

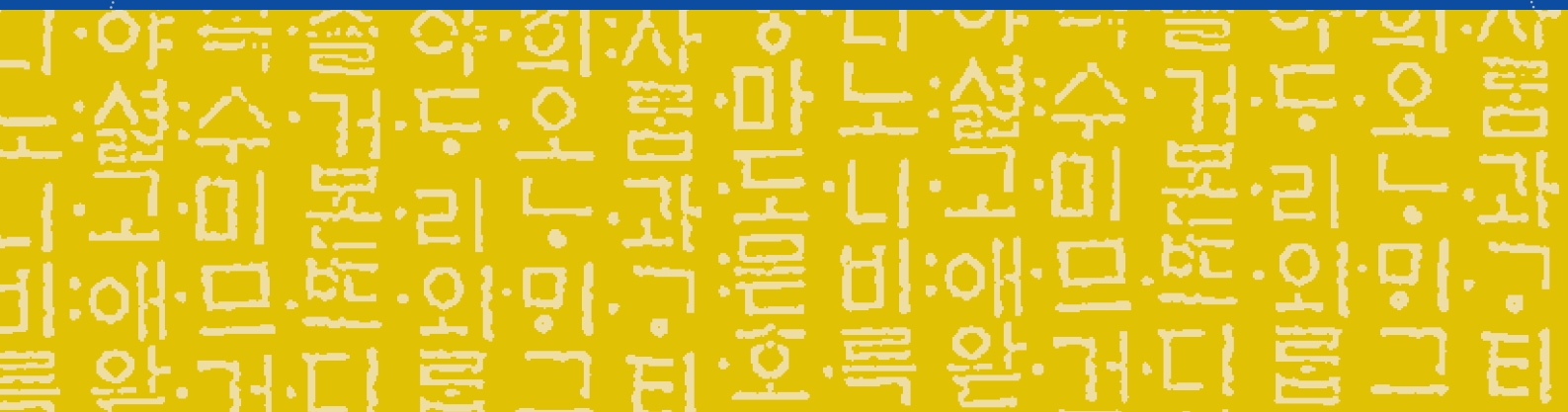


EDUCATION | SCIENCES | CULTURE | COMMUNICATION

Documentation of the **Symposium on Water – Education – Future**

Water in Education for Sustainable Development
22. September 2008 in the
Landesakademie des Sports in Hannover

UN Decade of Education for Sustainable Development (2005-2014)“



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Preface

By the Federal Minister for the Environment, Nature Conservation and Nuclear Safety

Dear Readers,

In general, Germany is blessed with a sufficient water supply. Due to a nationwide, state of the art wastewater treatment and production techniques that use reduced amounts of wastewater, we are able to keep these valuable water resources pure. Throughout the last decades, German rivers have become less polluted and nowadays swimming in many of them is possible again. Does that mean that everything is alright? Unfortunately, it does not.

Like in all the other states of the European Union the quality of the water bodies in Germany will continuously be improved until 2015. It is our aim to achieve good ecological conditions: Water bodies will once again become habitat for animals and plants. The public is intensively involved in the planning process in order to take the interests of all water users into account. Education for sustainable development may and must convey the competences which are necessary for those involved in the planning: starting with the technical understanding of the processes, continuing with the ability to take into account the different interests, up to the organisation of those processes.

The sustainable use of water throughout the world is one of the main challenges of the future. The German National Committee of the UN Decade of Education for Sustainable Development has taken on that challenge and has chosen "water" as the focus topic for 2008. My Ministry has led a working group which united experts on education and water. They considered in their discussion the different initiatives of the United Nations i.e. the UN Decade of Education for Sustainable Development (2005-2014) and the International Decade for Action "Water for Life" (2005-2014) and the International Year of Sanitation (2008) and decided on

what an activity centred education for sustainable development must look like.

This cooperation has proven to be very successful.

One of the results of that cooperation was the initiative for the symposium "Water – Education – Future", hosted by the German Commission for UNESCO during the German days of action initiated by the UN Decade. It took place in the "Landesakademie des Sports" in Hanover on September 22, 2008 and was meant to inform teachers and multipliers about the complex international field in the water sector by focusing on the issues of virtual water trade, sanitation and development cooperation, the EU Water Framework Directive and the protection of water bodies and drinking water as well as flood prevention.

More than 200 participants and numerous school classes have visited the Project Exhibition. This overwhelming response clearly shows the growing interest in the subject but also points out the need for continued training where education for sustainable development is concerned.

Let me finish by thanking all those who have contributed to the success of this symposium by their commitment, and who enhanced the UN Decade of Education for Sustainable Development with their ideas and examples of good practice.



Yours,
Sigmar Gabriel

Preface

By the Federal Minister for Economic Cooperation and Development

Dear Readers,

Life on earth depends on water. Without water, a person can only survive for approximately four days – but lacking water also affects entire countries and societies.

Today approximately 884 million people – one sixth of the world's population – lack access to clean drinking water.

About 2.4 billion people live without adequate basic sanitation. Water shortage and poor water quality are among the main causes of poverty, diseases and the destruction of the environment.

This is why one of the objectives of the seventh Millennium Development Goal (to ensure environmental sustainability) states: to halve, between 1990 and 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation.

Better access to water and sanitation is also the basis for achieving other Millennium Development Goals such as to end hunger, to fight poverty, to combat diseases and to fight for gender equality – girls are often charged with the time-consuming task of collecting water and thus do not have time to attend school. In addition, a large number of girls do not attend school because there are no sanitation facilities.

Clean water is also the basis for progress. If there is sufficient water, a country's development gains momentum. This is the reason why the water sector plays an important role in German development cooperation. Germany is one of the three biggest bilateral donors. It accounts for an annual volume of approximately 350 million Euros. In 27 partner states the German development cooperation concentrates on the sectors for drinking

water management and wastewater disposal. The Federal Government supports water management systems in the Middle East, along the Mekong River, in Kabul, along many of the African river systems like the Nile, the Congo or the Niger with the intention to provide clean drinking water and sanitation. Thus Germany's experience is made available throughout the world.

However, even here in Germany anyone can help. Our consumer behaviour directly affects the global water consumption level. For the production and the transportation of food and other consumer products much water is often needed, which is called hidden or "virtual" water. As a result, we, the industrialised nations use the water resources of other, partly much drier, regions. Producing for example one cup of coffee may take up to 140 litres of water; for the production of one sheet of paper (size DIN-A4) up to 10 litres of water are needed; manufacturing one cotton T-shirt takes ca. 2.000 litres of water. All in all, Germany belongs to the ten biggest importers of virtual water. The extent of our water consumption may be influenced by the responsible behaviour and the sustainable use of every citizen. Thus everyone can make a global contribution. Raising the awareness of the general public was among the main topics of the symposium "Water – Education – Future". The use of water has become a vivid example for the principal aim of education for sustainable development: to convey competence in light of these complex global relationships.

This documentation makes the discussions and results of this successful symposium available to a large public. I am grateful for this further contribution to the active debate and, at the same time, would like to thank all those who partici-

pate in the UN Decade of Education for Sustainable Development and global learning.

Yours,
Heidemarie Wieczorek-Zeul



Andreas Markurth

Welcoming address

Ladies and Gentlemen,

On behalf of the Lower Saxony Ministry of Education, I have the honour to welcome you to the symposium “Water – Education – Future” in the Lower Saxony capital Hanover. It is with great pleasure that the Ministry of Education accepted the proposal of the German Commission for UNESCO to co-host this symposium during the days of action concerning the UN Decade. I would especially like to thank those Federal Ministries which were involved in this project and the German Commission for UNESCO for the good and productive cooperation throughout the planning process of this extraordinary symposium.

Water is the focus topic for 2008 of the UN Decade of Education for Sustainable Development in Germany and the subject of this symposium. This symposium is not only meant for water experts but also, in the light of education for sustainable development, experts on education. Thus this symposium also addresses teachers and multipliers in formal and non-formal education and in teacher training programmes.



Photo credits: RaBoe/Wikipedia

Among the German states, Lower Saxony is one of the richest when it comes to water: From mountain streams and reservoirs in the Harz Mountains down to the dykes along the coasts. Water is an essential basis for life. It is a source of food for mankind, animals and plants as well as a resource for many industries. Therefore it is important to protect and conserve our water resources. Later generations should not only learn from books or movies what life was like when water could be used by mankind. In Lower Saxony, drinking water supply and wastewater removal have reached a high quality level. In order to provide future generations with a sufficient supply of clean water, one of the most important tasks of this century is to protect surface and ground water by means of environmentally friendly water management. In order to clean up our rivers and oceans a lot has been undertaken, at least in this part of the world.

In Africa, however, water and especially clean drinking water is a very rare commodity. In many areas water may cause sickness and disease. Even wars have been staged because of this resource and some say that access to water will increasingly be the cause of conflicts in the future.

Therefore it is our duty to teach our children the importance of using our water resources sustainably. How can we make a difference, in our schools, in our institutions, in our communities or just talking to other people? This is why this symposium is very special, because water experts and experts on education have

come together in order to look at this subject from different kind of angles and to thoroughly discuss the issue. I am eagerly looking forward to the various contributions and discussions in the different workshops. And I would be very glad if this symposium helped us to advance a little on our way.

Andreas Markurth

Lower Saxony Ministry of Education



Dieter Offenhäuser

Welcoming address

“We haven’t inherited this planet from our forefathers; we have only borrowed it from our children.” Is there any other sentence which points out any better the ambition and mission of the UN Decade of Education for Sustainable Development? Within the next ten years a change in mentality should take place, in individuals as well as in policy matters. The ideal of sustainable development in our global society, which ensures the quality of life of the present generation without limiting the chances of future generations, has to become a given fact for education in every country of the world. The German Commission for UNESCO located in Bonn has been charged by a unani-

“We haven’t inherited this planet from our forefathers; we have only borrowed it from our children.”

mous decision of the German Federal Parliament in 2004 with the implementation of the UN Decade in Germany.

Policies can only be politically successful if they convince people. The urgency of sustainable development has reached a new level due to the globalisation of markets and social upheaval. With respect to material prosperity and in part even democratic achievements, many former developing countries and emerging markets have drawn level with the former centres of the world, Europe and North America, and are adopting western life-styles and consumption habits along with all the non-sustainable consequences. It is often said – and quite rightly so – that Europe has long since procured, and not always gently, its share of the earth’s resources. It is often suspected that our commitment to sustainability is only a new way of the already rich countries to keep the status-

quo. We are faced with a dilemma: We realise the necessity of sustainable development, yet we continuously have to prove our sincerity towards the rest of the world.

Especially with respect to the credibility of our international efforts, the now 700 projects, which the National Committee has categorised as official German contributions to the UN Decade, play an important role. These projects exemplify innovative and broad implementation of education for sustainable development in Germany.

This is why I highly appreciate the voluntary commitment which fills this decade with “life”. The complexities of sustainability and the tensions that

can arise when solving problems in a global context can be easily demonstrated by using the topic of water as an example: 1.2 billion people do not have access to clean drinking water and almost double the amount do not have adequate sanitation. Scientists of the UNESCO Institute for Water Education in the Netherlands have calculated to which extent the cotton imports from Uzbekistan have added to the decline of the Aral Sea. The Andalusian province of Almeria owes its economic miracle to large-scale growing of tomatoes and vegetables in green-houses. However, these plants need irrigation and this causes groundwater depletion. Due to climate change, people have to face an increasing number of extreme weather events, for example floods and droughts, which had not occurred to such extremes in their regions before. Considering that all large European rivers are transboundary rivers, it is easy to comprehend the

important role the EU Water Framework Directive plays.

However, what does this mean with respect to education for sustainable development? This is the question discussed by the Working Group “Water and Education” of the UN Decade. This Working Group was set up by the Federal Ministry for the Environment and developed the concept of this symposium and the quality standards for good educational material on the topic of water. This material will be discussed in the different workshops. I would like to thank those present here, and those who were not able to attend, for the work the entire group has accomplished. This symposium will make a contribution by bringing together water experts, education experts and the UN Initiatives that concern education and water, because the answers to these questions can only be found in a combined effort.

Dieter Offenhäuser

Deputy Secretary-General of the German Commission for UNESCO



Introduction to the symposium topic

Background

With the UN Decade of Education for Sustainable Development (2005-2014), the International Decade for Action "Water for Life" (2005-2014) and the "International Year of Sanitation (2008)", the United Nations has undertaken diverse initiatives to raise global awareness for responsible water use. Against this background, the German National Committee of the UN Decade selected water as the focus topic for 2008. This expert symposium was held to promote interaction between water experts who are interested in education and education experts who are interested in water.

Questions and Issues

What knowledge and expertise must we have to use water sustainably? What can each individual do to meet the global challenge of securing our water resources? What does contemporary and relevant education on water issues need to contain? Against this background, the Working

Group of water and education identified these issues as particularly important:

- Water for sustainable consumption and sustainable production
- Primary drinking water supplies and wastewater treatment
- Water protection and the European Water Framework Directive (WRR)
- Water, climate change and extreme events

This symposium provided insights into issues facing water and educational experts dealing with education for sustainable development.

In this framework, dealing with complex relationships and conveying them coherently was just as important as the issue as to what are the opportunities for participating in water decision making processes.

