to new challenges and many more countries have joined. We can divide off few dates (years), that were very important for Europe after the war:

In **1950**, French Foreign Minister Robert Schuman proposed integrating the coal and steel industries of Western Europe. This leads to the Treaty of Paris, creating the European Coal and Steel Community (ECSC), in 1951, with six members: Belgium, France, Italy, Luxembourg, the Netherlands and West Germany. The same six countries signed the Treaties of Romein, creating the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM) in **1957**. They began removing trade barriers between them and move towards creating a 'common market'. The institutions of the EEC, ECSC and EURATOM were merged to form a single set of institutions: the European Commission, European Council and European Parliament (with members selected initially by national parliaments). This event had place in **1967**. In **1973** the European Community has been enlarged by Denmark, Ireland and the United Kingdom. The year **1979** was very important for future Union, because the first direct elections to the European Parliament took place, with voters in each EU Member State electing the members. Two years later (1981), Greece joined the European Community, and in 1986 also did Portugal and Spain. The Single European Act was signed by EU governments, providing for the creation of a single market in which people, goods, capital and services can move freely around the EC. **1992**: The Treaty of Maastricht was signed, creating the European Union and introducing new forms of cooperation between Member State governments – for example, on defence and justice and home affairs issues. EU leaders also agreed to create an Economic and Monetary Union, with a single currency managed by a European Central Bank, within a decade. The Single Market was formally completed, but much work remained to be done to make the promise of free movement of people, goods, capital and services a reality.

Map 8. New countries (blue color) in European Community (1990), Wikipedia 2008.

It was time for another, highly developed countries to join The Union. So in **1995** Austria, Finland and Sweden enlarged European Community, and four years later Europe's single currency – the euro – was officially launched and 11 EU Member States adopted it as their official currency, forming what is known as the euro zone. In **2001**, also Greece joins the euro zone. The Treaty of Nice was signed, introducing reforms to the EU's institutions to prepare for the expansion of the Union with the admission of ten new Member States in 2004.
The euro became a reality on **1 January 2002**, when euro notes and coins replace national currencies in 12 of the 15 countries which were members of the EU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain. A 'convention on the future of Europe' was launched, with 105 members representing national governments and parliaments in the Member States and countries waiting to join the EU, the European Commission and the European Parliament. **2003**: The convention ended and submited its draft 'Treaty establishing a Constitution for the European Union' to EU leaders. Member State governments began negotiations on the proposals. In May of **2004,** ten new

countries joined the EU, including eight from eastern and central Europe. They are: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, **Poland**, Slovakia and Slovenia.

EU leaders reached agreement on the Constitutional Treaty, which brought all the previous EU Treaties together in one document and introduced changes to the way the Union works. EU leaders argued these changes are needed to ensure that the Union can continue to operate effectively as it grows. Member States were given two years to ratify the Constitutional Treaty. As with all EU Treaties, it can only come into force if it is approved by all 25 Member States. **2005**: Referenda was held on the Constitutional Treaty in four countries: Luxembourg and Spain voted in favour, but France and the Netherlands voted against. EU leaders launched a 'period of reflection' to consider how best to proceed in the light of the No votes.

By June **2006**, 15 of the EU's 25 Member States had ratified the Treaty. The European Council agreed a timetable for deciding what to do next. It calls for:

- EU leaders to adopt a political declaration setting out Europe's values and ambitions and confirming their shared commitment to deliver them, at a ceremony to commemorate the 50th anniversary of the founding of the EU on **25 March 2007**.
- Germany, which holds the Presidency of the Union in the first half of 2007, to present a report to EU leaders at the June European Council assessing the state of the discussions on the Constitutional Treaty and exploring possible options for the future.
- A final decision on how to proceed to be taken by the end of **2008**. (AUEB 2008)

Over fifty years of United Europe caused a lot of changes in its structure, so it's good to take together the treaties, that are the spine of today's European Community (in order):

Treaty establishing the European Coal and Steel Community:

The Treaty establishing the European Coal and Steel Community (ECSC), which was signed on 18 April 1951 in Paris, entered into force on 23 July 1952 and expired on 23 July 2002. (European Union 2008)

Treaty of Rome:

The Treaty of Rome, establishing the European Economic Community (EEC), signed in Rome on 25 March 1957, and entered into force on 1 January 1958. The Treaty establishing the European Atomic Energy Community (Euratom) was signed at the same time and the two are therefore jointly known as the Treaties of Rome. (European Union 2008)

Merger Treaty:

The Merger Treaty, signed in Brussels on 8 April 1965 and in force since 1 July 1967, which provided for a Single Commission and a Single Council of the then three European Communities. (European Union 2008)

Single European Act (SEA):

The Single European Act (SEA), signed in Luxembourg and the Hague, and entered into force on 1 July 1987, provided for the adaptations required for the achievement of the Internal Market. (European Union 2008)

Treaty on European Union:

The Treaty on European Union, which was signed in Maastricht on 7 February 1992, entered into force on 1 November 1993. 'The Maastricht Treaty changed the name of the European Economic Community to simply "the European Community". It also introduced new forms of co-operation between the Member State governments - for example on defence, and in the area of "justice and home affairs". By adding this inter-governmental co-operation to the existing "Community" system, the Maastricht Treaty created a new structure with three "pillars" which is political as well economic. This is the European Union (EU). (European Union 2008)

Treaty of Amsterdam:

The Treaty of Amsterdam, signed on 2 October 1997, entered into force on 1 May 1999. It amended and renumbered the EU and EC Treaties. Consolidated versions of the EU and EC

Treaties are attached to it. The Treaty of Amsterdam changed the articles of the Treaty on European Union, identified by letters A to S, into numerical form. (European Union 2008)

Treaty of Nice:

The Treaty of Nice, signed on 26 February 2001, entered into force on 1 February 2003. It dealt mostly with reforming the institutions so that the Union could function efficiently after its enlargement to 25 Member States. The Treaty of Nice, the former Treaty of the EU and the Treaty of the EC have been merged into one consolidated version. (European Union 2008)

Treaty of Lisbon:

The Treaty of Lisbon was signed on 13 December 2007. It will have to be ratified by all 27 Member States before it can enter into force, which is hoped to be before the next European Parliament elections in June 2009. Its main objectives are to make the EU more democratic, meeting the European citizens' expectations for high standards of accountability, openness, transparency and participation; and to make the EU more efficient and able to tackle today's global challenges such as climate change, security and sustainable development. The agreement on the Treaty of Lisbon followed the discussion about a constitution. A "Treaty establishing a constitution for Europe" was adopted by the Heads of State and Government at the Brussels European Council on 17 and 18 June 2004 and signed in Rome on 29 October 2004, but it was never ratified. (European Union 2008)

6.2. Structure.

The European Community, just like typical countries, has its own political structure, institutions, laws and activities, that they care about. These days (2008) we have seven main parts of political structure of EU. The institutions are:

a) European Parliament - is the only directly-elected body of the European Union. The 785 Members of the European Parliament are to represent the citizens. They are elected once every five years by voters right across the 27 Member States of the European Union on behalf of its 492 million citizens. Parliament plays role in drafting legislation which has an impact on the daily lives of the citizens: on environmental protection, consumer rights, equal opportunities, transport, and the free movement of workers, capital, services and goods. Parliament also has joint power with the Council over the annual budget of the European Union. The Parliament also has its own structure, and it is like: (European Union 2008)

Figure 23. European Pariament's structure,
European Union 2008.

b) Council of the European Union – is the main decision - making body of the European Union. The ministers of the Member States meet within the Council of the European Union. Depending on the issue on the agenda, each country will be represented by the minister responsible for that subject (foreign affairs, finance, social affairs, transport, agriculture, etc.). The presidency of the Council is held for six months by each Member State on a rotational basis. The Council is responsible for decision - making and co-ordination, as follows: (European Union 2008)

- The Council of the European Union passes laws, usually legislating jointly with the European Parliament.

- The Council co-ordinates the broad economic policies of the Member States.

- The Council defines and implements the EU's common foreign and security policy, based on guidelines set by the European Council.

- The Council concludes, on behalf of the Community and the Union, international agreements between the EU and one or more states or international organisations.

- The Council co-ordinates the actions of Member States and adopts measures in the area of police and judicial co-operation in criminal matters.

- The Council and the European Parliament constitute the budgetary authority that adopts the Community's budget.

The number of votes each Member State can cast is set by the Treaties. The Treaties also define cases in which a simple majority, qualified majority or unanimity are required. A qualified majority will be reached if the following two conditions are met: 1. If a majority of Member States approve; 2. A minimum of 255 votes is cast in favour of the proposal, out of a total of 345 votes. (European Union 2008)

In addition, a Member State may ask for confirmation that the votes in favour represent at least 62% of the total population of the Union. If this is found not to be the case, the decision will not be adopted.

Here is the distribution of votes for each member state:

29 votes for Germany, France, Italy, United Kingdom,

27 votes for Spain and Poland,

14 votes for Romania,

13 votes for Netherlands,

12 votes for Belgium, Czech Republic, Greece, Hungary, Portugal,

10 votes for Austria, Bulgaria, Sweden,

7 votes for Denmark, Ireland, Slovakia, Lithuania, Finland,

4 votes for Cyprus, Estonia, Latvia, Luxemburg, Slovenia,

3 votes for Malta.

c) European Commission – we can separate following bodies of European Commision: President, Commissioners, Directorates-General & Services, Staff, Commission Directory.

It's good to know, that The President of the Commission is appointed by the governments of the Member States, and then approved by the European Parliament. This dual legitimacy gives the President political authority, which he exercises in a variety of ways. His task is to try to provide forward movement for the European Union and to give a sense of direction both to his fellow Commissioners and, more broadly, to the Commission as a whole. This role was strengthened by the Amsterdam Treaty: 'The Commission shall work under the political guidance of its President'. He calls and chairs meetings of the Members of the Commission, and can assign responsibility for specific activities to them or set up working groups. Lastly, he represents the Commission. In this capacity, he takes part in meetings of the European Council and of the Group of seven leading industrialised countries and Russia (G8), as well as in the major debates of the European Parliament and the Council of Ministers of the European Union. So, although the work of the Commission is based on the principle of collective responsibility, the President is much more than a first among equals. The President of the Commission serves a five-year term. The Maastricht Treaty brought the terms of office of the European Parliament and the Commission into close alignment: Colleges serve a five-year term and take up office six months after European Parliament elections, which are held on a fixed basis in the June of years ending in four and nine. (European Union 2008)

d) Court of Justice of the European Communities - The Court of Justice is composed of 27 Judges and eight Advocates General**.** The Judges and Advocates General are appointed by common accord by the governments of the Member States. They are chosen from among lawyers whose independence is beyond doubt and who possess the qualifications required for appointment, in their respective countries, to the highest judicial offices, or who are of recognised competence. The Judges of the Court elect one of themselves as President of the Court for a renewable term of three years. The President directs the work and staff of the Court and presides at hearings and deliberations of the full Court or the Grand Chamber.

The **Registrar** is the institution's secretary general and manages its departments under the authority of the President of the Court. The Court may sit as a full court, in a Grand Chamber of 13 judges or in Chambers of three or five judges. The Presidents of the Chambers of five judges are elected for three years, and those of the Chambers of three judges for one year. (European Union 2008)

e) European Court of Auditors - The European Court of Auditors is the EU Institution established by the Treaty to carry out the audit of EU finances. (European Union 2008)

f) European Ombudsman - The current Ombudsman is Mr P. Nikiforos Diamandouros, former national ombudsman of Greece. He investigates complaints about maladministration in the institutions and bodies of the European Union. The institutions include, among others, the European Commission, the Council of the EU and the European Parliament. He can investigate Union bodies like: The European Medicines Agency and the European Foundation for the Improvement of Living and Working Conditions. Only the Court of Justice, the Court of First Instance, and the Civil Service Tribunal acting in their judicial role do not fall within his jurisdiction. (European Union 2008)

g) European Data Protection Supervisor (EDPS) - The EDPS hears and investigates complaints, conducts inquiries and prior checks, publishes papers on different aspects of data protection relevant to his work and thus aims to promote a 'data protection culture' in EC institutions and bodies. An annual report of activities is published each year. A press service deals with media contacts and promotes EDPS advice in press releases and in newsletters. (European Union 2008)

Above institutions were created do keep law and order but also to take care about many activities, that are inseparable part of citizen's life. If we want to check the European's Community site resources, we can find that main subjects under Union's protection are:

Agriculture	**External Trade**
Audiovisual and Media	**Fight against fraud**
Bugdet	**Fisheries and Maritime Affairs**
Competition	**Food Safety**
Consumers	**Foreign and Security Policy**
Culture	**Humanitarian aid**
Customs	**Human rights**
Development	**Information Society**
Economic and Monetary Affairs	**Institutional Affairs**
Education, Training, Youth	**Internal Market**
Employment and Social Affairs	**Justice, freedom and security**
Energy	**Public Health**
Enlargement	**Regional Policy**
Enterprise	**Research and Innovation**
Environment	**Taxation**
External Relations	**Transport**

Table 4. Subjects under EU's law,
European Union 2008.

Map 9. Countries in EC,
European Union 2008.

6.3. Environmental law.

6.3.1. Water directives and statements in EU.

6.3.1.1. River basin directives.

Still increasing demand by citizens and environmental organisations for cleaner rivers and lakes, groundwater and coastal beaches has been evident for considerable time. When asked to list the five main environmental issues that Europeans are worried about, averaged results for the EU25 show that nearly half of the respondents are worried about "water pollution" (47%). This demand by citizens is one of the main reasons why the Commission has made water protection one of the priorities of its work. The new European Water Policy will get polluted waters clean again. In achieving these objectives, the roles of citizens and citizens' groups should be huge. This is why a new European Water Policy has to get citizens more involved. European Water Policy has undergone a through restructuring process, and a new Water Framework Directive adopted in 2000 should be the operational tool, setting the objectives for water protection for the future.

An early beginning

"Early European water legislation began, in a "first wave", with standards for those of our rivers and lakes used for drinking water abstraction in 1975, and culminated in 1980 in setting binding quality targets for our drinking water. It also included quality objective legislation on fish waters, shellfish waters, bathing waters and groundwater." (European Union 2008)

Addressing pollution from urban waste water and from agriculture

In 1988 the Frankfurt ministerial seminar on water reviewed the existing legislation and identified a number of improvements that could be made and gaps that could be filled. This resulted in the second phase of water legislation, the first results of this were, in 1991, the adoption of:

- the Urban Waste Water Treatment Directive, providing for secondary waste water treatment, and even more stringent treatment where necessary;

- the Nitrates Directive, addressing water pollution by nitrates from agriculture;

- a new Drinking Water Directive, reviewing the quality standards and, where necessary, tightening them;

- a Directive for Integrated Pollution and Prevention Control, adopted in 1996, addressing pollution from large industrial installations. (European Union 2008)

Getting Europe 's waters cleaner, getting the citizen involved: the new European water policy

Pressure for a fundamental rethink of Community water policy came to a head 1995: The Commission, which had already been considering the need for global approach to water policy, accepted requests from the European Parliament's environment committee and from the Council of environment ministers. Whilst EU actions of the past such as the Drinking Water Directive and the Urban Waste Water Directive can duly be considered milestones, European Water Policy has to address the increasing awareness of citizens and other involved parties for their water. At the same time water policy and water management are to address problems in a same way. As the culmination of this open process a two day Water Conference was hosted in May 1996. This Conference was attended by some 250 delegates including representatives of Member States, regional and local authorities, enforcement agencies, water providers, industry, agriculture and, not least, consumers and environmentalists. The outcome of this consultation process was a widespread consensus that, while considerable progress had been made in tackling individual issues, the current water policy was fragmented, in terms both of objectives and of means. All parties agreed on the need for a single piece of framework legislation to resolve these problems. In response to this, the Commission presented a Proposal for a Water Framework Directive with the following key aims:

- *expanding the scope of water protection to all waters, surface waters and groundwater;*

- *achieving "good status" for all waters by a set deadline;*

- *water management based on river basins;*

- *"combined approach" of emission limit values and quality standards;*

- *getting the prices right;*

- *getting the citizen involved more closely;*

- *streamlining legislation*; (European Union 2008)

A single system of water management: River basin management

The best model for a single system of water management is management by river basin - the natural geographical and hydrological unit - instead of according to administrative or political boundaries. While several Member States already take a river basin approach, this is at present not the case everywhere. For each river basin district - some of which will traverse national frontiers - a "river basin management plan" will need to be established and updated every six years, and this will provide the context for the co-ordination requirements identified above. (European Union 2008)

Surface water – ecological and chemical protection

For this reason, a general requirement for ecological protection, and a general minimum chemical standard, was introduced to cover all surface waters. These are the two elements "good ecological status" and "good chemical status". The second one is defined in annex of the Water Framework Proposal, in terms of the quality of the biological community, the hydrological characteristics and the chemical characteristics. As no absolute standards for biological quality can be set which apply across the Community, because of ecological variability, the controls are specified as allowing only a slight departure from the biological community which would be expected in conditions of minimal anthropogenic impact. The system is somewhat complicated, but this is inevitable given the extent of ecological variability, and the large number of parameters, which must be dealt with.

Good chemical status is defined in terms of compliance with all the quality standards established for chemical substances at European level. The directive also provides a mechanism for renewing these standards and establishing new ones by means of a prioritisation mechanism for hazardous chemicals. This will ensure at least a minimum chemical quality, particularly in relation to very toxic substances, everywhere in the Community. (European Union 2008)

Groundwater

The case of groundwater is somewhat different. The presumption in relation to groundwater should broadly be that it should not be polluted at all. For this reason, setting chemical quality standards may not be the best approach, as it gives the impression of an allowed level of pollution to which Member States can fill up. A very few such standards have been established at European level for particular issues (nitrates, pesticides and biocides), and these must always be adhered to. But for general protection, it is taken another approach. It is essentially a precautionary one. It comprises a prohibition on direct discharges to groundwater, and a requirement to monitor groundwater bodies so as to detect changes in chemical composition, and to reverse any antropogenically induced upward pollution trend.

Quantity is also a major issue for groundwater. The issue can be put as follows. There is only a certain amount of recharge into a groundwater each year, and of this recharge, some is needed to support connected ecosystems. For good management, only that portion of the overall recharge not needed by the ecology can be abstracted - this is the sustainable resource, and the directive limits abstraction to that quantity. (European Union 2008)

"One of the innovations of the directive is that it provides a framework for integrated management of groundwater and surface water for the first time at European level." (European Union 2008)

The river basin management plan

All the elements of this analysis must be set out in a plan for the river basin. The plan is a detailed account of how the objectives set for the river basin (ecological status, quantitative status, chemical status and protected area objectives) are to be reached within the timescale required. The plan will include all the results of the above analysis: the river basin's characteristics, a review of the impact of human activity on the status of waters in the basin, estimation of the effect of existing legislation and the remaining "gap" to meeting these objectives. One additional component is that an economic analysis of water use within the river basin must be carried out. This is to enable there to be a rational discussion on the cost - effectiveness of the various possible measures. It is essential that all interested parties are fully involved in this discussion, and indeed in the preparation of the river basin management plan as a whole. (European Union 2008)

Public participation

"In getting our waters clean, the role of citizens and citizens' groups will be crucial." (European Union 2008)

There are two main reasons for an extension of public participation. The first is that the decisions on the most appropriate measures to achieve the objectives in the river basin management plan will involve balancing the interests of various groups. The economic analysis requirement is intended to provide a rational basis for this, but it is essential that the process is open to the scrutiny of those who will be affected. The second reason concerns enforceability. The greater the transparency in the establishment of objectives, the imposition of measures, and the reporting of standards, the greater the care Member States will take to implement the legislation in good faith, and the greater the power of the citizens to influence the direction of environmental protection, whether through consultation or, if disagreement persists, through the complaints procedures and the courts. Caring for Europe 's waters will require more involvement of citizens, interested parties, non-governmental organisations. To that end the Water Framework Directive will require information and consultation when river basin management plans are established: the river basin management plan must be issued in draft, and the background documentation on which the decisions are based must be made accessible. Furthermore a biannual conference in order to provide for a regular exchange of views and experiences in implementation will be organised. Too often in the past implementation has been left unexamined until it is too late - until Member States are already woefully behind schedule and out of compliance. The Framework Directive, by establishing very early on a network for the exchange of information and experience between water professionals throughout the Community will ensure this does not happen. (European Union 2008)

Conclusion

The big progress has been made in water protection in Europe, but also in solving significant problems at European level. But Europe 's waters are still in need of increased efforts to get them clean. After 30 years of European water legislation, this demand is expressed, to an ever increasing extent by citizens and environmental organisations. We should take up the challenge of water protection, one of the great challenges for the European Union. We should seize the initiative generated by the political process on the Water Framework Directive. The main initiatives are:

- Making Europe 's waters cleaner

- Getting the all citizens involved in this work. (European Union 2008)

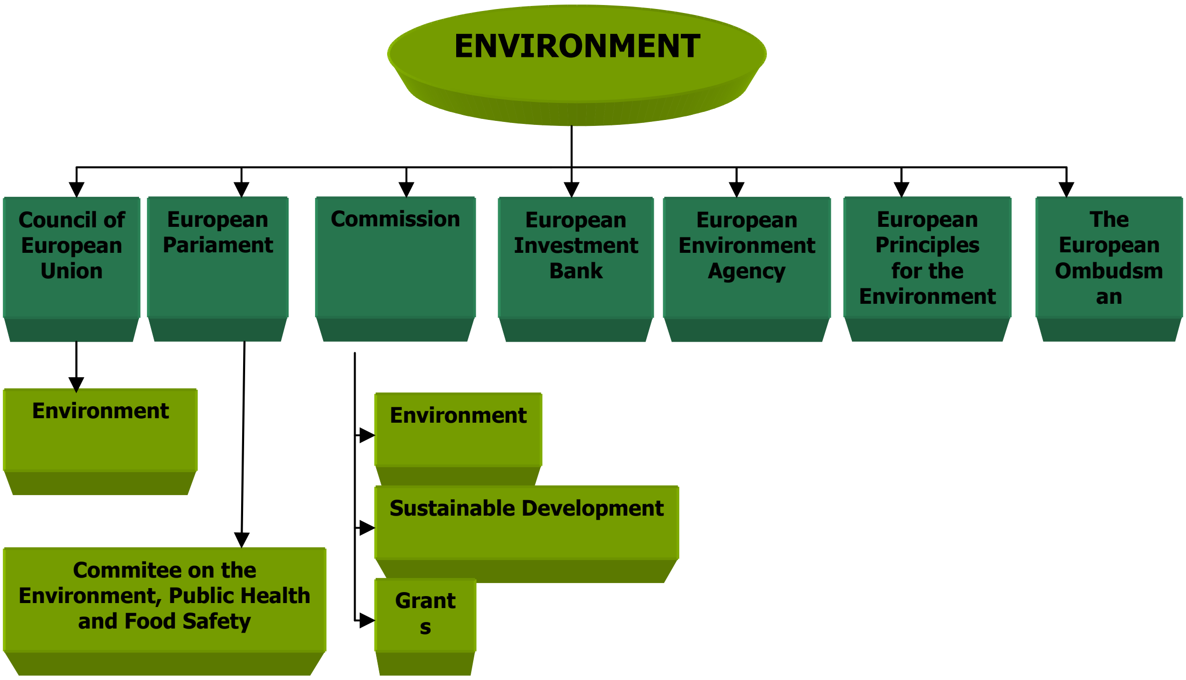


Figure 24. Structure of EU's divisions, involved in environmental management, European Union 2008.

6.3.1.2. Marine environment.

European Parliament and Council have agreed on the final text of the Directive. A consolidated text is already available. The European Commission proposed in 2005 an ambitious strategy to protect more effectively the marine environment across Europe, which included the legislative

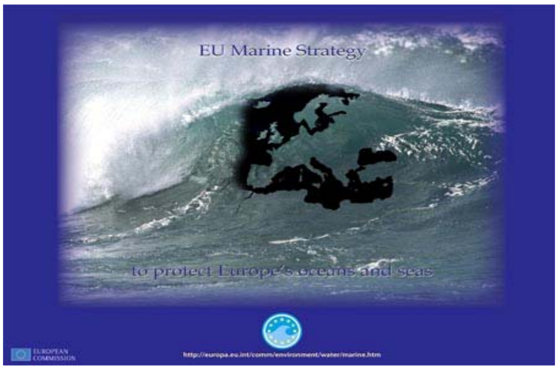


Figure 25. Marine strategy, European Union 2008.

proposal now agreed. The Thematic Strategy on the Protection and Conservation of the Marine Environment aims to achieve good environmental status of the EU's marine waters by 2021 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy will constitute the environmental pillar of the future maritime policy the European Commission is working on, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment. The Marine Strategy Directive will establish European Marine Regions on the basis of geographical and environmental criteria. The Marine Strategies will contain a detailed assessment of the state of the environment, a definition of "good environmental status" at regional level and the establishment of clear environmental targets and monitoring programmes. Each Member State will draw up a programme of cost - effective measures. Impact assessments, including detailed cost - benefit analysis of the measures proposed, will be required prior to the introduction of any new measure. The Marine Strategy Directive is consistent with the water framework directive from 2000 which requires that surface freshwater and ground water bodies (lakes, streams, rivers, estuaries, coastal waters) achieve a good ecological status by 2015 and that the first review of the River Basin Management Plan should take place in 2021. (European Union 2008)

6.3.1.3. Water quantity

6.3.1.3.1. Flood risk management

Directive on the assessment and management of flood risks entered into force on 26 November 2007. This directive now requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. With this Directive also reinforces the rights of the public to access this information and to have a say in the planning process.

The Directive was proposed by the European Commission on 18/01/2006, and was finally published in the Official Journal on 6 November 2007. Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river

Figure 26. Flood, Wikipedia 2008.

basins and associated coastal areas at risk flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. All assessments, maps and plans prepared shall be made available to the public. Member States shall furthermore coordinate their flood risk management practices in shared river basins, including with third counties, and shall in solidarity not undertake measures that would increase the flood risk in neighbouring countries. Member States shall in take into consideration long term developments, including climate change, as well as sustainable land use practices in the flood risk management cycle addressed in this directive. (European Union 2008)

6.3.1.3.2 Water scarcity and droughts.

Communication on Water Scarcity and Droughts In recognition of the acuteness of the water scarcity and drought challenges in Europe, the Commission undertook in 2006 and early 2007 an in-depth assessment of the situation at EU level. In the light of its preliminary results and of the overall policy context, the Commission adopted a Communication on these issues on 18 July 2007:

Figure 27. Drought, Wikipedia 2008.

- *Communication*
- *Impact Assessment*
- *Summary Impact Assessment*

This process has required an active involvement of the interested parties. The Commission set up a Stakeholder Forum which contributed to the debate and was an integral part of the process. Meetings of the Forum took place on 29 January, 26 March and 24 May 2007. The objectives of the meetings were twofold: I. Inform the Stakeholder Forum on the progress carried out so far to get a coherent overview of the scope and impacts of water scarcity and drought issues; II. Have exchanges with the stakeholders on the basis of the available information and collect contributions to strengthen the diagnosis as well as possible suggestions for addressing water scarcity and drought issues. (European Union 2008)

6.3.1.4. Water and health – directives.

6.3.1.4.1. Drinking water.

The objective of the Drinking Water Directive is to protect the health of the consumers in the European Union and to make sure the water is wholesome and clean. To make sure drinking water everywhere in the EU is indeed healthy, clean and tasty, the Drinking Water Directive sets standards for the most common substances that can be found in drinking water. While translating the Drinking Water Directive into their own national legislation, the Member States of the European Union can include additional requirements e.g. regulate additional substances that are relevant within their territory or set higher standards. Member States have to monitor the quality of the drinking water supplied to their citizens and of the water used in the food production industry. This has to be done mainly at the tap inside private and public premises. Member States report at three yearly intervals the monitoring results to the European

Commission. The Commission assesses the results of water quality monitoring against the standards in the Drinking Water Directive. After each reporting cycle the Commission produces a synthesis report, which summarises the quality of drinking water and its improvement at a European level. In order to adapt the Directive to progress in science and technology and to address the changed context met after the enlargement of the Union, the Commission is currently preparing a revision of the Directive. A large public consultation in 2003, named the Drinking Water Seminar, indicated the main topics to be covered by the revision of the Directive. They are: bacteriological contamination, chemical substances including construction products in contact with drinking water, small water supplies and risk assessment and risk management. The concept of risk assessment and risk management during the production and distribution of drinking water was introduced by WHO in the 2004 Guidelines for Drinking Water Quality. This concept was introduced in the context of Water Safety Plans. By taking on board this approach, the quality surveillance of the drinking water would shift from the current control of drinking water at the tap towards quality management along the production and distribution cycle from capture to tap. (European Union 2008)

6.3.1.4.2. Bathing water.

Bathing water quality. The new Bathing Water Directive

Europeans are very concerned about water quality in sea, coasts, rivers and lakes. They put good bathing water quality on the first line when judging their immediate living environment. Knowing they have clean and safe water to swim or play in is an important factor in their choice of a holiday or weekend destination. Also for the tourist industry, clean and safe water is an important argument to attract visitors to an area.

