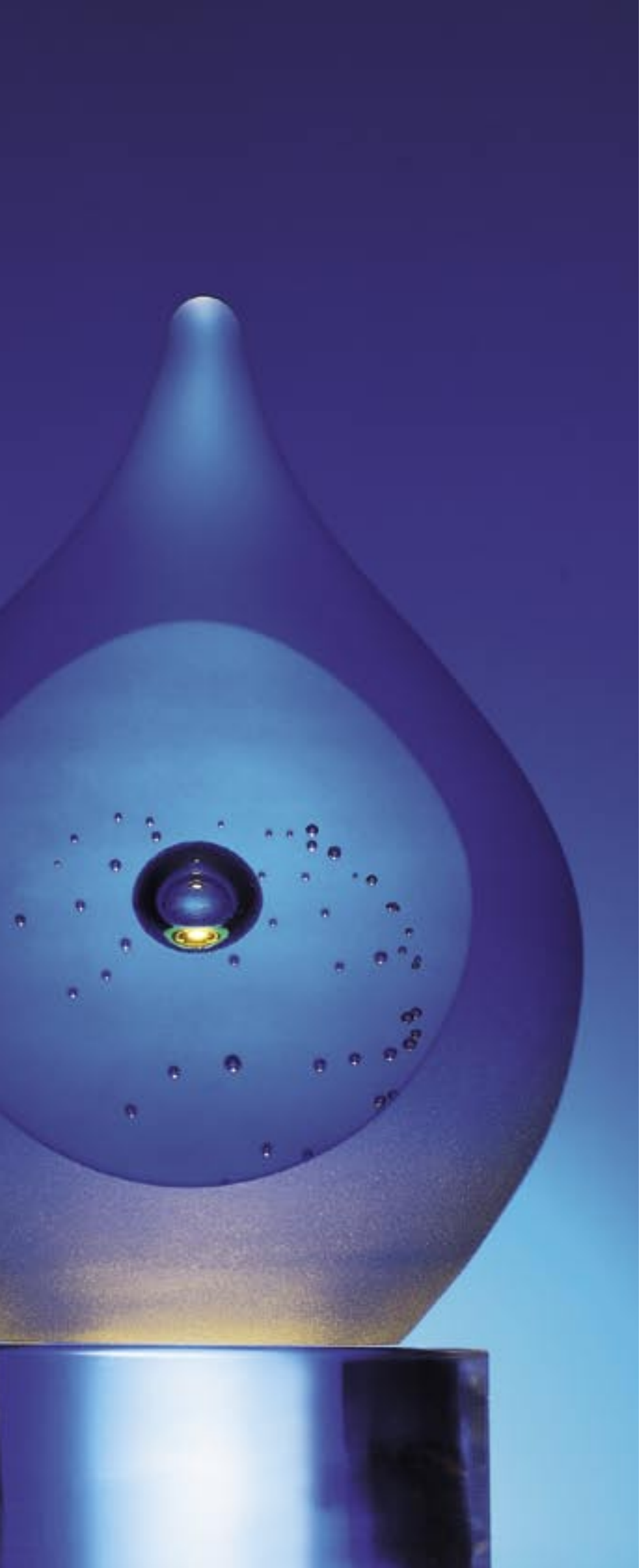
Finalists 2006 Stockholm Junior Water Prize

Stockholm Junior Water Prize



The Stockholm Junior Water Prize

Water and Young People – Linked to the Future

The international Stockholm Junior Water Prize contest aims to encourage young people's interest in issues concerning water and the environment.

The award is given annually for an outstanding water project by a young person or a small group of young people. With this, the competition seeks to inspire young people to a continued engagement in water and related subjects.

While the global water environment remains in peril, the future depends on our ability to manage this life-sustaining resource. Today's youth are indeed tomorrow's leaders and must be encouraged to pursue water-related careers or our scarce supply risk further erosion.

The finalists at the international Stockholm Junior Water Prize competition are the winners of national SJWP contests. The national and international competitions are open to pre-university people between 15–20 years of age who have conducted water related projects focusing on local, regional, national or global topics of environmental, scientific, social or technological importance.

The winner of the international Stockholm Junior Water Prize receives a USD 5,000 award and a blue crystal sculpture in the shape of a water droplet. The national competitions have inspired young people around the world to become active in water issues.

H.R.H. Crown Princess Victoria of Sweden is the Patron of the Stockholm Junior Water Prize.