Workshop

In the workshops, participants were able to:

- Develop quality criteria for educational materials on water that are oriented on

modern approaches for education for sustainable development (see page 22)

- Become acquainted with practical teaching and studying material as well as various stakeholders and vendors, institutions and associations at the Project Exhibition
- Talk about and try out interdisciplinary teaching methods on environmental and equal opportunity issues

Teaching materials

This documentation also contains a CD with numerous teaching and educational materials, which were compiled on the basis of the quality criteria for use in education for sustainable development.

It became clear that connecting criteria for good educational material to sustainable development with contextual issues such as water in educational discussions is still crossing uncharted waters and requires close cooperation between water and education experts.

**„Wenn man in seinen Gedanken versinkt,
darf man sich nicht mit seichem Wasser begnügen.“
Ernst R. Hauschka**

Übersetzung fehlt



Dr. Uschi Eid and Prof. Dr. Gerhard de Haan in a panel discussion with Dr. Helle Becker

Water in the context of the UN Decade of Education for Sustainable Development, “Water for Life” and the “International Year of Sanitation”



The UN Decade “Water for Life” and the UN Millennium Development Goals

Uschi Eid: In 2004, the former UN Secretary-General, Kofi Annan, declared that the UN Millennium Development Goals can only be achieved if all countries acknowledge that water is of utmost importance. All nations must set up their own plans for ensuring access to safe drinking water and adequate sanitation, as well as designating their own contact partners for drinking water and wastewater issues. It was in this context that the United Nations General Assembly decla-

red the year 2008 as the “International Year of Sanitation”.

Water education in schools

Gerhard de Haan: Traditionally, water issues are highly relevant in school curricula. Discussing the water cycle, drinking water supply and wastewater disposal are well-established topics even in primary schools. Not quite as well-defined is the importance of this complex issue in secondary schools, since water is only dealt with here in terms of subject-related partial aspects. Overall, it can be said that water is mainly considered in a

national context and that global problems and strategies are only rarely taken up.

Why is sanitation so important?

Uschi Eid: Sanitation is an urgent development-policy matter. Not having access to sanitation is a health care catastrophe that is not covered in the media. Around 5000 children under the age of five die each day from drinking unsafe water. Diarrhoea is the second most frequent cause of death of children and could be reduced by half simply by ensuring adequate sanitation. Inadequate sanitation and unsafe drinking water cause high health costs, an enormous work deficit and loss in productivity: Costs, which amount to five per cent of the economic power south of the Sahara, according to the UN development programme. It is hard to maintain dignity if people have to perform their bodily functions in public or if they live in a quarter where faecal matter is spilled out onto the streets. Women and girls who are able to perform their bodily functions in private are also better protected against sexual assault. Stalls that cannot be locked or unisex toilets contribute to the reason that girls in puberty frequently miss school or even no longer attend school.

What are the new water issues that will arise with respect to education for sustainable development?

Gerhard de Haan: Sanitation and the mentioned effects upon development opportunities and gender issues are topics that have received very little attention up to now.

„Water is the basis of all matter then everything is based on water and one day will return back to water.“
Thales of Miletus “Water is the first principle”

An issue that is currently receiving quite a bit of attention is so-called virtual water, which is used to establish a direct connection between our lifestyles and consumption habits and the amount of water needed to maintain them. Up to now, little attention has been paid to cultural dimensions: Understanding the role water plays in aesthetical, ethical and religious connections is necessary when dealing with future strategies.

Political Challenges

Uschi Eid: The bad example of industrial countries of predominantly using drinking water to flush toilets can only be countered if appropriate technologies are developed in the course of development cooperation and also implemented in the industrial countries. Otherwise, it could appear that poorer countries were being expected to be satisfied with second-rate sanitation.

An example of good work that has been done in this area is the work carried out by the German cooperation enterprise for sustainable development, the Gesellschaft für Technische Zusammenarbeit (GTZ), with the Ecosan concept (see box).

How can these new and complex relationships be realised on a daily basis in schools and educational curricula?

Gerhard de Haan: It is clear that these relationships cannot be handled as isolated topics in a 45-minute class. However, they can be excellently handled in interdisciplinary projects and in cooperation with nature and environmental centres as non-formal educational activities. Impressive examples of this could be seen among exhibitors at the Project Exhibition. In addition, cooperations with international partners can provide us with completely new experiences and changes in perspective. It is precisely these numerous schools that have reduced their water and energy costs and now have these savings to work with, which exemplify the astonishing opportunities for international partnerships with schools and other institutions.

Re-using wastewater and faeces is more sustainable and more economical than discharging them into surface waters. Ecological wastewater concepts are based on this principle and are internationally known as "ecological sanitation" or just "ecosan".



www.gtz.de/themen/umwelt-infrastruktur/wasser/8524.htm

The praxis orientation is obvious: Be it orange juice in the cafeteria or fresh fibre paper from pulp for copiers – the concept of virtual water provides a range of different options for action.

Encounters with two UN Decades – Opportunities arise!

Uschi Eid: The initiators and organisers are to be thanked for their efforts that with this symposium, a long overdue step has been taken. Synergy effects will inevitably arise and it would be desirable if sanitation could be raised out of the taboo zone. A first step is dealing with our standards of wastewater treatment.

which is another reason that cooperation is desirable. And even if it is not possible to stay continuously and permanently in contact, media and Internet provide good prime possibilities for constructive dialog.

Dr. Uschi Eid

Member of the Committee on Foreign Affairs in the German Parliament and Spokesperson for foreign cultural policy of the parliamentary group of the Alliance 90/The Greens; Deputy Chair of the UN Secretary General's Advisory Board on Water and Sanitation.

Prof. Dr. Gerhard de Haan

Department of Educational Science and Psychology, Head of the Institute for Educational Future Science of the Freie Universität Berlin, Chairperson of the German National Committee of the UN Decade of Education for Sustainable Development (2005-2014) and of the German Association for Environmental Education.

Dr. Helle Becker

Freelance science publicist, author and journalist



Another issue that should be dealt with in education is producing biogas out of faeces not just in large biogas plants, but also in small local applications. Hopefully, more than just this one exchange of ideas will arise.

Gerhard de Haan: Education for sustainable development urgently requires global perspectives and anticipatory actions,

Prof. Dr. Petra Döll

Hidden Water and Virtual Water Trade

Why do people need (fresh-) water, how do they use it? Water is withdrawn from surface waters and from groundwater for use in homes, industries and agriculture. In homes, water is used for drinking and eating, for washing and for disposing of excrements. In industries, water is used for the production of goods and electricity (cooling thermal power plants) and in agriculture, above all, for irrigation. If this water use is to be quantified, the amount of water that is withdrawn must be determined with pumps or the amount that is supplied to the user – in industrial countries usually via pipes. Actually, the term water consumption should be avoided, because water is not “consumed” during its use. This is the classical water management view of water use from the perspective of a professional water supplier – liquid water, which is withdrawn within a spatial unit and provided to an “end user”.

Another type of water use is the in-situ

use of surface water, in which the water is used directly, but not withdrawn. The amount of water “used” in this important type of water use, e.g. for generating electricity in hydropower plants, for navigating ships and for swimming and fishing, cannot be very well quantified and is not considered any further in the following.

A new view of water use has established itself recently that is a useful complement to the water management view. Here, water use is considered from the perspective of the consumers of the goods and the water used for their production. From this viewpoint, the amount of water is quantified that is used to produce the goods and is called “virtual” – or hidden – water. Allan (2003) developed the concept of virtual water, to show that water scarcity in the Near East could be combated by importing food instead of irrigating the fields to grow crops.

The total water use of a consumer is made up of the direct use of liquid water at home and the indirect use of virtual water through the consumption of goods. Virtual water consumption is dominated by the consumption of food, since plants have to evaporate water to grow. This total water use is called the “water footprint” (see www.waterfootprint.org). The water footprint is an indicator of the anthropogenic use of the natural resources, comparable to the “ecological footprint”, whereby the virtual water content of a product can be considered as a part of the “ecological backpack” of a product. The water footprint in Germany is ca. 4,000 l per day and person and is ca. 30 times as large as the household water use of ca. 125 l per day and person (see Fig. 1).

Vegetarians have a smaller water footprint, because ca. 10 kg of plants as feed for the animals are needed for the production of 1 kg meat. Thus, the virtual water contents of meat – but also of dairy products – are by far larger than that of vegetarian food (factor 5-15).

With the concept of virtual water, the influence that the individual consumer, through global trade of food and other goods, has upon the global water resources can be recognised. For example, by eating beef from a cow from Lower Saxony that was fed soy grown in Brazil, a German consumer indirectly influences the water use and water resource situation in Brazil. Thus, “virtual” water and the water footprint are parts of a holistic view of the resources used by mankind, which is suitable for an enhanced understanding of the human-environment-system in a globalised world.

However in dealing with the virtual water content of a product, it is necessary to differentiate whether the water used in the production was “blue” or “green” water (Falkenmark, 2007). Green water is the part of precipitation that falls on

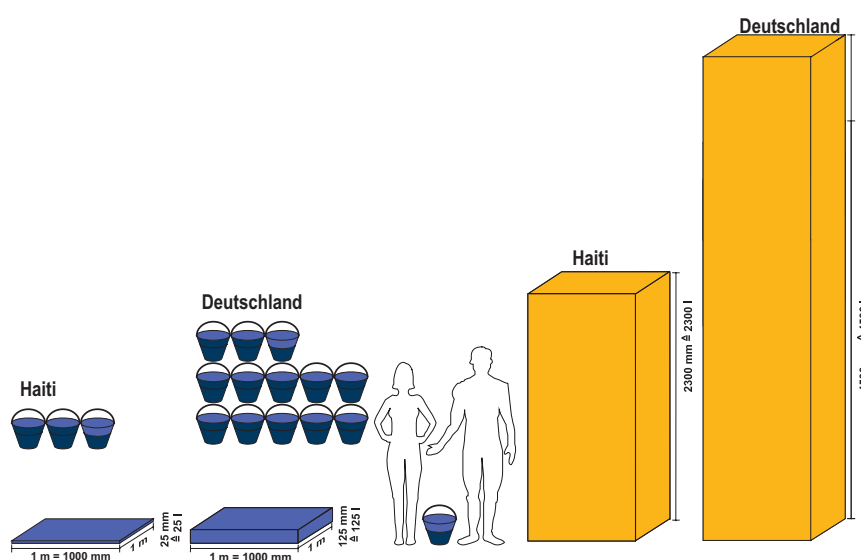


Fig. 1: Daily per-capita-water use in households in Haiti and in Germany (left side) as well as daily per-capita-water footprint in both countries (right side). Half of the water footprint in Germany is caused by the net-import of goods to Germany. Data on the water footprint are available at www.waterfootprint.org.

the field and evaporates, thus enabling the plant to grow. It accounts for the largest part of the agriculturally used water. Blue water is the water in surface water bodies and in groundwater that can be withdrawn and used. If fields are irrigated, in addition to the green water, blue water is also used. The use of blue and green virtual water has very different consequences. Using blue water to irrigate a field competes with water used in households and industries, and also for water use in aquatic ecosystems.

Thus, the use of blue water can lead to the drying up of rivers, as e.g. in the case of the Colorado River in the USA, with negative consequences for the aquatic ecosystem and the downstream water users. Using green water does not have such effects. However, agriculture, and thus virtual water use, often leads to a decrease in water quality, e.g. through the use of pesticides. Thus, it makes sense to quantify not only the blue virtual water, but also the green virtual water. Up to now, this has not been differentiated, but

now should be calculated according to green and blue separately. First steps have been carried out. (see Fig. 2, page 13) shows the global total water use for crops in 2000 as well as the percentage of the blue water. The latter is high in areas with intensive irrigation and often leads to water scarcity. A discussion on virtual water and the water footprint of people and countries should always be preceded by a clear portrayal of the earth's water resources. It is very important to emphasize the re-