A new Bathing Water Directive was adopted 15th February 2006 after a long process which required a final conciliation agreement between Council and Parliament. During discussions in the European Parliament and Council, the main issue for debate was the severity of the health standards that bathing sites must attain to comply with the directive. The Commission’s proposal included three categories for the classification of bathing sites: “excellent,” “good” or “poor”. Moreover, it stated that all sites should achieve at least the classification “good” to comply with the directive. However, in its common position, the Council had a different opinion and took the view that sites should be considered compliant even when they achieved the standards of a fourth category, called “sufficient,” situated between “good” and “poor.” While both Commission and Parliament accepted this in order to see an overall improvement of the legislation, the Parliament adopted amendments to tighten the quality standards for the “sufficient” category. The new Directive lays down provisions for more sophisticated monitoring and classification of bathing water. Directive requires Member States to draw up a management plan for each site to minimise risks to bathers, based on an assessment of the sources of contamination that are likely to affect it. (European Union 2008)

6.3.1.5. Water pollution directives.

Council directive concerning urban waste water treatment was adopted on 21 May 1991 to protect the water environment from the adverse effects of discharges of urban waste water and from certain industrial discharges. On 27 February 1998 the Commission amended the old directive to clarify the requirements of the directive in relation to discharges from urban waste water treatment plants to sensitive areas which are subject to eutrophication. Commission decision was adopted on 28 July 1993 and defines the information that Member States should provide the Commission when reporting on the state of implementation of the directive according to existing article, and specifies the format in which the information should be provided. This Decision was adopted in accordance with Article 18 of the Directive.

Nitrates

The European Community has been taking measures concerned with nitrogen pollution in waters for over twenty years. Whilst the initial directives concerned themselves mainly with water for human consumption, more recent directives, such as those on nitrates from agricultural sources and urban waste water treatment have placed increased emphasis on the environmental effects of excess nitrogen, in particular eutrophication. These recent directives are currently in the process of implementation. (European Union 2008)

6.4. Conclusion.

This long paragraph shows, how has been European Community created and how works its law in example of environmental issue. As it's possible to see, it was a long road (since II World War) to build the whole structure with policy, law, and particular directives, also contains ***water directives.*** The structure is really impressive, because of the details that are taken under European "wings". It is worth to notice, that each new member of EU has to follow new rules, which are often very strict and hard for adaptation in the beginning of being in European Union. As example of the country that is still trying to reach European standards we can show Poland – the country that has joined The Community four years ago, and which is, by the way, the part of this project's target.

Of course, all the policies and laws are not a guarantee of better water management or resources, because in my opinion the most significant thing is that the people should involve themselves more in protection of environment, and the European Union should give, beside the legislations, also a good access to the knowledge about water situation in this, and each region in the world.

So, in my opinion, writing about European Community is a very important thing in this kind of project.

Also, in this paragraph it is shown how the EC was created – step by step, with the most important dates. I put (chronological) information about Treats that are the spine of today's European Community, and future (year 2009) European Union, after ratification of Reforming Treat. Through the years, new countries were joining Community, which was built on the three other small communities, which were created after World's War II. On May 2004 also Poland has joined EC, and that was the beginning of several changes in this country, including changes in environmental law, to be the same as in other European countries under Community's law, for example - Germany which was one of the creator of European Community, so in some way also the creator of the main law and policies.

Next small point shows the politic structure of European Community, also the environmental organisations and institutions that care about environment and water resources in the government of EC. This point ends with some important water directives, given by Parliament and water divisions of the environmental part of legislation. The directives show how to treat water resources in several ways: river basins, water scarcity, flood management, marine management and also water influence for human's health. Beside, the directives are some kind of instructions about water treatment in the member countries of European Community and future European Union.

7. Water pollution – global vision.

7.1. Kinds of water pollution.

Water pollution can come from a number of different sources. If it comes from a single source, it is called point - source pollution. If it comes from many sources, it is called nonpoint - source pollution.

Most types of pollution affect the immediate area surrounding the source, but sometimes we can speak about transboundary pollution, such as nuclear waste.

Surface water pollution

This kind of pollution can be dangerous for exterior water resources, like:

- Oceans
- Rivers
- Lakes

These waters can become polluted in a number of ways, and we call them surface water pollution. (WPG 2008)

Groundwater pollution

The big water resources are underground in soil or under rock structures called aquifers. We often use aquifers as a means to obtain drinking water, and build wells to access it. When this water becomes polluted it is called - groundwater pollution. This kind of pollution is often caused by pesticide contamination from the soil, this can infect our drinking water and cause disease. (WPG 2008)

Microbiological water pollution

Microbiological water pollution is a natural form of water pollution caused by microorganisms.

Many types of microorganisms live in water and make fishes, land animals and humans to become ill. Microorganisms can be like:

- Bacteria
- Viruses
- Protozoa

Serious diseases such as cholera come also from microorganisms that live in water. These diseases usually affect the health of people in poor countries, as they do not have the possibility to treat polluted water. (WPG 2008)

Oxygen depleting

When too much biodegradable material is added to water, the number of microorganisms increase and use up the oxygen. We call it oxygen depletion.

In situation when oxygen levels in the water are depleted, aerobic microorganisms die and anaerobic microorganisms begin to thrive. Some anaerobic microorganisms are harmful to people, animals and the environment, as they produce harmful toxins such as ammonia and sulfides. (WPG 2008)

Nutrients

Nutrients are essential for plant growth and development. Many nutrients we can wind in wastewater and fertilisers, and these can cause excess weed and algae growth if large concentrations end up in water.

The risk is about:

- Contamination of drinking water and clog filters;
- Destruction of other aquatic organisms as the algae use up the oxygen in the water; (WPG 2008)

Suspended matter

Some pollutants do not dissolve in water as their molecules are too big to mix between the water molecules. This material is called particulate matter and can often be a cause of water pollution.

- The suspended particles eventually settle and cause a thick silt at the bottom. This is harmful to marine life that lives on the floor of rivers or lakes.
- Biodegradable substances are often suspended in water and can cause problems by increasing the amount of anaerobic microorganisms present.
- Toxic chemicals suspended in water can be harmful to the development and survival of aquatic life. (WPG 2008)

Chemical pollution

Industrial and agricultural work involves the use of many different chemicals that can run-off into water and pollute it.

- Metals and solvents from industrial work can pollute rivers and lakes. These are poisonous to many forms of aquatic life and may slow their development, make them infertile or even result in death.
- Pesticides are used in farming to control weeds, insects and fungi. Run-offs of these pesticides can cause water pollution and poison aquatic life. Subsequently, birds, humans and other animals may be poisoned if they eat infected fish.
- Petroleum is another form of chemical pollutant that usually contaminates water through oil spills when a ship ruptures. Oil spills usually have only a localised affect on wildlife but can spread for miles. The oil can cause the death of many fish and stick to the feathers of seabirds causing them to lose the ability to fly. (WPG 2008)

7.2. The causes of water pollution.

Sewage and wastewater

The pollution of lakes and rivers may be caused by domestic households, industrial and agricultural practices which produce wastewater:

- Sewage is the term used for wastewater that often contains faeces, urine and laundry waste.
- There are billions of people on Earth, so treating sewage is a big priority.
- Sewage disposal is a major problem in developing countries as many people in these areas don't have access to sanitary conditions and clean water.
- Untreated sewage water in such areas can contaminate the environment and cause diseases such as diarrhoea.
- Sewage in developed countries is carried away from the home quickly and hygienically through sewage pipes.
- Sewage is treated in water treatment plants and the waste is often disposed into the sea.
- Sewage is mainly biodegradable and most of it is broken down in the environment.
- In developed countries, sewage often causes problems when people flush chemical and pharmaceutical substances down the toilet. (WPG 2008)

Industrial waste

Also industry is a huge source of water pollution, it produces many pollutants that are harmful to people and the environment:

- Many industrial facilities use freshwater to carry away waste from the plant and into rivers, lakes and oceans.
- Pollutants from industrial sources include:
    - **Asbestos** – This pollutant is a serious health hazard and carcinogenic. Asbestos fibres can be inhaled and cause illnesses such as asbestosis, mesothelioma, lung cancer, intestinal cancer and liver cancer.
    - **Lead** – This is a metallic element and can cause health and environmental problems. It is a non-biodegradable substance so is hard to clean up once the environment is contaminated. Lead is harmful to the health of many animals, including humans, as it can inhibit the action of bodily enzymes.
    - **Mercury** - This is a metallic element and can cause health and environmental problems. It is a non-biodegradable substance so is hard to clean up once the environment is contaminated. Mercury is also harmful to animal health as it can cause illness through mercury poisoning.
    - **Nitrates** – The increased use of fertilisers means that nitrates are more often being washed from the soil and into rivers and lakes. This can cause eutrophication, which can be very problematic to marine environments.

- **Phosphates** - The increased use of fertilisers means that phosphates are more often being washed from the soil and into rivers and lakes. This can cause eutrophication, which can be very problematic to marine environments.
- **Sulphur** – This is a non-metallic substance that is harmful for marine life.
- **Oils** – Oil does not dissolve in water, instead it forms a thick layer on the water surface. This can stop marine plants receiving enough light for photosynthesis. It is also harmful for fish and marine birds.
- **Petrochemicals** – This is formed from gas or petrol and can be toxic to marine life. (WPG 2008)

Oil pollution

- Oil spills make up about 12% of the oil that enters the ocean.
- An oil spill from a tanker is a severe problem because there is such a huge quantity of oil being spilt into one place.
- Oil spills cause a very localised problem but can be catastrophic to local marine wildlife.
- Oil cannot dissolve in water and forms a thick sludge in the water. (WPG 2008)

Atmospheric deposition

Atmospheric deposition is the pollution of water caused by air pollution.

- In the atmosphere, water particles mix with carbon dioxide sulphur dioxide and nitrogen oxides, this forms a weak acid.
- Air pollution means that water vapour absorbs more of these gases and becomes even more acidic.
- When it rains the water is polluted with these gases, this is called acid rain.
- When acid rain pollutes marine habitats such as rivers and lakes, aquatic life is harmed. (WPG 2008)

Marine dumping

Dumping of litter in the sea can cause huge problems. Different items take different lengths of time to degrade in water:

- Cardboard – Takes 2 weeks to degrade.
- Newspaper – Takes 6 weeks to degrade.
- Photodegradable packaging – Takes 6 weeks to degrade.
- Foam – Takes 50 years to degrade.
- Styrofoam – Takes 80 years to degrade.

- Aluminium – Takes 200 years to degrade.
- Plastic packaging – Takes 400 years to degrade.
- Glass – It takes so long to degrade that we don't know the exact time. (WPG 2008)

Radioactive waste

Nuclear waste is produced from industrial, medical and scientific processes that use radioactive material. Nuclear waste can have detrimental effects on marine habitats. Nuclear waste comes from a number of sources:

- Operations conducted by nuclear power stations produce radioactive waste. Nuclear-fuel reprocessing plants in northern Europe are the biggest sources of man-made nuclear waste in the surrounding ocean. Radioactive traces from these plants have been found as far away as Greenland.
- Mining and refining of uranium and thorium are also causes of marine nuclear waste.
- Waste is also produced in the nuclear fuel cycle which is used in many industrial, medical and scientific processes. (WPG 2008)

Underground storage leakages

A tank or piping network that has at least 10% of its volume underground is known as an underground storage tank. They often store substances such as petroleum, that are harmful to the surrounding environment should it become contaminated. Many tanks constructed before 1980 are made from steel pipes that are directly exposed to the environment. Over time the steel corrodes and causes leakages, affecting surrounding soil and groundwater. (WPG 2008)

Global warming

An increase in water temperature can result in the death of many aquatic organisms and disrupt many marine habitats. For example, a rise in water temperatures causes coral bleaching of reefs around the world. This is when the coral expels the microorganisms of which it is dependent on. This can result in great damage to coral reefs and subsequently, all the marine life that depends on it. (WPG 2008)

Eutrophication

Eutrophication is when the environment becomes enriched with nutrients. This can be a problem in marine habitats such as lakes as it can cause algal blooms.

7.3. Dangers of pollution.

We can separate several dangers, caused by pollution:

- Heavy metals from industrial processes can accumulate in nearby lakes and rivers. This can slow development; result in birth defects and some are carcinogenic.
- Industrial waste often contains many toxic compounds that damage the health of aquatic animals and those who eat them. They can cause immune suppression, reproductive failure or acute poisoning.
- Microbial pollutants from sewage often result in infectious diseases that infect aquatic life and terrestrial life through drinking water.
- Organic matter and nutrients causes an increase in aerobic algae and depletes oxygen from the water column. This causes the suffocation of fish and other aquatic organisms.
- Sulfate particles from acid rain can cause harm the health of marine life in the rivers and lakes it contaminates, and can result in mortality.
- Suspended particles in freshwater reduces the quality of drinking water for humans and the aquatic environment for marine life. (WPG 2008)

7.4. Preventing of water pollution.

Here are the simple tips for preventing if water pollution:

- *Conserve water by turning off the tap when running water is not necessary.*
- *Be careful about what you throw down your sink or toilet. Don't throw paints, oils or other forms of litter down the drain.*
- *Use environmentally household products, such as washing powder, household cleaning agents and toiletries.*
- *Take great care not to overuse pesticides and fertilisers. This will prevent runoffs of the material into nearby water sources.*
- *By having more plants in your garden you are preventing fertiliser, pesticides and contaminated water from running off into nearby water sources.*
- *Don't throw litter into rivers, lakes or oceans. Help clean up any litter you see on beaches or in rivers and lakes, make sure it is safe to collect the litter and put it in a nearby dustbin.* (WPG 2008)

7.5. Treating.

7.5.1. Industrial treatment.

Before raw sewage can be safely released back into the environment, it needs to be treated correctly in a water treatment plant. In a water treatment plant, sewage goes through a number of chambers and chemical processes to reduce the amount and toxicity of the waste.

- The sewage first goes through a primary phase. This is where some of the suspended, solid particles and inorganic material is removed by the use of filters.
- The secondary phase of the treatment involves the reduction of organic, this is done with the use of biological filters and processes that naturally degrade the organic waste material.
- The final stage of treatment is the tertiary phase; this stage must be done before the water can be reused. Almost all solid particles are removed from the water and chemical additives are supplied to get rid of any left-over impurities. (WPG 2008)

7.5.2. Septic tanks.

Septic tanks treat sewage at the place where it is located, rather than transporting the waste through a treatment plant or sewage system. Septic tanks are usually used to treat sewage from an individual building.

- Untreated sewage from a property flows into the septic tank and the solids are separated from the liquid.
- Solid material is separated depending on their density. Heavier particles settle at the bottom of the tank whereas lighter particles, such as soap scum, will form a layer at the top of the tank.
- Biological processes are used to help degrade the solid materials.
- The liquid then flows out of the tank into a land drainage system and the remaining solids are filtered out. (WPG 2008)

7.5.3. Denitrification.

Denitrification is an ecological approach that can be used to prevent the leaching of nitrates in soil, this in turn stops any ground water from being contaminated with nutrients.

- Fertilisers contain nitrogen, and are often applied to crops by farmers to help plant growth and increase the yield.
- Bacteria in the soil convert the nitrogen in the fertilizer to nitrates, making it easier for the plants to absorb.

- Immobilization is a process where the nitrates become part of the soil organic matter.
- When oxygen levels are low, another form of bacteria then turns the nitrates into gases such as nitrogen, nitrous oxide and nitrogen dioxide.
- The conversion of these nitrates into gas is called denitrification. This prevents nitrates from leaching into the soil and contaminating groundwater. (WPG 2008)

7.5.4. Ozone wastewater treatment.

Ozone wastewater treatment is a method that is increasing in popularity.

- The generators convert oxygen into ozone by using ultraviolet radiation or by an electric discharge field.
- Ozone is a very reactive gas that can oxidise bacteria, moulds, organic material and other pollutants found in water.
- Using ozone to treat wastewater has many benefits, like:
  - Kills bacteria.
  - Oxidises substances such as iron and sulphur so that they can be filtered out of the solution.
- The disadvantages of using ozone as a treatment for wastewater are:
  - The treatment requires energy in the form of electricity; this can cost money and cannot work when the power is lost.
  - The treatment cannot remove dissolved minerals and salts. (WPG 2008)

7.6. Conclusion.

The last part was completely about water pollution. This is the very important topic when we speak about water, because pollution can be everywhere and sometimes it is not possible to remove it from environment.

First of all, I wrote about possible kinds of pollution in water with the short description of each of them. As we can see there might be a many kinds of pollution, also made by bacteria, viruses or protozoa. This kind of microorganisms can cause diseases so it is also very important to control this sector of pollution even if it's not global and visible. The microorganisms may cause also several oxygen variations (depletion) which is the reason of creating toxins in the water, not profitable for humans, animals and all environment. Of course in the paragraph is also mentioned about chemical pollution which is the reason of agricultural and industrial activity – probably the biggest sectors for water withdrawal in both countries: Germany and Poland.

Also it was important to mention about causes, how the pollution can be created – also by human activity (or mostly). In some way, it is the answer for the question HOW the pollution may exist next to us: also made by the industry and by the humans in their houses. Beside this, the reason of pollution are tanks and ships on the oceans (mostly because of loosing oil), acid condensation in the atmosphere, radioactive waste and many others.

The thing is to understand how dangerous may the pollution be for environment. This information can be also found in this paragraph. To avoid the danger few tips are given, next to the information about pollution treatment in each sector.

8. Poland in European Community.

8.1. Historical background.

Poland initiated the reform of its political system and economy in 1989. In this new situation, a return to the West, as embodied in the form of the EU and NATO, became realistic. Already on 19th September 1989 Poland signed the agreement for trade and trade co-operation with the European Community . That agreement was not only the basis for further relations but also a starting point for future negotiations on the subject of associating with EC. Such an intention was expressed by Polish Prime Minister Tadeusz Mazowiecki in his speech in the European Parliament in February 1990. Slightly later in June 1991 Polish Minister of Foreign Affairs Krzysztof Skubiszewski declared in his expose in Polish Parliament that Poland was determined to become a member of the European Community. On 19th May 1990 Poland officially applied for a beginning of negotiations for an agreement of associating, and the negotiations began in December 1990. After eleven months on 16th December 1991 the Polish government signed the Europe Agreement which established an associate relationship between the EC and the Republic of Poland. The Europe Agreement set out the legal grounds for the pursuit and implementation of economic, political, scientific, and cultural union. The agreements signed with the EC, which at this time was preparing for its transformation into the European Union (EU), initiated Poland's process of European integration. The Europe Agreement came into force on 1st February 1994. Despite the fact that the EC very early on signed a range of association and customs agreements with Poland, the Agreement was in practice treated as a completely new entity. It included resolutions on political dialogue, obligations related to the narrowing of the gap between the association states and EC legislative models, as well as guidelines governing co-operation in the area of culture. The EC gave its consent to the Agreement foreword containing an additional point: "Poland's ultimate aim is membership of the Community." In this way the Polish partner established that the aim of the Agreement was the creation of frameworks for Poland's gradual integration into the Community. The most important from Poland's point of view was that as a result of diplomatic interventions by the states of the Visegrád Group, the European Council decided at its Copenhagen summit in June

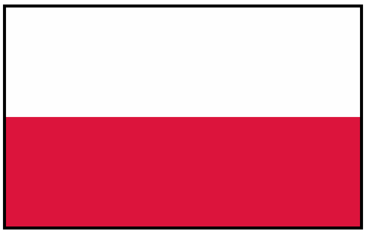
1993 that: "the associate member states from Central and Eastern Europe, if they so wish, will become members of the EU. In order to achieve this, however, they must fulfill the appropriate conditions." These became known as the Copenhagen criteria, or simply, membership criteria. The Copenhagen criteria laid down the following EU membership requirements:

1. ***"That candidate countries achieve stable institutions that guarantee democracy, legality, human rights and respect for and protection of minorities."*** (Polska 2008)
2. ***"That candidate countries have a working market economy, capable of competing effectively on EU markets."*** (Polska 2008)
3. ***"That candidate countries are capable of accepting all the membership responsibilities, political, economic and monetary."*** (Polska 2008)

Another important stage on Poland's way to EU took place at the Luxembourg summit in 1997, when the EU accepted the Commission's opinion to invite several Central and Eastern European states (Poland, Czech Republic, Hungary, Slovenia, Estonia and Cyprus) to start talks on their accession to the EU. The preliminary condition for the inauguration of negotiations was maintenance of the criteria by the countries operating within the Copenhagen framework. In 1999 EU made another decision on the introduction of the access negotiations with four next candidate countries: Slovakia, Lithuania, Latvia and Malta. The negotiation process started on 31st March 1998, when the first sitting of the International Accession Conference took place. After the meeting, screening sessions began to determine the extent to which Polish law was in accordance with community law, followed by the two parties developing position papers for each negotiating position. The opening of negotiations in given areas signified that the European Council has granted the European Commission the relevant mandate to conduct talks with the candidate states. After the final agreement negotiations were temporarily closed. In the final phase of all the negotiations their results took the form of entries in the accession treaty. Poland (with other candidate countries) finished the accession negotiations in December 2002. Than the Accession Treaty was signed in Athens on 16th April 2003. After the ratification of that Treaty, Poland and other 9 countries became the members of EU on 1st May 2004. (Polska 2008)

8.2 Informations about Poland (goegraphy, resources).

8.2.1. Basic data.



Poland lies in the central part of the European continent, the geometrical centre of which is near Warsaw. This is where the lines from Nordkyn in Norway to Matapan in Greece, and from Cabo da Roca in Portugal to the central Urals

Figure 28. Flag of Poland, Wikipedia 2008.

intersect. The boundary between the East and West European continental masses also runs through Poland. In fact it is possible to say, that Poland is a kind of heart of Europe because of it's localization, with very good access to the Baltic Sea. (Polish Institute 2006)

Official name:	***The Republic of Poland***
Location:	***52°13'N, 21°02'E***
Capital city:	***Warsaw***
Area:	***312,679 km²***
Population:	***38.518.241 (2007)***
Density:	***122 / km²***
Currency:	***Zloty***
Language:	***Polish***
Religion:	***Roman Catholic 89.8%, Eastern Orthodox and others***
Tourist destinations:	***Warszawa, Krakow, Mazury, Tatry mountains.***
Neighbouring countries:	***Russia (Kaliningrad District) (210 km)***
	Lithuania (103 km)
	Byelorussia (416 km)
	Ukraine (529 km)
	Slovakia (539 km)
	Czech Republic (790 km)
	Germany (467 km)
	Length of sea border (528 km)
Total border lenght:	***3582 km***

Table 5. Basic informations about Poland,
Polish Institute 2008.

Map 10. Poland - administrative map, with the net of rivers,

Polish Institute 2008.

8.2.2. The State of the Republic of Poland.

In accordance with the Constitution of April 2nd, 1997 (took effect on October 17th, 1997), the organs of state are:

- *Legislative authority: The Sejm and the Senate of the Republic of Poland,*
- *Executive authority: The President and the Council of Ministers,*
- *Judicial authority: The courts and tribunals.*

The President: ***Lech Kaczynski***, sworn into office on 23rd December 2005.

The president is elected in a general election; the term lasts for 5 years from the date the President is sworn into office.

The Parliament: Sejm and Senate of the Republic of Poland. The term lasts for 4 years.

- Sejm - 460 deputies (posel), elected in national election.
- Senat - 100 senators, elected in national election.

Prime Minister: ***Donald Tusk***

***Minister of Environment:* Maciej Nowicki**

With data from the table, Poland is the ninth largest country in Europe, after Russia, Ukraine, France, Spain, Sweden, Germany, Finland and Norway, and the 63rd largest in the world. (Poland 2008)

8.2.3. Environment and natural resources.

Poland is mostly lowland. The average height equals 173 m. Low-laying parts of the country (lower than 300 m) constitute about 91,3 % of Poland's territory, uplands (300-500 m) – 5,6 %, and mountains (over 500 m) only 3,1 %.

Despite the majority of lowland Polish landscape is very varied. Poland is famous for its lakes (there are over 9300 of them) and rivers (main rivers of Poland are Vistula (Wisla) and Odra). (Poland 2008)

Climate: Continental; moderate, changeable weather.

Average temperatures:

- January:
on the coast and the West: from 0 to -1°
North-East: from - 4,5° to - 5,5°
In the mountains (South): - 7°

- July:
on the coast: 16,5°
In the South: 19°

Average annual rainfall	***600 mm***
The highest mountain's peak	***Rysy (Tatra mountains) - 2499 m***
The longest river	***Wisla (Vistula) - 1047 km.***
The biggest lake	***Sniardwy (Mazury Lake District) - 11383 ha***
The deepest lake	***Hancza - 108 m***

Table 6. Main parts of Polish environment,
Polska 2008.

Nature has bestowed Poland generously with both non - renewable and renewable resources. The latter, such as wind and solar energy, are used more and more frequently, their growing popularity supported by great advances in technology.
Poland is a country rich in minerals. It is among the world's biggest producers of hard and brown coal, copper, zinc, lead, sulphur, rock salt and construction minerals.

As early as in antiquity, the country was famous for its amber, transported along the Amber Route from the Baltic Sea to the Adriatic coast. The largest amounts of amber, often called Baltic gold, were found at the mouth of the Vistula and on the Sambia Peninsula (now in Russia's Kaliningrad Region). It was a much valued material at that time and played a major role in barter trade with the Meditterranean. Amber was traded most intensively in the second century AD. Today Poland remains a major supplier of this material, with its resources estimated at 12.000 tons. The richest deposit is Mozdzanowo, where a variety of colours and shades can be found, including some 60 percent of transparent amber. Significant deposits also exist at the base of the Hel Peninsula, but they are located too deep (130m). Curiously, new and promising deposits have been recently discovered in the Lublin Upland.

The earliest evidence of mining in Poland dates back to 3500 BC when flint was mined by Neolithic tool makers. In Krzemionki Opatowskie, there is one of the world's best preserved flint workings. This is also one of the most valuable archeological sites in Europe.
In the fourth century BC iron ore started to be mined in the Silesian Upland and the Swietokrzyskie Mountains. At the same time quarries of construction and ceramic materials appeared in various parts of the country, as did lead, copper, silver and gold mines in Silesia and Malopolska.

In the Middle Ages mining rock salt in Bochnia and Wieliczka near Cracow was an important industry. The mines were royal property and under the Piasts and Jagiellons provided one-third of the state's income. Salt money was spent on maintaining the royal court, castles that protected trade routes, the army and the Cracow Academy (today's Jagiellonian University) founded in 1364 by King Casimir the Great.

That period also saw the emergence of the miner as a distinct occupation. In the 14th century capital companies known as gwarectwa appeared in Poland to mine precious metals on royal charter. This was the main branch of mining until the 17th century.
In the mid 18th century coal mining became prominent. The Silesian coalfields (Zaglebie Dabrowskie, Zaglebie Gornoslaskie, Zaglebie Krakowskie) grew into major industrial regions. In east Galicia, near Jaslo, Krosno and Boryslaw, oil mining developed a bit later. After the First World War, East Podkarpacie became a centre of natural gas mining. In 1919 a mining academy was established in Cracow with the aim of educating new engineers.
As a result of post - war border shifts, Poland lost most of its resources of oil and natural gas, while gaining rich deposits of coal in Upper and Lower Silesia. In the 1970s it became one of the world's biggest producers of hard coal. In 1979 a record 201 million tons were mined. Hard coal became the basic fuel and the main hard-currency earner, often referred to as "black gold". Until the late 1980s coal mining was considered to be a national industry and miners enjoyed great respect and prestige. (Polska 2008)

Hard and brown coal

Poland's reserves of hard coal are estimated at 45.4 billion tons. With the current annual production of 102 million tons (in 2000), they will suffice to meet the country's demand for almost 500 years, that is twice as long as the world's average. In fact, they will suffice for much longer as coal is being replaced in Polish economy with environment-friendly natural gas. For this reason, by 2020 the production of hard coal will be reduced to some 82 million tons a year, and by 2050 to about 40 million tons.