Finalists 2006

ARGENTINA

"Bio-controlling Fish" – An Option to Control Vector Transmitted Illnesses

By Santiago Jesús Cardozo, Sergio Daniel Legal, Lucas Josué Leiva and Francisco Javier Lezcano

Vector transmitted diseases are a main cause of death in developing countries. The prevalence of mosquitoes and flat snails (of the *Biomphalaria* genus) is high in the finalists' home province. These vectors pose a serious regional and local health threat. The situation is aggravated by deficient health and sanitary services due to the low socio-economic status of a large portion of the population. Biological treatment methods have been increasingly recognised in recent years as a viable alternative to more harmful, traditional chemical methods for controlling vector populations.

The Argentinean group sampled and evaluated two types of native fish, *Phyrrhulina australis* (masked fish) and *Cichlasoma dimerus* (little pig), with regard to their efficiency as bio-controllers for invertebrates of medical concern. Samples of these species were fed with mosquito larvae and snails and the results show that they both constitute an important alternative to controlling vector populations, but that no remarkable accomplishment will be made without community involvement.

AUSTRALIA

The Sustainability of the Brisbane River for Recreational and Commercial Use

By Alex de Sousa and Linda Van

The Brisbane River is not only an important aesthetic feature but it is also an imperative water resource for the city of Brisbane. The river has high recreational values and water sports such as canoeing, rafting, jet skiing and swimming are appreciated activities for people living in the area. It is also essential for commercial use, since Queensland's major shipping company, the "Port of Brisbane", is based at the mouth of the river. These are all important reasons why the Brisbane River's water quality should be sustained.

Alex de Sousa and Linda Van analysed the Brisbane River at several locations to evaluate the water quality. According to their results the water quality was satisfying, but there was still room for improvement. Possible pollution sources were identified as well as two strategies for pollution reduction. "Urban runoff containment" and "pollution minimisation" were the strategies recommended by the finalists in order to minimise the risk of pollution increase.

BENIN

Every Drop is Important

By Mohammed Coudous Makinde

Every Beninese uses a considerable amount of potable water on daily basis, of which only a fraction is used for drinking. The rest is used for household purposes such as cleaning and personal hygiene. During a visit to a neighbourhood where the water supply had been cut off because of unpaid bills, Mohammed Coudous Makinde discovered that the community suffered from excess consumption because of equipment and faucet leakages.

He then initiated an awareness campaign, focused on young people, with the aim to change behaviour and habits as well as to influence their parents to reduce their water consumption. Sixty households were included in a targeted follow-up study to the campaign. Their consumption patterns were obtained though information from their water bills and collaboration with a local plumber. The awareness campaign was successful, and as much as a 50–70% reduction of water consumption was observed.

CAMEROON

Community Health Education and School Sanitation (CHESS) Project, Cameroon – A Youth Audience Approach

By Elizabeth Atang, Yannick Ngembus and Everette-Kelton Ngwane

Clean and safe water and adequate sanitation are critical factors for human health and for protection against a wide range of diseases. The competitors from Cameroon are members of the International Centre for Education, Youth Orientation and Mobilisation (ICEYOM). ICEYOM involves Cameroonian youths in raising public awareness in order to contribute to improved health in communities throughout the country. Important focus areas for ICEYOM are the promotion of health and hygiene education in schools and to raise the aspect of gender related to water issues.

The main objective of the Cameroonian student's project was to point out the social, cultural and economic issues faced by Cameroonians due to the lack of access to clean and safe water as well as adequate sanitation. The team developed and introduced education, coordination and information programmes, linking sanitation and health issues to the UN Millennium Development Goals.

Finalists 2006

CANADA

Living in the Sydney Tar Ponds – an Analysis of the Microbial Community

By Joanna McNeil

The Sydney Tar Ponds is North America's largest toxic dump site, created by what was once North America's largest steel mill. The ponds, at the heart of the city, have for decades had a detrimental effect on the health and lifestyle of the Sydney residents. No facility for collecting the contaminated water has been established, and it flows freely into the Atlantic Ocean or percolates through the soil, hence polluting groundwater. Sydney has the highest rates of some types of cancer in Canada.

In searching for a way to combat this problem, Joanna McNeil tested the efficiency of a biological abatement process, in which micro-organisms decompose toxins into more manageable substances. Through a microbial community analysis on microbes found in the tar ponds, she discovered an interesting pattern where the microbes' activity was limited by temperature. Thus Joanna found that bio-remediation was not only possible, but could also be improved further through an increase in temperature and oxygen levels.