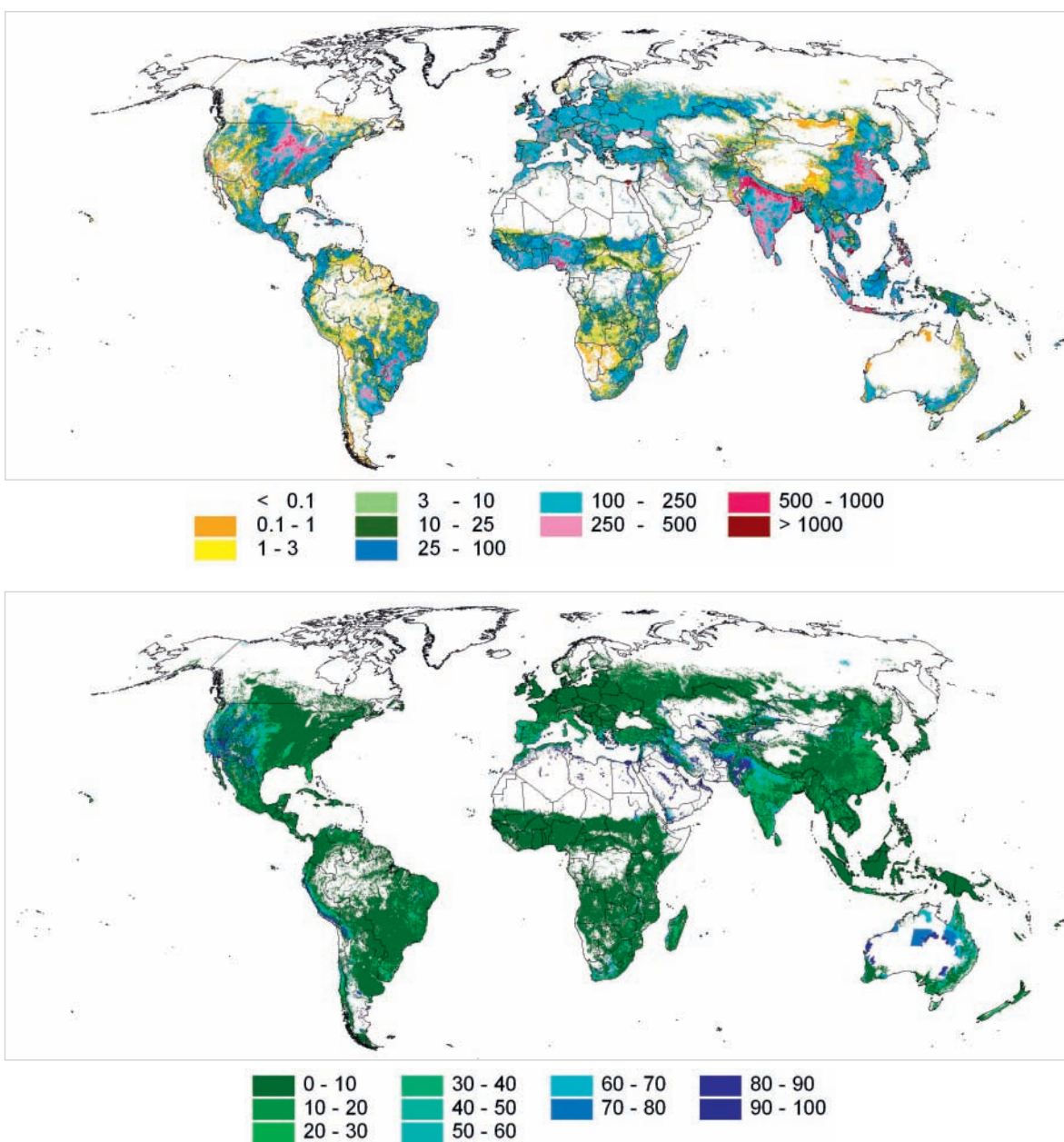


Fig. 2: Water use for crop production in 2000.
 Top: Total water use from precipitation and irrigation in mm/a.
 Bottom: Percentage of blue water from irrigation in percent. 1 mm water column corresponds to 1 l water per m² area (own calculations).

wable water resources instead of the usual portrayal of the water amounts in the oceans, glaciers, groundwater, etc. Renewable water resources in a region are defined as the long-term average of the difference between precipitation and actual evaporation. Furthermore, it should be shown how differently the renewable water resources are globally distributed (see Fig. 3, page 14).

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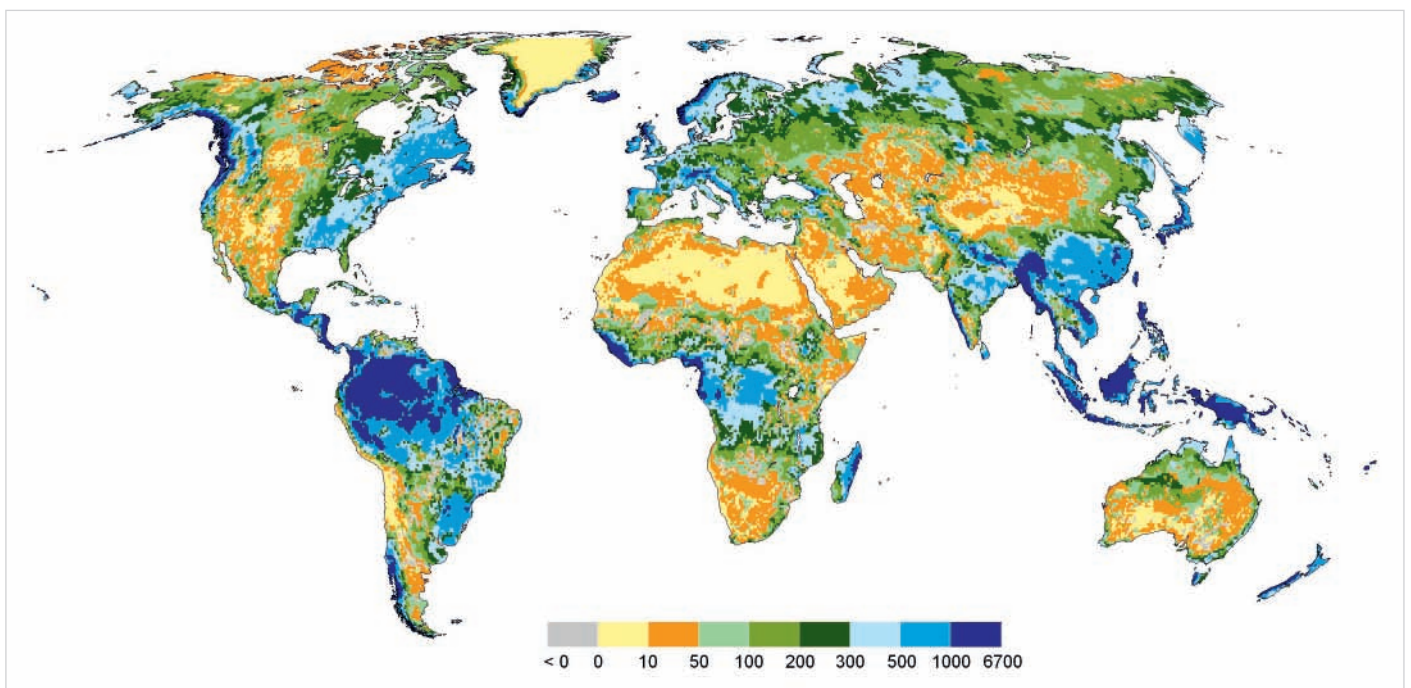


Fig. 3: Renewable global water resources, in mm/a (climate period 1961-1990, own calculations).

Franca Schwarz

Education, Health, Water and Sanitation

Recognising feedbacks and making better use of them

During the past century, the global population increased four-fold, but at the same time, the global water demand – due in part to economic development – increased ten-fold. Whereas only approximately two percent of the population lived in cities around 1800, in 2000 ca. 50 percent did and in 2030 it is estimated that ca. 75 percent will. This rapid growth is accompanied by a just as massive increase in problems, especially in infrastructure: According to official figures from the World Health Organisation (WHO), ca. one billion people have no access to safe drinking water at this time; more than two billion have no basic sanitation. In many countries, drinking water is only available in the residential areas of the prosperous and the rich. The poorer population can only get their water from a few taps or buy from tank cars – often at exorbitant prices. Untreated wastewater is disposed into groundwater or rivers, which are important sources of drinking water. This frequently leads to diarrhoeal diseases such as typhoid, dysentery or cholera. Every year, several million children die due to inadequate hygiene conditions, a lack of sanitation and unsafe drinking water. The World Health Organisation attributes ca. 90 percent of all diarrhoeal diseases in developing countries to unsafe drinking water and inadequate sanitation.

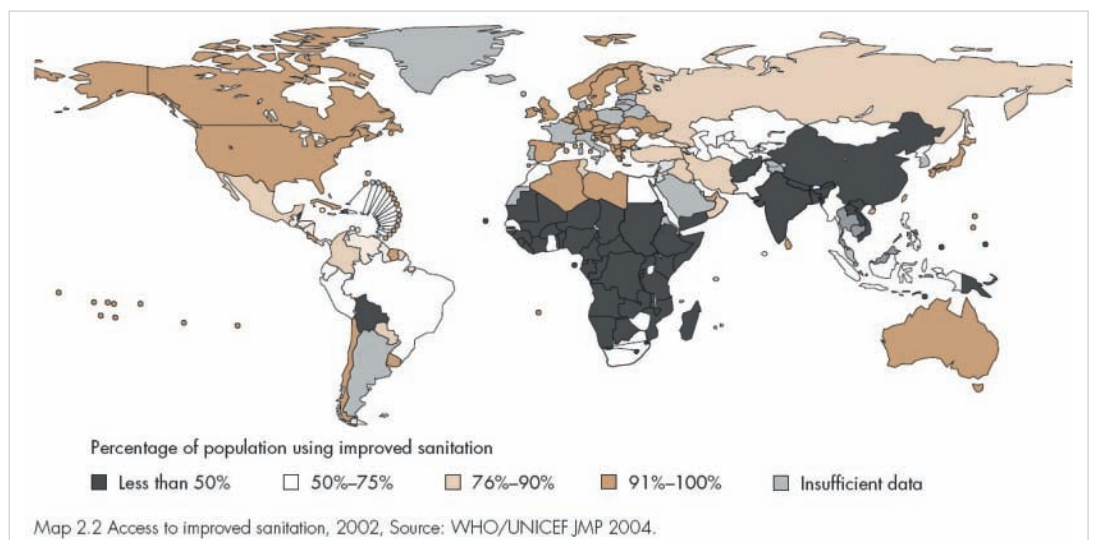
In addition to treating the wastewater management issue as a taboo, as well as policy shortfalls (e.g. many

countries do not have adequate standards or guidelines, planning tools or enforcement authorities), a lack of knowledge regarding the correlation between water, sanitation, education and health is a major problem. This lack of knowledge often leads to money being used to buy consumer goods instead of investing in a better (drinking) water supply or sanitation facilities.

In this context, the positive effects of providing safe drinking water and sanitation facilities are manifold and cannot be dismissed:

- Improved education: If children no longer have to haul water and sanitation facilities are available in the schools, it has been proven that more children attend school. The education opportunities for both boys and girls are improved. A lack of or unhygienic school toilets often lead to girls leaving school when they start menstruating.

- Fewer diseases: 90 percent of the diarrhoeal diseases in developing countries are caused by unsafe water and inadequate sanitation. Almost two million people die yearly because of diarrhoea, over 90 percent are children under the age of five. Improved water management reduces breeding places for mosquitoes and thus occurrences of malaria. Investments and campaigns lead not only to improved infrastructure, but also to increased awareness and better hygiene education of the population, thus avoiding additional diseases.
- Improved economy: The time gained by no longer being sick can be used for economic activities, i.e. household incomes increase and thus there is economic growth as a whole. In addition, the costs needed to treat the diseases, which were caused by unsafe drinking water and inadequate hygiene, are saved.



- **Gender equality:** In general, women and girls are responsible for securing the family's water supply as well as caring for the sick. However, when appropriate water and sanitation facilities are available, there are clearly less sick people. Thus, girls and women have more time, which they use to enhance the household income or other meaningful things, thereby stabilising their social position.
- **Environmental protection:** Inadequate drinking water supplies are generally accompanied by overuse of rivers, lakes and groundwater. Worldwide, more than 90 percent of industrial and household wastewaters remain untreated when disposed into groundwater and rivers, which are then used for drinking water. In addition, fertilisers and pesticides are often washed out from agriculturally used fields. This overuse, in combination with pollution, frequently leads to the destruction of ecosystems that had been intact.

Since water resources are global public goods, the United Nations declared the time period 2005 to 2015 as a Decade for Action with the title "Water for Life", which should also help in implementing the UN Millennium Development Goals.

Among other goals, the Millennium Goal 7 aims to halve the proportion of people who do not have access to water and basic sanitation, by 2015. Since there is much work still needed, especially in the area of sanitation, the United Nations also declared 2008 as the "International Year of Sanitation".

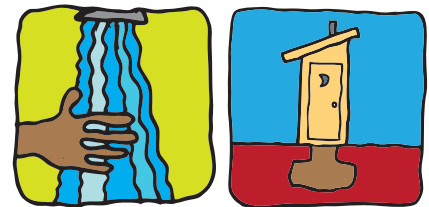
Therewith, this declaration calls for increased activities in the areas of household hygiene and wastewater management.

In detail, this means:

- Secure, affordable and dignified access to sanitation
- Sustainable wastewater and waste management, which protects people from infections and is environmentally sound
- Improved awareness for necessary basic hygienic behaviour.