Poland has three major Upper Carboniferous coalfields, with 130 deposits of which 47 are currently exploited, their documented resources estimated at 16.6 billion tons. The main coalfield (Gornoslaskie Zaglebie Weglowe) lies in the Silesian Upland and is among the biggest hard-coal fields in the world. With an area of about 4,500 km^2, it has as many as 108 deposits, and the most valuable ones, characterized by high heating value, are located in the west and north. Coal is currently mined in Silesia in 41 mines. So far, the Silesian miners have produced some 9 billion tons of this fuel.

Hard coal is also found in the Lublin Upland's Bogdanka coalfield (known as Lubelskie Zaglebie Weglowe and having 11 deposits). Coal seams stretch from the Polish-Ukrainian border to Radzyn Podlaski. There is only one mine here, called Bogdanka, but it is the most modern and profitable mine in the country. In 2000 it produced 4,25 million tons of coal. Hard-coal deposits also exist in Lower Silesia, notably in the Walbrzych and Kamienna Gora area, but they are difficult to exploit and production is unprofitable, so all the local mines were closed down by 2000.

Second to hard coal among Poland's most important fuels is brown coal. Its reserves are estimated at nearly 14 billion tons. The deposits are located in eight regions, mainly in central Poland (coalfields at Konin, Belchatow and in Wielkopolska) and in its western part (at Turoszow on the Polish side of the Lusatian Neisse). Opening the mine at Turoszow in the 1950s marked the beginnings of brown-coal mining in Poland. Today the country is the world's sixth producer of this fuel, with 78 documented deposits, of which the exploited twelve have 2,1 billion tons.

Brown coal is utilized almost exclusively by the energy industry, with 98% used by large power plants. Mines are situated next to power plants with which they typically constitute one economic entity. Poland's biggest brown-coal power plant is Belchatow in the south of the Lodz province.
The Belchtow coalfield is at once the youngest and the biggest brown-coal field. Discovered in 1960, its deposits were estimated at 2 billion tons. There are actually three separate fields:

Belchatow, Szczercow and Kamiensk. In 1981 a mine was opened here, which supplies the Belchatow power plant. It is the biggest and one of the most advanced opencast mines in the world. Coal is mined here from 100 to 230m below the ground level. The mine's current production is about 35 million tons a year and it is adjusted to the needs of the Belchatow power plant. In winter as many as 140,000 tons a day are produced. Mining is carried out predominantly in the Belchatow field (3,200 ha) which will be used up by 2017. In 2002 the Szczercow field is planned to be opened, which has similar geology and will additionally supply a new plant, Belchatow II. These resources will suffice until 2020 - 2030.

Brown coal is the cheapest fuel used in the energy industry. In Poland, the cost of producing 1 GJ of energy from it is three times lower than for hard coal, six times lower than for natural gas and over eight times lower than for heating oil. However, exploiting brown - coal fields is environmentally hazardous as it destroys large expanses of soil, changes the surface - water structure, causes air pollution and is noisy. (Polska 2008)

Oil and natural gas

Although the world oil industry was born in Poland, the country can't compare with Kuweit. On the other hand, Polish geologists, geophysicists and oil engineers have not said their last word yet. Top-class equipment and cutting-edge exploration techniques including 3-D seismography make it possible to discover gas in areas that were once believed to contain no hydrocarbons. Significant deposits of natural gas are much more likely to be found in Poland than oil deposits.

Natural oil seepages were known in Poland as early as in the 13th century. Oil oozed out of the ground and gathered on sandstone outcrops, stream banks or water surface in a wide belt along the northern rim of the Carpathians. In the 19th century wells dug out by hand to collect "rock oil" were a common sight in many parts of Podkarpacie. The substance was used then for lubricating cart wheels and as a medicine for the cattle. In 1854 Ignacy Lukasiewicz drilled the world's first oil well in Bobrka near Krosno.

Deposits of oil and natural gas have been discovered in the Carpathians, Carpathian Foreland (the Carpathian Depression), Sudetian Monocline and Pomerania. Currently there are 92 known and documented deposits of oil, estimated at 13,7 million tons. In 2000 underground deposits yielded 350.000 tons of oil (64.000 in the south and 279.000 in the Polish Lowland). This is far less than the country's needs: about 18 million tons of oil and 11 bcm of natural gas a year. Since 1981 the Baltic shelf has been explored for oil. The Petrobaltic company, which holds a prospecting licence for 8,600 km^2 of the shelf, has discovered the B3 deposit, situated 80km off the Rozewie Cape, and has started to exploit it. Another deposit, B8, will be soon ready for exploitation. The submarine resources, 1400m below the water surface, are estimated at 20 million tons. This is high - quality oil, almost sulphur-free. Today the Baltic oil accounts for about half of Poland's oil production.

Exploration and exploitation of oil and gas deposits in Poland requires a licence granted by the Ministry of Environment. Polskie Gornictwo Naftowe i Gazownictwo SA (Polish Oil and Gas Company) holds 97 licences for 51,500 km^2. These are the best-surveyed areas in the country. 120 licences have been granted to foreign oil prospectors. Most of them (59 licence blocks) are held by companies co-established by Apache Corporation and FX Energy. Wielkopolska Energia SA, whose shareholders are El Paso Energy and Texaco, has 16 licences. Other licence holders include CalEnergy Gas Polska and RWE - DEA Polska Oil. Most active in the field of hydrocarbons exploration in Poland are the Americans. Apache Poland holds more licences than any other foreign prospector and has the largest seismic base. Its first success was the finding in 2000 of the Wilga natural gas deposit in central Poland, estimated at 1 bcm. (Polska 2008)

Metals, non-metals and rocks

The biggest resources of metals in Poland are those of copper, zinc and lead. Poland is one of the world's leading producers of copper.

Copper is extracted from sulphide ores found in Zechstein deposits, Europe's biggest and some of the biggest in the world. The deposits are located in two Lower Silesia geological units: the North Sudetian Basin (Niecka Polnocnosudecka) and the Sudetian Monocline (Monoklina Przedsudecka). The latter also contains many other metals including silver, gold, lead, selenium and nickel, all of which are mined.

The resources are estimated at 2,5 billion tons of ore, including 49 million tons of metallic copper. In 1998 the resources grew by 14% when the Glogow Gleboki deposit, situated at more than 1400m underground, was discovered. The resources of the already exploited deposits - Lubin, Polkowice, Rudna and Sieroszowice - are 1,5 billion tons of ore, including some 30 million tons of metallic copper.

Copper ore is mined only in the Legnica-Glogow Copper District by KGHM Polska Miedz SA, Poland's sole producer of copper from primary materials. In 2000, 27 million tons of ore were mined there, yielding about 480.000 tons of copper.

Zinc - lead ores are located in Malopolska, near Olkusz - one of the country's oldest mining centres, which developed by exploiting its lead and silver deposits until the 16th century when it began to decline - as well as near Boleslaw and Chrzanow.

Poland also has immense deposits of sulphur and is one of the biggest exporters of it. The deposits located in three areas of the Carpathian Depression - Staszow, Tarnobrzeg and Lubaczow - are among the richest in the world (504 million tons). Over the last few years sulphur production has dropped significantly and in 2000 it was 1,4 million tons, of which over 50% was exported. This reduction has been largely due to environmental considerations as it was necessary to remove sulphur from oil, natural gas and smelter gases produced by sulphur works.

All over the country there are also a variety of valuable rocks used for producing construction materials. The richest deposits are located in Upper and Lower Silesia, on the outskirts of the Swietokrzyskie Mountains and in the Lublin Upland. The most important for the economy are carbonate rocks: limestone, marl, dolomites and natural aggregate, used for road-building. (Polska 2008)

Renewable resources

One treasure of Poland that until recently was used little or not at all is geothermal waters, their resources ranking among the richest in Europe. They are to be found at one-third of the country's area and are equivalent to some 3,5 billion tons of oil. This is sufficient for heating the houses of about 30 million people.

At the moment Poland has a few large geothermal plants. The first one was opened in Pyrzyce near Szczecin in 1997. Hot water (64ºC) rises from a depth of 1700m. The biggest geothermal project currently underway in Poland is a chain of thermal plants in the Podhale region like the one already built in Banska Wyzna. Water at over 90ºC is taken through four wells from a depth of about 3000m. At the moment three Podhale towns use the geothermal energy, including Zakopane (since 2001). By 2005 all of Podhale will be heated in this way.

Poland is not a major player in hydropower engineering but it has an over century - long tradition in this field and excellent natural conditions to utilize the energy of flowing water. In the 20th century about 500 large and medium power plants were built, as were numerous waterwheels that drive mills, sawmills and fulling mills. After 1945 the priority was large coal power plants, and hydroelectric plants were neglected. Today much effort is made to increase the amount of hydroenergy produced in Poland. The rivers with the greatest potential are the Vistula (80%) and the Odra (10%). Now a mere 15% of their energy is used. Altogether, there are 128 large water power plants and about 360 small plants in the country. Almost one-third of Poland's territory is conducive for building wind power plants. The best area is the coastal belt from Swinoujscie to Gdansk, notably aroud the Rozewie Cape, followed by the Suwalki region, south-west Poland, parts of Wielkopolska and almost the entire Mazovia.

Currently Poland has about a dozen of modern wind power plants with a capacity of about 2.5 MW each plus a few tens of smaller plants. The electric energy produced by wind power plants is estimated to account for some 0.002% of the country's total production. Optimistic assumptions hold that by 2030 wind power plants will have 6000-9000 MW of installed power, producing 10 TW of energy a year.

8.2.4. Wisla and Odra rivers – The biggest in Poland, two of the biggests in Europe.

Name:	***Vistula, Wisla, Weichsel***
Lenght (km):	***1064***
Discharge (m^3/s):	***1100***
Countries:	***5***
Sea at mouth:	***Baltic***
Ramsar sites:	***4***

Table 7. Basic informations about Vistula river,
UNEP 2008.


Map 11. Vistula's localization in Europe, UNEP 2008.

Flowing eastward and then northward from the Carpathian Mountains of southern Poland to its delta near Gdansk on the Baltic Sea, the Vistula River forms a giant letter S. With its branches, including the Bug, Wieprz, San, Narew, Nida, Pilica, Brda, and Wierzyca rivers, the Vistula drains a basin of about 194 000 km^2.

The middle and lower sections of this river are considered to be one of Europe's most exceptional areas of natural and landscape value, with meanders, ox - bows, steep banks and sand islands. These habitats and features help to explain why 76% of the breeding bird species of Poland occur here, including many species that are threatened in Europe. The Vistula also has a particular cultural prominence. It is the "spiritual monument" of Poland, known by many as the" Queen".

Map 12. Vistula's way in Poland,

UNEP 2008.

The existing deterioration of this Polish river's natural functioning would be accelerated by a plan to build new dams on the river's lower reaches. In addition to altering natural physical and hydrological characteristics, the creation of more reservoirs would generate greater problems of sediment, nutrient, and toxic accumulation and have serious negative impacts on fisheries.

Municipal wastewater is a major problem in the Vistula River basin. The main cities are Warsaw (about 1 500 000 inhabitants), Bydgoszcz, Torun, Wloclawek, Lublin, Krakow and the Katowice region. In the early 1990s, municipal systems in Poland discharged about 900 000 million m^3 of untreated sewage, while about 1 400 000 m^3 were treated mechanically and/or biologically with an average treatment efficiency. The share of industrial wastewater in total discharges to municipal sewage systems is on the order of 27%. In Ukraine, the city of Lvov is a major industrial center and sewage disposal for its 800 000 inhabitants is unsatisfactory. Similar concerns may be raised for the city of Brest, one of the principal industrial centers of Belarus. In both cities, lack of pretreatment of industrial wastes discharged to municipal sewage systems is a serious problem. Disposal of municipal sludge is one of the major environmental problems in the Vistula catchment area.

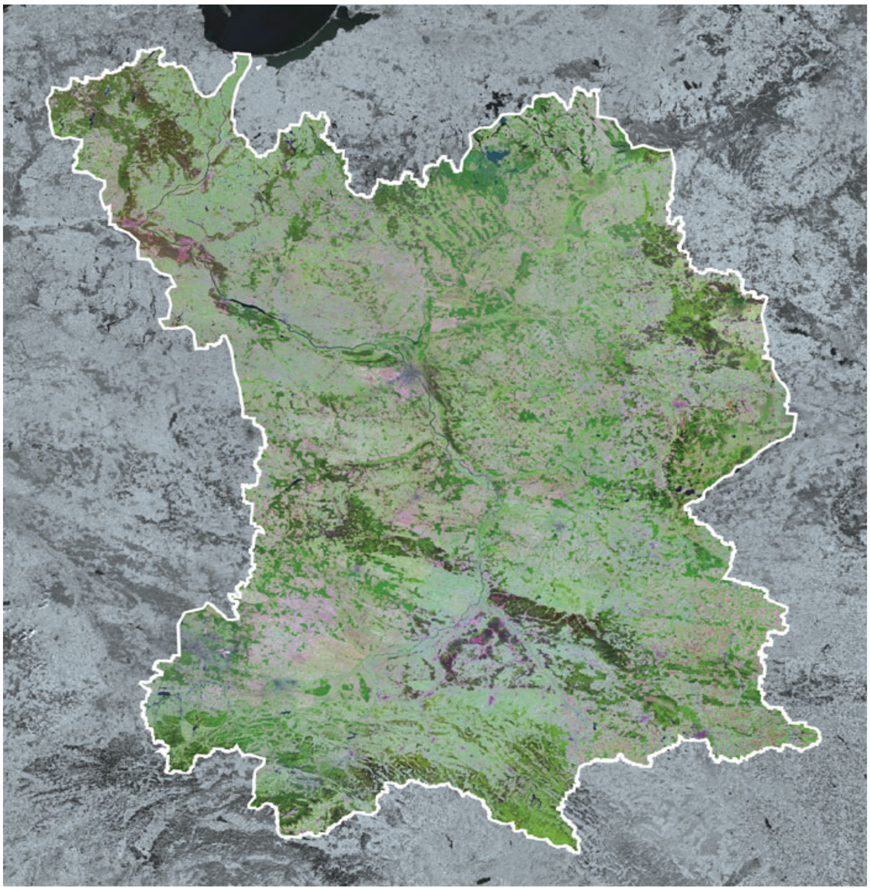


Figure 29. Satellite shot of Vistula's area,
UNEP 2008.

The most critical pollutants entering the Vistula River are: nutrients, phenols, heavy metals (Cd, Pb, Zn, Hg, Cu, As, Cr, Ni), plankton, organic and sediments. The Vistula river, together with the Oder river, is also the main deliverer of pollutants to the Baltic Sea (90%). (UNEP 2008)

Name:	***German Oder, Czech and Polish Odra***
Lenght (km):	***906***
Discharge (m^3/s):	***540***
Countries:	***3***
Sea at mouth:	***Baltic***
Ramsar sites:	***4***
Drainage area (km^2)	***125000***

Table 8. Main informations about Orda river,
UNEP 2008.

Map 13. Odra's localization in Europe, UNEP 2008.

The second longest river in Poland, the Oder River flows northward from the Oder Mountains of the Czech Republic to form, with the Neisse River, the border between Poland and Germany. It is an economically important transport route, navigable for more than 700 km of its all 903 km length, and connected by canal with the Vistula River and with western European waterways. Most of the river basin is densely populated lowland less than 200 m above sea level. The Oder valley, with its old riverbeds, floodplain forests and wet meadows, constitutes one of the most vital ecological corridors in Central Europe.

Known for catastrophic floods in 1997, the Oder River and its tributaries have valuable natural floodplains that are of great importance for effective flood prevention. However, lack of traditional ecological methods of flood prevention is one of the most important problems hindering the realisation of effective and permanent flood control in Poland. An effective, cheap and longlasting flood prevention method along the Oder is the restoration of the natural floodplain areas, including the forested areas. The Oder estuary at the German/Polish border is charcterized by various water quality problems. Due to the heavy nutrient load, the Oder river is one of the most important sources of eutrophication and pollution in the southwestern part of the Baltic Sea. (UNEP 2008)

NOTE:

"The International Commission on the Protection of the Oder against Pollution (ICPOAP) is one of thirteen international commissions for the protection of rivers, lakes and seas whose catchment areas fall within the territories of more than one country. The ICPOAP was established on the basis of a Convention signed by the Governments of the Republic of Poland, the Czech Republic and the Federal Republic of Germany and by the European Community.

In May 2002 ICPO received the mandate to coordinate the implementation of the EU Water Framework Directive within the international Oder River basin." (UNEP 2008)

Map 14. Odra's way in Poland,

UNEP 2008.

1997 Flood

"As a result of extreme rain during July 1997, Poland was affected by a devastating flood, the worst in the past 200 years. Areas in seven voivodships in the upper and middle Oder river basin and upper Vistula river basin were flooded over more than 25% of their territory, causing flood damage of approximately 3 billion US dollars." (UNEP 2008)

8.3. Conclusion.

Above paragraph shows some information about Poland – country in the central Europe, the neighbour of Germany. First of all, we can read about long road to join the European Community, after Polish hard history under about fifty years under Soviet occupation. Now, when Poland is in "Europe" it is under new law, including the environmental law, with new policies, standards and restrictions – the same for other European countries. This new policies should make the environmental situation better and keep water resources on the high level.

Next points shows some basic data about Polish geography – with the information in tables, to give a clean view and to make it easy to compare; environmental situation and natural resources, which is important to place this country in its water situation. Additionally we can read something about Polish climate – characteristic for this part of Europe. With this, it is not very hard to compare Poland to Germany, while both of the countries are very close to themselves, so the environment should be also similar. To check it, it is necessary to give some data about environment, like Polish rivers water resources, which is the topic of the next point.

In this point, I put also information about structure of Polish Government (with names of most important people in Poland – The President and Prime Minister). I've made it also to get a chance to compare it with German political structure, which should be not much different, if both countries are making similar politics (environmental and others) under European law. In my opinion, the environmental politic structure should be similar and work with not much different rules, to take a control over all European environment.

In the end, (point 8.2.4.) I decided to show the two biggest rivers in Poland (the source of fresh water and also the renewable source of energy) with basic data and information about them, like localization in Poland, water resources, all information with maps, to show the conditions of the rivers in the Polish environment and to give a view of the river's net - the "legs" (small rivers flowing from them across the country).

9. Water in Poland.

9.1. Resources of water in Poland (by numbers) - Aquastat.

To find actual and detailed data about water resources, it is good to go to Aquastat page. There, we are able to find a lot of informations that are usefull while comparing, for example few countries in way of water usage in direct category. We can choose, in what issue we are interested in, and simply take a period, for example last 15 years. Below, there are current data taken from Aquastat in the table to show, how looks the water situation in Poland (2007).

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Total area [1000 ha]	**1992**	31.269	**1997**	31.269	**2002**	31.269	**2003**	31.269
Arable land [1000 ha]	**1992**	14.337	**1997**	14.006	**2002**	13.010	**2003**	12.587
Permanent crops [1000 ha]	**1992**	362	**1997**	315	**2002**	327	**2003**	314
Cultivated area (arable land + perm. crops) [1000 ha]	**1992**	14.699	**1997**	14.321	**2002**	13.337	**2003**	12.901
Total population [1000 inhab]	**1992**	38.352	**1997**	38.667	**2002**	38.622	**2005**	38.516
Rural population [1000 inhab]	**1992**	14.945	**1997**	14.905	**2002**	14.760	**2004**	14.677
Urban population [1000 inhab]	**1992**	23.407	**1997**	23.762	**2002**	23.862	**2004**	23.874
Population density [inhab/km^2]	**1992**	123	**1997**	124	**2002**	124	**2004**	123

Table 9. Data of population in Poland,
Aquastat 2008.

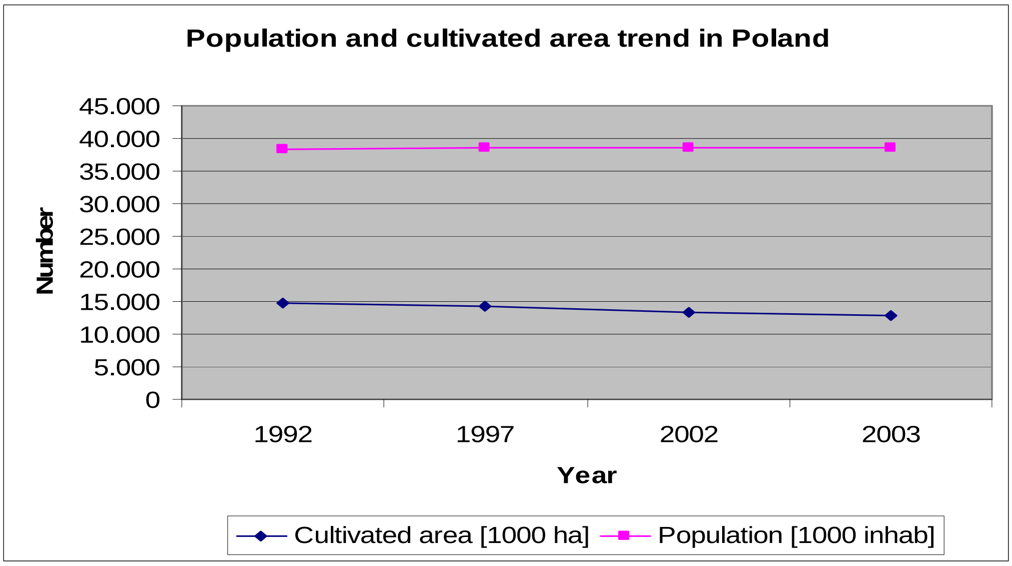


Figure 30. Diagramo of population and cultivated area trend in Poland,
Aquastat 2008.

From this diagram we can see, that the population of Poland didn't change much during over ten years, but some area of this country changed from arable, to urban. While the density is almost the same every time, cultivated area (arable + permanent crops) is smaller, and that means the citizens are moving from villages to the cities.

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Total economically active pop. in agriculture [1000 inhab]	**1992**	19.041	**1997**	19.685	**2002**	20.143	**2004**	20.369
Male economically active pop. in agriculture [1000 inhab]	**1992**	10.343	**1997**	10.600	**2002**	10.781	**2004**	10.891
Female economically active pop. in agriculture [1000 inhab]	**1992**	8.698	**1997**	9.086	**2002**	9.362	**2004**	9.478

Table 10. Data of active population in agriculture in Poland, Aquastat 2008.

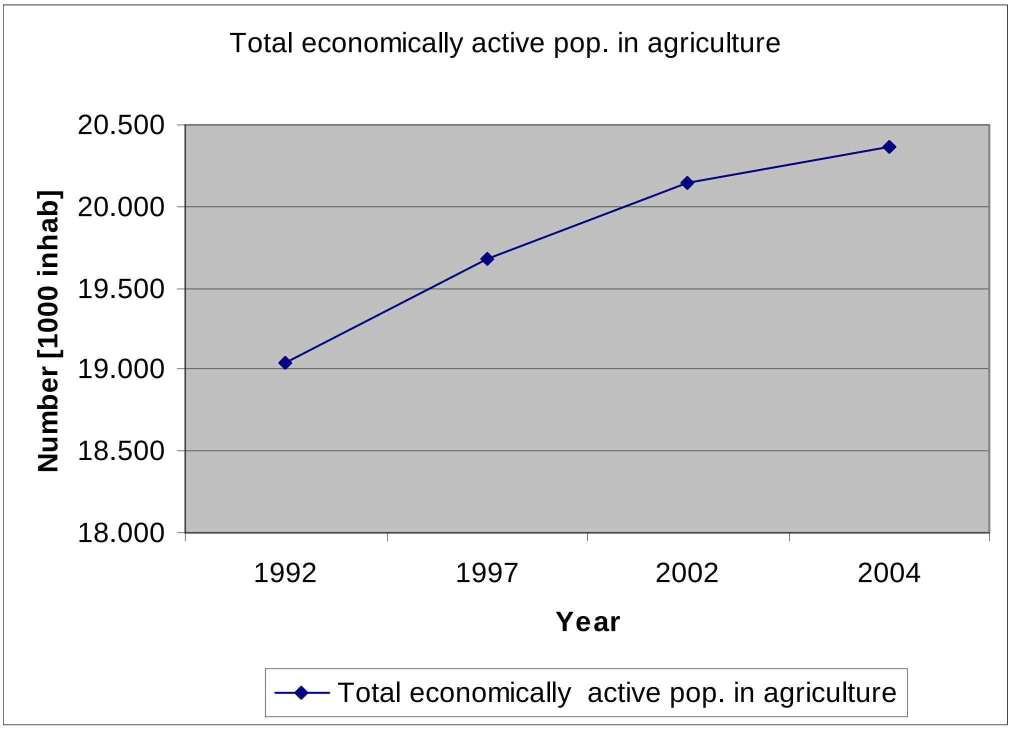


Figure 31. Diagram of total economically active population in agriculture, Aquastat 2008.

In agriculture we can see big changes, because also men and women are less active in this kind of work, and this is just a confirmation of conclusion from first table, that people rather want to move and live in urban area, so they are still leaving agricultural way of life.

During 12 years (1992 – 2004) we noticed a drop of about 20% of citizens, that moved to

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Average precipitation in depth [mm/year]	**1992**	600	**1997**	600	**2002**	600	**2007**	600
Average precipitation in volume [10^9 m^3/yr]	**1992**	188	**1997**	188	**2002**	188	**2007**	194
Surface water: produced internally [10^9 m^3/yr]	**1992**	53,1	**1997**	53,1	**2002**	53,1	**2007**	53,1
Groundwater: produced internally [10^9 m^3/yr]	**1992**	12,5	**1997**	12,5	**2002**	12,5	**2007**	12,5
Overlap between surface water and groundwater [10^9 m^3/year]	**1992**	12	**1997**	12	**2002**	12	**2007**	12

Table 11. Data of precipitation and surface/groundwater resources in Poland, Aquastat 2008.

urban area, giving with this also a drop of cultivated areas in Poland.

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Water resources: total internal renewable [10^9 m^3/yr]	**1992**	53,6	**1997**	53,6	**2002**	53,6	**2004**	53,6
Water resources: tot. internal renew. per capita [m^3/inhab/year]	**1992**	1.398	**1997**	1.386	**2002**	1.388	**2004**	1.392
Surface water: inflow not submitted to treaties [10^9 m^3/year]	**1992**	8	**1997**	8	**2002**	8	**2007**	8
Surface water: accounted inflow (actual) [10^9 m^3/year]	**1992**	8	**1997**	8	**2002**	8	**2007**	8
Surface water: total external renewable (actual) [10^9 m^3/year]	**1992**	8	**1997**	8	**2002**	8	**2007**	8
Water resources: total external renewable (actual) [10^9 m^3/year]	**1992**	8	**1997**	8	**2002**	8	**2007**	8
Surface water: total renewable (actual) [10^9 m^3/year]	**1992**	61,1	**1997**	61,1	**2002**	61,1	**2004**	61,1
Groundwater: total renewable (actual) [10^9 m^3/year]	**1992**	12,5	**1997**	12,5	**2002**	12,5	**2007**	12,5
Water resources: total renewable (actual) [10^9 m^3/year]	**1992**	61,6	**1997**	61,6	**2002**	61,6	**2004**	61,6
Water resources: tot. renew. per capita (actual) [m^3/inhab/year]	**1992**	1.606	**1997**	1.593	**2002**	1.595	**2004**	1.599
Dependency ratio [%]	**1992**	13	**1997**	13	**2002**	13	**2007**	13
Water resources: total exploitable [10^9 m^3/year]	**1992**	33	**1997**	33	**2002**	33	**2007**	33

Table 12. Data of water resources per capita in Poland, Aquastat 2008.

If we talk about water resources in Poland it's good to know, that it didn't change during the years. Using data from Aquastat we can see, that the only category with a very small drop is "total renewable water resources per capita" but the reason is that population is changing a little bit during the decades, and this is not a consequence of loosing total renewable water resources. For sure it is a good information, because it gives a view on water situation in

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Agricultural water withdrawal [10^9 m^3/year]					**2000**	1,35		
Domestic water withdrawal [10^9 m^3/year]					**2000**	2,10		
Industrial water withdrawal [10^9 m^3/year]					**2000**	12,8		
Total water withdrawal (summed by sector) [10^9 m^3/year]					**2000**	16,2		
Agricultural water withdrawal as part of total [%]					**2000**	8,33		
Domestic water withdrawal as part of total [%]					**2000**	13,0		
Industrial water withdrawal as part of total [%]					**2000**	78,7		
Total water withdrawal: per capita [m^3/inhab/year]					**2000**	419		
Desalinated water produced [10^9 m^3/year]	**1990**	0,007						
Agr. water withdrawal as % of total renewable water resources [%]					**2000**	2,19		

Table 13. Water withdrawal in Poland, Aquastat 2008.