CHILE

Cultivating the Desert with Seawater

By Víctor Arredondo and Jimmy Galleguillos

The quinoa plant, *Chenopodium quínoa Wild*, was the staple grain of the indigenous people in the Andes before the Spanish arrival. Quinoa is rich in amino acids, and is capable of withstanding a number of stressful conditions, such as salinity, frost and water deficiency. The Food and Agricultural Organisation has projected that the grain has a potential to enhance food security in Chile.

Víctor Arredondo and Jimmy Galleguillos come from Iquique in Northern Chile. The city is surrounded by sea and desert and has little vegetation due to scarcity of freshwater. In this arid region agricultural activities are limited and there is a need for a drought and salt tolerant grain species which can provide vitamins and proteins to the local people. The team have tested if it is possible to make the quinoa seeds germinate when irrigated with seawater. Their results indicated that seawater irrigation is a viable option - the germination rate after 96 hours showed no significant differences between the three samples utilising distilled water, 50% saltwater and 75% saltwater respectively.

CHINA

Application, Research and Practice of a Comprehensive Technology for Restoring Urban River Channels Ecologically

By Hao Wang, Jie Weng and Yi Xiao

The Shanghai area includes many severely polluted river channels. The Chinese finalists have explored several feasible treatment methods originating from the concept of "urban pre-tank engineering technology" – a combination of dredging, irrigation and spraying. The Chinese team have developed and improved several methods, facilities and technologies, of which four inventions have been patented in 2006.

Tests performed in the Caoxi River indicate that these novel ideas integrated with comprehensive technology can have substantial positive effects on the water quality. Previously dark and odorous water has become clear after treatment, and the general water quality has reached or exceeded the domestically recommended standard for surface water. The technology has provided another highly efficient low-cost ecological treatment scheme for improved water quality and restored the self-cleaning capability of small and mid-sized urban river channels.

DENMARK

Farming Against Global Warming

By Fateh Warraich and Nagina Warraich

Global warming is a serious threat to our future and an issue that has to be addressed and attacked from several angles. One such perspective is the issue of carbon sinks. The oceans have great potential in this respect, a fact which constitutes the starting point of Fateh and Nagina Warraich's project.

The overall purpose of their study was to examine the role of phytoplankton in regulating the content of CO_2 in the atmosphere. The basic idea is that an increase in the amount of phytoplankton in the oceans would be possible through artificial mineral additives, thereby enabling a higher production of photosynthesis. This would lead to a decrease in atmospheric CO_2 concentrations as carbon is stored for centuries when plankton sink to the sea floor. The team examined how much CO_2 the phytoplankton could absorb under optimal conditions (purified seawater) and found that the uptake depended on the amount of nutrients available. They concluded that algae in purified seawater could absorb up to three times more carbon dioxide than algae in ordinary seawater.

ESTONIA

Water Quality in Blueberry Plantations and Natural Bog Areas

By Marek Karja and Heilika Leinus

Cultivation of berries is an agricultural activity that can have negative consequences, especially if plantations are situated adjacent to marsh lands, which generally have high biodiversity. Leakage of fertilisers from the berry plantations could result in water pollution affecting the marsh ecosystems.

Heilika Leinus and Marek Karja were concerned about the fact that the most favourable areas for cultivation of *Vaccinium* – blueberries – in Estonia are peat milling fields situated in marsh areas. They analysed the water quality in pristine marsh lands as well as in marsh lands with adjacent berry plantations to compare and then be able to quantify the fertiliser leakage from the plantations. Their results showed that the amount of nutrients in the water in cultivated areas was higher than in uncultivated areas. Repetition of the tests showed that the levels were increased over time. The finalists suggest that ecological farming and changes in fertilisation timing should be considered in order to decrease the negative impacts of fertiliser leakage.

FRANCE

When CO_2 Cares About H_2O – Learn About Water While We Learn Our Trade

By Fabien Levillain and Mathieu Urvoy

As part of a course in Industrial Vehicle Maintenance, Fabien Levillain and Mathieu Urvoy read about how their personal and professional actions affect the water environment. Having studied internal combustion engines, students in their school were generally more concerned about the contribution of exhaust fumes to the greenhouse effect than about water issues.

This perspective was somewhat changed with Fabien and Mathieu's project, whose aim was to spread knowledge to students, professionals and companies about water responsibility in the car industry. They wrote and distributed a newsletter as well as took part in an exhibition, which attracted 1500 young apprentices from various courses at CIFAC – a leading training institute in Caen. The newsletter has become an ideal help in their information campaign aimed at companies and professionals in the sector. The finalists are dedicated to remain involved in making the transport sector more aware of problems related to water pollution. They are also involved in the environmental certification work taking place at their current workplace.