At the same time, every contribution that aids in achieving the Millennium Development Goal 7 (water) is also a contribution that aids in achieving the Millennium Development Goals 1 (reduction of poverty), 2 (education), 3 (gender equality) and 4-6 (health). It is not enough to only promote setting up

INTERNATIONAL YEAR OF SANITATION

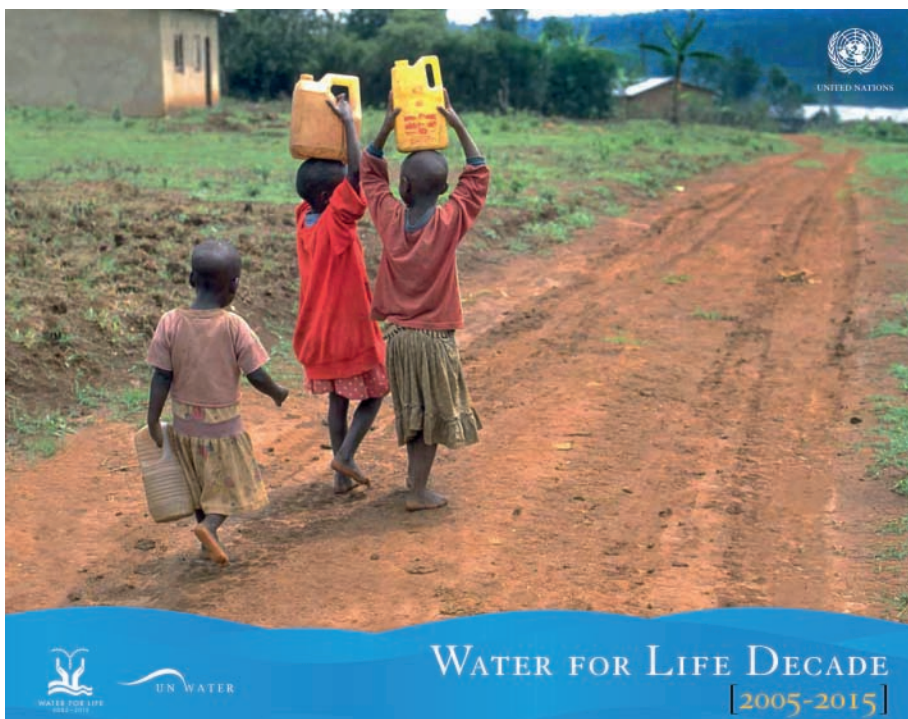


2008

the infrastructure; furthermore, the population's basic hygiene awareness must be enhanced. By demonstrating and imparting the correlations between basic hygiene and health, independent, responsible actions, as also claiming guaranteed rights, are enhanced and enabled. Germany contributes to this process in multiple ways. For example, water and sanitation areas have been in our main focus for more than 30 years in German development cooperations. Bilateral funding amounts to ca. 350 million Euros annually.

The basis for this is Integrated Water Resources Management (IWRM), which hopes to ensure that the development and management of water, land and corresponding resources are coordinated and promoted. The goal is to maximise economical, ecological and social effects. In practice, this means that in addition to improving wastewater management through financing infrastructure, that the responsible institutions are advised. In particular, it is of great importance to the German federal government that hitherto undersupplied and under-represented population groups are supplied as rapidly as possible, in accordance with national sector policy.

In doing so, it must be ensured that this supply is sustainable and that it can be maintained by the people locally. These challenges in areas of water and sanitation and bordering sectors can only be solved together with international and national partners. In other words: Cooperation between the recipient and donor



countries and the implementing organisations, between water supply and wastewater disposal companies, consulting companies, universities, governmental and private institutions are absolutely essential for success. There is no standard solution, but rather various approaches and locally suited and sustainable solutions must be found. In the future, intersectoral approaches in water and sanitation must receive more attention.

Franca Schwarz

Federal Institute for Geosciences and Natural Resources (BGR)



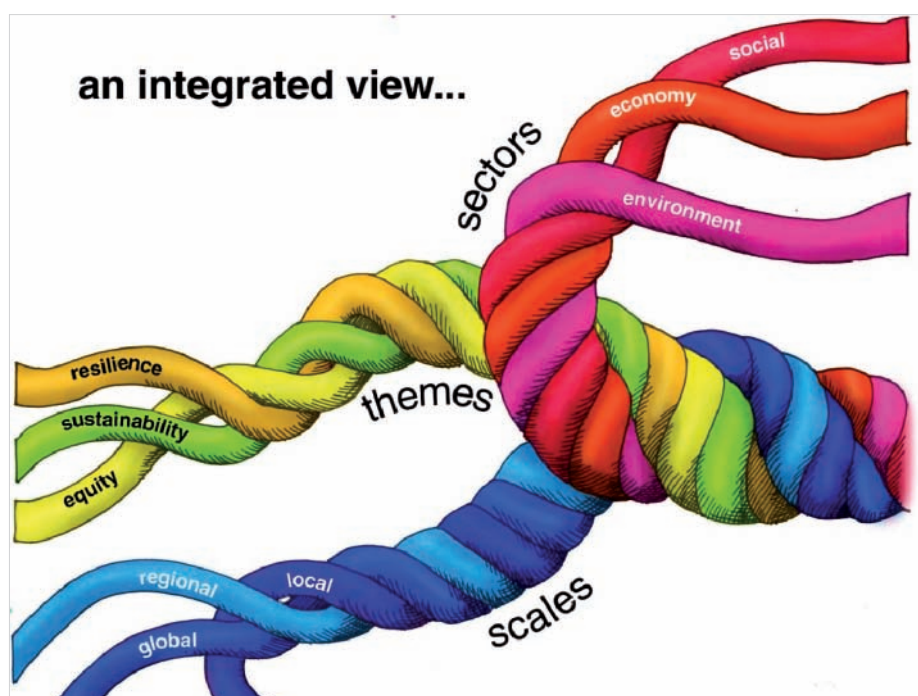
Co-author: Kirsten Dölle
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German cooperation enterprise for sustainable development)

„Die Erde ist ein gebildeter Stern mit sehr viel Wasserspülung.“
Erich Kästner

Übersetzung fehlt



Making drinking water protection in rural areas understandable! Project of the Federal Institute for Geosciences and Natural Resources (BGR) in Paraguay



Requirements for Integrated Water Resource Management (IWRM)

Dr. Joachim Bley

Common development of future water landscapes

How do educational opportunities support implementation of the European Water Framework Directive?

A biologist working in a water management administration has determined a deficit in the microorganism community in a water body. The upstream sewage plant is quickly suspected as the cause and the community that owns and operates the facility is required to further invest in it, although it already has good discharge values. A self-evident inference could be drawn between the deficit and the upstream inflow.

When the European Water Framework Directive (WFD) went into effect, more comprehensive approaches became mandatory in water protection. Now the goal is to sustain ecologically functioning water systems. Thus, the WFD stipulates a catchment area-wide consideration of all impacts and a differentiated investigation of the water bodies. It is no longer enough to only consider the invertebrates (macrozoobenthos), but rather, the biological water quality must also be determined based on fish, water plants



(macrophytes) and algae (phytoplankton). Furthermore, the chemical water quality must also be considered as well as hydromorphology. Based on these comprehensive investigations, water bo-

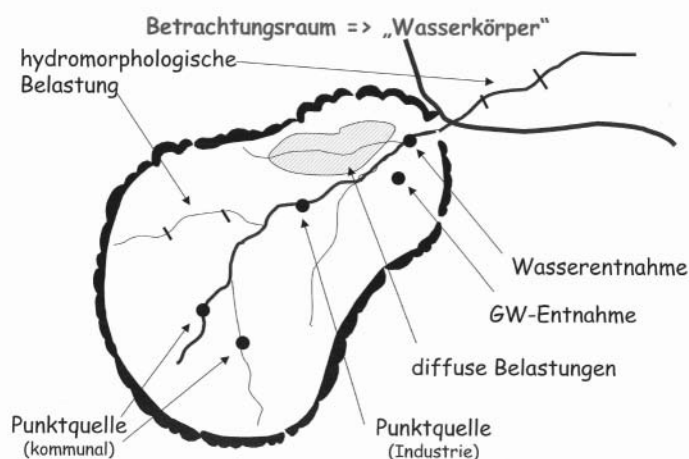
dies that have water quality deficits are determined.

A change from evaluating water quality to a comprehensive evaluation of the quality of the water body is taking place. The water management administration cannot carry out these tasks alone. It is dependent upon an informed population as well as upon their acceptance of the measures.

How can these new evaluation approaches be communicated? In Baden-Württemberg, a modular education concept was set up that was oriented for use with target groups in kindergartens, at schools and universities, for adults and families, in administrations and with specific user groups.

This concept will be presented in detail using active public participation with respect to WFD as an example. For the “poor” sections of the water bodies, measures are to be identified with which bet-

Grundidee WRRL



ter quality of the water bodies can be achieved. How can the general public be made aware of these topics?

1. Baden-Württemberg invited participants at the water catchment area level, where all participants could identify with their water body, to an active participation of all stakeholders. These events were always made up of three phases, an initial information phase, then an active phase, in which participants had the opportunity to directly enter their knowledge and recommendations in existing maps, and a final conclusion phase.
2. At this level of public participation, as many people as possible should be motivated to actively participate in formulating specific measures to improve the state of the water bodies. Thus, the invitations to the events should be distributed widely: Involved communities and administrations, regional and nature protection associations and other users as well as the general public. In addition, the place and time of such events should be well-planned, so that

**Up to your neck in hot water
Walking on thin ice
To be thrown into deep water
That's water under the bridge
Water proverbs and sayings**

employed participants could attend – that means at the earliest after 5 o'clock in the afternoon. The location of the place should be easily reached by all and preferably in a public building. The event and its location should



Intact water bodies have high aesthetic qualities (Biotoppass am Breitbach, Scherermühle)



Intact water bodies have high aesthetic qualities

be well signposted and allow a good presentation of the informational materials. This includes maps – and aerial photos, if available – and the use of modern information technology.

3. In an introductory talk, easily understandable key indicators as examples are used to explain the complexity of the problems and solution approaches are addressed. Above all, fish can be used as understandable key indicators. For example, in the Rhine, the successful resettlement of salmon in the river was chosen as a symbol for the improvement of the state of the water body. During this phase, it must be made clear that the administration already has specific knowledge and notions, but that in some cases, the local population is involved more closely in the current development of the situation and thus can provide suggestions and constructive critique. On the other hand, it must also be made clear that all suggested measures will be critically evaluated and that not every suggestion can be incorporated into the programme. Furthermore, the measures are subject to further official procedures and legal approval.

4. Comprehensive considerations of water quality include biology, chemistry and above all hydromorphology. This overarching approach must be reflected in educational material. The communication between all those in-

involved and the search for balanced solutions that take into account the interests of all stakeholders, water protection as well as water use, must be predominant. If ecologically and economically meaningful solutions for our waters can be found under these premises, then all will benefit from the solution.

Dr. Joachim Bley

Ministry for the Environment of Baden-Württemberg, Member of national and international river commissions (Rhine, Danube).



Prof. Dr. Uwe Grünewald

Water and Extreme Events

Usually, the general public is only aware of the natural resource “water” if there is too little or too much of it or if its quality does not allow important uses, which are now taken for granted.

Of all worldwide natural disaster occurrences, floods are the most frequent, cause the most economic damage and also cause the largest number of deaths.

**Water, water everywhere and not a drop to drink.
Still waters run deep.
To throw water on fire.
*Water proverbs and sayings***

Particularly seldom, extreme riverine floods – as in August 2002 in the Upper and Middle Elbe – have mercilessly shown again and again the weak points in our public and private flood prevention measures, here in our regions throughout history.

Extreme low water flow, as occurred throughout Germany in 2003 and 2006, are not unusual in our region. Low flow also produces constraints upon the usual usages and also again and again displays the weak points in our highly industrialised and seemingly highly organised society (e.g. restrictions in navigation and energy generation; local drinking water problems; drastic impairment of water quality, e.g. in backed up rivers). High water flow and low water flow are part of the spatially and temporally very unevenly distributed water cycle on earth. Inasmuch as they are parts of “nature”, they are not actually catastrophes. However, floods are viewed as catastrophes by mankind if their characteristics (e.g. flood peak flow, flood crest, flood duration) are so concentrated in one region that society undergoes severe hazards. In the course of these events such heavy damages to property and life can occur that the local societal structure

breaks down and all or some essential social functions cannot be fulfilled.

In this respect, damages due to extreme events (water related) should always be connected to a “likelihood of occurrence”. The intersection of both is often called “flood risk”. The necessary “Flood Risk Management” can be displayed as a cycle of flood prevention and flood coping (see Fig. page 21).

Flood risk management is an integrated task that cannot be solved in only one sector.

Coping with the various individual elements of flood prevention – such as e.g. providing space for flooding by stopping

the inclusion of “values” into potential flood risk areas – and their links are still unsolved problems. In particular, the multitude of stakeholders and the various department competencies cause difficulties again and again, especially in federally governed Germany with 16 different water laws (see Fig. on page 21).

Another special problem is the communication of the risk of (water related) extreme events, because the risk awareness,



Flood in New Orleans 2005

e.g. for floods in the public mind often fade quickly.

It is especially this context of communication that should be stressed in the development of educational materials on water and extreme events.

Alpine countries such as Switzerland and Austria, which are confronted with natural disasters much more frequently and directly, tackle these complex problems much more offensively. In Germany, there is a tendency to talk down such (natural) hazards and give the population a false sense of security.

Flood types

Floods that are caused by bodies of water

- **Coastal floods** (from e.g. storm surges or tsunamis)
- **Inland floods** (rain, snow melt, ice, mixed forms)
- **Catastrophic floods, which were caused by impoundage** (of rivers) (through landslides, rockslides, dam failure from moraines and through failure of man-made dams such as dykes, concrete dams)

Floods that are not caused by water surfaces or bodies

- **Flash floods**
- **Hydrometeorologically influenced or caused mudslides** (landslides or debris flow)

Possible educational opportunities are manifold. They range from (travelling) exhibits, senior and children universities and brochures, on to integration in school and university courses. Especially children can serve as multipliers.