Poland, which even if it's not very well because of not big resources – it's stable.

We don't have data for each year, so it is hard to compare and give a trend of changing in cathegory of water withdrawal, but the information we can read from the table is that the biggest part of total water withdrawal is taken by the industrial arm (78,7%). It is worth to notice, that in small part Poland is using its access to the Sea, realizing the process of water desalination, but the last data we have is from 1990.

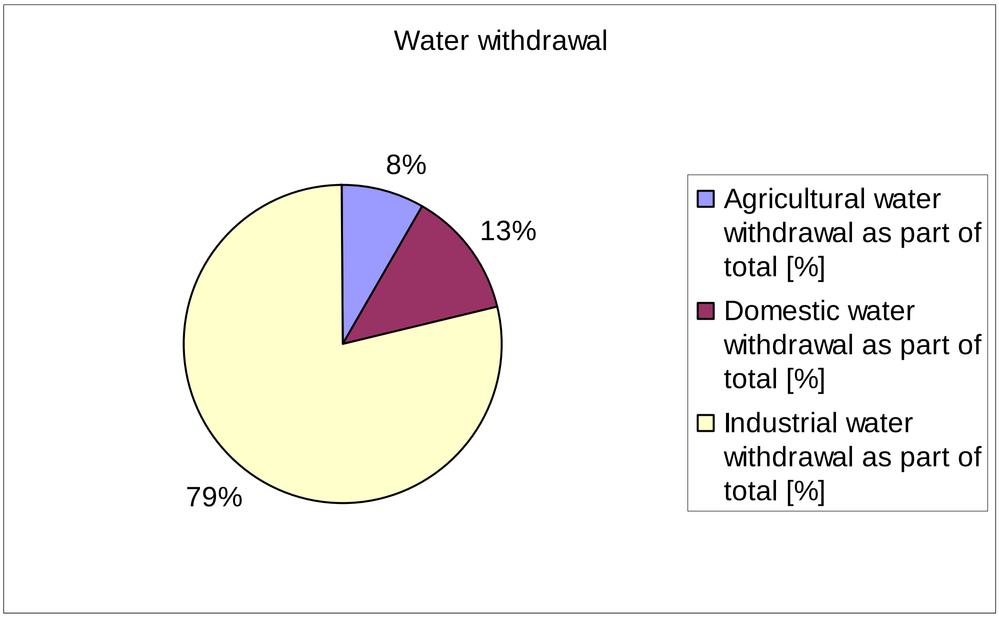


Figure 32. Diagram of water withdrawal in main sectors,
Aquastat 2008.

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Area equipped for irrigation: full control localized irrigation [1000 ha]	**1991**	4						
Area equipped for irrigation: full control - total [1000 ha]							**2005**	124
Area equipped for irrigation: equipped lowland areas [1000 ha]							**2005**	0
Area equipped for irrigation: spate irrigation [1000 ha]							**2005**	0
Area equipped for irrigation: total [1000 ha]	**1990**	100	**1995**	100	**2000**	100	**2004**	124
Flood recession cropping area non-equipped [1000 ha]					**1998**	0	**2005**	0
Cultivated wetlands and inland valley bottoms non-equipped [1000 ha]					**1998**	0	**2005**	0
Agricultural water managed area: total [1000 ha]	**1990**	100			**2002**	100	**2004**	124
Area equipped for irrigation as % of agricultural water managed area [%]	**1990**	100			**2002**	100	**2004**	100
Area equipped for irrigation: actually irrigated [1000 ha]							**2005**	70,4
Part of area equipped for irrigation actually irrigated [%]							**2004**	56,7
Area equipped for irrigation as % of cultivated land [%]	**1992**	0,68	**1997**	0,698	**2002**	0,75	**2004**	0,963

Table 14. Data of irrigation areas,
Aquastat 2007.

9.2. Polish law. Structure of Legislative and Executive bodies.

To understand the environmental law structure in Poland it is necessary to give the most important informations about that how works the **Legislative** and **Executive** Authority in Poland.

These days, the Polish Parliament consists of two legislative bodies. The lower house is called Sejm, and Senate is the upper house. 460 elected deputies sit in Sejm, and 100 senators in the Senate. Candidates standing for Sejm must be citizens of Poland, enjoying full public rights and aged at least 21 on the day of the election. Candidates to the Senate must be 30 years old.

Deputies (Members of Sejm) are returned for the electoral constituency where they won their mandate. Most constituency borders coincide with those of one or several gminas. In large cities constituencies may be smaller in area. During a parliamentary vote, neither members of Sejm nor senators are bound in any way by the instructions of their electorate, but do have the constitutional obligation to be guided by the well-being of the entire Republic. The Polish political system is based on a party system. In the parliamentary, presidential, and local elections candidates supported by significant political parties stand a better chance of success. Parliamentarians belonging to the same political group create their parliamentary "clubs" within the Sejm and Senate. In practice most of the bills and legislative amendments are brought to the House through the parliamentary clubs. Parliamentary deputies participate in Sejm sessions and have the right to question members of the Council of Ministers; they work in numerous, permanent or special, committees attached to Sejm or Senate, and established to review various issues related to state administration and public life. (Poland 2008)

The following permanent committees operate within the Sejm of the Republic of Poland:

Figure 33. 25 elements, as a structure of committees which operate within Sejm, Poland 2008.

The main executive body in the Republic of Poland is The Council of Ministers (cabinet), or Polish government, consists of ministers, heads of departments of ministerial rank, and heads of central institutions. The Council of Ministers is the body which exercises executive power. Under the Public Administration Branches Act the Prime Minister, who heads the Council of Ministers, enjoys a considerable degree of freedom in decisions concerning its personnel. The Prime Minister may create, combine, or dissolve departments, change their area of responsibility, and even apply to the President to expand the Council of Ministers to include ministers without portfolio, or coordinators for projects performed by the Council of Ministers, e.g. reform of the educational system or health service.

The chairpersons of certain committees specified in the legislation (e.g. the European Integration Committee), may also be appointed to the Council of Ministers. The composition of the Council of Ministers is proposed by the Prime Minister, who lodges an application to the President of the Republic for the appoinment of cabinet members. The President appoints the

Council of Ministers and receives their oath "of loyalty to the Constitution and other laws of the Republic of Poland".

Currently, the Council of Ministers consists of the Prime Minister and 18 members, including the ***Minister of Environment*** in following order:

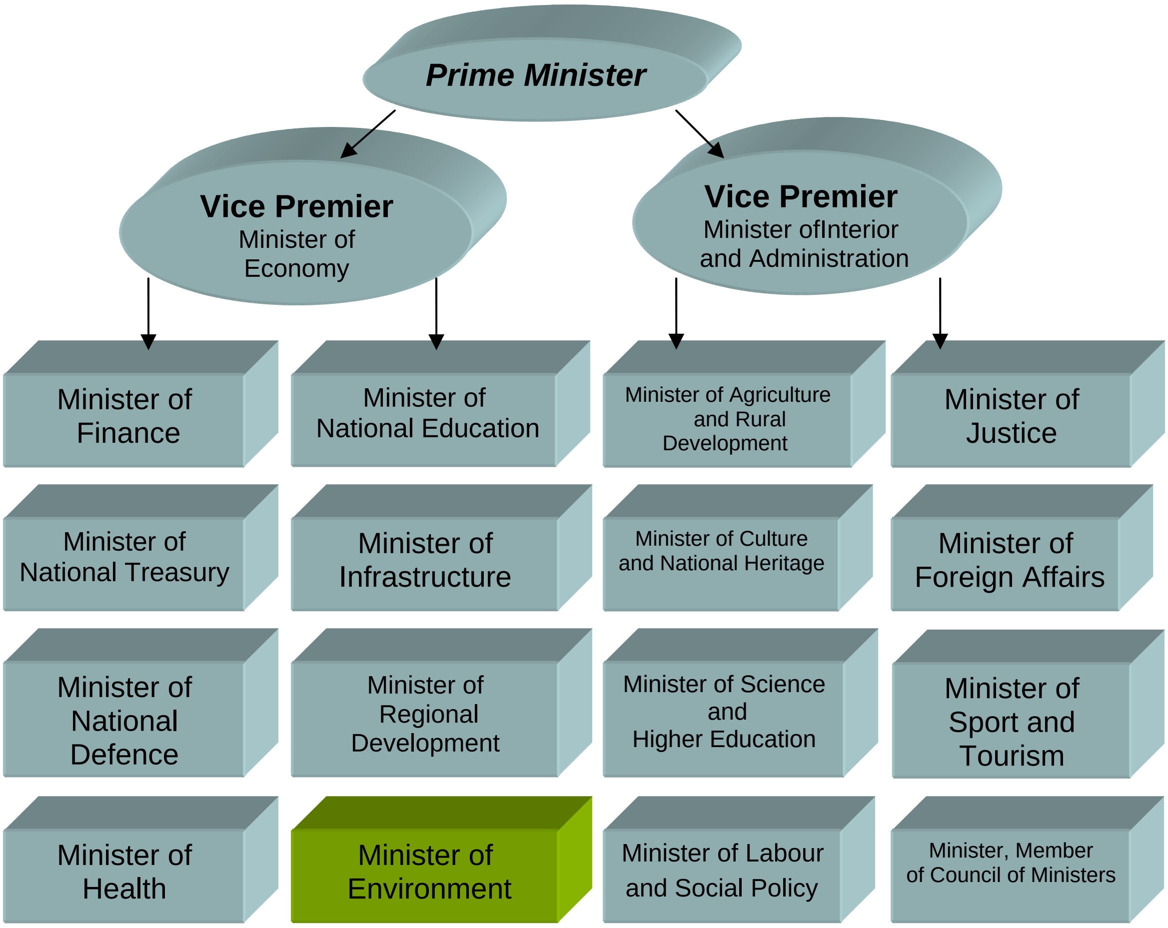


Figure 34. Council of Ministers,
Poland 2008.

The Council of Ministers also manages the current policy of state, ensures the execution of the law by issuing ordinances, coordinates and controls the work of government administrative bodies, ensures public order and the internal and external security of the state, protects the interests of the State Treasury, approves the draft of the budget, and supervises its execution. The Council of Ministers also signs international agreements which require ratification, and can revoke other international agreements.

Members of the Council of Ministers are jointly responsible to Sejm for the operation of the government; they can also be individually responsible for the tasks entrusted to them by the Prime Minister or falling within the authority of their ministries. Any breach of the law or crime related to the offices they hold carry the risk of trial before the State Tribunal, a special court appointed by Sejm, in which members of Sejm act as judges.

The Council of Ministers is represented in the different voivodeships of the country by its voivodes or regional governors. There are 16 of them - one for each voivodeship. The voivodes supervise the state administration within the territory of their voivodeship. The officials subordinate to the voivodes, as well as those working in the central offices and ministries, constitute the civil service corps, a politically independent body or administrators. The civil service corps is headed by the Prime Minister.
Alongside the civil service corps, the Chancellery of the Prime Minister and all ministries entail political cabinets - teams of advisors working for the government and each ministry on detailed policy guidelines. (Poland 2008)

9.2.1 Ministries connected with environment (water), areas of their work.

The main ministry that is connected directly with environment is, as it was marked at diagrams – ***Ministry of Environment***. This sector cares about all environmental issues, not only about water, but also forestry, climate changes, economy, ***partnership with neighbours*** (foreign affairs). Present days, we can give following facts about the Ministry of Enviroment:
Ministry *was established under relevant legal act - Regulation of the Council of Ministers of 26 October 1999 that entered into force on 10 November 1999 (Official Journal of 1999, No. 91, Item 1017)* (MOS 2008)

The most important people in the Ministry are:

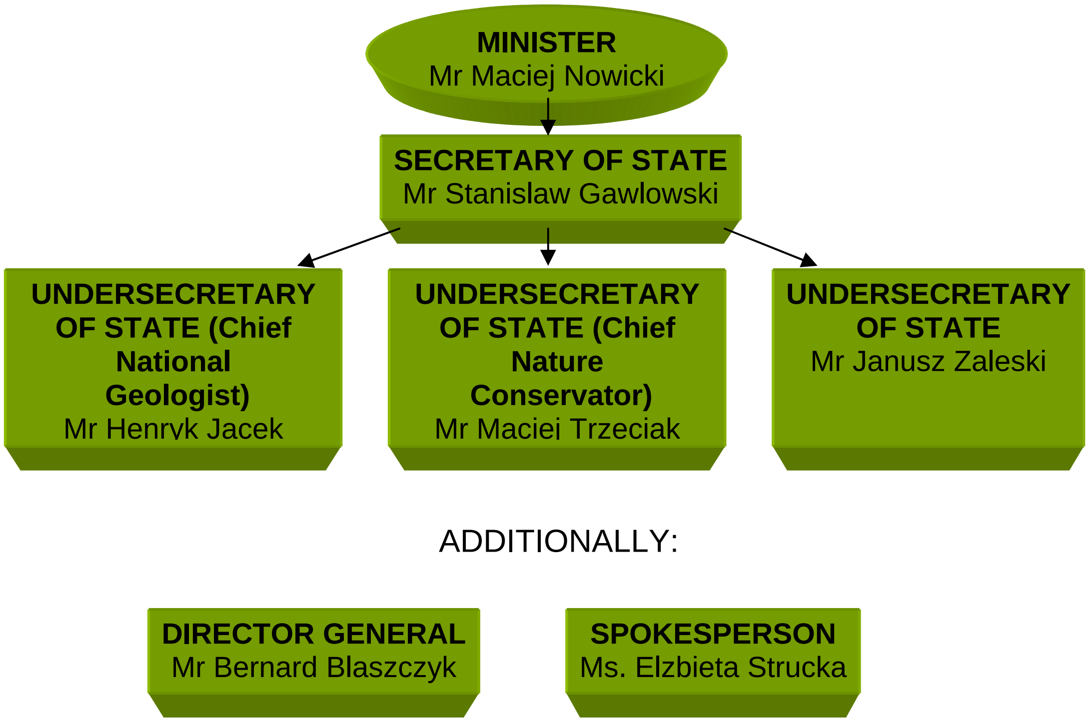


Figure 35. Personal structure of the Ministry of Environment in Republic of Poland, MOS 2008.

Under this personal structure there are several units, which are the part of whole Ministry of Environment. Some of them hold power directly on environment, for example waste management, and some of them take care about economy or financial instruments. Each of Unit has it's own chef or director.

- **The Minister's Political Office**
- **Department of Education and Public Relations**
- **Department of Economy**
- **Department of Geology and Geological Concessions**
- **Department of Waste Management**
- **Department of Financial Instruments**
- **Department of National Forms of Nature Conservation**
- **Department of Forestry**
- **Department of Natura 2000 Sites**
- **Department of Environmental Impact Assessment**
- **Department of Law**
- **Department of Infrastructure and Environment Operational Programme**
- **Department of Climate Change and Sustainable Development**
- **The Minister's Secretariat**
- **Director's General Secretariat**
- **Bureau of International Cooperation**
- **Bureau of Inspection and Internal Audit**
- **Bureau of Defence Affairs and the Protection of Confidential Information**

Figure 36. Principal Organisational Units of the Ministry,
MOS 2008.

Beside this units, in the structure of Ministry of Environment there are advisory and opinion - pronouncing bodies, whose tasks are:

THE AWARDING COMMISSION FOR THE OUTSTANDING SCIENTIFIC AND RESEARCH ACHIEVEMENTS IN THE FIELD OF ENVIRONMENTAL PROTECTION AND DEVELOPMENT AND THE USE OF ENVIRONMENTAL RESOURCES

The Commission's responsibility scope is to:

- consider the applications for granting the Minister's Awards;

- assess the works nominated to granting the Minister's Awards;

- prepare the draft proposed list of the works to be distinguished with the Minister's Awards. (MOS 2008)

THE COMMISSION FOR CARTOGRAPHIC

The Commission is concerned with investigation and appraisal of and pronouncing opinions on draft design documentation, i.e. programmes and annexes for both geological survey and original cartographic elaborates like:

- Detailed Geological Map of Poland, scale 1:50 000

- Economic-Geological Map of Poland, scale 1:50 000

- Geoenvironmental Map of Poland, scale 1: 50 000

- Hydro-Geological Map of Poland, scale 1:50 000

- other maps, according to current needs (MOS 2008)

THE COMMISSION FOR GEOLOGICAL-ENGINEERING DOCUMENTATION

The Commission is concerned with the assessment of geological documentation and elaborates in relation to the correctness of the determination of geological and engineering conditions for building and construction purpose. (MOS 2008)

THE COMMISSION FOR HYDRO-GEOLOGICAL DOCUMENTATION

The Commission is concerned with the following activity scope:

a) Assess geological projects and documentation relating to subterranean waters, in particular:

- regional hydro-geological surveys;
- evaluation of saline, thermal and healing water resources with the aim to abstraction thereof;
- hydro-geological conditions for the establishment of protective zones of subterranean water reservoirs;
- hydro-geological conditions relating to extraction of the basic fossil minerals from their deposits and to forcing water into the rock mass
- hydro-geological conditions relating to storage or deposition of substances or waste within the rock mass;
- hydro-geological conditions relating to extraction of fossil minerals within marine areas in the territory of the Republic of Poland;

- hydro-geological conditions relating to design of the dewatering facilities destined for extraction of fossil minerals from their deposits;
- monitoring of subterranean waters.

b) Assess the substantive scope of geological works which are envisaged to be carried out, as requested by the Minister.

c) Assess the other hydro-geological elaborates which have been forwarded to the Commission by the Ministerial Department of Geology and Geological Concessions.(MOS 2008)

THE COMMISSION FOR MINERAL RESOURCES

Detailed responsibility scope of the Commission includes:

- assess the documentation on fossil mineral resource deposits in terms of the correctness of these resources prospecting;

- assess the other geological documentation and elaborates;

- analyse the methods for conduct of geological works for documentation purpose, and make opinions on draft legal regulations concerning both the design of geological works and the fossil mineral resource prospecting. (MOS 2008)

THE COMMISSION ON GENETICALLY MODIFIED ORGANISMS

The Commission's responsibility scope includes:

- Making comments on the applications concerning the granting of the consents to perform activity in relation to GMO,

- Making opinions on the cases presented by the Minister in the field of its powers resulting from the Act,

- Making opinions on the draft legal acts relating to GMO and biological safety,

- Making opinions on the draft assumptions concerning the National Policy in the field of application of GMO and biological safety. (MOS 2008)

THE FORESTRY COUNCIL

THE NATIONAL COMMISSION FOR ENVIRONMENTAL IMPACT ASSESSMENT

Some of the taskas are:

1. Provision of advice on the matters which fall in competence of Minister of the Environment that relate to both the investment process and the environmental impact assessment system.

2. Participation to the implementation process in Poland of the application of the best available techniques.

3. Make comments on the draft legal acts concerning environmental impact assessment system.

4. Cooperate with the Voivodship Commissions on Environmental Impact Assessment.

5. Publish information on the Commission's own activities and the materials promoting environmental impact assessment methodology. (MOS 2008)

THE STATE COUNCIL FOR ENVIRONMENTAL PROTECTION

The Commission's responsibility scope includes:

- pronounce opinions on the policy directions in the field of environmental protection and the national policy for sustainable development,

- presenting proposals for activities to provide for establishment of the conditions for the protection of the environment and the improvement of the state thereof,

- pronounce opinions on legal acts in the field of broadly understood environmental protection,

- pronounce opinions in relation to Poland's accession and participation to the European Union,

- initiate and analyse of and pronounce opinions on scientific and research programmes in the field of ecology, environmental protection and sustainable development,

- pronounce opinions on the other cases as requested by the Minister of the Environment;

- co-operate with other advisory and opinion pronouncing bodies assigned to the Minister of the Environment. (MOS 2008)

THE STATE COUNCIL FOR NATURE CONSERVATION

The tasks of the State Council for Nature Conservation are, particularly, as follows:

- to evaluate the state of nature conservation and of the utilisation of protected areas for research purposes;

- to give opinions on drafts of legal acts relating to nature conservation;

- to submit proposals and opinions regarding to nature conservation;

- to give opinions on research programmes in the scope of nature conservation and to popularize of nature conservation;

- to give opinions both on an appointment and on removal of a Managing Director of a National Park;

- to give opinions both on an appointment and on removal of the Head of the Board of National Parks;

- to give opinions on applications for permits for introduction into the wild or movement of the animals or plants which are alien to the indigenous Fauna or;

- to give opinions on applications for permits for introduction into waters of the fish species which do not occur in; (MOS 2008)

THE STATE COUNCIL FOR WATER MANAGEMENT

9.2.2 Structure and areas of work of environmental (water) departments in Poland, connected with Ministry of Environment.

In the Ministry of Environment there are two main supervised bodies:

National Directorate of Water Management (KZGW);

Figure 37. Supervised unit,
MOS 2008.

The chief of the first institution is called **President of National Water Management Authority**, and his duties are:

The President of the National Water Management Authority is a central administrative body responsible for water conservation, and especially for water management and water. The President of the National Water Management Authority is selected on a competitive basis. He is appointed and dismissed by the Prime Minister upon the motion of a competent minister for water management. The term of office of the President of the National Water Management Authority is 5 years counting form the day of his appointment. The President of the National Water Management Authority remains in office until the day on which his successor has been. The deputies of the President of the National Water Management Authority are appointed and dismissed by the competent minister for water management upon the motion of the President of the National Board for Water Management. The performance of the President of the National Water Management Authority is supervised by the competent minister for water management. Ministerial supervision of the President's performance includes in particular: (MOS 2008)

- ***approving the implementation programmes for the tasks related to investments in water and water equipment conservation,***

- ***approving annual task completion reports,***

- ***a control plan of water management to be performed by the President.***

- ***ordering checks which are not included in the control plan.*** (MOS 2008)

As specified in articles the responsibilities of the President of the National Water Management Authority include in particular:

- ***developing the national water and environmental programme,***

- ***preparing draft proposals of the river basin water management plans,***

- ***developing draft proposals of flood protection and drought prevention plans to be implemented on the national territory, including the division into river basin districts,***

- ***harmonizing the draft proposals of the conditions for the use of waters in the water region in question,***

- ***keeping water inventory of the national territory, including the division into river basin districts,***

- ***supervising the performance of Directors of the Regional Water Management Boards and in particular, controlling their activities, approving their activity plans and the relevant reports on implementation thereof as well as giving orders to carry out immediate checks of water management within selected river basin districts,***

- ***supervising the performance of the national hydrological and meteorological and hydrogeological services,***

- representing the State Treasury in water management issues in relation to the property owned by it, as specified in the Water Act,

- programming, planning and supervision of the implementation of tasks related to the conservation of water and water works and water management investments,

- harmonising the aspects of water management in the draft proposals of the priority programme lists under the National Fund for Environmental Protection and Water Management. (MOS 2008)

The President of the Regional Water Management Board executes ownership rights to public waters owned by the State Treasury, to waters important form the point of view of water resources management and flood protection and especially groundwater and land surface water:

- in mountain torrents and their sources,

- in natural water courses from the source to the estuary with the average flow rate based on long-term measurements higher or equal to 2,0 m3/s in estuary-cross-section,

- in lakes and artificial water reservoirs with water courses described in point b flowing through them,

- in border regions,

- in inland waterways (MOS 2008)

The budget share allocated to water management and managed by the President of the National Water Management Authority is used to finance:

- the activities of national hydrological and meteorological and hydrogeological services,

- maintenance, reconstruction, expansion and dismantling of the basic observation and measurement network of national hydrological and meteorological services as well as the system of data collection, processing and exchange,

- maintenance, reconstruction, expansion and dismantling of hydrogeological gauge instruments used by national hydrogeological services,

- the activities and development of methodology units,

- preparation of hydrological and meteorological as well as hydrogeological data and information

- preparation and publication of warnings, general forecasts as well as hydrological and meteorological reports and bulletins, and also hydrological, meteorological and hydrogeological yearbooks. (MOS 2008)

The President of the National Water Management Authority keeps the water inventory of the national territory which includes the division into basin districts and water.

The President of National Water Management Authority and the directors of regional boards for water management control the following areas of water management:

- implementation of water management plans and programmes prepared in compliance with the Act,

- water use,

- compliance with the decisions taken in compliance with the Act

- water and water works conservation,

- compliance with the responsibilities and restrictions imposed upon land owners,

- compliance with the requirements of the Act referring to protected zones and areas,

- compliance with the requirements relating to flood banks and the areas under direct risk of flooding,

- flood preparation and removal of flood damage related to the conservation of water and waterworks,

- installation and maintenance of fixed gauge instruments on the shores and in the water,

- any activities or works which are performed close to waterworks and which could be dangerous for such waterworks or damage them,

- removing water management related damage caused by mining-induced ground movement (MOS 2008)

After the completed checks, the President of the National Water Management Authority or a director of the regional board for water management can issue a post-check order or apply to the competent body to start administrative proceedings. The President of the National Water Management Authority or a director of the regional board can file an application to start official or other legal proceedings against the individuals or organizations that are guilty of irregularities and inform them about the result of the proceedings and measures taken by the established date. When performing checks, the President of the National Water Management Authority and a director of the regional board co-operate with other control bodies, public administration bodies, civil protection forces and public organizations.

The President of the National Water Management Authority is assisted by the National Water Management Authority created on July 18, 2001 and the Regulation of the Prime Minister dated June 27, 2006 concerning the charter of the National Water Management Authority.

National Water Management Authority started to operate on July 1, 2006. (MOS 2008)

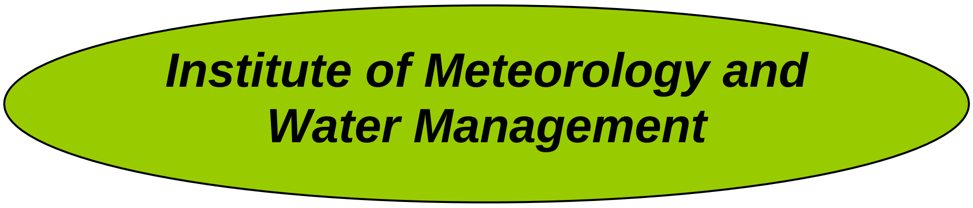


Figure 38. Supervised unit,
MOS 2008.

IMGW statutory tasks

The Institute of Meteorology and Water Management (IMGW) is a research-development unit created by the Council of Ministers on 30 December 1972 on merging the State Hydrological and Meteorological Institute with the Institute of Water Management. IMGW operates on the basis of the act dated 25 July 1985 concerning research-development units. The Institute is supervised by the Minister for Environment. (MOS 2008)

Subject and scope of activity

Basic statutory tasks of the Institute include scientific and development activities as well as state services in the following domains:

- meteorology
- hydrology
- oceanology
- water management and engineering
- water resources quality
- wastewater management
- sewage utilisation (MOS 2008)

Bodies of the Institute

- Director
- Scientific Council (MOS 2008)

ACTIVITIES:

IMGW general tasks are:

- Carrying out scientific-research works in the fields connected with the Institute's mandate.
- Making regular measurements and observations with the use of basic systems and measurement networks.
- Acquisition, archiving, processing and making available measurement and observational materials, both national and international ones.
- Preparation and dissemination of forecasts and warnings for general public and national economy protection as well as for state defence.
- Forecasting of water resources quality and air pollution.
- Elaboration of dams technical state and safety estimates.
- Issue of opinions and expertises in domains being the responsibility of the Institute.
- construction, research, manufacturing, checking and legalisation of instruments and equipment.
- Standardisation and unification activities falling within the responsibility of the Institute.
- Participation in the activities of the World Meteorological Organization and other specialised UN agencies, co-operation with other organizations, national and international institutions. (MOS 2008)

Technical Infrastructure:

The State Hydrological and Meteorological Service (PSHM) carried out by the IMGW provides continuously the state authorities, general public and national economy with current information on the state of the atmosphere and hydrosphere, forecasts and warnings both in normal as well as in emergency situations. (MOS 2008)

Meteorology:

IMGW activities in meteorology cover:

- Provision of meteorological products to public sector services and business sector.
- Regular meteorological measurements and observations carrying out.
- acquisition, archiving, processing and making available measurement and observational materials, both national as well as international ones.
- Development and exploitation of meteorological mathematical models.
- Scientific - development works in meteorology. (MOS 2008)

Hydrology:

IMGW activities in hydrology cover:

- Regular hydrological measurements and observations.
- Acquisition, archiving, processing and making available hydrological measurement and observational materials.
- Development and exploitation of hydrological mathematical models.
- Scientific-development works conducted in hydrology. (MOS 2008)

9.2.3 Changes caused by joining the European Community.

According to the Regional Environmental Center, we can notice that the Water Act of 1974 is the basic act on water protection and water management. Although the legislation is old even as is, its predecessors were approved in 1961 and 1922. Now pending in parliament is a draft of a new water act. There are many common features between Polish law and the Directives of the EU, but there are also sharp differences resulting from complicated problems rooted in the water resources economy. It will take many attempts to fully harmonize this body of law. (REC 2000)

Council Directive - Surface water for drinking

The law establishes three classes of water. Water of the first class of purity should be of drinking water quality and is to be used for the water supply of the population and for the water supply of industrial enterprises which need water of potable quality. Water of this class also ought to be suitable for salmon. The second class of water is to be used for stock-breeding, for public baths, and fit for fish other than salmons. Water belonging to the third class of purity must be fit for industrial needs and for the irrigation of agricultural land. The Executive Order regulated also the quality standards for each class of water. There are 57 standards. These standards are identical or very similar to those comprised in given directive. This legislation ought to create the starting point for the regulation of water use, especially for sewage disposal. Water use ought to be so arranged that the quality of water will be not changed. But this was only an idea. In practice, there was a significant deterioration of a quality of water. So not only the first class of water, but also the second is used to produce water for public consumption. Notwithstanding, water for public consumption must fulfill the legal requirements put down in Executive Order of Minister for Health and Social Services of 31.05.1977. As of now, there is no program concerning water improvement. (REC 2000)

Council Directive - Quality of bathing water

There is no legal regulation on the quality of bathing water. In the draft water act now pending in Parliament there is a provision which allows the MEP to introduce the protection of bathing water in the form of an executive order. (REC 2000)

Council Directive - Dangerous substance discharges

Discharges of dangerous substances are regulated in the Executive Order of MEN of 5.11.1991 which regulates in detail the condition of sewage introduced to surface inland waters and sea, water, and includes a general prohibition. The whole concept is based on a set of physical, chemical and biological parameters (effluent standards). There are 47 such parameters divided into five groups (basic, eutrophic, inorganic, dangerous inorganic, and dangerous organic). The parameters are the same or nearly the same as those comprised in Council Directive. Sewage may be discharged into water, provided it does not exceed the effluent standards. The Executive Order prohibits the introduction of any sewage into:

- underground water,
- inland surface waters and soil, if it has an adverse effect on the protection zone of a water source or a water intake,
- inland surface waters within one kilometer from bathing areas,
- lakes without outflows,
- lakes and their tributaries up to three kilometers from their mouths, if sewage has not yet been discharged there,
- soil in areas where groundwater lies under a small, porous layer of deposit.