GERMANY

Annual Invasion of "Blue Poison Dwarfs" – Algal Blooms in the Lake Banter See

By Christina Kronenberg, Marielouise Sander and Kim Annchen Tappe

Algal blooms occur more frequently in the leisure lake called "Banter See". The annual blooms of toxic cyanobacterium *Nodularia spumigena* constitute a major inconvenience for the population of Wilhelmshaven in Lower Saxony, since they cause annual swimming bans.

To find a starting point for research on prevention of algal blooms, the German group conducted growth experiments focusing on temperature, salinity, nutrient salt concentration, and light in combination with temperature. Their results revealed that the conditions typical for early summer in the Banter See are ideal for the initiation of algal blooms. They further established that the lake salinity was lower than preferred, and that the proposed opening of a "Grodendamm" (frog dam) probably would make the conditions more favourable for algal blooms, since increased levels of nitrogen and phosphorus would favour algal growth. A "free jet method" for destratification has been discussed as a possible algal bloom remedy, but is still in a trial phase.

INDIA

Ou Lota (a Liane of *Tetracera sarmentosa*) – An Alternative Source of Potable Water

By Antora Borah and Rohan Borah

Supply of potable water is one of India's greatest challenges, and governmental policies have not yet been successful in this regard. Alternative sources of water have therefore become increasingly significant. In bedtime stories during childhood, Antora and Rohan Borah were told about a plant with remarkable water storing capacity, called Ou Lota. It is a climbing plant which grows to a height of 60–65 feet and is found in abundance in Australia, the Amazons, India, and many South-East Asian countries.

For their project the team ventured into Nambor-Doigrung Wild Life Sanctuary and found plenty of Ou Lota. Samples were extracted and analysed – establishing that the plant water is indeed suitable for drinking. In comparison to general groundwater and commercial mineral water, the Ou Lota exudates are rich in permissible minerals. Since the stems and barks of the plant can be used for various other purposes like preparation of cosmetic articles, agricultural tools, etc., Ou Lota could become an alternative source of potable water while commercial usage extended.

ISRAEL

A System for Elimination of Oil Slicks on the Sea Surface

By Grigory Lisochenko and Alexey Vanyukhin

One of the most acute problems related to oil exploitation is contamination of the sea surface and coastal areas by oil slicks. Finding a remedy to this problem is of utmost importance from an ecological as well as an economic point of view. Current methods of abating sea pollution are tailored toward specific ecological problems and damage limitation, such as pollution levels and disastrous after-effects.

Instead, Grigory Lisochenko and Alexey Vanyukhin have aimed at developing a system of barriers to reduce the spread of crude oil on the surface of the sea and to collect the spilt oil. The system is based on a combination of a floating barrier and magnetic receivers that collect the spilled oil. A prototype tested experimentally in a laboratory wave tank proved to be 100% efficient. It remained stable in the presence of sea waves and had sufficient elasticity to follow the movement of the water surface. The system may be of great use for maritime oil transportation companies, as well as for prevention of ecological disasters along sea shores.

ITALY

Water from the Hills – Hydrological Study of Minor Streams in the Alba Area

By Viviana Ambrosio, Elia Blangero and Elena Costa

The area surrounding the town Alba is full of small rivers and streams whose erosive action has sculptured the surrounding landscape. Most of the year the streams are dry, but in spring and autumn, following thaws, heavy rainfall or summer storms, they convey water to the drainage channels downstream. Intense, short storms have repeatedly resulted in flooding, which have affected inhabited areas.

The Italian finalists have through elaborate calculations assessed the risks of flooding and suggested a series of preventive actions in order to limit damage to people and property. In their risk assessment they have calculated river flow rates, rate of flow through hydraulic constructions such as channels and bridges, slope gradients in and surface area of the drainage basin. The critical sections of the downstream drainage channels have been identified and proposed to be widened. Moreover, some changes in the actual design of the drainage channels have been suggested, for example raising the level of the stream and river banks.

JAPAN

A Tiny Case with Big Possibilities – Environment Friendly and Water Conserving Nursing Method for Rice Seedling Production

By Satomi Kosho, Sae Nishino and Naomi Sugimoto

In the agricultural sector there are few possibilities for disabled people to earn their living. Concern about this minority of labourers motivated the Japanese finalists to find new methods to germinate and nurse seedlings which could then be sold at a market.