Unfortunately, mass media tends towards portraying catastrophe scenarios than to problem related processing of the problems. Chances could arise in the development of adaptation strategies and tactics with respect to climate change, whereby however, history has shown that improvements in risk communication and risk management are desperately needed today, even without climate change.

Prof. Dr. rer. nat. Uwe Grünewald
BTU Cottbus

Professor for Hydrology and Water Management at the TU Cottbus, (now Brandenburg University of Technology, BTU)



Übersetzung fehlt



Flood Risk Management – an integrated task that cannot be solved in only one sector

Übersetzung fehlt



Fig. 2: The variety of stakeholders in flood risk management

Übersetzung fehlt

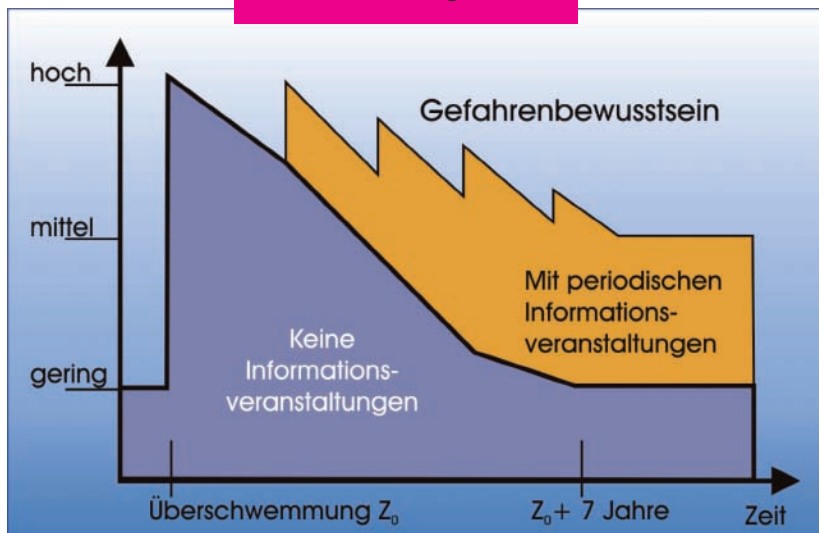


Figure on the right: Lessening of hazard awareness with time (International Commission on Rhine Protection)

Quality criteria for educational material

Within the framework of the UN Decade Education for Sustainable Development (2005-2014), the German National Committee selected water as the focus topic for 2008. Under the auspices of the German Federal Environmental Ministry, a Working Group (AG) “water and education” was formed with experts from the areas of water and education for sustainable development. At the interface of their work areas, these experts will establish a professional basis that will ease the selection and evaluation of educational materials and projects.

These quality criteria will help educational experts in selecting suitable material, authors in developing materials on water and education, and funding institutes in choosing eligible projects.

Fresh water core topics

What are the most important core topics in fresh water and sustainable develop-

ment, which should find their way into areas of education and their materials? The experts from the Working Group water identified four main areas.

- Water for sustainable consumption and sustainable production patterns
- Basic drinking water supply and wastewater treatment
- Water protection and European Water Framework Directive
- Water, climate change and extreme events

Education criteria

The goals set down in the UN Decade of Education for Sustainable Development in Germany were summarised by the education experts in the working group into five points:

1. The topic should belong to the central key topics of sustainable development,

which correspond to the core topics mentioned above.

2. The perspectives ecology, economy and social issues are chosen as central themes and are made workable with regards to their conflicts of goals and values along with their respective stakeholders
3. Target group adapted options of action are identified and opportunities for individual initiative and participation with respect to planning and policy are dealt with.
4. Relationships to the living environment and possible links to private and professional daily life of the students are provided.
5. With respect to the educational goals, it is mentioned, among others, which competencies are enhanced and how the teaching materials can be incorporated in the curriculum, if they are to be used in schools.

Overview of the institutes in the Working Group “water and education”

Allianz Umweltstiftung	Nature Conservation and Nuclear Safety (BMU)	Bavarian society for the protection of birds (LBV)
Arbeitsgemeinschaft Natur- und Umweltbildung Bundesverband e.V. (ANU)	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (GTZ)	LBV Kindergarden “arche noah”
Programme Transfer-21	German Association for Water, Wastewater and Waste (DWA)	S.O.F. Save Our Future – Umweltstiftung
Federal Institute for Vocational Education and Training (BIBB)	German Development Institute (DIE)	German Commission for UNESCO (DUK)
Federal Ministry for Economic Cooperation and Development (BMZ)	Helmholtz Centre for Environmental Research (UFZ)	Federal Environment Agency
Federal Institute for Geosciences and Natural Resources (BGR)	Inwent - Capacity Building International, Germany	Ministry for the Environment of Baden-Württemberg
Federal Ministry for the Environment,		German Association of Water Protection



Fresh water and salt water – two different viewpoints of the topic with multiple cross-references.

Selection of Internet sources on competency models in education for sustainable development:

Programme Transfer-21 – Explanations on design competency:

<http://www.transfer21.de/index.php?p=222>

Freie Universität Berlin, working group for educational future science.

Orientation framework for the educational area global development in the course of education for sustainable development:

http://www.globaleslernen.de/coremedia/generator/ewik/de/Downloads/Diverses/Orientierungsrahmen_20Globale_20Entwicklung.pdf

BMZ and Education Ministry Conference.

Core curricula for grade schools, grades 1-4, general studies/social studies:

<http://db2.nibis.de/1db/cuvo/ausgabe/>
Lower Saxony Ministry of Education

Basic attributes for selecting educational materials

The quality criteria correspond exclusively to work at the interface of water and education for sustainable development and assume that their users know, what characterises good educational materials with respect to good methods:

- Contextual quality
- Educational goal: Increasing the competencies for designing the future
- Service orientation, especially with respect to materials that are recommended for use in schools

Contextual quality

In this respect, this means not only contextually and factually correct, but rather also with respect to relevant issues of sustainability as well as multiple perspectives or system-theoretical approaches (above all ecological, social and economic

aspects and the resulting conflicts and dilemmas). Integrated topics that are relevant for various areas or respectively represent an intensification of the challenges such as climate change, the right to physical integrity, life styles and use conflicts, are always relevant when handling the issue of water and must be taken into account in various places.

Educational goals

Education for sustainable development should allow independent handling of the topic, in which forming own opinions and evaluating as well as contributing to the formation of one's personal and professional surroundings with respect to sustainable development is possible. This must be reflected in the materials overall, e.g. through corresponding methods, even if for instance, individual components are concentrated in providing know-how or other standpoints.



Service orientation

Pedagogic material can be used more widely if it is linked to the tasks that are to be accomplished anyway. There are only a few pedagogical situations, in which it is possible to incorporate additional contents. Thus it is very helpful for pedagogical experts, if the curricula and

competency areas, which can be achieved with the materials, are included in the materials.

Furthermore, understood under service orientation is everything that leads to the immediate use of the material or respectively that which can be easily adapted for own teaching goals, answer possibilities

given for tasks, etc. Due to the numerous educational areas (age groups / formal – non-formal / professional education) references to the curricula and educational standards cannot be given in detail. Specific educational criteria for the core topics will be handled in the workshops.

Workshop I

“I see water that you don't see”

Due to optimised household appliances, thrifty fixtures and consumer behaviour that is more conscious, the daily water demand in Germany is now less than 130 l per person. However, the actual water use is up to 4.000 l per person and day!

Implementing the educational criteria for this area

1. The topic is a key topic of sustainable development and has the following aspects:

- Virtual Water
- Life styles and water use (tourism, agriculture, food production – in particular meat, clothing, electrical appliances and other industrial goods)
- Water footprint (by country)
- Links to climate protection and adaptation (e.g. biogas)
- Political concepts on virtual water trade

2. The perspectives ecology, economy and social issues will be chosen as central themes and are made workable with regards to their conflicts of goals and values along with their respective stakeholders:

Principal stakeholders:

- Consumers
- Trade, Industry, Agriculture
- Energy sector
- Tourism
- Nature protection agencies and associations

Principal goal conflicts/problems:

- Ecology: soil erosion, salinisation, changes in the groundwater levels, biodiversity
- Social issues: Women, children, indigenous peoples as those mainly affected, corruption and violence; international conflicts and water as political leverage
- Economy: Bioenergy and water use, rising standards of living (in emerging markets) and meat consumption (especially production techniques that are water intensive)

3. Options of action are identified and opportunities for individual initiative and participation with respect to planning and policy are dealt with:

- Requesting labels or respectively regulations for using water efficient technologies
- Consumer decisions
- Support for projects and initiatives for sustainable economic activities
- Support for regional initiatives, which provide alternatives to products with large water footprints
- Support for ecological cultivation, also as a permanent part of the school profile

4. Social living environment references and possible links to the private and professional daily life of the students are provided:

- Water footprint as a tool for reflecting daily habits
- Decreasing the consumption of meat, since the virtual water use of meat is much higher than that of needed to grow crops
- School management: Recycling paper instead of white sheets
- Critical review of the selections offered in the cafeteria and stands in the schools



Daily reminder: exotic fruits play an important role in virtual water trade

- Projects for prolonged use of school-owned devices and electronics
- Agriculture as the largest water uses (often for export to Germany)
- Water scarcity in Germany

5. With respect to the educational goals, it is mentioned, among others, which competencies are enhanced and how the teaching materials can be incorporated in the curriculum, if they are to be used in schools:

- *To be open-minded and to use new perspectives to integrate knowledge, to analyse global change:* To recognise the relationships between global trade and water fluxes as well as global economical links, the impact upon water resources through global trade
- *To obtain and deal with interdisciplinary results:* there is relevance to all of the natural sciences, politics and economics, social studies as well as ethics
- *To obtain information and process it:* Research via www.waterfootprint.org and other Internet sites
- *To recognise diversity:* Loss of biodiversity, e.g. through monocultures
- *To differentiate operating levels of social action:* Personal consumption levels, political and economical control mechanisms in global trade, (European) policy and consumer organisations: Enhancement of eco-labels with respect to water in production
- *To think and act providently:* To comprehend strategies of economic operating levels
- *To reflect on one's own concepts and those of the others:* To reflect upon one's own lifestyle in dealing with water in cultural comparisons
- *To make use of critical reflection and opinions*
- *To evaluate and decide about design options:* to save water directly and indirectly
- *To motivate oneself to become active:* Increase in the quality of life through buying regionally made, organic pro-

ducts and knowing where it came from

- *To motivate others to become active:* Competition: comparing the water footprints from different schools
- *To show empathy and solidarity for those less fortunate:* Contact to people, whose lives have been impaired
- *To show understanding and conflict resolution:* Through role playing between stakeholder groups
- *To plan and act independently and with others*
- *To participate in decision making processes*



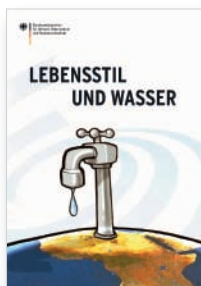
Workshop Transcript

The following three educational and teaching materials were considered:

Material 1:

The worksheets on virtual water from “Lifestyle and water” by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

www.bmu.de/bildungsservice



Material 2:

“Virtual water” for grade schools by Margret Datz.

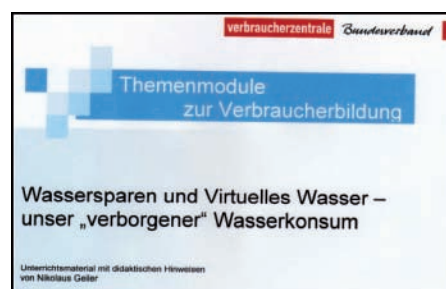
www.lehrer-online.de



Material 3:

“Saving water and virtual water” by Nikolaus Geiler from the Federation of the German Consumer Organisations e.V.

www.vzbv.de



Contextual Evaluation

The selected materials can only provide an introduction into the complex topic of virtual water. In handling this topic, it must be stressed that water resources should be introduced as “renewable water resources” that, in terms of long-term averages, are equal to precipitation minus evaporation. A comparison of regional precipitation and water use would be helpful. Thus, physical and geographical facts as well as climate diagrams for clarifying the material should be included in the lesson. Especially important is the connection between consumption and virtual water and how virtual water is used in the chain of production. To do this, the difference between blue and green water (cf. page 13) must be made clear.

Didactic Evaluation

The definite classification according to grade and school type and clarification of the initial competencies of the pupils when using the materials are necessary and often not satisfactory.

Questions should be less ambiguous and adapted to the educational objective-operators, as given in the curricula (e.g.: Instead of “think” or “gather information”, it would be correct to write “name” or “explain” or something similar). Multiple choice questions should be the exception. Photos, diagrams and figures should support the text in suitable sizes and forms. Sources and supporting documents for indicators and numerical data should be clear and definite for enquiries and easily traceable.

Moderation:



Rainer Berg

German Association of Water Protection



Prof. Dr. Petra Döll

Professor for Hydrology at the Goethe-University in Frankfurt/Main



Dr. Henning Smolka

Environmental Communication

Workshop II

Education, Health, Water and Sanitation

Almost seven billion people have to share the freshwater that is available on earth. Water use is increasing due to population growth and economic development. Over a billion people do not have access to safe, clean drinking water and in many countries there is an everlasting water scarcity, which has grave consequences for health and education.