The regional governor can set up limits higher than in the Executive Order for parameters not belonging to the groups termed dangerous organic and dangerous inorganic.

Authorization must be acquired for discharges into water of all substances whose parameters have been set up in the Executive Order. (REC 2000)

Council Directive - Protection of groundwater against pollution

There is no comprehensive legislation concerning the protection of groundwater. But there are some regulations of this problem. There is a prohibition against the introduction of sewage directly to groundwater. So, it may be stated that the direct discharge of any substance is forbidden. The problem of indirect discharges is not at all regulated. Indirect discharges are treated as discharges into surface water and are limited in the same way.

Proposal for a Council Directive - Ecological quality of water

There is no framework legislation intended to establish the ecological quality of all surface waters. (REC 2000)

WATER			
Criteria	**Score**	**Weight**	**Level of compliance**
1. Does water protection cover the water discharges?	1	0,17	0,1667
2. Are there specific water quality requirements for different water uses, like drinking or bathing water?	0,67	0,17	0,1111
3. Are there regulations for protection of groundwater against pollution?	0,67	0,17	0,1111
4. Are water quality requirements for the general ecological quality of water reflected in national legislation?	0,33	0,17	0,0556
5. Are water quality standards laid down?	1	0,17	0,1667
6. Is a monitoring system set up for water quality control?	1	0,17	0,1667
TOTAL			0,78

Table 15. Assessment of the Compliance Level of EU Environmental Legislation in Poland, REC 2000.

9.3. Conclusion.

"At first, it must be must acknowledged that two pieces of framework legislation which are bound to have the deepest influence on the whole body of environmental law have not yet been enacted. These are the Water Act and Environmental Protection Act. The draft of the first act (Water Act) is now in parliament after five years of preparatory work and the second is only in the (unofficial) preparation stage. The draft of act on waste is now in the last stage of legislative proceedings in the government, not yet submitted to parliament. The changes of environmental law which occurred in Poland in the last five years were connected primarily with the new Nature Conservation Act. Also amended were some of the laws regulating nature management. The last such change will be to the Hunting Act. There were also changes to those acts which regulated procedural and organizational matters. There are four such acts: the Building Act of 1994, the Physical Management Act of 1994, the Standardization Act of 1993, and the Certification Act of 1993. The importance of the State Inspectorate of Environmental Protection of 1991 must also be stressed here. The last change is to the Act related to the Plant Protection Agents of 1995.

It may be said that only one act was tailored specifically to environmental protection the Nature Conservation Act. The remaining acts, though important for environment protection, have rather peripheral meaning for the whole body of law and have not determined the evolution of environmental law. So Polish environmental law was created at a time when approximation with the environmental law of the European Union was not a priority task.

Although Polish environmental law is in the beginning of the process of approximation with that of the European Union, it may be said that there are some positive signs. First of all, *these lay in the fact that the overall structure of the general legal concept of Polish law are the same or similar to that of most countries belonging to the European Union. I would like to stress in this context the concept of acts approved by parliament, the concept of delegated legislation, the concept of the role of courts, and the concept of administrative decision. These concepts are of fundamental meaning and the similarity between the European Union legal system and that of Poland in these fundamental respects seems to be a good basis for the process of continued approximation.*

The serious obstacles on the route of approximation must also be noted. One of these is the rate and scope of the task. We must harmonize a body of law which is already quite bulky and is still growing in size. It would be much easier for the process of approximation if the development of environmental law were not so practically important as it is. In the present situation, the process of approximation must be twofold. Not only must piecemeal approximation be undertaken to develop a legal system capable of coping with the problems of everyday life, but those making the laws must determine just what approximation entails what must be done first and what next, not to mention that the representatives of CEE countries ought to have better insight into the legislative work of European bodies. The development of EU law should depend also on the efforts of the representatives of CEE countries.

Approximation of Polish environmental law with EU law denotes two different things. Poland has an opportunity to adapt its law to more progressive patterns. But it must simultaneously abandon solutions that are not false per se, but because the majority has chosen other solutions. This is the price of approximation. Taking into account the situation in Polish law, it seems that the greatest difficulties will involve emission law. At first, it is necessary to change the basic philosophy of legal regulation. This means two things. We must reduce the number of limit values and second, introduce the BATNEC concept. There must be made a deep-seeded reform of regulations on waste management and some changes to the Water Act. The crucial point in this process is the overall reorientation of the country's legal system. This entails not only recognizing the necessity of continuation of some experience and legal construction but also change. The problem is even more complicated because of new elements appearing in the EU, such as the IPPC concept. These make the process of approximation more painful because they demand that old habits be discarded. This is not only a problem for newcomers. At the same time, some new ideas are appearing in the EU. But these may seem to many as returning the EU to the path we are now following. There are the ideas inherited in the Proposal for Council Directive on ambient air quality assessment and management. The weakest aspect of Polish environmental law is surely waste management. A comprehensive body of new regulation must be created in this area. The European Union provides a good example. A great deal of courage and patience is necessary to fulfill the requirements of water law approximation. Some elements in Polish legislation seem to make *this process relatively simple but there are many regulations for which the process of approximation is much more difficult. It seems that incorporating the directives on groundwater, on the discharge of dangerous substances, and on the ecological quality of water, will be especially difficult."* (REC 2000)

10. Germany as a neighbour of Poland.

10.1. Basic informations about Germany.

Bundesrepublik Deutschland or the Federal Republic of Germany is a European country situated at the western region of central Europe. Germany is considered as the largest country in the whole of continent of Europe when it comes to size (with a total area of 357,021 km^2) and is the second largest when it comes to population (with a population size of 82.400.996 as of July 2007). What is interesting about Germany is that it is found in the middle of diverse climates, regions and areas. It is in between European

countries more closely concerned with the sea in the west such as France, Belgium, Luxembourg and Netherlands. While at the eastern side of Germany can be found countries situated within the European continent and a little far away from the oceans and seas such as the Czech Republic and Poland. It is a country of sea coasts, mountain ranges and wide sloping plains where one can find shores opening up to the Baltic Sea and North Sea as well as the towering Bavarian Alps and several other mountain ranges. Germany is also an interestingly diverse area when it comes to climate, situated between the cold northern regions of Europe and the warmer south of Europe.

Figure 39. Flag of Germany (Wikipedia 2008).

Germany is also known all over the world as one of the most affluent countries in the world, not to mention it is also one of the very few technological powers among the world's nations. Due to the high standards of living, the existence of a progressive social security system and the many scientific and technological accomplishments of Germany, its economy has grown significantly and is now known as the third largest economy in all the world. Because of the many states, cities, princedoms and even monarchies that survived and predominated Germany for hundreds of years, forming a unified and whole country became a rather difficulty feat to accomplish. Unlike other countries where there usually can be found a single city considered more important and more influential than all the others in the country, Germany has several distinctly important and influential cities and states within it.

In all of Europe, Germany is known to have the second largest population, trailing only Russia. Germany is also known for having the seventh largest area, with its territory spanning approximately 357,021 square kilometers. Of all that land area, 349,223 square kilometers consist of land as opposed to 7,798 square kilometers of water. This makes the geography of Germany ideal for those who enjoy treks and trips that allow for amazing views of the landscapes and mountainsides. (Deutschland.de 2008)

Official name:	***The Republic of Germany***
Location:	***Central Europe (2° 31′ 0″ N, 13° 24′ 0″ E)***
Capital city:	***Berlin***
Area:	***357,021 km²***
Population:	***82.210.000 (2007)***
Density:	***230 / km²***
Currency:	***Euro***
Language:	***German***
Religion:	***Christianity (64%), Islam (4%)***
Tourist destinations:	***Berlin, Hamburg, Munich, Frankfurt***
Neighbouring countries:	***Denmark***
	Poland
	Czech Republik
	France & Luxemburg
	Belgium
	Austria
	Switzerland
	Netherlands
Borders lenght:	***3.757 km***

Table 16. Germany – Basic data,
Deutschland.de 2008.

The elevated mountain regions of Germany, namely the Alps are contrasted by the shores of the North Sea (found north-west) and the Baltic Sea (found north-east) that are below sea level. Germany's central areas are also divided between the uplands of central Germany and the low lands of northern Germany, the lowest of which is Wilstermarsch at 11,6 feet below sea level. These areas also have major rivers cut across them like the Rhine, Danube and Elbe. Germany shares its borders with Denmark, Poland, Czech Republic, Austria, Switzerland, France, Luxembourg, Belgium, and the Netherlands and is considered to be the country in Europe that shares the most borders with other countries.

Germany's climate is regulated by the North Atlantic Drift, an extension of the Gulf Stream, and causes the climate to become temperate. This leads to the considerable humid westerly winds that loom over the entire area. Around the north - west area, rainfall occurs often. Winters also tend to be fairly favorable and mild, while the summer months tend to be cool although temperatures occassionally exceed 30°C or 86°F. The scenario is the exact opposite on the opposing eastern end, where the climate is considered more continental than oceanic. Winters tend to be very cold, while the summers end up being really warm. The central and southern areas seem to range and vary between both oceanic and continental weather conditions.

The entire map of Germany is divided into sixteen states, with the states further subdivided into districts and cities that total to 439. The largest state is Bavaria (or Bayern) with 70.549 square kilometers, although it only has the second largest population with 12.444.000. The distiction of having the largest population goes to the state of North - Rhine Westphalia, with 18.075.000. Berlin, Hamburg, and Bremen are the smallest of Germany's states and are 892, 755, and 404 square kilometers respectively. (Wikipedia 2008)

10.1.1 Climate & Environment.

Germany is located between the tropics and the polar circles, a region that is blessed with a temperate climate. The country generally enjoys mild temperatures in the summer and winter as well as generous amounts of rainfall. The climate may vary when westerly winds from the Atlantic Ocean meet the cold air from northeastern Europe but extremes in temperatures rarely arise. Although Germany is temperate as a whole, there are still climate variations among different regions in the country. The mountainous areas receive the most rainfall and experience a much cooler temperature. The highest peak in the Harz mountains, for instance, has an annual precipitation of about 60 inches. In contrast, the basins only get about 17 inches of rainfall in a year. The northwestern and lowland regions of Germany experience high humidity and moderate temperatures. These areas often have gentle, warm summers and mild winters. The hilly portions in the central and southwestern areas as well as the uplands and plateaus in the southeast have much sharper ranges of high and low temperatures. The climate in Southeastern Germany can be considered as the most extreme in the country. This region has the coldest winter but certain areas such as the Rhine, Main Neckar, and Moselle rivers experience the hottest summers.

"Germany is one of the most environmentally conscious nations in the world. It ranked 31st in the Environmental Sustainability Index which was conducted by Yale University. German society and its corresponding government have acknowledged the global warming phenomenon and its causes. As a response, Germany committed to the Kyoto protocol, along with several other treaties in order to promote biodiversity, recycling, the utilization of renewable energy, low emmission standards, recycling, the support for sustainable development on a global scale. However, despite these efforts, it would seem the Germany's carbon dioxide emissions per capita remains one of the highest in the European Union, though it is considerably lower compared to other nations such as Canada, Australia, and the United States. Germany is

generally clean and organized, despite the emissions from coal-burning industries which contribute to air pollution. This results to acid rain (from the sulphur dioxide emissions), which in turn, damages forests. The Baltic sea has also been a repository for raw sewage and industrial effluents from rivers, though modern times have seen to its reduction. Germany is ever persevering to lessen pollution, as the governmnent under Chancellor Schroder announced his goal to end the use of nuclear power in the production of electricity. Along with other nations in the European Union, Germany is dedicated to the identification of preservation areas within the line of EU's Flora, Fauna and habitat directive." (Germany 2008)

10.1.2. The State of the Republic of Germany.

Politics of Germany takes place in a framework of a federal parliamentary representative democratic republic, whereby the ***Federal Chancellor*** is the head of government, and of a plurality multi-party system. Executive power is exercised by the ***government***. Federal legislative power is vested in both the government and the two chambers of parliament, ***Bundestag*** and ***Bundesrat***. Since 1949, the party system has been dominated by the ***Christian Democratic Union*** (CDU) and the ***Social Democratic Party of Germany*** (SPD). The Judiciary of Germany is independent of the executive and the legislature. The political system is laid out in the 1949 constitution, the ***Grundgesetz*** (Basic Law), which remained in effect with minor amendments after 1990's German reunification. The constitution emphasizes the protection of individual liberty in an extensive catalogue of human rights and also divides powers both between the federal and state levels and between the legislative, executive, and judicial branches.

On the hand, the head of state performs representative and ceremonial duties. The ***President*** is chosen every five years by the Federal Assembly (Bundesverasammlung) which features the whole Parliament and state representatives selected across the country. Horst Kohler is the current Federal President. (Wikipedia 2008)

Federal Parliament

Germany has on the federal level a bicameral legislature. The parliament has two chambers. The ***Bundestag*** (Federal Diet) nominally has 598 members, elected for a four year term, 299 members elected in single-seat constituencies according to first-past-the-post, while a further 299 members are allocated from statewide party lists to achieve a proportional distribution in the legislature, conducted according to a system of mixed member proportional representation. Voters vote once for a constituency representative, and a second time for a party, and the lists are used to make the party balances match the distribution of second votes. In the current parliament there are 16 overhang seats, giving a total of 614. This is caused by larger parties winning additional single-member districts above the totals determined by their proportional party vote. A party must receive 5% of the national vote or win at least three directly elected seats to be represented in the ***Bundestag***. This rule, often called the "five percent hurdle", was incorporated into Germany's election law to prevent political fragmentation and strong minor parties, which was considered a major reason for the inefficiency of the Weimar Republic's Reichstag. The first ***Bundestag*** elections were held in the Federal Republic of Germany ("West Germany") on August 14, 1949. Following reunification, elections for the first all-German ***Bundestag*** were held on December 2, 1990. The last election was held on September 18, 2005, the 16th ***Bundestag*** convened on October 18, 2005. The number of Bundestag Deputies was reduced from 656 to 598 beginning in 2002, although under the additional member system, more deputies may be admitted if a party wins more directly elected seats than it would be entitled to under proportional representation. The ***Bundesrat*** (Federal Council) is the representation of the state governments at the federal level. It consists of 69 members who are delegates of the 16 Bundesländer and usually, but not necessarily include the 16 Minister Presidents themselves. The Länder each have from three to six votes in the ***Bundesrat***, dependent on population. ***Bundesrat*** members receive voting instructions from their state governments. The legislature has powers of exclusive jurisdiction and concurrent jurisdiction with the Länder in areas specifically enumerated by the Basic Law. The Bundestag bears the major responsibility. The necessity for the ***Bundesrat*** to concur on legislation is limited to bills related to revenue shared by the federal and state governments and those imposing responsibilities on the states, although in practice, this means that ***Bundesrat*** concurrence is very often required as federal legislation often has to be executed by state or local agencies. (Wikipedia 2008)

Structure of Government

The Basic Law of the Federal Republic of Germany, the federal constitution, stipulates that the structure of each Federal State's government must "conform to the principles of republican, democratic, and social government, based on the rule of law". Most of the Länder are governed by a cabinet led by a Ministerpräsident (Minister - President), together with a unicameral legislative body known as the Landtag (State Diet). The Minister - President appoints a cabinet to run the Land's agencies and to carry out the executive duties of the Land's government. The governments in Berlin, Bremen and Hamburg are designated by the term Senate. In the three free states of Bavaria, Saxony and Thuringia the government is referred to as the State Government (Staatsregierung), and in the other ten Länder the term Land Government (Landesregierung) is used.

President:* *Horst Köhler

Federal Chancellor:* *Angela Merkel

Two biggest parties:* *SPD, CSU *(Social Democratic Party of Germany, Christian Social Union of Bavaria)* (Wikipedia 2008)

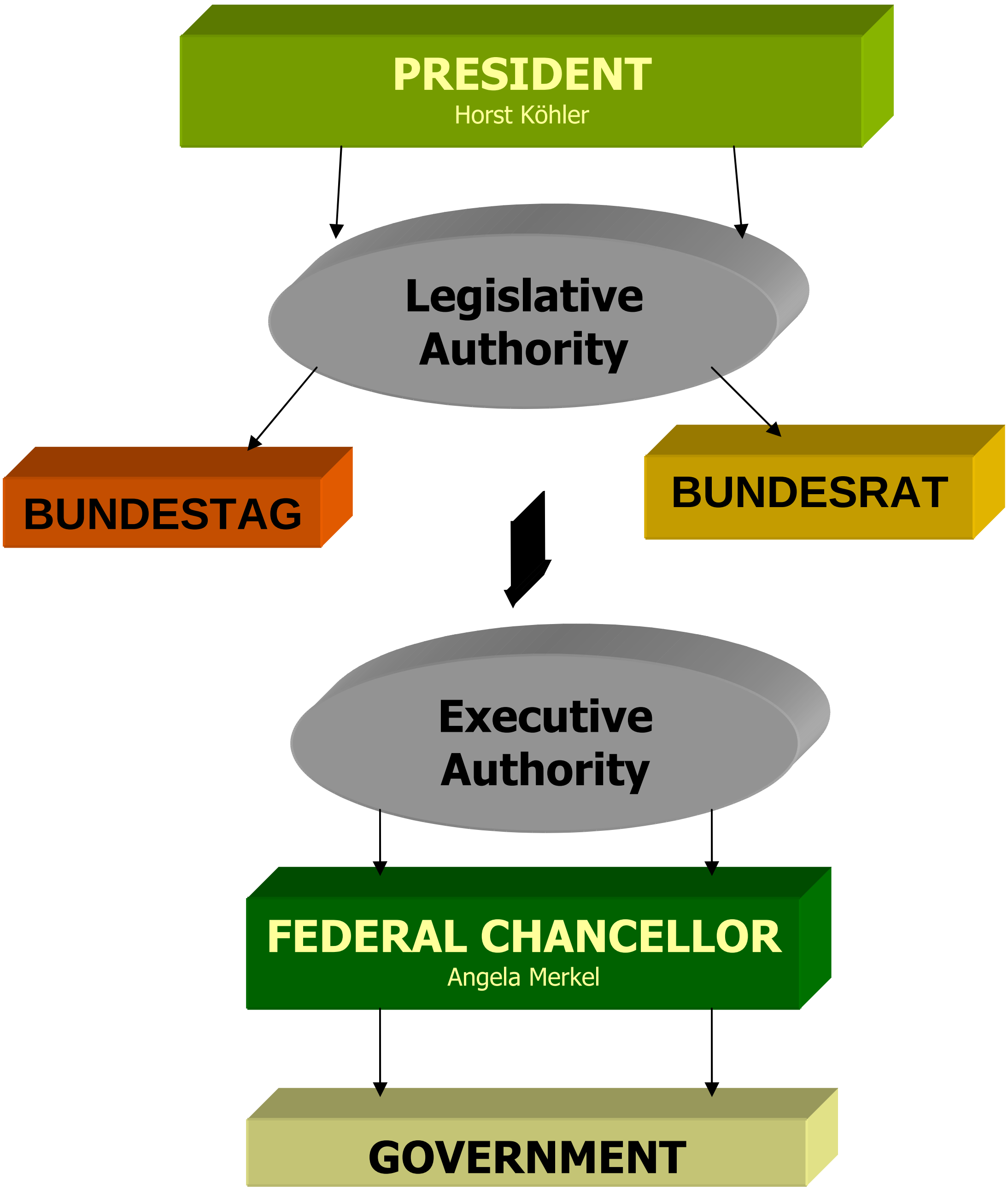


Figure 40. Structure of German politic system,
Germany 2008.

10.2. Water resources.

Just like in earlier paragraph, the good idea is to show German water resources by tables (Aquastat), because in the end it is possible to compare with Poland and also to show diagrams with the population/water resources tendency. All the data were chosen almost the same like it was with Poland, and with this we can pu together two countries and give a statement about their water situation.

Data	**1988 – 1992**		**1993 – 1997**		**1998 – 2002**		**2003 – 2007**	
Total area [1000 ha]	**1992**	35.705	**1997**	35.705	**2002**	35.705	**2003**	35.705
Arable land [1000 ha]	**1992**	11.467	**1997**	11.832	**2002**	11.791	**2003**	11.903
Permanent crops [1000 ha]	**1992**	241	**1997**	228	**2002**	206	**2003**	198
Cultivated area (arable land + perm. Crops) [1000 ha]	**1992**	11.708	**1997**	12.060	**2002**	11.997	**2003**	12.101
Total population [1000 inhab]	**1992**	80.406	**1997**	82.086	**2002**	82.507	**2005**	82.689
Rural population [1000 inhab]	**1992**	11.421	**1997**	10.726	**2002**	9.959	**2004**	9.531
Urban population [1000 inhab]	**1992**	68.985	**1997**	71.360	**2002**	72.549	**2004**	73.158
Population density [inhab/km^2]	**1992**	225	**1997**	230	**2002**	231	**2004**	232

Table 17. Data of population in Germany,
Aquastat 2008.

From the table above we can read some basic information about Germany, like total are of the country, or the population. As the area is the same across the years (caused by high stabilization in modern Europe), the population of Germany is getting higher, from 80 millions in the early 90's , to the 82 millions in 2005. Cultivated area, which is the sum of arable lands and permanent crops is quite stable, and that is maybe a result of high stabilisation in this sector in Germany. Reading about population we can notice, that more people decided to move from small villages to the big cities across the years – on that indicates a number of people in rural/urban population between 1992 and 2007.

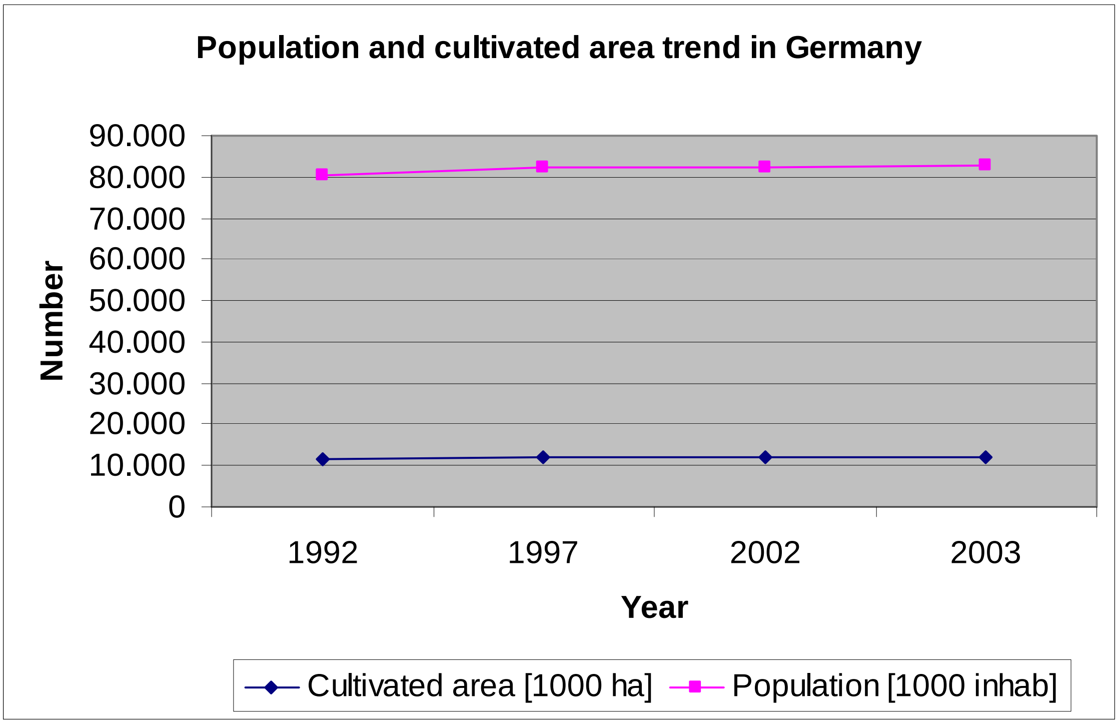


Figure 41. Diagram of population and cultivated area trend in Germany, Aquastat 2008.

The diagram above shows the trend about total population and cultivated area, which gives the information, that the sector of land cultivating in Germany is very stable (flat diagram) while the total population is still growing up (2 millions more, during 13 years).

Data	1988 – 1992		1993 – 1997		1998 – 2002		2003 – 2007	
Total economically active pop. In agriculture [1000 inhab]	**1992**	40.167	**1997**	40.515	**2002**	40.357	**2004**	40.367
Male economically active pop. In agriculture [1000 inhab]	**1992**	23.350	**1997**	23.385	**2002**	23.025	**2004**	22.852
Female economically active pop. In agriculture [1000 inhab]	**1992**	16.817	**1997**	17.129	**2002**	17.332	**2004**	17.515

Table 18. Data of active population in agriculture in Germany, Aquastat 2008.

Table with data about economically active population in agriculture is just a kind of proof about high German stabilization in cultivated/agricultural sector. Only important changes that we can notice is that a little bit more women are economically active in agriculture, then it was sixteen years ago, and there is a small drop of men engagement in agricultural sector.

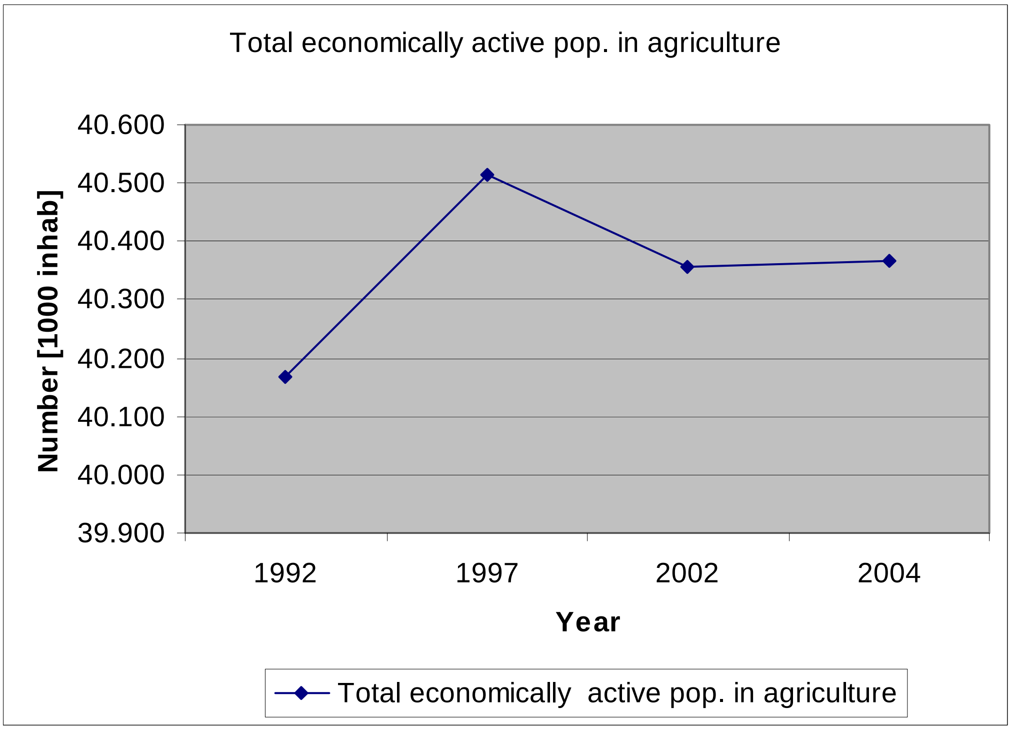


Figure 42. Diagram of total economically active population in agriculture,
Aquastat 2008.