Through modification of the Wardian Case, which is a plant life-sustaining invention used for transportation of plants, the team created their own Katsura Nursery Case (KNC). Based on the same principles as the Wardian case, the KNC effectively nurtures plants with little effort and minimal water usage. To enhance the KNC's field of use, the group tried rice production. The traditional rice cultivation practices require large amounts of water in the initial stage, something that the KNC managed to reduce by about 93%. The total water reduction, for the whole rice production process, amounted to 39%. The conditions inside the Nursery Case also shortened the sprouting stage by four to seven days and improved the overall quality of the seedlings.

LATVIA

The Investigation of Jugla Lake Water Composition

By Andris Rudzinskis

There are plenty of lakes with high recreational values in Latvia. To the inhabitants of Riga, the nearby Lake Jugla is an important destination for excursions and leisure activities. However, the water quality of Lake Jugla is deteriorating due to eutrophication aggravated by anthropogenic activities in the area. Although lake quality conservation is listed as one of the primary goals of Latvia's environmental protection plan, there is currently no programme for lake supervision at the state level. In order to control and abate increased pollution levels it is important to monitor water quality continuously.

Andris Rudzinskis has conducted four months of observation and analysis of the Jugla lake water and compared his results to previous studies. He has suggested regular surveys of the water condition and lake treatment activities such as reed and mire removal. From an economic perspective the most efficient activity would be to remove the mire layer.

MEXICO

Elimination of NOx Through Fe(0) Reactive Barriers

By Jenny Díaz Centeno

During the last century it was found that high concentration of nitrates and nitrites in water and food is a factor contributing to certain illnesses, such as metahemoglobinemia. Since there are no cost-efficient methods for removing nitrogen compounds from wastewater – discharge from industrial and municipal waste as well as agricultural run-off are main sources of these compounds in surface and groundwater. This water is commonly used for household purposes and once inside the human body, the nitrogen ions react with iron in the blood, thereby obstructing oxygen distribution.

Jenny Díaz Centeno evaluated a remedial strategy that makes the nitrogen compounds harmless to the human body. The process is based on metallic iron reactive barriers which in combination with active micro-organisms cause the nitrogen ions to react and degrade. She found that this combination process could speed up degradation considerably.

NIGERIA

The Roles of Youths and Children in Water Supply and Management in the Peri-urban and Rural Areas of Anambra State, Nigeria

By Stanley Obinna Okafor, Maureen Chidera Okika and Stephen Chukwuemeka Umeh

In peri-urban and rural areas of Anambra State, Nigeria, youths and children face a lot of difficulties and challenges resulting from a lack of clean water available for consumption and domestic use. This predicament results in a spread of water-borne diseases, leading to increased mortality and high morbidity, especially affecting children. In this area it is common that youth and children have to work very hard to supply water for household needs. In rural areas they often have to walk long distances to collect water, while in other areas the only alternative is to wait for rain which can be collected and harvested off buildings.

The Nigerian team have been involved in activities to secure water resources, such as well digging and channel constructions for floodwater draining. The group were also concerned about water quality issues and initiated a money raising program to purchase stream covering nets in order to prevent vegetation and other unwanted debris from falling into the fresh water reservoirs.

NORWAY

Rovebekken – Who Should Take Responsibility for the Environment in the Rovebekk?

By Marianne Dahl, Silje Holm Karlsen, Eivind Gullestad Storm-Olsen and Ming Kit Wong

The little stream Rovebekken is polluted, but the main contributing factor is not known. The Norwegian group collected and analysed water samples from the stream and found that the upstream part has a higher pollution content compared to downstream areas. The upper part of the small river is situated close to the local airport, and the results of the tests indicates that glycol from the airport could be a major source of pollution. However, the evidence is ambiguous since the creek also receives run-off containing nutritive salts and other polluting substances from surrounding agriculture.

Based on their results the group presented both local farmers and the airport management several preventive measures to improve the environmental status of the stream. The airport is working on improving the collection of glycol used to defrost the airplanes, as well as the drainage system for taxi- and runways. They are also extending their control on general environmental impact.

POLAND

Water Shortage Concerns You – Let's Help

By Klaudia Nowicka

To Klaudia Nowicka, the water crisis is not a problem only concerning certain people or communities, but drought, floods and water contamination may happen to anyone, anywhere and at any time. She points out that also people in developed countries have to be prepared to encounter freshwater problems in the future. Another issue raised by Klaudia is that we all contribute to the deterioration of potable water resources and that joint efforts of communities, institutions and governments may prevent aggravation of the approaching crisis.