Implementing the educational criteria for this area

1. The topic is a key topic of sustainable development and has the following aspects:

- Global political goal: To halve the number of people without access to drinking water and sanitation
- Different business models for water supply and wastewater management (privately owned services and public supplies)
- Access to drinking water is a human right, equitable distribution – social and political factors of water supply
- Services of general interest, right to physical integrity, health aspects
- Water management and wastewater management as core tasks in development cooperations
- Development and establishment of decentralised sustainable sanitation concepts

2. The perspectives ecology, economy and social issues will be chosen as central themes and are made workable with regards to their conflicts of goals and values along with their respective stakeholders:

Principal stakeholders:

- Poor populations in rural and semi-arid regions of developing countries (informal settlements, slums)
- Local governmental stakeholders and in development cooperations
- Public and privately own suppliers
- Technology providers
- Non Governmental Organisations (NGOs)

Principal goal conflicts/problems:

- Planning problems, as long as informal settlements are not formalised
- Scarce provision of funding
- Lack of competency in countries (set-up, operation, maintenance)
- Conflict due to commercialisation and privatisation (“water is not a good” or: Willingness to pay for the provision of the infrastructure)
- Lack of regulations, laws and enforcement agencies
- Unsettled responsibilities: Conflicts of interest between ministries

3. Options of action are identified and opportunities for individual initiative and participation with respect to planning and policy are dealt with:

- Partnerships between educational and research institutes and public suppliers in the course of city partnerships
- Participation opportunities for students during their studies or their apprenticeships: Commitment in NGOs
- Support of school competitions and projects (e.g. German Toilet Organization)
- Voluntary Community Service (FSJ), “weltwärts” (world-wards): development volunteers service of the German Federal Ministry for Economic Cooperation and Development, ecological sanitation (ecosan, see page 11) in school gardens

4. Social living environment references and possible links to the private and professional daily life of the students are provided:

- Empathy with the involved people in developing and emerging countries

- Situation during vacations and the water, educational and health situations there
- Direct connections through German influence in development cooperations (governmental, parochial, non-denominational NGOs)

5. With respect to the educational goals, it is mentioned, among others, which competencies are enhanced and how the teaching materials can be incorporated in the curriculum, if they are to be used in schools:

- *To be open-minded and to use new perspectives to integrate knowledge, to analyse global change:* Educational material can be used to encourage dealing with the taboo topic of sanitation and to recognise the connections.
- *To obtain and deal with interdisciplinary results:* Water and sanitation can be covered as interdisciplinary topics (e.g. geography, chemistry and ethics).
- *To obtain information and process it:* references to information sources, e.g. BMZ, “Bread for the World”, UNICEF, WHO.



- *To recognise diversity:* Material should contribute to gaining intercultural insights
- *To differentiate operating levels of social action:* To recognise cities and communities, national political structures and NGOs as stakeholders
- *To think and act providently:* Water and sanitation and hygiene are represented as elements that belong together in sustainable development
- *To reflect on one's own concepts and those of the others:* Contemplating the situation in developing countries encourages reflecting on the responsibilities for the environment and one's own health
- *To make use of critical reflection and opinions:* What is the water and sanitation management like in my home town? Are there still challenges? Am I affected by the situation in the other countries? Can I do something to change the situation there?
- *To evaluate and decide about design options:* Is the significance of the issue correctly represented in development cooperations? Strategic considerations with respect to limited funding: Priority for a functioning water supply and sanitation? Or integrated management?
- *To motivate oneself to become active:* School sponsoring, among others, through the German Toilet Organization. Talk about beautifying the lavatories at one's own school or plan to install water conserving toilets
- *To motivate others to become active:* Participation in events from governmental institutions (e.g. BMZ and partner organisations); Supporting NGOs such as Bread for the World, Kinder-nothilfe and others.
- *To show empathy and solidarity for those less fortunate:* Being able to put oneself in another one's living situation and realising that sanitation aspects need to be openly discussed
- *To show understanding and conflict resolution:* Being able to also understand perspectives and situations from other cultural surroundings
- *To plan and act independently:* To be able to also influence hygiene decisions in one's own circle of influence
- *To plan and act with others:* Develop stronger intercultural competency



- *To participate in decision making processes:* Stress sanitation as an issue in development cooperations (governmental and privately owned) more strongly and introduce it in further educational areas (e.g. higher education)

Material 2:

The magazine "Kinder, Kinder" – "Robinson in Ethiopia" by the Kindernothilfe.

www.kindernothilfe.de

Workshop Transcript

The following three educational and teaching materials were considered (more details on contents and references in the accompanying CD):

Material 1:

The worksheet "In the beginning there was a village" ("Am Anfang war das Dorf") from "Lifestyle and water" by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

www.bmu.de/bildungsservice



Material 3:

The brochure "Clean water for all" ("Sauberes Wasser für alle") from the German Association of Water Protection.

www.vdg-online.de



The Educational Materials

Although there are numerous high quality informational materials in German on this issue, there are only a few that deal with didactics.

According to the participants, the material that was presented here is only conditionally suitable for teaching. The main points of criticism were the, in part, factually incorrect representations, the inadequate designation of the target groups, the indiscriminate use of teaching materials for very different age groups, the lack of integration of international perspectives as well as insufficient didacticism of the materials. In addition, a stronger link to practice would be preferable. The educational materials of the project Transfer-21 were pointed out in the course of the discussion.

(www.transfer-21.de).

The Quality Criteria

With respect to this issue, the participants expressed the need for further expert information on water and sanitation. Thus it would be desirable that material intended for education for sustainable development include a definition of sustainability and how it is used. Basically, the criteria were evaluated as an important basis for evaluating and preparing didactic materials, which should be further elaborated. Photos and methods as well graphics and legends should be appropriately adjusted to the age of the target groups.

Moderation:



Kirsten Dölle

German cooperation enterprise for sustainable development (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ))



Günter Klarner

CREative TAten



Franca Schwarz

Federal Institute for Geosciences and Natural Resources (BGR)

Go, I say,
Go on your way,
do not tarry,
water carry,
let it flow abundantly,
and prepare a bath for me!

From: Johann Wolfgang von Goethe „The Sorcerer’s Apprentice“

Workshop III

“Common development of future water landscapes”

With the European Water Framework Directive (WFD), the countries of the EU have created a legal framework for a common sustainable and environmentally friendly water management.

Implementing the educational criteria for this area

1. The topic is a key topic of sustainable development and has the following aspects:

- Implementation of the WFD
- Transboundary cooperation, conflicts of use, use concepts, taking into account of the environmental characteristics in catchment areas
- Precautionary principle – Avoidance of water pollution due to “new” substances (e.g. micro-contaminations, pharmaceutical residues), avoidance at the source
- Sustainable use of water resources, groundwater protection, intergenerational justice, climate change

2. The perspectives ecology, economy and social issues will be chosen as central themes and are made workable with regards to their conflicts of goals and values along with their respective stakeholders:

Principal stakeholders:

- Water management operators
- Farmers
- Fisheries
- Tourism branches and associations
- Nature protection associations
- Power plant operators
- Professional inland navigation
- Consumers
- Industries

Principal goal conflicts/problems:

- Energy supply: Water power or flow continuity of the water body?
- Renewable primary products or groundwater protection?
- Water use in energy production with coal and nuclear power

3. Options of action are identified and opportunities for individual initiative and participation with respect to planning and policy are dealt with:

- Involvement of interested parties and population in implementing the WFD
- Agriculture: Applying good ecological practices, providing for buffer strips, etc.
- Stream sponsorships through the general public, schools and nature protection groups
- International exchange of water body observation data of, e.g. between schools
- Policies: Approving intervention payments (eco-account) for water body measures
- Industry: Use of industrial water, internal water cycles, minimisation of water use through process changes, etc.
- Tourism: Behaviour near and on water bodies

4. Social living environment references and possible links to the private and professional daily life of the students are provided:

- Demands on the water bodies of people

who live on those water bodies with respect to good quality and leisure activities

- Indirect responsibility as a consumer: Potential contamination of the water bodies through agriculture near banks and shores or through fisheries
- Water quantity: Personal actions with respect to water (e.g. saving water). In Germany, this is only locally relevant, but in countries with water scarcity, a main issue!

5. With respect to the educational goals, it is mentioned, among others, which competencies are enhanced and how the teaching materials can be incorporated in the curriculum, if they are to be used in schools:

- *To be open-minded and to use new perspectives to integrate knowledge:* Holistic views of water bodies from all perspectives, national and international
- *To obtain and deal with interdisciplinary results:* See section 2 on “perspectives...”
- *To obtain information and process it:* Indicate that the official agencies are required to provide information and that there are (re)search possibilities of data in the Internet and for own data capture on water quality
- *To recognise diversity:* The value of biological diversity, e.g. adaptation of the flora and fauna to flow conditions. Diversity of restoration methods. Importance of diversity for the natural purification of water bodies
- *To analyse global change:* Climate change effects upon water bodies (minimal flow and flash floods). Common projects with developing countries as comparisons
- *To differentiate operating levels of social action:* EU-requirements and implementation in member countries; federal framework competence, imple-

„The air is fresh and it darkles,
And smoothly flows the Rhine;
The peak of the mountain sparkles,
In the fading sunset shine.“

From: Heinrich Heine „Ich weiß nicht, was soll es bedeuten“ (Buch der Lieder, Nr. 2)



mentation in 16 federal states, stakeholders on water bodies, including leisure activities. Regulations e.g. with respect to industrial chemicals in locations with different river catchment areas

- *To think and act providently:* Long-term effects of agricultural use upon groundwater and medicinal residues in surface waters
- *To reflect on one's own concepts and those of the others:* Leisure activities such as fishing, boating in unspoiled nature; Food production (quality products, organic crops), Medicinal residues
- *To make use of critical reflection and opinions:* WFD participation procedure is explained and thus offers motivation to take a stand on issues. Designation of dilemmas such as water power vs.

river continuity, critical handling of (over-) regulation by WFD

- *To evaluate and decide about design options:* Material provides contextual knowledge for evaluating design opportunities on the waterfront
- *To motivate oneself to become active:* Material provides incentives for attractive events and the sources where other stakeholders (nature protection associations, Agenda 21 groups) can be found
- *To motivate others to become active:* Material provides examples such as visits from farmers whose fields abut water bodies and provides motivation for implementing buffer strips
- *To show empathy and solidarity for those less fortunate*
- *To show understanding and conflict resolution:* Role playing and simulation games for simulating public participa-

tion procedures

- *To plan and act independently:* Rights and limits of own actions with respect to water bodies
- *To plan and act with others:* Encourage project work in the course of water re-naturation and common events in leisure areas (fisheries and tourism). Get to know the perspectives of other stakeholders in the participation procedures
- *To participate in decision making processes:* Role playing and simulation games in the decision-making processes. Opportunities for co-determination in spatial-planning and policy matters, for example in water continuity

Workshop transcript

The following educational and teaching materials were considered:

Further criteria for evaluation of water protection materials can be found in the media database “H2O-Wissen” of the Federal Environment Agency (UBA). Approximately 80 of the ca. 400 described educational materials that deal mainly with water protection for schools and extracurricular sectors were evaluated from the viewpoint of education for sustainable development. <http://www.h2o-wissen.de/>

References to school curricula

A comprehensive catalogue of references to curricula for various grades in the Elbe riparian federal states can be found under http://fgg-elbe.de/lernmaterial/mach_mit/lehrplan.php#

Material 1:

Material on rivers, Ministry for the Environment of Baden-Württemberg
http://85.10.209.136/wbw/news/GWP_Materialien_Fliessgew_2008



Material 2:

Water in the 21st century, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
www.bmu.de/bildungsservice



Material Group 3:

Deutsche Umwelthilfe
Schools for a Weser that's alive – workshops (on the Internet)
www.duh.de/sflw-arbeitsm.html

CD from the Environment Education Berlin “Bach Land Fluss” (CD)
www.duh.de/291.html

“Ecological Evaluation of Rivers” from the German Association of Water Protection
www.vdg-online.de

“Our Stream under the Microscope”
 (“Unser Bach unter der Lupe”)
European otter protection

Material 4:

Danube-Box, International Commission for the Protection of the Danube River (IKSD)
www.donaubox.de



Educational criteria

The publicity carried out in the forefront of the participation processes on the implementation of the European WFD clearly shows how important careful planning and preparation are for reaching the target groups. Even if there are already concepts for educational institutions and a continuing education community (see www.wbw-fortbildung.de), the available information material can only serve as a basis for educational work and must be adapted to the respective specific local conditions. Communication between all those involved and searching for balanced solutions that consider the interests of all water users and water protectors are practical examples for participation that is hard to implement.

Quality criteria

The quality criteria were proven to be helpful, because aspects such as relationship to the environment, action orientation and the acquisition of competencies for participatory processes play an important role.



Bürgerinnen und Bürger konnten ihre Anliegen und Vorschläge zum Schutz lokaler Gewässer auf Karten befestigen.