Even if the diagram doesn't look really flat, there were small changes in economic activity in agricultural sector. It only shows, that in 1997 the indicators were the highest across the years, a little bit higher then in 1992, but later the tendency of economically active population in agriculture became very stable, until present days. The difference between the lowest an the highest point of this diagram is about 300.000 citizens, during twelve years.

Data	**1988 - 1992**		**1993 - 1997**		**1998 - 2002**		**2003 - 2007**	
Average precipitation in depth [mm/year]	**1992**	700	**1997**	700	**2002**	700	**2007**	700
Average precipitation in volume [10^9 m^3/year]	**1992**	250	**1997**	250	**2002**	250	**2007**	250
Surface water: produced internally [10^9 m^3/year]	**1992**	106	**1997**	106	**2002**	106	**2007**	106
Groundwater: produced internally [10^9 m^3/year]	**1992**	45,7	**1997**	45,7	**2002**	45,7	**2007**	45,7
Overlap between surface water and groundwater [10^9 m^3/year]	**1992**	45	**1997**	45	**2002**	45	**2007**	45

Table 19. Data of precipitation in Germany,
Aquastat 2008.

Precipitation data can't say more across the years, because they didn't change much, in fact we can say they didn't change at all, so only we can use it and say something about it in the future, when we will be comparing two countries – Poland and Germany. Also, the production of surface and groundwater is very stable in Germany, nothing has changed across the years, maybe it is because the climate is also stable in this part of Europe.

Data	1988 - 1992		1993 - 1997		1998 - 2002		2003 - 2007	
Water resources: total internal renewable [10^9 m^3/year]	**1992**	107	**1997**	107	**2002**	107	**2004**	107
Water resources: tot. internal renew. per capita [m^3/inhab/year]	**1992**	1.331	**1997**	1.304	**2002**	1.297	**2004**	1.294
Surface water: inflow not submitted to treaties [10^9 m^3/year]	**1992**	47	**1997**	47	**2002**	47	**2007**	47
Surface water: accounted inflow (actual) [10^9 m^3/year]	**1992**	47	**1997**	47	**2002**	47	**2007**	47
Surface water: total external renewable (actual) [10^9 m^3/year]	**1992**	47	**1997**	47	**2002**	47	**2007**	47
Water resources: total external renewable (actual) [10^9 m^3/year]	**1992**	47	**1997**	47	**2002**	47	**2007**	47
Surface water: total renewable (actual) [10^9 m^3/year]	**1992**	153	**1997**	153	**2002**	153	**2004**	153
Groundwater: total renewable (actual) [10^9 m^3/year]	**1992**	12,5	**1997**	12,5	**2002**	12,5	**2007**	12,5
Water resources: total renewable (actual) [10^9 m^3/year]	**1992**	45,7	**1997**	45,7	**2002**	45,7	**2004**	45,7
Water resources: tot. renew. per capita (actual) [m^3/inhab/year]	**1992**	1.915	**1997**	1.876	**2002**	1.867	**2004**	1.862
Dependency ratio [%]	**1992**	30,5	**1997**	30,5	**2002**	30,5	**2007**	30,5
Water resources: total exploitable [10^9 m^3/year]	**1992**	101	**1997**	101	**2002**	101	**2007**	101

Table 20. Data of water resources in Germany,

Aquastat 2008.

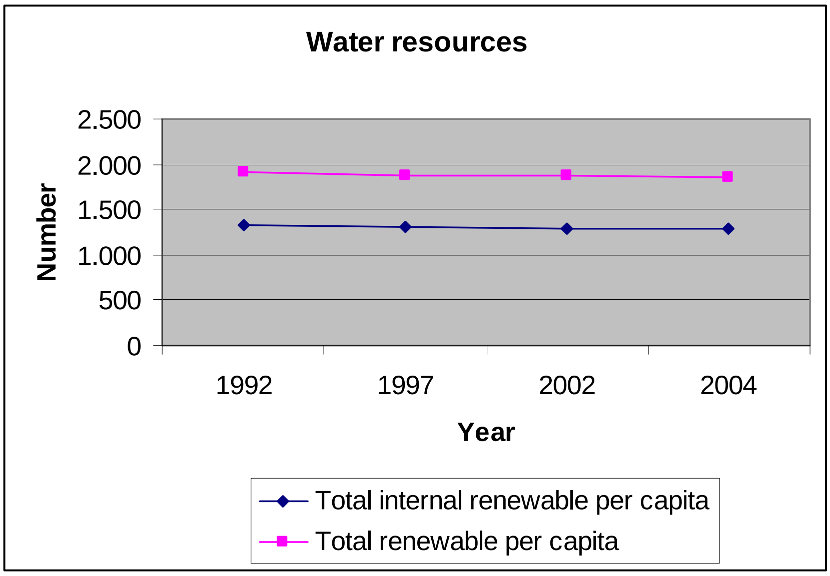


Figure 43. Diagram of water resources per capita in Germany (1992-2004),

Aquastat 2008.

As w can see from the diagram above, the tendency of water resources per capita is almost flat, but a little bit going down each year. This data are also for internal renewable water resources and total renewable water resources per capita. The drop is not very big (flat diagram) and that is probably caused by the increasing population in Germany, and it is not because of bad water management – this seems to be on the same lever across the years. Beside this, the rest of data is the same for last sixteen years, so there is no reason to show information on diagram. For example, the number of total surface water, groundwater, or total renewable water resources are still the same like it was in 1992. Only changes that we can notice are caused by the largest population, which is normal for the country like Germany (on this level of development).

Data	**1988 - 1992**		**1993 - 1997**		**1998 - 2002**		**2003 - 2007**	
Agricultural water withdrawal [10^9 m^3/year]					**2000**	9,31		
Domestic water withdrawal [10^9 m^3/year]					**2000**	5,81		
Industrial water withdrawal [10^9 m^3/year]					**2000**	31,9		
Total water withdrawal (summed by sector) [10^9 m^3/year]					**2000**	47		
Agricultural water withdrawal as part of total [%]					**2000**	19,8		
Domestic water withdrawal as part of total [%]					**2000**	12,3		
Industrial water withdrawal as part of total [%]					**2000**	67,9		
Total water withdrawal: per capita [m^3/inhab/year]					**2000**	570		
Desalinated water produced [10^9 m^3/year]		-		-		-		-
Agr. water withdrawal as % of total renewable water resources [%]					**2000**	6,05		

Table 21. Data of water withdrawal,

Aquastat 2008.

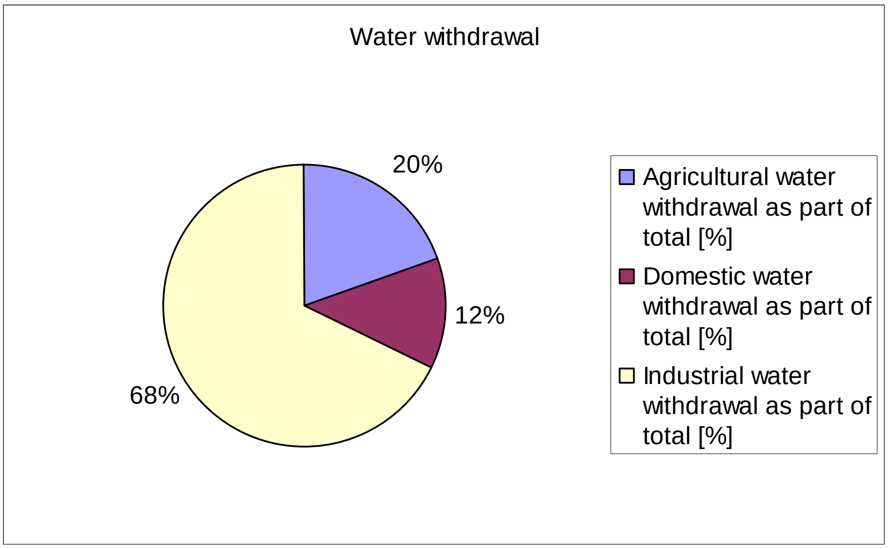


Figure 44. Diagram of water withdrawal,

Aquastat 2008.

Data about water withdrawal are only for year 2000, but from it we can get an important information, which is that the biggest sector for water withdrawal in Germany is Industry, with about 68% of total withdrawal. The second sector is Agriculture with 20% of total withdrawal and on the third place there is Domestic sector with 12%.

Germany doesn't produce desalinated water at all.

Data	**1988 - 1992**		**1993 - 1997**		**1998 - 2002**		**2003 - 2007**	
Area equipped for irrigation: full control localized irrigation [1000 ha]	**1991**	1,85						
Area equipped for irrigation: total [1000 ha]	**1990**	482	**1995**	485	**2000**	485	**2004**	
Flood recession cropping area non - equipped [1000 ha]					**1998**	0		
Agricultural water managed area: total [1000 ha]	**1990**	100			**2002**	100	**2004**	124
Area equipped for irrigation as % of agricultural water managed area [%]					**2002**	100		
Area equipped for irrigation as % of cultivated land [%]	**1992**	4,12	**1997**	4,02	**2002**	4,04		

Table 22. Data of land irrigation in Germany,

Aquastat 2008.

10.2.1. German environmental department's structure. Institutions and organisations connected with water management.

"Environmental protection is a high - priority topic in Germany – and it's been a national objective anchored in the Basic Constitutional Law of the Federal Republic since 1994." (Deutschland.de 2008)

The main unit connected with environment in Germany is the ***Federal Ministry for the Environment, Nature Conservation and Nuclear Safety***. The personal structure of this most important, environmental body is as follows:

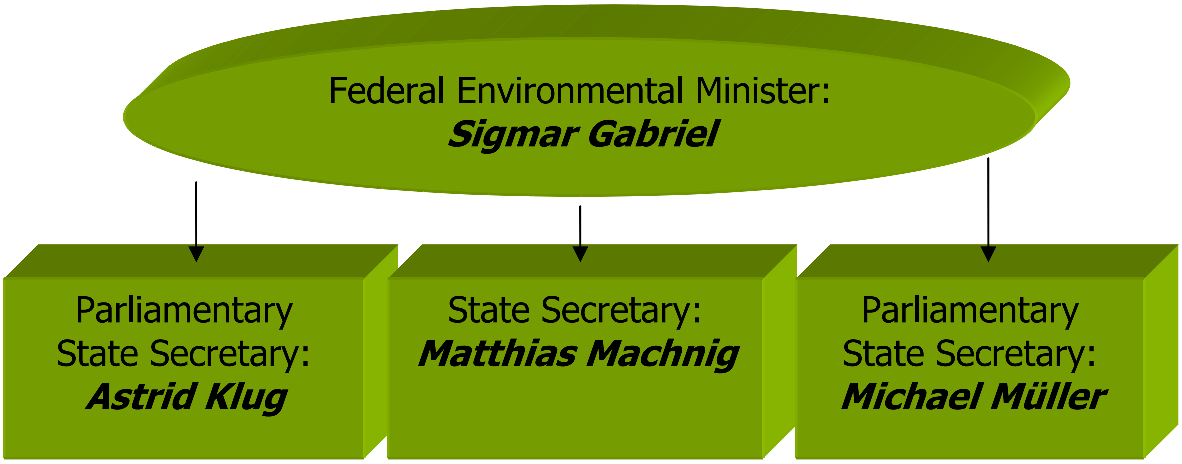


Figure 45. Personal structure of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in Germany,
Deutschland.de 2008.

Here are the institutions and organisations that are connected with the German Ministry of Environment and responsible for environmental politics:

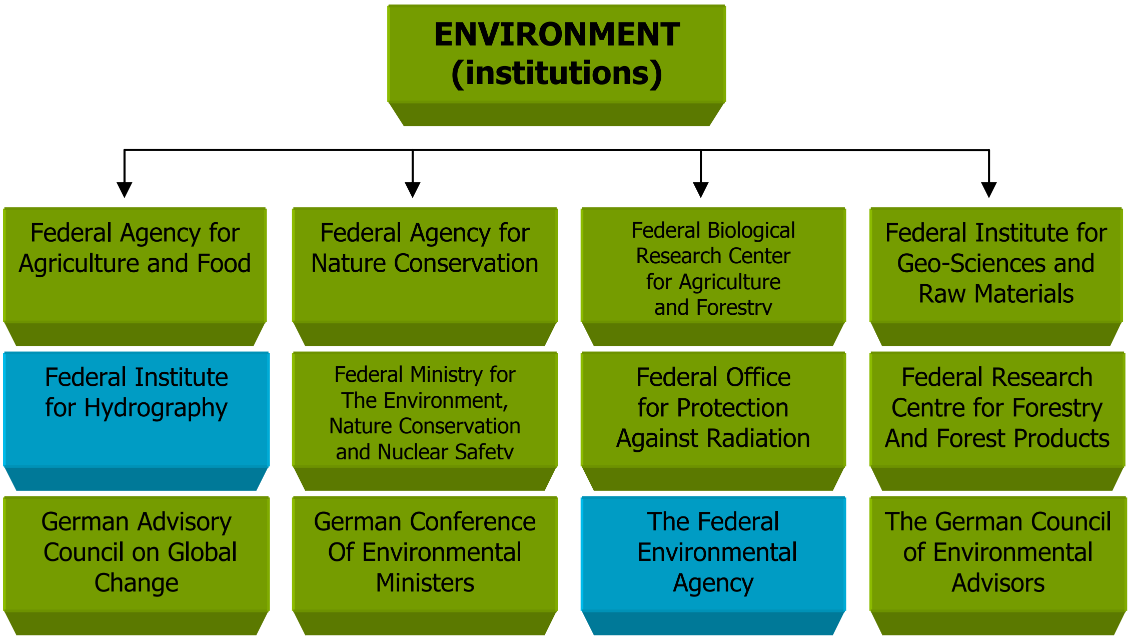


Figure 46. Environmental institutions in Germany, Deutschland.de 2008.

While each of the institutes cares about environment, there are two really important in the context of water treatment, and they are: a)***Federal Institute for Hydrography*** and b)***The Federal Environmental Agency***.

Ad. a)

The German Federal Institute of Hydrology (BfG)

Within the federal system of Germany, responsibilities for waters are divided between national authorities and those of the federal states, the Länder. As a scientific institution ranking as a supreme federal agency, the BfG is responsible for the German waterways in federal ownership. In this position it has a central mediating and integrating function. The Federal Institute of Hydrology (BfG) advises the federal ministries (e.g. the Federal Ministry of Transport, Building and Urban Affairs (BMVBS)) and the Waterways and Shipping Administration (WSV) in matters of utilisation and management of the German federal waterways. (Bfg 2008)

Mission

Being part of the Federal Ministry of Transport, Building and Urban Affairs (BMVBS), the mission is to contribute to the implementation and operation of an efficient and environment-friendly transport system. By improving national infrastructure, the Institute try to increase

Germany's economic power, strengthen Germany as an investment and industrial location and secure its position in a European context.

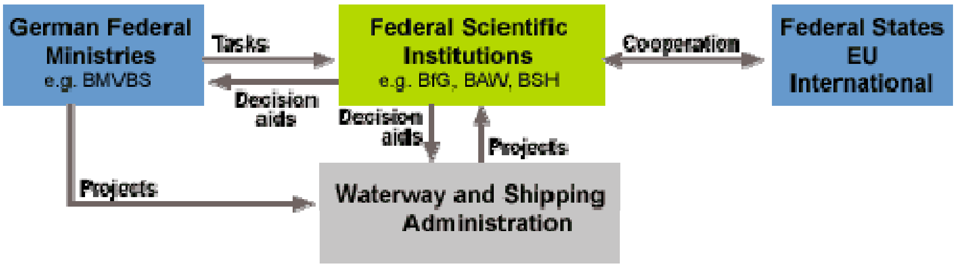


Figure 47. The way of co-operation with other Institutes,
Bfg 2008.

The BfG also has two international units. The IHP/HWRP Secretariat co-ordinates German research contributions in international water-related projects of WMO and UNESCO. The Global Runoff Data Centre (GRDC) works under WMO's auspices as a global centre for streamflow data. (Bfg 2008)

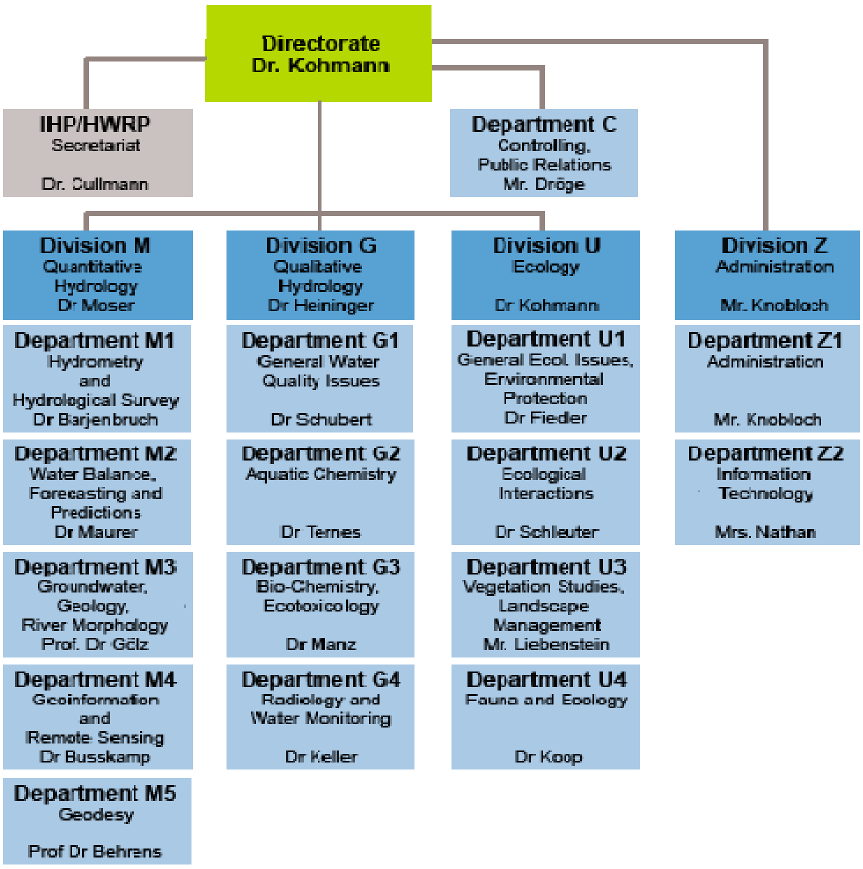


Figure 48. BfG's structure of organisation (personal),
Bfg 2008.

Fields of activity

- Quantitative hydrology

The flow (discharge) of a water body determines its navigability, influences the supply of the riparian population with process and drinking water, but in case of floods it can also lead to the destruction of property, natural resources, and cultural heritage. Moreover, water transports dissolved substances and sediments. The latter may be deposited in places where they become hindrances for navigation and have to be removed by dredging. However, if sediments are constantly removed by natural processes, the river will cut deeper and deeper into its surrounding landscape, the water level will drop, and this may damage the sensitive riverside ecosystem. This interaction between water flow and sediment transport is decisive for the geometry and appearance of the watercourse. The quantitative hydrological factors of streamflow and sediment balance may influence both flora and fauna, as well as the usability of the watercourse as a waterway.

Figure 49. Quantitative hydrology in the BfG,
BfG 2008.

In the context of quantitative hydrology we observe the geology and geometry of waterways, the development of discharge and the water and sediment balances. These studies and measurements go far beyond the narrow scope of the waterway and consider also the floodplain, groundwater-river interactions, developments in the catchment area, and even impacts of global climate change. Here, the development of measuring equipment and methods and the quality assurance of the data play major roles. Combined with appropriate simulation, forecasting, and scenario models, the data allow to draw reliable conclusions on the impacts of hydraulic engineering and water-management measures and on the development of runoff in the catchment area. (Bfg 2008)

- Qualitative hydrology

Industrialization, intensive land use, and growing consumption have led to strong environmental pollution by substances that are insoluble in water, hardly degradable, and often toxic. Most of these substances enter water bodies, are transported in adsorbtion on suspended matter, and are deposited in sediments. Maintenance dredging to keep waterways navigable, but also natural processes such as riverbed erosion lead to releases of substances from the sediment layers of watercourses. So, it is imperative to have knowledge about their qualitative, chemical composition, their concentrations, and the effects they may cause, in order to assess the impacts of waterway development and maintenance projects.

By integrating the disciplines of chemistry, biochemistry, eco-toxicology, and radiology, our division of Qualitative Hydrology has comprehensive knowledge of the chemical and radiological contamination and of the ecotoxicological potential in navigable inland and coastal waters, in particular in suspended matter and sediments. Data from a comprehensive measuring network deliver the inputs needed to develop and apply impact scenarios and forecasts.

Figure 50. Qualitative Hydrology in the BfG,
BfG 2008.

Risk analyses and risk assessments are a fundamental part of our work. As the discussion about environmental risks and health hazards always attracts tremendous public attention, we believe that adequate communication and explanation of the actual dangers posed by toxic substances are equally important tasks. (Bfg 2008)

- Ecology

Micro-organisms and macro-organisms living in water bodies constitute one interacting system with the riparian flora and fauna (the adjacent terrestrial ecosystems). Thus, changes in the physical structures of rivers or canals influence the entire ecological system. Ecology became a division in its own rights in our organizational set-up because of its high socio-political ranking. There we not only study the causes and impacts of ecological changes in and along federal waterways, but also identify ways to minimize or compensate possible detrimental impacts.

To answer complex ecological questions it is not enough to examine only the beds of rivers or canals. We need a holistic and impact-oriented system approach to develop environmental compatibility studies (Environmental Impact Assessments - EIA), projectaccompanying landscaping plans or comprehensive environmental concepts for waterways and their environs.

- International co-operation

Water is crucial to our survival. All over the world, it is involved in its different physical states in innumerable natural and technical processes and systems, which sometimes assume continental or even global dimensions. Hence, the responsible and sustainable use of this precious resource is only possible if the nations work together. Be it within Europe or on a world-wide scale, water-related activities are increasingly becoming transboundary efforts. The large global organisations like UNESCO or the WMO play a leading role in this context. In co-operation with many partners we participate intensively in international water-related activities. Among other things, we provide several global data centres with information on water-related issues, contribute to the international hydrological programmes of UNESCO and WMO, and are represented in transnational river commissions. This intensive co-operation enables a fruitful exchange of knowledge with our international partners and allows us to share the latest findings of international top-level research. This has established our stable position within an international network and enables us to remain efficient and competitive at a high level both today and in the future. (Bfg 2008)

Ad. b)

The Federal Environmental Agency cares about many environmental issues, and they release publications about the state of the environment in Germany - also, about water, specially drinking water and water protection.

95% of the drinking water in Germany is supplied centrally by municipal or private water companies. A small share is supplied by smaller facilities that produce less than 1.000 m³ per year, and up to 2 million Germans are estimated to be supplied by their own domestic well. Over 70% of drinking water is from groundwater or bank filtrate. Although this water usually already has very good quality, treatment is necessary in some regions in order to remove iron and manganese, or to improve its technical suitability for distribution, e.g. through softening. Furthermore, disinfection may be necessary. For surface water, technical rules require treatment as a general principle.

Treatment procedures usually begin with removal of particles, often by flocculation and filtration, sometimes enhanced by pre - oxidation, or by membrane technologies. Oxidation, ion exchange, and activated carbon treatments remove dissolved substances. Bank filtration and slow sand filtration are two particularly environmentally sustainable drinking water treatment techniques that avoid the use of chemicals and combine, usually quite effectively, particle removal and pollutant breakdown (the latter by microorganisms in the sediment). The focus of the Federal Environment Agency's approach to drinking water treatment is to optimise its hygienic safety while minimising environmental impacts resulting from the treatment procedure. The focal areas of the Federal Environment Agency's current research projects on drinking water treatment procedures are:

1. riverbank filtration and slow sand filtration,
2. biological iron and manganese removal,
3. chemical disinfection.

For this research, the Federal Environment Agency (Umweltbundesamt – UBA) conducts field observations and laboratory experiments. In particular, it combines these with experiments using its own technical scale facilities which simulate treatment procedures, thus bridging the gap between unrealistically simple laboratory conditions and realistic, but poorly defined and controlled field conditions. This approach provides results and conclusions on the efficacy of treatment procedures which are as realistic as possible. A basic element of the Agency's technical - scale facilities is a waterworks which extracts groundwater, uses a biological process to remove iron and manganese, and if necessary applies further treatment to provide any quality needed for the experiments. For de - central drinking water supply systems, UBA has developed and tested small-scale biological iron and manganese removal systems. Further, it has tested the efficiency of this process in removing other pollutants (arsenic and uranium). The objective of this work is to promote biological treatment processes as alternatives to chemical treatment.

A major experimental facility is a test site for bank and slow sand filtration, consisting of a pond with a volume of approx. 3.000 m³ in which ground water is conditioned to assume surface water characteristics and then infiltrates into a sand and gravel layer, simulating passage through the underground. In addition, it is possible to simulate both industrial scale slow sand filtration as well as artificial groundwater recharge in four infiltration ponds. The entire facility is separated from surrounding groundwater by a layer of clay, which allows experiments with hazardous substances to be carried out without the latter being discharged to the environment. The facility has been in use since 1999 for a variety of experiments, largely through externally funded projects and co-operation with external research institutes. A new technical scale experimental facility is a test stand to verify the efficacy of disinfectants and associated processes in inactivating pathogens. This experimental capacity is important for the Federal Environment Agency's regulatory responsibilities both in listing disinfection processes for use in Germany as stipulated by the German Drinking Water Ordinance, and for assessing the efficacy of disinfectants for their approval in the context of the EU Biocide Directive. (Umweltbundesamt 2008)

Additionally, in Germany we can select few organisations, that are also connected with environment, but non of them is strictly connected with water management. We can sort the organisations like it is shown below:

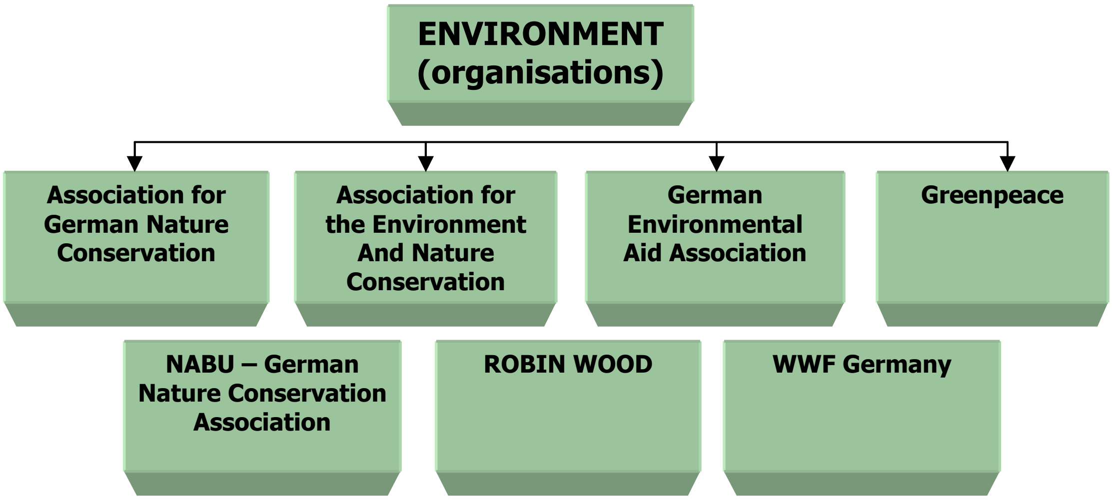


Figure 51. Environmental organisations in Germany,
Das Deutschland Portal 2008.