In order to relieve drinking water shortages in developing countries she has planned to set up her own aid organisation. Her idea is to finance the aid activities through fundraising in the society as well as corporate sponsorships. Schools in particular will play a significant role in the fundraising strategy, which includes advertising in news papers and magazines, setting up a website, initiate workshops, community fairs and other public outreach activities.

RUSSIAN FEDERATION

How to Preserve River Island Ecosystems for People and for Nature?

By Kristina Barsheva

Following the construction of large water reservoirs, hundreds of thousands hectares of land were submerged – transforming the most elevated parts of the affected landscapes into small islands. These islands are excluded from the state land regulations because they are referred to as "non-existent" and are therefore not legally protected by Russian land legislation.

Kristina Barsheva analysed the legal status of 36 islands in the tideway of the River Volga, near the city of Kazan, with high recreational values. The analysis of local and federal regulatory policies showed that the state effectively refused to recognise any social or economic responsibilities for these islands. The undefined or unclear legal status provokes extensive use of the islands' natural resources, which adversely affects the river ecosystem. The results of this study helped to formulate proposals to restore regulatory land-use mechanisms, aiming at increasing the protection for land and biological resources of river islands.

SOUTH AFRICA

Improvement of Grey Water – "Plant Tea"

By Nompilo Mahlobo, Thobile Mbanjwa and Thokozile Mbanjwa

Water shortage is a severe problem in many parts of South Africa, especially in informal settlements. One way to partly solve the problem can be to reuse household wastewater, so called grey water. The South African group have encouraged the reuse of water in schools and surrounding communities through promotion of their own innovation – "Plant Tea". Plant Tea is a liquid fertiliser composed of grey water and a variety of organic household wastes, which not only saves water but also recycles plant nutrients.

The objectives of their project were to help people in informal settlements to conserve precious water resources and to determine the effectiveness of the Plant Tea as a fertiliser. To test the quality of the mixture they compared the effects on four agricultural plots using four different treatments; grey water with added fertiliser, Plant Tea, plain grey water and regular tap water. The Plant Tea proved to be more efficient than both the plain grey water and tap water.

SPAIN

Sea Pollution by Zinc Chloride – Effects of Sea Pollution by Zink Chloride on the Embryonic Development of *Mytilus*

By Irene García

Because many marine species reproduce by external fertilisation with the embryonic development taking place in the open sea, they are often more sensitive to different kinds of pollution. A zinc chloride accident outside the seaside town Blanes last year inspired Irene García to find out what effects the pollution would have had on marine life if it had reached the sea.

She conducted a series of experiments focusing on the effects that zinc chloride has on the embryonic development of a mussel (*Mytilus sp.*). By looking at more than 1000 embryos she concluded that zinc chloride have negative effects on the embryonic development of mussels. Not only was the embryonic development disturbed and brought to an end, but also the number of defective individuals increased, causing a diminishing cell division frequency. Even at allowed concentrations of zinc chloride she detected negative effects on the mussels and she therefore extends a warning that water contamination should be taken more seriously.

SRI LANKA

Water Conservation in Paddy Cultivation

By A.P. Mihirani Kethumalika, G.D. Uthpala Rathnayake and J.M.A. Chathurika Rathnayake

Water is becoming scarcer in Sri Lanka, partly due to inefficient agricultural practices and improper resource management. Improved water conservation practices are urgently needed in order to meet the increasing pressure on the limited resources, especially from food production. As rice is the staple food in Sri Lanka, paddy cultivation is a very important feature all over the country. However, cultivation of paddy is water intense and application of excess water is even recommended by agricultural authorities as a means to control weeds. Nearly nine percent of the water is wasted through this practice.

The Sri Lankan project evaluates the effectiveness of applying "paddy straw mulch" on paddy fields as an alternative weed control practice. They concluded that in addition to controlling the weeds, and conserving water, this method is a meaningful and effective way to minimise the problems associated with water shortages locally, nationally and even globally.

SWEDEN

The Quantity of Bacteria in Drinking Water at Various Temperatures – A Comparison Between "Cooler" Drinking Water and Tap Water

By Joachim Westerlund

The introduction of water coolers in Joachim Westerlund's high school gave rise to the idea to find out whether the water which they contained was healthier than the community tap water. Since Joachim suspected that outside air would carry bacteria into the container he wanted to compare bacteria content in the water from the coolers to ordinary tap water.