Übersetzung fehlt

Moderation:



Dr. Joachim Bley
Ministry for the Environment of Baden-Württemberg



Annette Dieckmann
Arbeitsgemeinschaft Natur- und Umweltbildung (ANU)



Dieter Gadermann
Deutsche Kommission zur Reinhaltung des Rheins in the Ministry for the Environment of Baden-Württemberg

Workshop IV

“Too much water – too little water”

Natural events such as floods and droughts are parts of our natural environment and occur again and again. These phenomena are only catastrophes if people and their goods are involved. These weather events could be occurring more frequently and more extremely due to climate change.

Implementing the educational criteria for this area

1. The topic is a key topic of sustainable development and has the following aspects:

- Flood risk management: This includes, among others, increasing the natural flood retention capacity of the catchment areas, technical flood protection measures, disaster prevention and assistance, support for reconstruction; create premises to enable self-reliant actions of the residents.
- Drought management: Providing provisions and dealing with low water and droughts.
- Based on current knowledge, climate change increases the occurrence of extreme events.

2. The perspectives ecology, economy and social issues are chosen as central themes and are made workable with regards to their conflicts of goals and values along with their respective stakeholders:

Principal stakeholders for “too much water” (flood risk management):

- Flood risk management (“too much water”) concerns all those who are stakeholders with regards to land use in catchment areas or water use (i.e. houses, traffic, agriculture, industries and businesses, shipping and power generation) and which thereby have an impact upon the water budget of the landscape and the runoff properties; in particular, these are:

- Municipal, regional, state and EU policies
- Regional planning e.g. through regional planning measures
- Water supply agencies: Implementing water protection and flood prevention measures.
- Institutions involved with flood prevention: Regional planning and risk management, early warning systems, hazard maps

Behavioural provisions:

- Insurance companies
- Media
- Private households

Principal stakeholders for “too little water” (drought management):

- Water management agencies
- Agriculture
- Industry
- Private households
- Energy providers
- Inland navigation, tourism

Principal goal conflicts/problems:

“Too much water”:

- Especially competing land uses in natural floodplains and retention areas due to settlements, agriculture, traffic and industrial areas, as well as impacts upon the natural water balance in catchment areas through land use overall
- Upstream and downstream riparian conflicts (measures that are carried out in the upper part of a catchment area can positively or negatively affect the flood situation in the lower parts, this also concerns transboundary cooperation

tion in river catchment areas

- An increase in heavy rains can be assumed due to climate change.

“Too little water”:

- Usage competition due to limited water availability can require concerted efforts and can lead to regional or temporary use restrictions, e.g. in agriculture (irrigation), industry and energy supply (production limits), inland navigation (limitations on traffic or transport also for fossil energy sources with feedback to energy generation), in households/tourism (limits for use)

3. Options of action are identified and opportunities for individual initiative and participation with respect to planning and policy are dealt with:

- Behaviour during acute flood events or drought situations, including helping neighbours or volunteering in emergencies
- Behavioural provisions in flood protection and prevention: Appropriate building types in floodplain areas, or respectively, changing existing and future zoning plans/decentralised rainwater infiltration; rainwater retention and use through own rain barrels or garden ponds/decreasing sealed areas
- Involvement in the given participation processes, e.g. within the framework of the planning assessment procedure.

4. Social living environment references and possible links to the private and professional daily lives of the students are provided:

- Directly affected, e.g.: life-threatening extreme rainfall events, basement flooding, power outages, water scarcity
- Dealing with water more consciously
- Indirectly affected, e.g. as helpers during extreme events (e.g. fire department)

ments, search and rescue units, Technisches Hilfswerk)

5. With respect to the educational goals, it is mentioned, among others, which competencies are enhanced and how the teaching materials can be incorporated in the curriculum, if they are to be used in schools.

- To be open-minded and to use new perspectives to integrate knowledge, to analyse global change: To recognise the dimensions and connections of the impact factors of flood development and prevention. [To recognise the global dimensions of man-made climate change].
- To obtain and deal with interdisciplinary results: to detect trans-sectoral impact factors and possible courses of action, to understand consequences of material and immaterial damages.
- To obtain information and process it: Use local, regional, national and international data sources, select and evaluate information. To recognise the possible impacts that the individual stakeholders and their interactions have in the flood risk management cycle.
- To recognise diversity: Comprehend the importance of different landscape elements. Importance of periodic floods and droughts as prerequisite for life communities and cultures (e.g. floodplain biotopes, nomads).
- To differentiate operating levels of social action: Private, municipal, regional, federal and international provision through flood risk / drought management within the river catchment plans, including climate change adaptation strategies, internationally agreed procedures for climate protection.
- To think and act providently: Floods and droughts
- To research and discuss consequences of climate change and adaptation options (see this helpful web-site: www.anpassung.net)
- To reflect on one's own concepts and those of the others / To make use of critical reflection and opinions: Question reasons for wanting to live directly on the waterfront, question why agricultural fields are protected from floods, these competencies can be won



in schools, especially through using simulation games.

- To evaluate and decide about design options: These can be discussed based on the flood risk management cycle. Before a flood, these could be e.g.: Possibilities for individual preparation through structural changes of one's own home, buying flood insurance. Participating in participative processes during the planning e.g. technical flood protection. During a flood: appropriate flood behaviour ...
- To motivate oneself to become active: Assuming responsibility for regional / local surroundings and volunteering, contributing to flood awareness (undertaking responsible actions) / reflecting upon one's own flood hazard. Is my insurance sufficient? Should I insure my property?
- To motivate others to become active: Through awareness raising and being an example
- To show empathy and solidarity for those less fortunate: e.g. through volunteering with the fire department or the disaster prevention, e.g. THW
- To show understanding and conflict resolution: participating in participative processes and local projects, role games, simulation games that focus on the catchment area
- To plan and act with others: Participation in local agenda groups, which deal with flood/drought related issues, e.g. efficient water use in agriculture, rain barrels in the garden, etc.

Workshop transcript

The following film was shown as the basis for the discussion of the educational criteria:

Flood – what now? Released by the city of Cologne and published by the DKKV (German Committee for Disaster Reduction) as a supplement to Volume 1/2007 of the educational series “Praxis Schule” grades 5-10: Living with floods/Rhine floods

The Educational Material

Viewing the film, together with a short contextual introduction to the flood topic, were the starting points for the discussions about the educational criteria in this workshop. The differences in perception and evaluation of these impulses were, considering the heterogeneous backgrounds of the participants, hardly surprising. The educational material was evaluated as only conditionally suitable for use in schools. In particular, not as introductory material, since a working knowledge of the connection between flood development and influencing factors was a prerequisite. To facilitate introducing the topic to students, it was suggested that examples from real life be

used or that the educational material be connected to the students’ own spatial environment. However, this is quite a bit harder to realise.

The Educational Criteria

It must be able to apply the educational criteria to the diversity of the media available, i.e. also to film material. The participants stated their concerns as to whether the criteria “ability to act” and “relationship to the environment” could be combined. In addition, an additional criterion is needed that refers to the target group that the educational materials deal with and checks if students can grasp the subject matter of the educational material. Also, the educational criteria should be broken down into the specific contents of the individual subjects. Furthermore, the wide difference between conveying the contents and design competencies was pointed out. The educational criteria provide an approach for combining both aspects. On the whole, the discussion showed that the debate about educational criteria is a challenge that must be carried out in the context of the “What should our (future) schools look like” and “Which competencies can and should they convey?” discussion.

Moderation

Günter Bernert
Transfer 21 – Lower Saxony



Dr. Johannes Cullmann
German Secretariat of the UNESCO
water programmes



Almut Nagel
Ministry for the Environment, Nature
Conservation and Nuclear Safety

You never miss the water until the well is dry.
No sweat!
“Cry Me a River”.
Water sayings and proverbs

Workshop Summaries – Results and Prospects

Reports from the Workshops

Workshop I

“I see water that you don’t see”

(virtual water)

Henning Smolka summarises: Although the concept of “virtual water” has only received public interest for a relatively short time, there is already quite a large selection of material. However, at times, the quality leaves much to be desired and is a reason for critique.

The criteria have proved worthwhile in considering the material. Regarding the water footprint as a key topic has found common consent. The goal conflicts in ecology, economy and social affairs can be well-represented. Upon closer examination, it became clear that the political conflict fields need to be named more clearly. This is all the more important because the relationships between consumption and life-style offer complex starting points. The tight focus on the natural and social sciences should be complemented by teaching materials for other disciplines that could provide important contributions.

Workshop II

Education, Health, Water and Sanitation

Günter Klarner summarises: The quality criteria were very helpful as a guideline for evaluating the teaching materials. As a result, it can be said that interdisciplinary concepts and the comparison between the German and global situation need to be presented in a more definite manner and that alternative options should be shown. As cross-cutting topics, the manifold connections between education and sanitation can only be integrated



Berichte und Ausblicke – v.l.: Günter Klarner, Dr. Henning Smolka, Prof. Dr.-Ing. Heribert Nacken, Dr. Helle Becker, Dr. Ralf Klingbeil, Almut Nagel, Dieter Gadermann

Übersetzung fehlt

into the traditional core subjects with difficulty. As a future necessity, an inventory and evaluation of all available material would be reasonable.

Workshop III

Common development of future water landscapes

Dieter Gadermann summarises: Exemplarily, the public relation work and the participation processes carried out in the frame of the European WFD clearly showed how important careful planning and implementing are in reaching the target groups.

The quality criteria were helpful, because aspects such as relationships to the environment, action orientation and acquisition of competencies regarding the

participatory process play an important role. Indeed, there are materials available, but they can only serve as a basis for educational work and must be adapted to the respective specific local conditions. It is exactly the work being done within the context of the European WFD that provides the opportunity to give more attention to adult continuing education.

Workshop IV

“Too much water – too little water”
(extreme events)

Almut Nagel summarises: Viewing a film on floods was the starting point for this workshop, which had a very heterogeneous group of participants. Thus, the differences in perception and evaluation of these impulses were hardly surprising. According to the group, the educational criteria discussed are a good bridge between teaching of the subject and acquisition of competencies. However, the prerequisites for the individual subjects

“The dignity of movement of an iceberg is due to only one ninth of it being above water.”
Ernest Hemingway

and study groups are so varied that a too detailed breakdown of the criteria could also cause problems. An important criterion should also be the question as to whether the learning material is really ascertainable for the group.

Future Prospects

Thinking outside the box

Ralf Klingbeil contributes: Still, in much of the material, the German or Western European situation dominates and thus hinders the change in perspective that is needed in education for sustainable development. However, there are opportunities for partnerships with schools in other countries, which are supported by numerous programmes, e.g. the United Nations. In addition, internationally exchanging teaching and study materials could broaden the horizons. Changes in perspective are also possible by taking a glance at one's own past, thus creating the opportunity to integrate other subjects into the topic.

A Look at Quality

Heribert Nacken contributes: Developing quality teaching and study materials is carried out on several levels, which need to be considered as a whole. There are several possible tools for checking actuality and technical accuracy, which derive from other disciplines. In

the sciences, mutual appraisals and quality control have been well-established and proven procedures for quite some time now. Feedback and evaluations from users are important tools for quality development in continuing education and Internet-based courses. Thus, feedback forms should become standard evaluation tools for all teaching material.

With similar procedures, the didactical and methodical quality could be continually improved and, at the same time, would mean security for the users.

An Overview

The H2O-database of the Federal Environment Agency (UBA), the CD that accompanies this documentation and the collection of links presented here, already provide good opportunities for finding appropriate material on water topics for one's own work. Enhancing the range of topics to include further water topics and a detailed systematization with respect to a differentiation of the methods and application possibilities would be meaningful during further development of the database.

Possible Cooperation Partners

Not only international partnerships are beneficial – cooperations with partners in the region often provide a basis for long-term planning and are an enhancement. An important aspect is that networks, co-

operations and projects usually only develop slowly and must prove themselves in real use. Unfortunately, by then, the funding for the promising project has usually stopped.