10.3. Differences in water resources and environmental organisations structure between Poland and Germany.

10.3.1. Government, organisations and institutions – the differences.

Germany and Poland are close neighbours. They are countries with old European tradition and culture. Across the centuries, political structure of these quite big two countries were created and modified, to be optimal for the citizens. In this paragraph I would like to show how big (or small) are the differences between Germany and Poland in political issues, like legislative and executive authority, presidency, and also about this how the governments care about environment (especially connected with water management) using it's organisations and institutions. This will probably give the answer, if European Community "wants" to keep similar political system in each of the 27th countries, to avoid disorder in the whole European's political structure.

In my opinion there should be not many differences between Poland and Germany and that is because both of it co-operate in many ways for a long time in the civilization's history, and by the way – they are almost at the same localization in the World, with similar religion, culture, and views for the future Europe.

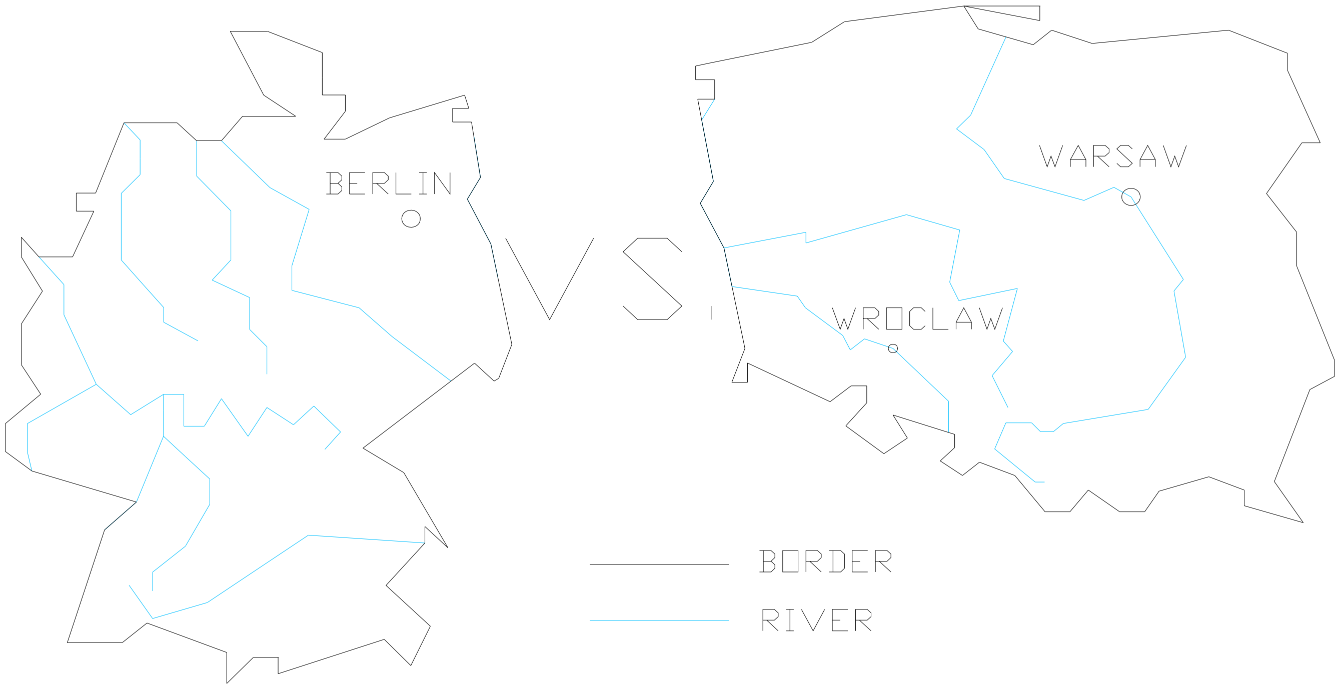


Figure 52. Germany and Poland,

Piotr Rucki 2008.

Taking the information from Aquastat we are able to compare Poland and Germany, about their water resources and also it is good to select some parts of environmental organisations structure, to give a view on possible differences between two countries.

If we speak about politics, we can say it is not much different, because the structures of both countries are very similar. On one side, there is a ***President***, which is a representative body of each country. Legislative bodies (two in each country) take control about similar issues. We can separate also the upper room of legislative bodies, also in Poland (***Senat***) and in Germany (***Bundesrat***). Lower bodies of Legislative Authority are: ***Sejm*** in Poland and ***Bundestag*** in Germany.

The small difference between Poland Germany is, that in Poland, the ***President*** can use the Veto option for some law, and German President has ONLY representative function.

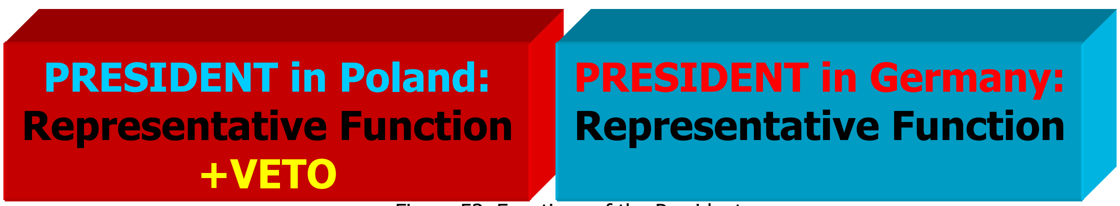


Figure 53. Functions of the President,

Wikipedia 2008.

Figure 54. Legislative bodies in Poland and Germany,
Wikipedia 2008.

On the other side, there are governments, which are the executive bodies, and each of them has the supervisor: In Poland – ***Prime Minister***, Donald Tusk; In Germany – ***The Chancellor***, Angela Merkel. The supervisors of the governments have in real the biggest power in both countries, because they don't realize representative functions, like the President.

The differences in governments are not very big, in Germany it takes under control each Land (each of it has its own supervisor) - for example Bavaria. In Poland, the main structure of government is about Council of Ministries with the supervisor for each Ministry – for example: Ministry of Environment.

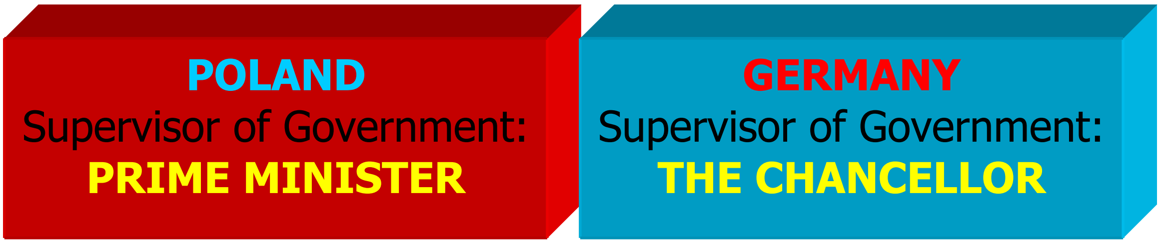


Figure 55. Supervisors of Government in Poland and Germany,
Wikipedia 2008.

So, in the political structure, there are no big differences between Poland and Germany. As we can see, also in both countries there are two biggest parties this time, which are under citizen attention. The Legislative, and Executive Authorities are built almost the same – with two main Legislative bodies, and with main supervisor over the Executive Authority, who rules many of Ministries.

Environment

On the other hand we can, and we should compare structure of environmental units in Germany and Poland to show possible differences, or maybe similar aspects in this structure.

The main bodies that care about environmental management in both countries are Ministries of Environment. These units have several issues under control and some of them are connected with ***water*** and ***water management***.

Figure 56. Units over Environment,
Wikipedia 2008.

In Poland important units, that take care about water management, are the advisory and opinion – pronouncing bodies, and also several institutions or organisations directly connected with ***water management***. In Germany, mostly the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety takes environmental issues, but also there are several units connected with the Ministry, directly connected with water issues.

Let's look again on the most important bodies connected with ***WATER*** in both countries.
With this we are able to make a clean look on that what is the same and what is different in the structure of environmental management in Germany and Poland. Below, there are the most important institutions/organisations/units which care about environment in each country:

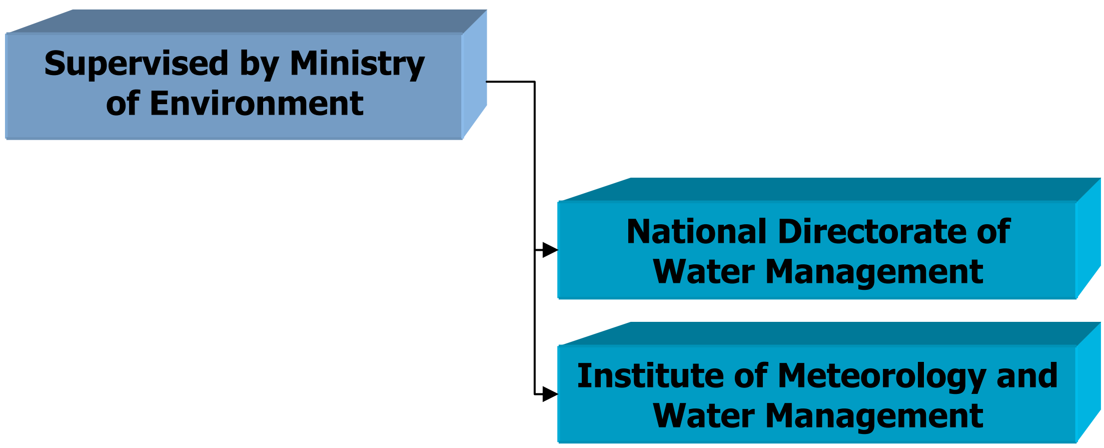


Figure 57. Supervised bodies connected with water management in Poland – the glossary,
MOS 2008.

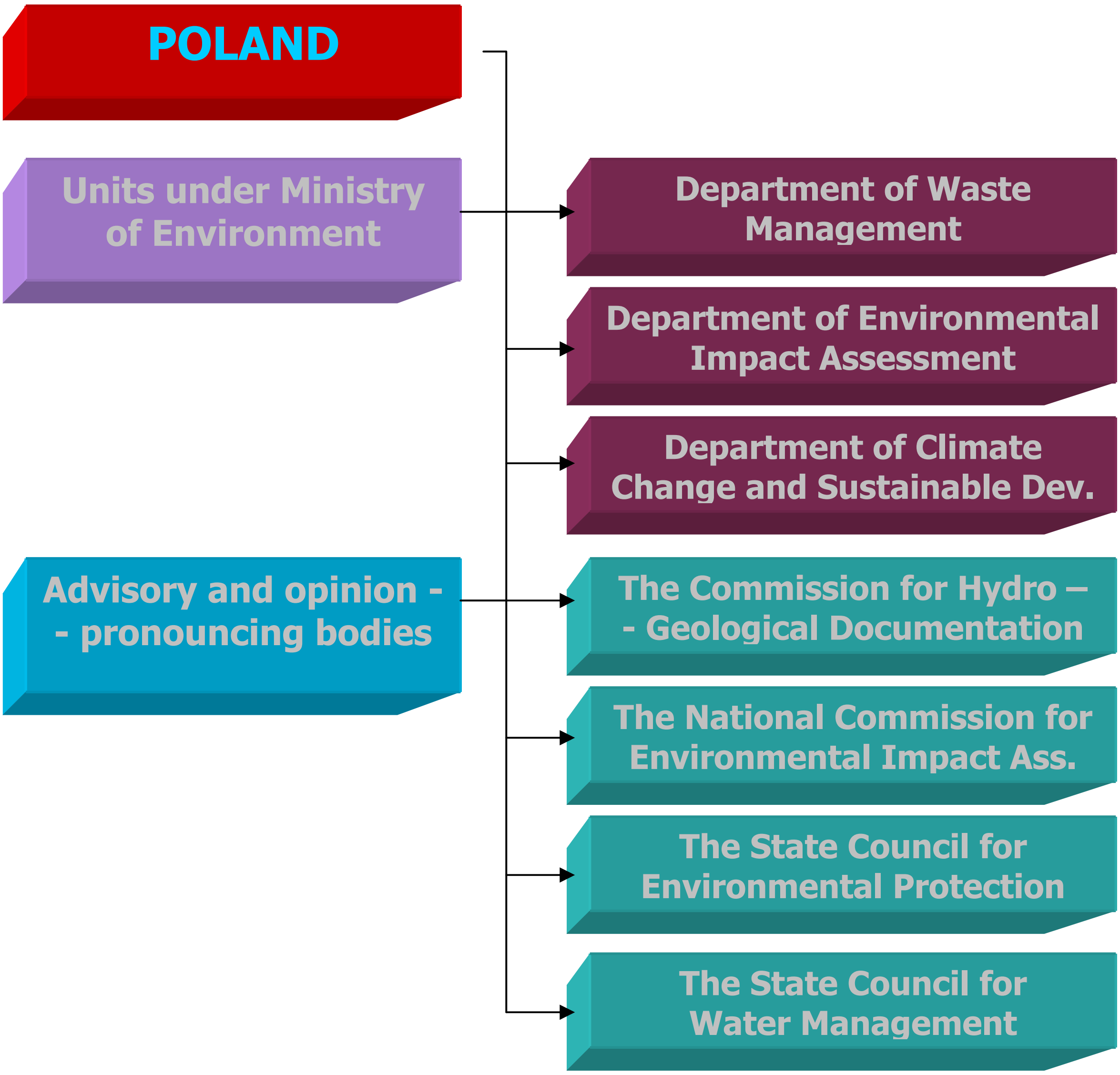


Figure 58. Units and advisory bodies connected with environment and water in Poland – the glossary, MOS 2008.

This is the main glossary about water management organisations and institutions in Poland. Now it is better to see how it works – without descriptions, only the graphic version. Now, we can show the same about Germany and then give the conclusion if there are big differences or it is almost the same in both countries.

From what we know now, the main institution for environmental protection in Poland in ***The Ministry of Environment***. It has a many organisations that they are under control of it, to care about the most important ***water*** issues.

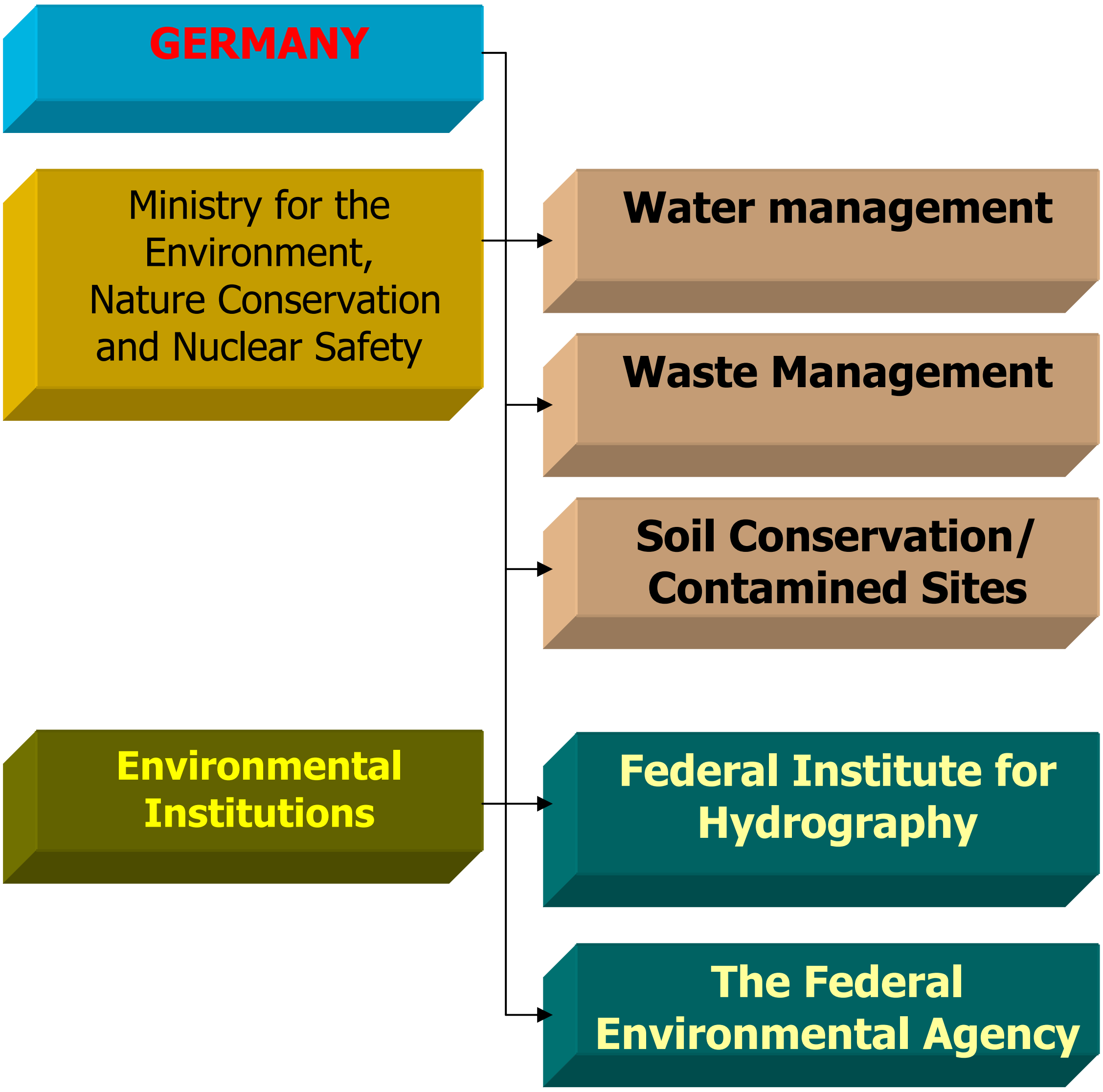


Figure 59. Issues about environment and water management in the most important German institutions, Deutschland.de 2008.

Conclusion

So now, we know more about environmental law structure in both countries. As we see, the differences are not so big, in each country there are several institutions about water management – mostly connected with the main environmental body called ***The Ministry of Environment.*** There are a lot of advisory bodies which help care about the smaller issues with water management.

I think the most important thing is to remember the most simple structure to understand something about water policies, because the key is, that both – Germany and Poland are very similar because of the European Community, and that is the reason they rule its departments in the same way.

10.3.2. Comparison of water resources.

Let's look a little bit for the water resources in Germany and Poland – both countries lies in almost the same part of Europe, so maybe the numbers are very similar, or maybe we should mention more about the differences between these two big nations. Here are some basic information by numbers and also by diagrams (for better comparing):

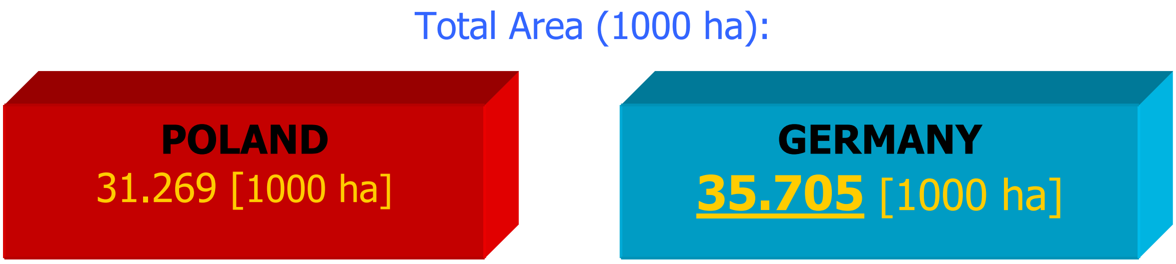


Figure 60. Comparing of the total area between Germany and Poland,
Aquastat 2008.

There is no big difference in total area. Now we should check the population that is using the water in both countries and also the cultivated are, which is the sum of total arable land and permanent crops. Now, even when it's almost the same level, it is important to say, that in Poland, the cultivated are is getting smaller each year, while in Germany is on the almost same level for few years. It looks like this:

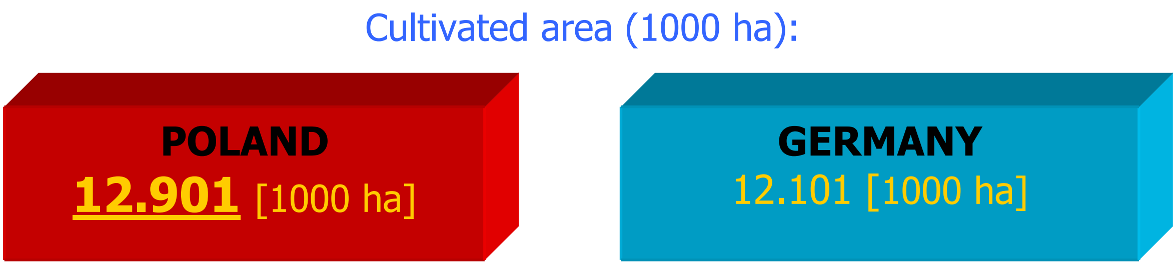


Figure 61. Comparing of cultivated area,
Aquastat 2008.

These days, the cultivated area is still a little bit bigger in Poland than in Germany, with the information, that Poland is also the smaller country, so it is easy to say, that in Germany there is bigger urban population. Let's look how the population looks by numbers:

Total Population (1000 inhab.):

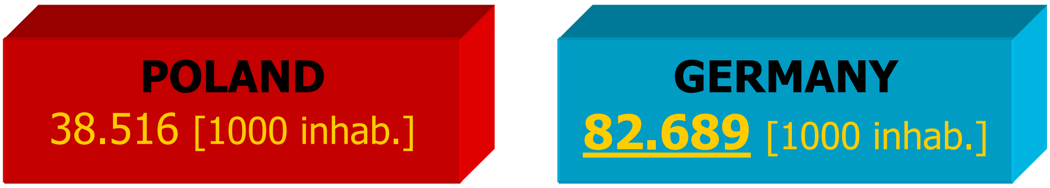


Figure 62. Comparing about total population,
Aquastat 2008.

Over two times, almost on the same land area, Germany has bigger number of citizens, so we can think, that Germany needs also more water resources, and have stabile management to keep this resources on the same level every time, without big looses of water. Later it will be good to check and compare also this, how big are the water resources in both countries, but now, here are the diagram of the total population tendency across the years:

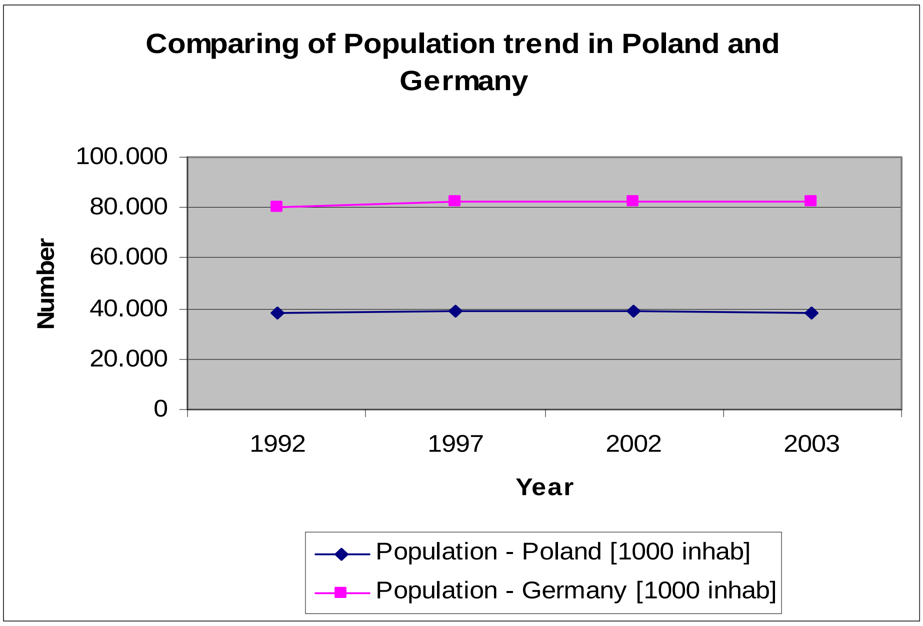


Figure 63. Comparing of German and Polish population across the years,
Aquastat 2008.

Thing that is the same for both countries is, that the population tendency is almost flat. Anyway, in Germany there are two times more citizens. That is the reason, the density looks like:

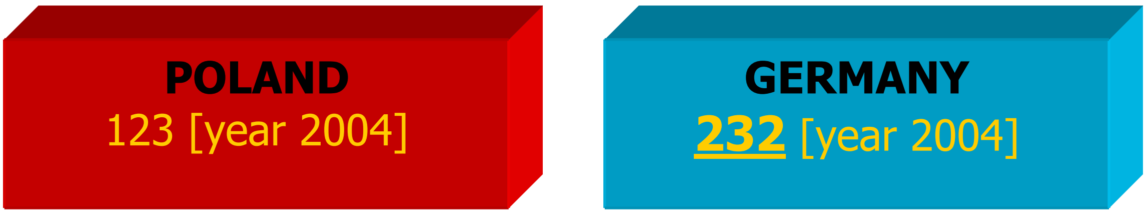


Figure 64. Density of both countries – Poland and Germany,
Aquastat 2008.

Across the years, total economically active population in agriculture has changed in both countries, but in Poland it was with a growing tendency, while in Germany it`s more flat. Comparing the numbers – the active population in German agriculture is about two times bigger than in Poland, but it is because of the bigger total population. In twelve years (1992 – 2004), tendency in this sector is:

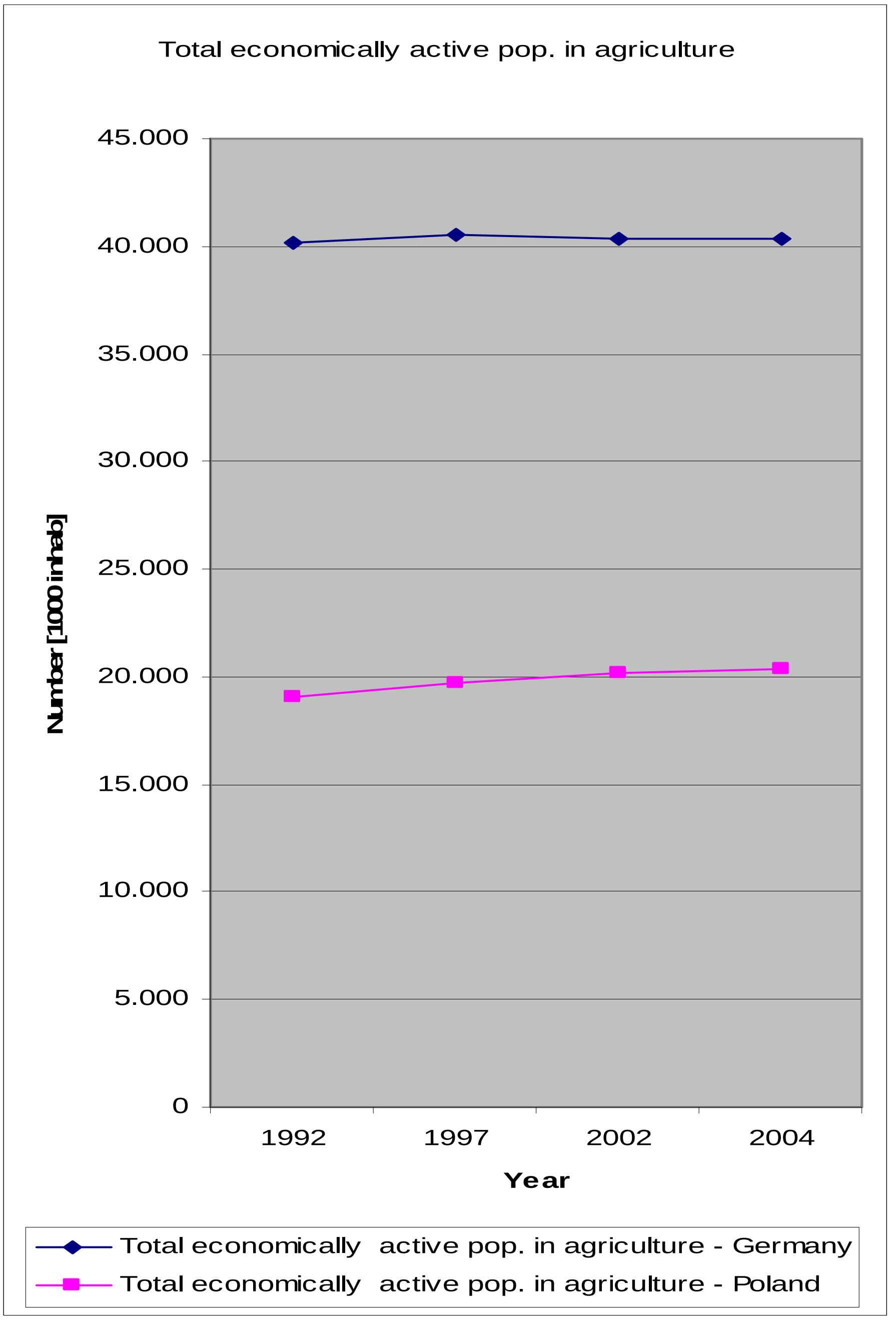


Figure 65. Comparing of total economically active population in agriculture, Aquastat 2008.