At various temperatures, water samples were cultivated in order to evaluate the bacteria content. The amount and the most common forms of colonies were assessed using nigrosin solution staining, and a species classification was made through gram staining. Joachim's results showed that after 24 hours at 37°C there were no bacteria in the tap water, whereas the amount discovered in the packaged water was up to 10000 bacteria/ml. According to the Swedish National Health Guidelines this figure should be no greater than 20 micro-organisms/ml. After Joachim presented his results to the school management, the water containers were removed and water cooling systems for ordinary tap water were introduced instead.

UKRAINE

Device for Electrochemical Treatment of Industrial Wastewater with Environmentally Clean Inexhaustible Energy Source

By Maxym Dmytrenko and Roman Levin

Present industrial wastewater treatment methods require large amounts of energy. Therefore Maksym Dmytrenko and Roman Levin have developed a new wastewater treatment unit. Their idea was to eliminate some of the disadvantages of the electrolysis and electrodialysis units currently used for removal of cyan and thiocyanogen from wastewater. The innovative design uses wind power as an alternative energy source in order to minimise the consumption of non-renewable energy.

In addition to designing the wastewater treatment unit the team have constructed a prototype and thoroughly tested the construction and its components. These components include a device for electrochemical treatment of water, a power supply unit which consists of a wind engine, an inductor generator with a stabiliser, and a rotation frequency generator. Some of their results were published in scientific journals and they received six patents for the wastewater treatment unit and its various parts.

USA

A Tale of Two Oysters – A Vital Management Issue for the Chesapeake Bay

By Emily Brownlee

With the decline of the native oyster, *Crassostrea virginica*, in the Chesapeake Bay due to disease and over-harvesting, ways to increase oyster production are of great concern. One proposal that has stirred controversy is the introduction of a new species of oyster, *Crassostrea ariakensis*, the Asian oyster. It is however uncertain how the growth of newly set oysters would be affected by the annual phytoplankton blooms in the bay.

Emily Brownlee examined and compared the effects of two species of blooming algae on the growth rates of both native and non-native oysters. Her results show high susceptibility of both oysters to the algae species *Karlodinium* in their first growth weeks, which indicate major potential problems for oysters as long as the water quality of Chesapeake Bay remains poor. The study also suggest that there is a possible difference in how the two oyster species are affected by phytoplankton blooms, implying that oyster managers must identify where oysters would have the best chance for survival when accounting for where algal blooms regularly occur.

VIETNAM

Proposed Solution for Improving Traditional Water Filters in Combination with the Use of *Cyperus inoolucratus* and Flocculant

By Dang Phuc Long Nguyen, Van Thinh Nguyen and Tuyet Trinh Nguyen

Guaranteeing safe water supply for domestic use is a critical goal for Vietnam, since only about 30% of the population in rural areas have access to clean and safe water. Most people use water pumped from shallow wells – water that often does not meet health standards on content of iron, magnesium, ammonium, or even heavy metals and bacteria.

In order to improve the water situation for people in the rural areas, the Vietnamese finalists carried out experiments to further develop a traditional water filtration system. The filtration system is used especially for groundwater with high iron content and contains both physical, biological (wild plant – *Cyperus inoolucatus*) as well as chemical (flocculant) substances. The water treatment method proved to be effective with increased water quality for domestic use and the authors plan to develop the filtration system model even further to provide a reasonably priced water treatment facility for household use.

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Stokholm Junior Water Prize Finalists, 2005.

Stockholm Junior Water Prize Winners

2005

In 2005, Pontso Moletsane, Motebele Moshodi and Sechaba Ramabenyane, South Africa, won the Stockholm Junior Water Prize for their revolutionary solution to minimise the need for water in small-scale irrigation. They developed a low-current electric soil humidity sensor which uses light detection to control water pipe valves and improve irrigation efficiency.

2004

Tsutomu Kawahira, Daisuke Sunakawa and Kaori Yamaguti from Japan won the Prize for the development and application of an environmentally friendly organic fertiliser for the Miyako Island. The method is applicable to many places around the world.

2003

Claire Reid, South Africa, won the Prize for an innovative, practical, easily applicable technique for planting and successfully germinating seeds in water-scarce areas to improve rural and peri-urban livelihoods.

2002

Katherine Holt, USA, won the Prize for research that looked at how foreign species could be introduced to benefit the Chesapeake Bay while preserving the bay's native oyster species and meeting national environmental goals.

2001

Magnus Isacson, Johan Nilvebrant and Rasmus Öman from Sweden won the Prize for their innovative and relevant research on the use of natural materials to remove metals in leachate from landfills.

2000

Ashley Mulroy from the USA won the Prize for a contemporary project that investigated how inefficient wastewater treatment processes can lead not only to antibiotic contamination in American waterways, but also to progressive resistance among harmful bacteria to those same antibiotics that once controlled them.