Additional Participants



Prof. Dr.-Ing. Heribert Nacken

University Professor at RWTH Aachen University in Engineering Hydrology



Dr. Ralf Klingbeil

Senior Programme Officer for the UN Water Decade Programme on Capacity Development (UNW-DPC) in Bonn



Perspektivwechsel: Waschen in Indien

Übersetzung fehlt

Tips & Links

Selected organisations in the fields of water and education

Arbeitsgemeinschaft Natur- und Umweltbildung (ANU)

In ANU, environmental centres, associations, initiatives, freelancers and individuals who are active in environmental education and education for sustainable development, are networked. Further information about projects and teaching and study materials on water can be found on their homepage.

www.umweltbildung.de



Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

Important task areas of the Federal Ministry are water and ocean protection. The BMU education service publishes teaching and study materials on current topics in education for sustainable development, e.g. water.

www.bmu.de

Deutsche Bundesstiftung Umwelt (DBU)

The Deutsche Bundesstiftung Umwelt (German Environment Foundation) is one of the largest foundations in Europe and promotes innovative projects on environmental protection. The DBU exhibit "WasserWissen" was chosen as an official project of the UN Decade, see page 40.

www.dbu.de

German Toilet Organization e.V. (GTO)

The GTO is a non-profit association that uses public relations to promote environmental protection and to improve health by enhancing the public awareness for

clean and sustainable toilet and sewage systems.

www.germantoilet.org

International Commission for the Protection of the Danube River (ICPDR/IKSD)

The goal of the IKSD is securing the sustainable and balanced use of the (fresh) water resources of the Danube. Publisher of the Danube Box for classroom use in grades 4 to 6.

www.icpdr.org

International Commission for the Protection of the Odra River against Pollution (ICPO/MKOO/IKSO)

The ICPO is based upon government treaties between Poland, the Czech Republic, the Federal Republic of Germany and the European Union.

www.mkoo.pl

International Commission for the Protection of the Rhine (ICPR/IKSR/CIPR)

Currently, work of the ICPR is focusing on sustainable development of the Rhine, its floodplains and good quality of the

water in its catchment area. Numerous media are available on their homepage.

www.iksr.de

International Hydrological Programme (IHP)

IHP is UNESCO's international scientific cooperative programme in water research that deals with water resource management, education and capacity-building (Internet pages in English, French and Spanish).

www.unesco.org/water/ihp

International Water and Sanitation Centre (IRC)

IRC facilitates the sharing, promotion and use of knowledge about water and sanitation in order to support developing countries to obtain water and sanitation services (Internet pages in English, French, Spanish and Portuguese).

www.irc.nl

Michael Otto Foundation

The Michael Otto Foundation funds and supports projects for the protection of rivers and streams, lakes, seas and wetlands.

www.michaelottostiftung.de

Programme Transfer-21

The programme is oriented towards providing formation competency for the future. In the frame of this program, a

*"The rivers of our brothers they quench our thirst."
Chief Seattle's speech*

multitude of educational materials among others on the topic of water, have been developed.

www.transfer-21.de

Federal Environment Agency (Umweltbundesamt, UBA)

The UBA was founded in 1974 and is Germany's central federal authority on environmental matters. The H2O-database of the Federal Environment Agency (UBA) contains numerous materials on water protection, see page 40.

www.umweltbundesamt.de

UN-Water

UN-Water is a UN mechanism that strengthens co-ordination and coherence among countries in achieving the water related MDGs by 2015. A multitude of information and a comprehensive collection of background documents from the UN are available on the homepage (in English).

www.unwater.org

UN-Water Decade Programme on Capacity Development (UNW/DPC)

The programme focuses on developing countries and aims to strengthen the training and educational initiatives of UN-Water.

<http://www.unwater.unu.edu/>

Federation of German Consumer Organisations

The Federation of German Consumer Organisations promotes the strengthening and enhancing of consumer education in schools and adult continuing education and publishes numerous education material materials, among others, on the topic of water.

www.verbraucherbildung.de

German Association of Water Protection (VDG)

Through information and education, the VDG promotes water protection. The on-line-media shop has numerous water materials, e.g. virtual water.

www.vdg-online.de

World Water Assessment Programme (WWAP)

The UN programme addresses the state of the world's freshwater resources.

www.unesco.org/water/wwap/

Übersetzung fehlt

„Wasser ist eine farblose Flüssigkeit, die schwarz wird, wenn man sein Gesicht darin wäscht.“
Mickey Mouse, Comic-Figur



Selected Official Projects of the UN Decade on Water

International Wadden Sea School

The International Wadden Sea School is an initiative of the “Trilateral Cooperation for the Protection of the Wadden Sea”. Its goal is to raise the awareness of the unique natural and cultural heritage among children and youths in the three bordering countries of the Wadden Sea: Denmark, Germany and the Netherlands. www.iwss.org



Wasserwerkstatt

The Wasserwerkstatt is a didactic concept to learn about and experience complex systems. Starting with a water analysis, a river or stream is investigated with interdisciplinary measures. These include flow experiments and experimental fountains.

www.creta.de



Further Decade Projects

on the topic of water and other areas of education for sustainable development can be found at:

www.bne-portal.de/dekade-projekte

Exhibit WasserWissen

The interactive exhibit “WasserWissen – the wonderful world of water” runs until October 2009 in the Zentrum für Umweltkommunikation (ZUK) of the German Environment Foundation (DBU) in Osnabrück and then will become a traveling exhibit. In accompaniment, the ZUK offers a diverse, learning by doing, programme for children of all ages and school types.

www.wasser-wissen.net



Living Lakes

Living Lakes is an international network and partnership of the Global Nature Fund Living Lakes whose mission is to enhance the protection, restoration and rehabilitation of lakes, wetlands, other freshwater bodies of the world and their catchment areas. The main purpose of this international initiative is the conservation and protection of natural resources, chiefly the drinking water reservoirs of the earth.

www.globalnature.org



German Alumni Water Network (GAWN)

The German Alumni Water Network is a joint effort of German universities and the German Academic Exchange Service (DAAD) and offers German universities and their international alumni who study water the possibility of strengthening and enhancing their cooperations with universities, enterprises and institutions in Germany and in partner countries.

www.gawn.de



Marine Competition “Research at Sea”

Since 2005, the Hamburg Centre for Marine and Atmospheric Sciences has organised the marine competition “Research at Sea”. The competition is open to all children in grades 9 and up in Northern Germany. In small teams, the students develop their own research ideas in disciplines such as marine biology, marine chemistry or marine physics and enter the competition for a ship ride with a project sketch.

www.meereswettbewerb.de



Selected materials on the topic of water



BMU education service

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety publishes teaching materials on various topics in education for sustainable development.

www.bmu.de/bildungsservice

BMZ Spezial: "Entwicklungszusammenarbeit im Bereich Siedlungshygiene und Abwassermanagement"

This brochure contains information about the connections between water, sanitation, health and education.

www.bmz.de/de/service/infothek/fach/spezial/spezial158pdf.pdf

Biosphere reservation Elbe (Biosphärenreservat Flusslandschaft Elbe): CD-ROM

Flora and fauna along the Elbe River are presented.

www.elbetourist.de

Das Parlament

The August issue (Volume 32) in 2008 of the political magazine, published by the German Parliament, covered topics on water.

www.bpb.de

Fluter – Das Wasserheft

Volume 23/June 2007 of the magazine published by the Bundeszentrale für politische Bildung covered topics on water.

www.fluter.de

Every drop counts – Water is Life

This UNICEF publication uses contributions, texts, statistical tables and graphics to provide information on the water situation in developing countries.

www.unicef.de

Not just a question of Scarcity – Power, Poverty and the Global Water Crises

This multi-media DVD from the United

Nations Association of Germany contains videos, photos and interactive graphics.

www.dgvn.de

Virtual Water – hidden in the shopping cart

Information booklets, posters and worksheets for secondary schools.

www.vdg-online.de

World Map "WorldWater"

This coloured world map published by the "Welthungerhilfe" has information about the water availability in various world regions and presents forecasts for our water resources.

www.welthungerhilfe.de

WASSER lesen

CD with texts from well-known authors and writers on the topic of water from two and a half centuries.

www.sabinewaffender.de/wasserlesen.html

„Auf einem Dampfer, der in die falsche Richtung fährt, kann man nicht sehr weit in die richtige Richtung gehen.“
Michael Ende, Zettelkasten. Skizzen und Notizen

Übersetzung fehlt

Weitere Materialien

finden Sie auf der beigefügten CD!

Übersetzung fehlt

Selected Internet pages on the topic of water

Sustainable Sanitation Alliance (Su-SanA): www.susana.org

International Year of Sanitation 2008
<http://esa.un.org/iys/>

International Year of Freshwater 2003
www.wateryear2003.org

Internet portal: Education for Sustainable Development: 2008 Focus Topic Water of the UN Decade
www.bne-portal.de

Media database H2O-Wissen
www.h2o-wissen.de

Water is a Human Right!
www.menschen-recht-wasser.de

UNEP – Freshwater
www.unep.org/themes/freshwater

**UN-International Decade for Action
“Water for Life” 2005-2015**
www.un.org/waterforlifedecade

Water is Life
www.h2o-ist-leben.de

Water Glossary (German)
www.wasser-lexikon.de

UNESCO Water Portal
www.unesco.org/water

Water Education for Teachers
www.projectwet.org

Water Footprint
www.waterfootprint.org

World Water Day
www.worldwaterday.org

World Water Week 2008
www.worldwaterweek.org



Speakers, moderators and panel members (in alphabetical order)

Dr. Helle Becker



Dr. Becker works as a freelance publicist, author and journalist in continuing education. Among other topics, her work focuses on educational theory, political and cultural youth and

adult education and education for sustainable development. She works for ministries, associations and educational institutes at the federal and state level and is NRW-Project Head in the BLK-Pilot Project "Agenda 21 in schools" as well as Project Head of the GEMINI-Project "Politics & Participation in All-Day Schools".

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He is the Chief Executive Officer of the Bonn-based German Association of Water Protection (VDG). During his studies in biology at the University of Bonn, he specialised in open land

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Günter Bernert



Certified ESD-Consultant and associate in the Lower Saxony state-co-ordination of the Programme Transfer-21, where he is responsible for communication, multi-media and

public relations. He has taught art and history in high schools since 1991 and is a Corporate Identity Consultant for Schools.

Dr. Joachim Bley



Dr. Bley, an agricultural scientist, is speaker for the German Committee of the International Commission for the Protection of the Rhine. Furthermore, he is head of the

project group European Water Framework Directive (WFD) and speaker of the State of Baden-Württemberg in national and international river commissions (Rhine, Danube). Before that, he worked for the EU-Commission in the EU-Twinning Project Germany-Hungary and was CEO of the LAWA-EU-contact committee.
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Prof. Dr. Gerhard de Haan

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Prof. Dr. Petra Döll



Dr. Döll is Professor for Hydrology at the Goethe-University in Frankfurt a. Main. Her work focuses mainly on quantifying global water resources and their use, in order to

assess future developments. She is the author of 29 peer-reviewed publications in international journals and an additional 25 peer-reviewed publications. Furthermore, she is the lead author of the Fourth Assessment report of the IPCC, as well as the IPCC Technical Report on Climate Change and Water.

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After her studies in political sciences and international technical and economical cooperation at the RWTH Aachen, she worked as a GTZ-consultant at the Federal

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Dr. Uschi Eid MdB



Dr. Eid is a member of the German Parliament and of its Permanent Committee on Foreign Affairs as well as Speaker for Foreign Cultural and Educational Policy of the

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From 2001 to the middle of 2008, he

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Since 2004, he has been Deputy Secretary-General of the German Commission for UNESCO and its spokesman since 1993. Before that, he was Officer for International Media Poli-

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**"Your task is not to foresee the future, but to enable it."
Antoine de Saint-Exupéry, *The Wisdom of the Sands***

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“And the flood was forty days upon the earth; and the waters increased, and bare up the ark, and it was lift up above the earth. And the waters prevailed, and were increased greatly upon the earth; and the ark went upon the face of the waters. And the waters prevailed exceedingly upon the earth; and all the high hills that were under the whole heaven, were covered. Fifteen cubits upward did the waters prevail; and the mountains were covered.

And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man.”

The Bible, First Book of Moses, Chapter 7

Exhibitors at the Project Exhibition

Arbeitsgemeinschaft Natur- und Umweltbildung – Bundesverband e.V.
www.umweltbildung.de

Atelier Wasserart
www.wasserart.de

Bildungsprogramm Siemens Generation21
www.generation21.siemens.de

Federal Environment Ministry
www.bmu.de

Federal Institute for Geosciences and Natural Resources (BGR)
www.bgr.bund.de

CREative TAten – Insyde e.V.
www.creta.de

United Nations Association of Germany
www.dgvn.de

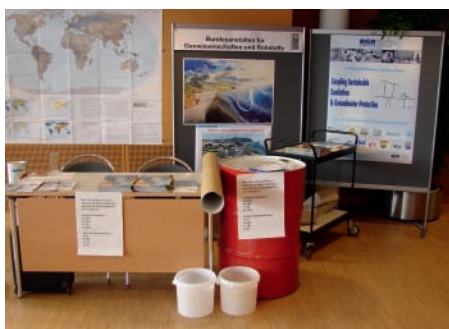
German Commission for UNESCO
www.unesco.de

Gesellschaft für angewandte Stadtökologie
www.gfas-bremen.de,

International Wadden Sea School
www.iwss.de

Kampagne „WasSerleben 2008“
www.wasserleben.bayern.de

Network for Urban Rivers – a non-profit Association
www.netzwerk-flur.de



Schülerreporter berichten von dem vielfältigen Angebot der Bildungsprojekte und Materialien auf dem Markt der Möglichkeiten. Der Bericht befindet sich unter www.gidw-os.nibis.de/aktuell/2008/noz/noz_24_09_08.pdf

Neue Osnabrücker Zeitung
www.neue-oz.de

Regierung Unterfranken
www.regierung.unterfranken.bayern.de

RWTH Aachen University – Lehr- und Forschungsgebiet Ingenieurhydrologie
www.lfi.rwth-aachen.de

Senatsverwaltung für Bildung, Jugend und Sport – Landesstelle für gewerbliche Berufsförderung in Entwicklungsländern
www.berlin.de/sen/bwf

Staatlich anerkannte Umweltstation Natur- und Umweltgarten Reichelshof
www.umweltstation-reichelshof.de

Unabhängiges Institut für Umweltfragen
www.ufu.de

German Association of Water Protection
www.vdg-online.de

Wasser-Info-Zentrum Eifel
www.wasser-info-zentrum-eifel.de

Wasserschutz macht Schule
www.danubebox.org

Zentrum für Umweltkommunikation der Deutschen Bundesstiftung Umwelt
www.dbu.de



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