Now we can look at more important issue, which is water resources, and compare it. For water resources, we also include average precipitation, produce of surface and groundwater.

Average precipitation in depth [mm/year]

POLAND
600 [mm/year]

GERMANY
700 [mm/year]

Figure 66. Comparing of average precipitation,
Aquastat 2008.

Surface and groundwater: produced internally [10^9 m^3/year]

POLAND
Surface water:
53,1 [10^9 m^3/year]
Groundwater:
12,5 [10^9 m^3/year]

GERMANY
Surface water:
106 [10^9 m^3/year]
Groundwater:
45,7 [10^9 m^3/year]

Figure 67. Comparing of average precipitation,
Aquastat 2008.

These two figures show, that Germany has better (bigger) internally water resources. It's also about precipitation and water produced internally on surface and underground. That for sure helps Germany to keep water resources on the same, high lever every year, even with two times larger population against Poland. While the difference in precipitation is not so big (600/700), the resources of surface water are two times larger in Germany and also the groundwater resources are over three times larger then it is in Poland.

Water resources, total renewable [10^9 m^3/year]

Water resources, total renewable [10^9 m^3/year]	
Poland	**Germany**
Internal	
53,6	***107***
Surface water, external	
8	***47***
Surface water (total)	
61,6	***153***
Groundwater (total)	
12,5	12,5
Total renewable per capita [m3/inhab/year]	
1.599	***1.862***
Total exploitable	
33	***101***

Table 23. Comparing of basic water resources in Poland and Germany, Aquastat 2008.

Water withdrawal [10^9 m^3/year]

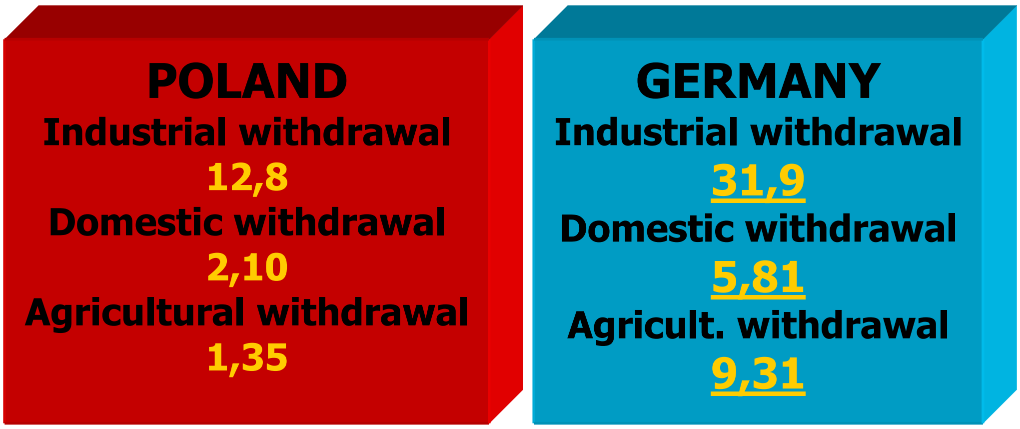


Figure 68. Comparing of water withdrawal by sectors, Aquastat 2008.

Desalinated water produced [10^9 m^3/year]

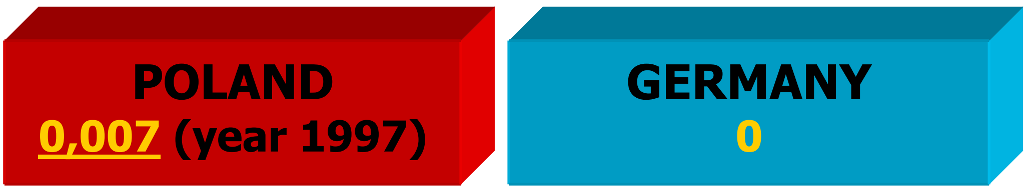


Figure 69. Comparing of desalinated water produced (1997), Aquastat 2008.

10.4. Conclusion.

In this almost final point, the biggest part of description is about comparing two countries – Germany and Poland, which was in fact the main idea of the project. We did comparison in two main levels: about environmental law structure in governments and about water resources.

In theory, there should not many differences in politics, and environmental structure, because since 2004, both countries are under European's Community law (Germany as a founder of EU, and Poland as a new country), and everything in the community is going to be similar, to have better control over the issues. When we see the governmental structure of both countries, we find our suppose truly. Alike Germany and Poland have the same king of national supervisors – there is a President function and the function of Ministry Master (Prime Minister in Poland, The Chancellor in Germany). The differences in their powers are not really big (for example in Poland, The President still has VETO power, in Germany it is only representative function.

Both countries have Legislative and Executive authorities. For Legislative bodies alike in Germany and Poland there are two rooms in each country: SEJM and SENAT in Poland and BUNDESTAG and BUNDESRAT in Germany, with annotation that SENAT and BUNDESRAT are the upper rooms, and two others: lower rooms.

As I mentioned before, the Governments have their own supervisors, who keep the power over the government and the Ministers (with the small difference, that in Germany there are separated supervisors for each land, and in Poland there is a body called Council of Ministers). In fact we can say, that the differences between this two countries are mostly figurative, and that is because the most important decisions and legislations (environmental, for example) have their roots in European Parliament and European's Government structure, and if all of the countries from today's Community will sign the Ratification Treaty, all significant resolutions will be created about to Government of European Union (since 1.01.2009).

Strictly about environmental law structure in Germany and Poland, as we can guess, there are similar organisations and the structure is really not much different. The main units that take care about environment are: ***Ministry of Environment*** (Poland) and ***Federal Ministry for the Environment, Nature Conservation and Nuclear Safety***. Under this units there are several organisation connected with all environmental issues and also with water problems – of course. Some of the works directly under the Ministry and some of them are just institutions connected in some way with the main unit, for example advisory and opinion – pronouncing bodies.

In the second part of this paragraph we could see the differences in water resources between Poland and Germany. We can find easy, that Germany has better water situation, because of larger natural resources and also bigger precipitation in the year. It is profitable for Germany to have these resources of water, because the population of this country is very big (two times more than in Poland). Also we can notice, that water withdrawal is far more higher in Germany – mostly in industrial and agricultural sectors. Interesting fact is, that in 1997 Poland has produced a small part of desalinated water, when Germany hasn't at all. The fact that is worth to notice is, that if we look at the diagrams about water resources or population alike in Germany and Poland we can see, that everything is square, and the tendencies of all changes are very "flat". I think the main reason of this is the high and stable lever of development, which is an effect of sustainable development politics in both countries (and all European Community).

11. German and Polish vision of water protection.

11.1. Artificial lakes and dams in Poland.

Solina Reservoir – San

Lake Solina (Polish: *Jezioro Solińskie*) is an artificial lake in the Bieszczady Mountains region, more precisely in Lesko County of the Subcarpathian Voivodship of Poland.

Location	Bieszczady
Lake type	Artificial lake
Primary sources	San River
Primary outflows	San River
Surface area	22 km^2
Water volume	472 mio m^3

Table 24. Basic data about Solina artificial lake, Wikipedia 2008.

The lake was created in 1968 by the construction of the **Solina Dam** on the San River. It has an area of 22 square kilometers and contains 472 million cubic meters of water, making it Poland's largest artificial lake.

Figure 70. Solina Lake, Panoramio 2008.

It is the best known tourist attraction of the region, with waterside villages like Solina, Myczkowce and Polańczyk catering to watersports enthusiasts. The lake's great depth, water clarity, and mountainous scenery makes it a very popular destination for boaters. Because of these qualities the lake has been nicknamed the "Bieszczady Sea".

Figure 71. The dam on Solina lake,
Panoramio 2008.

Starting in the 1970s the Wojewódzkie Przedsiębiorstwo Turystyczne (State Tourism Enterprise) "Bieszczady" purchased a number of vessels for the lake and established the lake's White Fleet. The fleet's main ships offer cruises on the lake. (Wikipedia 2008)

Figure 72. Solina lake,
Wikipedia 2008.

Zegrze Reservoir – Narew

The **Zegrze Reservoir** (or **Zegrze Lake**, in Polish *Zalew Zegrzyński* or *Jezioro Zegrzyńskie*) is a reservoir in Poland, located just north of Warsaw. It is formed by a dam constructed in 1963 on the lower course of the Narew river (sometimes also called Bugo-Narew river). Its area is about 33 km².

Location	North of Warsaw
Lake type	Reservoir
Primary sources	Narew
Primary outflows	Narew
Surface area	33 km^2

Table 25. Basic data about Zegrze,
Wikipedia 2008.

This location, it is a very popular place of recreation for the inhabitants of Warsaw. (Wikipedia 2008)

Figure 73. Zegrze Reservoir,
Wikipedia 2008.

Wloclawek Reservoir - Vistula

On 6 July 2001, in Warsaw, a partnership of the World Wide Fund for Nature (WWF), the Global Water Partnership (GWP), academics, and civil engineers, in co-operation with the people, businesses and government of Poland, launched the 'Overview´ Report of the World Commission on Dams (WCD) - in their own language. According to officials, the Polish version of the Report makes the findings and recommendations of the WCD available and useful to a wider constituency of more than 2.000 individuals planning to use the Report to turn dam controversies of the past into development consensus for the future.

A multi-criteria options assessment based on the recommendations of the WCD was carried out to assess the alternatives available to secure the safety of the 1970 Wloclawek dam project, on the lower Vistula River. Alternative options being considered are 1) constructing an additional dam, 2) maintaining the existing dam, 3) decommissioning the existing dam: (UNEP 2008)

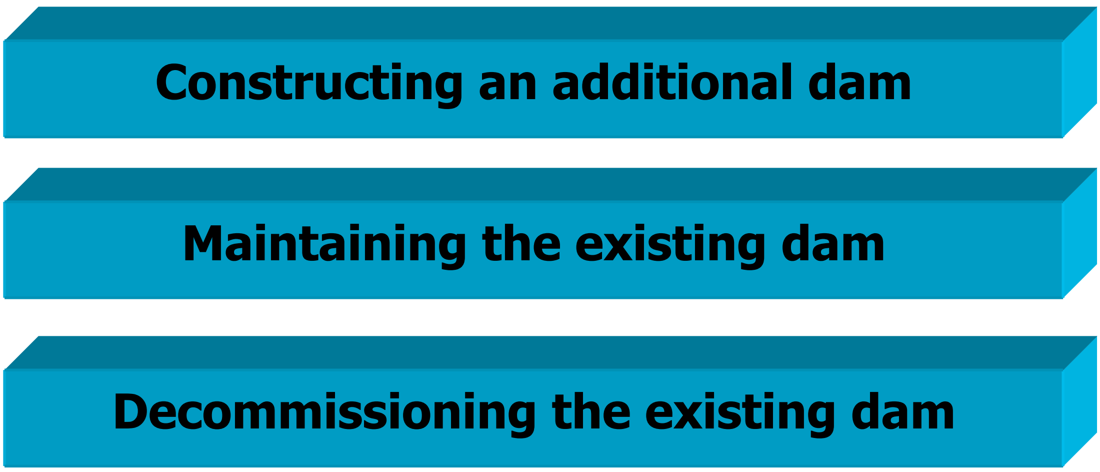


Figure 74. Alternative options for Wloclawek's dam project, UNEP 2008.

Figure 75. Wloclawek – dam on Vistula,
Wikipedia 2008.

11.2. WWF projects in Poland.

Introduction about WWF (World Wide Fund for Nature)

The main goal of **WWF** is to stop, and subsequently reverse, processes of environmental degradation on our planet.

Nature is a singular treasure of Poland, preserved on a scale that is rarely found in Europe. The crown jewels include the oldest forest of the European Lowlands - the Bialowieza Forest, the last large and natural European river - the Vistula, unique riparian forests, peat bogs, and diverse agricultural landscapes. Amongst these are found large animals such as the European bison, elks and wolves, which still thrive in their natural habitat together with numerous species of birds, insects and plants that are now rare in Europe.

Since the beginning of the organisation existence in Poland they have been carrying out numerous nature conservation projects. Their task has been to equally preserve the greatest natural assets of our country whilst ensuring the development of different regions in an eco-friendly manner and the well-being of local communities. All their actions are carried out in close co-operation with those who live in the particular area, in accordance with the principle: "Protect Nature with People and for People".

They care for the biological diversity of Polish nature, initiate the establishment of protected areas and they support those enterprises that support the sustainable management of natural resources. Important is to encourage the development of agricultural tourism, persuade investors to invest in renewable energy sources and also carry out numerous educational programmes that help to promote the conservation of Nature. (WWF 2008).

Main WWF projects:

Sustainable development

*"The basic assumption for **sustainable development** is to manage policies and activities in particular in the economic sector and in social life, so as to preserve environmental resources and values in such a way that secures the opportunity for future generations to use them, while the sustainability of natural processes and natural biodiversity performance is secured on landscape, ecosystem, species and gene level. The essence of sustainable development is an equal treatment of social, economic and ecological reasons, which means the necessity to integrate environmental protection issues in policies within particular economy sectors."* (WWF 2008).

Sustainable Development

The Sustainable Development Principle is included in the Constitution of Poland Sustainable development is a concept which binds economic growth with environmental protection and social development to create better perspectives for future generations.

Investments made in Poland, including those financed from EU funds, should support sustainable development. Meanwhile, an investment which, at the first glance, may seem profitable, i.e. the construction of a new road, port or real estate center, may in fact lead to environmental degradation, sometimes on an astoundingly large scale. Poorly planned investments constitute a great danger for Poland's unique nature, which is home to many animal and plant species not found in other places in Europe.

WWF takes action to prevent investment plans which are dangerous to the environment. They promote such ways of spending EU funds that improve living conditions of the local communities and, at the same time, protect and make good use of the natural potential of our regions.

They create a platform for exchanging experiences and information which contributes to environmentally friendly expenditure of the Structural Funds. We inform the public about projects which, contrary to the EU's intentions, expose regions to the risk of environmental losses. We demand higher standards for Environmental Impact Assessment (EIA).

WWF facilitates closer cooperation between ministries responsible for the economy and the environment as well as local authorities. We also promote the opportunities to use the EU financial instruments for the sustainable development of our country. (WWF 2008)

The Oder River

Since the flood in 1997, the river Oder is mainly associated with the flood hazard. Despite its regulation and the fact that its run has been shortened by more than 180 km, water drops have been constructed and banks have been strenghtened, the Oder valley has retained suprisingly much of its natural value, which makes it unique at the European scale. (WWF 2008).

Figure 76. Oder River, WWF 2008.

The aim of WWF activities in the Oder region is to stop any further degradation of the valley's natural environment, to protect riverine areas, as well as to design and implement envirnment -friendly methods of flood protection. We are also trying to build up approval for nature protection amongst river bank inhabitants through establishing bonds between the local economy and preservation of the region's natural values. WWF supports the development of agro-tourism and the necessary touristic infrastucture, as well as participate in establishing bicycle and educational paths.

They are developing our flood programme in the Oder region, on the basis of natural methods of decreasing the impact of flooding. As our experiences from previous years have demonstrated, raising embankments and constructing large retention basins are not efficient as means of protection against catastrophic water rises. Therefore, they are co - operating with local authorities in implementing solutions which, by giving the river natural space, would decrease the impact of overflows and reduce the losses connected with floods. (WWF 2008)

The Vistula River

The Vistula basin covers more than half of Poland. The river's condition and water quality influences the living conditions of most of the country's inhabitants. Thereby, the Vistula forms a unique treasure of nature in the country and is rightly called the "Queen of Polish Rivers". (WWF 2008).

The Vistula is the last large lowland river in Europe which has retained its natural character in many sections, whereas most European rivers have long been regulated or canalised. The many risks connected with extreme taming regulating of major rivers include: regular floods, the extinction of numerous plant and animal species as well as an impoverishment the riverside landscape.

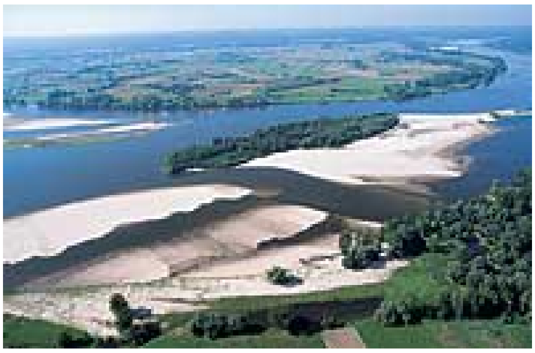


Figure 77. Vistula River – last major unregulated river in Europe, WWF 2008.

The aim of WWF project is to preserve the Vistula's natural values and promote the sustainable development of its basin. Responsible tourism and sustainable agriculture in particular have a unique opportunity to reach strong enhancement thanks to the specific character of the region.

WWF strongly focuses on these points and strives to establish a landscape park in the river's central current, thereby including most of the riverbed in 'Nature 2000', or the European Nature Protection System. We aim reorient inconsiderate plans to regulate the Vistula and the construction of the dam in Nieszawa in particular by recommending methods which not only make more sense in social and environmental terms, but which are also more economically efficient. Amongst others, we aim to reintroduce salmon and other migrating fish in the Vistula. (WWF 2008)

11.3. Artificial lakes and reservoirs in Germany.

Eschbachtalsperre

Location	Remscheid, North Rhine - Westphalia
Lake type	Reservoir
Catchment area	5,25 km^2
Basin countries	Germany
Surface area	0,14 km^2

Table 26. Basic data abour Eschbachtalsperre reservoir, Wikipedia 2008.

The **Eschbachtalsperre** is the first dam built in Germany for drinking water supply. It is located in Remscheid, North Rhine - Westphalia, Germany. With its opening in 1891, this pioneer work of hydraulic engineering was a milestone in the economic development of the city.

The Eschbachtalsperre was designed by professor Otto Intze. It was constructed during the years 1889 to 1891 by the industrialist Robert Böker following the idea of the Intze-Principle.

Until the beginning of the 20th century it was common in Germany to name the dam after the city where it stood rather than the waters it impounded. Consequently, in the writings of the times, the Eschbachtalsperre is also called the Remscheider Dam.

This impressive work of water commerce saw many diverse imitations world-wide and was a popular tourist destination from the beginning. Prince Friedrich Leopold of Prussia visited the dam on July 15, 1897. Two years later, Emperor Wilhelm II visited the dam and praised it as a great work of construction technology and water commerce. In 1977, in order to make the dam more attractive to visitors, a road was built around the reservoir that led to a nature trail.

Figure 78. Eschbachtalsperre reservoir,
Wikipedia 2008.

The dam was redeveloped from 1991 to 1994. It was refortified with a 35 cm thick concrete retaining wall and an inspection walkway on the water side. A new drainage system was also added, along with new removal processors and monitoring systems. A good view of the remodeled retaining wall and the water of the reservoir encircled by trees can be seen from the terrace of the A 1 rest stop, "Remscheid". (Wikipedia 2008)

Möhne Reservoir

Lake type	Artificial lake
Catchment area	432 km^2
Basin countries	Germany
Surface area	1067 ha
Water volume	135 mio m^3

Table 27. Basic data about Möhne artificial lake,
Wikipedia 2008.

The **Möhne Reservoir** is an artificial lake in North Rhine - Westphalia, some 45 km east of Dortmund. The dam was built between 1908 and 1913 to help control floods, regulate water levels on the Ruhr river downstream, and generate hydropower. Today, the lake is also a tourist attraction. The lake is formed by the damming of two rivers, Möhne and Heve, and with its four basins stores as much as 135 million cubic meters of water.

The dam was destroyed by British bombers ("The Dambusters") during Operation Chastise on the night of 16 - 17 May, 1943, together with the Edersee dam in northern Hesse. Special bouncing bombs had been constructed which were able to skip over the protective nets that hung in the water. A huge hole of 77 m by 22 m was blown into the dam. The resulting huge floodwave killed at least 1579 people, 1026 of them foreign forced labourers held in camps downriver. The small city of Neheim-Hüsten was particularly hard-hit with over 800 victims, among them at least 526 victims in a camp for Russian women held for forced labour.

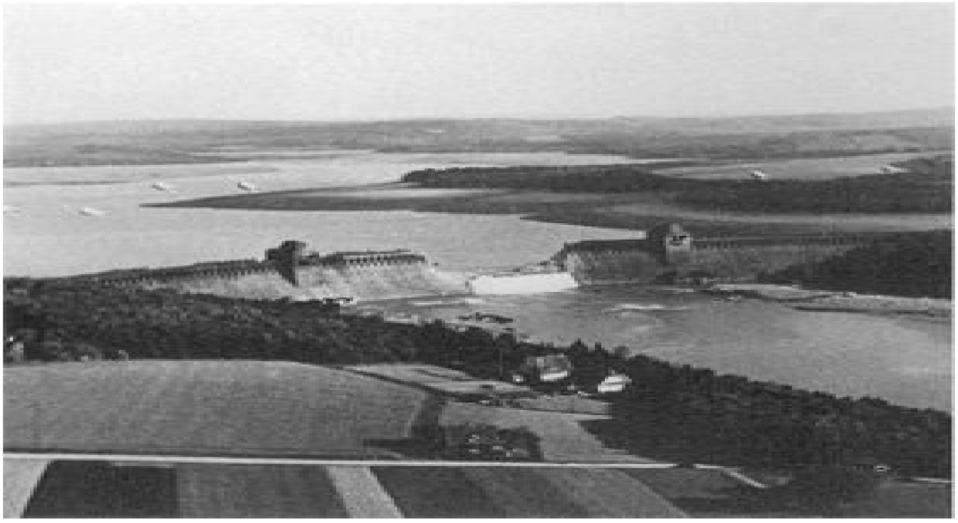


Figure 79. The breached Möhne Dam after the bombing,
Wikipedia 2008.

Though the Organisation Todt quickly repaired the dams with forced labourers commanded over from the construction of the Atlantic Wall, the impact of the raid on German industry in the Ruhr valley and indeed on the civil population was significant. In the Möhne and Ruhr valleys, 11 factories were totally destroyed, 114 seriously damaged, 25 road and rail bridges were destroyed and throughout the region power, water and gas supplies were seriously disrupted. Industry production was back at normal level by September, however. (Wikipedia 2008)

Figure 80. The dam of the Möhne reservoir,
Wikipedia 2008.

11.3.1. The artificial stream and pond systems in Germany by Federal Environment Agency.

The artificial stream and pond system of the German Federal Environment Agency's field station in Berlin - Marienfelde is a new, technically sophisticated test plant. Its facilities comprise 16 streams of 1,6 km total length, 16 ponds, approximately 5 km of pipe network equipped with more than 60 pumps, 360 valves and technical measuring equipment.

One objective of experiments is to examine the effects of substances and microorganisms, which are selectively introduced into the systems on the flora and fauna, and to gain experience concerning their dispersion and stability in different aquatic compartments. The substances can either be introduced into surface waters by treated municipal wastewater, by runoff from rural areas, or as the result of industrial accidents or atmospheric deposition.

Figure 81. View of the hall housing the indoor artificial ponds, Umweltbundesamt 2008.

The system is also used to validate studies carried out elsewhere and to improve continually the expertise of the Federal Environment Agency in regulation procedures for substances and mixtures. It also provides the Federal Environmental Ministry with scientific assistance in developing and consolidating environmental protection regulations.

Some features of the system, are:

I. Its modular design, providing maximum flexibility.
II. Simulation of both flowing and stagnant water systems.
III. Variable flow velocity allowing simulation of a wide range of aquatic systems.
IV. Availability of various water qualities for experiments - from groundwater to wastewater.
V. Long stream distance allowing point - source loadings.
VI. Different levels of simulation by use of indoor and outdoor systems.

Figure 82.Indoor stream, Umweltbundesamt 2008.

VII. Option to use up to 8 replicates in parallel for each of the indoor and/or outdoor systems.
VIII. Simulation of groundwater flow in semi-natural conditions.
IX. Possibility of using municipal wastewater.
X. Additional technical devices for measurements in water and sediment. (Umweltbundesamt 2008)

12. Global conclusion.

Here, it is necessary to put together the most important data about two countries, which we mention in the introduction – Germany and Poland. After comparison in project, we can show the differences, and similar issues about social aspects, the resources of water and the structure of environmental organisations in both countries.

First of all, the main economic difference is that in Germany, monetary unit is Euro, and in Poland there is still Polish Zloty. That is an effect of the time difference for being in European Community (EC) – Poland joined EC just in 2004, and Germany is some kind of inventor of "European" idea. That is the second main difference, because Poland has waited so many years to join the community, so it was difficult for this country to reach all the points (for example in making environment better) in this short time. Germany had its social programme for many years, while Poland was fighting with the hard history of this country, for example Soviet occupation after World's War II, for about fifty years. I believe, that before joining the Community, the social and environmental aspects in Poland were much different then in Germany (or at least the Western Germany), because by this time this country was making environmental policies together with other nations (first members of EC).

These days, when Poland is also a member of European Community for over four years, we can compare some real numbers between this two counties. First of all we can notice, that Germany is a little bit bigger about the land area, but what is the most important – Germany has two times more citizens (38 million against 80 million), so Germany should have more needs for water, then Poland, so they also need to care more about water social aspects. The differences between cultivated area are very small (which is also an effect of sustainable management in this sector), so if the water necessity in Germany are bigger, it is only because of the citizens or industrial needs. We can check it by comparing data from Aquastat database: All the sectors for water withdrawal are the way bigger in Germany, then in Poland, for example, industrial water withdrawal in Germany is about 31,9 * 10^9 m^3 /year and in Poland it occurs about 13* 10^9 m^3/ year. The same situation is with domestic withdrawal – it's almost three times bigger in Germany, and this may suggest, that German citizens use more water than Polish citizens (the population is two times bigger). Maybe we should look for the reasons in the water resources in both countries – Germany can use much more water, because their resources are larger (for example because of bigger precipitation in year – 600mm/year in Poland, 700mm/year in Germany). Beside groundwater resources, all the others are almost three times bigger in Germany (the main difference we can notice in external, surface water resources, so it means the inflows of water are very big). Even if we know, that the German population is larger, the numbers say that in Poland total renewable resources of water per capita are 1.599 m^3/inhab/year, and in Germany – 1.862 m^3/inhab/year, so Germany leads in the issue of water resources in almost all the aspects. By the way, we can mention about Polish programme of water desalination (last information from the 1997), when in Germany, this issue was not realized – probably because of high costs, and with no important reason for doing this programme in the country of large water resources.

Watching the maps of possible water scarcity in next 15 years we see, that Europe are is not on real danger about water resources. It's in big part because of providing the high level of sustainability for many years, making water protection and new directives to keep the resources in good condition. Alike in Germany and in Poland, the population growth diagrams are flat, and that means we also don't expect growing population next years. For water resources condition is a good sign – with this information is easier to plan developing of water in the future. Providing the sustainable development, it is possible, to stay on the same level of natural resources only with small looses - but this is unavoidable.

As we can see in the paragraph of comparing the structures for the environmental organisations, in both countries everything works almost in the same way – most of the policies are given by European Community: The organisation of water protection is very similar, we can't find important differences between Germany and Poland. If we look on the environmental structure we can see, that there is one main unit to supervise others – smaller, usually advisory bodies, which works on some special topics, for example meteorology, or hydrography. All the conformities are the result of being under the same law – European law, which provide good water and environmental politics, and the proof can be the water situation in Germany – still stable with the high water withdrawal and usage by the citizens. Now, it is the chance to provide the same directives in Poland, to keep its smaller (but also in good condition) water resources clean and stable for the next years. By the way, to reach the good level of water protection and management, Poland should follow the German water policies, because as we can see, it brings very good results across the years – the best for Poland (in fact for both countries) will be to co-operate with the western neighbour in all aspects of water policies. In my opinion about water protection, in countries like Germany or Poland it's important to show people how to treat water well, because even with new technologies it's hard to provide good management without understanding from the citizens. Anyway, there is no big water stress in this region of Europe, but the thing is to keep water tendencies in good condition, maybe even for supply other areas with higher water scarcity.

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