1999

Rosa Lozano, Elisabeth Pozo and Rocío Ruiz from Spain won the Prize for an innovative project that used sea urchins, starfish and sea cucumbers to measure the effectiveness of an EU beach protection program on Spain's western Mediterranean coast.

1998

Robert Franke from Germany won the Prize for his design of the Aquakat, a solar-powered, flow-through reactor for the treatment of industrial wastewater.

1997

Stephen Tinnin from the USA became the first international Stockholm Junior Water Prize winner for research that investigated the correlation between the reproductive rate of sea urchins and water pollution.

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Cameroon: Cameroon Vision Trust, The Water Environment Science and Technology (WEST) Fund, Women International Coalition Organisation (WICO), Africa Commonwealth Women's Forum (CWF) International.

Canada: Western Canada Water Environment Association, Canadian Water and Wastewater Association, Water Environment Federation, ITT Flygt, British Columbia Water and Wastewater Association, Water Environment Association of Ontario, Réseau Environment Inc., Atlantic Canada Water Works Association

Chile: Dirección General de Aguas MOP, ANDESS, AIDIS Chile, Comite Chileno del PHI, SOCHID, Embajada de Suecia en Chile, Museo Nacional de Historia Natural, Escuela de Ingenería de la U. de Chile, Escuela de Ingenería de la U. de Catolica, Faculdad de Ingeniería de la U. de Concepcion, Fanaloza, Metro S.A., ALHSUD Chile, Ministerio de Educacion, Educar Chile, ESSBIO, TetraPak Chile

China: The Center for Environmental Education & Communications of State Environmental Protection Administration (SEPA CEEC), ITT

Denmark: Unge Forskere

Estonia: Estonian Institute for Sustainable Development, Tallinna Waterworks Ltd, Tallinn City Government, Estonian Institute for Sustainable Development

Finland: Water Association Finland, The Land and Water Technology Foundation Finland, Kemira Chemicals Ltd., Uponor Finland Ltd., Ekokem Ltd., Helsinki Water Ltd.

France: Office Francais de la Fondation pour l'éducation à l'environment ITT Flygt France, Fondation VEOLIA, Agences de l'Eau "Seine Normandie" and "Artois Picardie"

Germany: Stiftung Jugend Forscht e.V., Federal Department of Education and Science, The Ernst Sobotha Foundation, Bundesanstalt für Arbeitschutz und Arbeitsmedizin

India: Centre for Environment Education

Israel: Faculty of Engineering at Tel Aviv University, The Iby & Aladar Fleischman Faculty of Engineering, The Manuel and Raquel Klachky Foundation, The Israel Water Commission

Italy: Federazione delle Associazioni Scientifiche e Tecniche (FAST), Foist, CusmiBio, Fondazione Lombardia per l'Ambiente, Quark, Sanofi-Aventis, Start People, with the patronage of Ministero dell'Istruzione, dell'Università e della Ricerca and Ufficio Scolastico per la Lombardia

Japan: Japan Water Prize Committee (JWPC), Lion Corporation

Latvia: Education, Youth and Sports Department of Riga City Council, SIA "Rigas Udens" (LTD "Riga Water")

Mexico: FEMISCA (Mexican Federation of Environmental Engineering), Swedish Embassy, the Mexico City Government, the Ministry of Education, the Ministry of the Environment and Natural Resources, The National Autonomous University of Mexico, the Mexican Academy of Sciences, the Mexican Federation of Sanitary Engineering and Environmental Sciences, the Mexican Association of Environmental Engineering, Swedish-Mexican Chamber of Commerce, Kemwater de Mexico, Alfa Laval, ITT, Tetra Pak, Ericsson Telecom, Sandvik, Swedish Foreign Trade Association

Nigeria: National Environmental Watch and Service (NEWS), Nnamdi Azikiwe University, Intercontinental Bank PLC, CALTEC Nig., FUSE Nig. Ltd., PINAC PHARMACY NY USA, OKAFOR & SONS Nig. Ltd.

Norway: Norsk Hydrologiråd, Norsk Vannforening, VA-yngre, AnoxKaldnes, Kemira, Fujitsu-Siemens, Norges Vassdrags og Energidirektorat (NVE), Norsk Institutt for Vannforskning (NIVA)

Poland: Polish Foundation for the Protection of Water Resources, The Economic Chamber of "Polish Waterworks", The National Fund for Environmental Protection and Water Management

Russian Federation: Environmental Projects Consulting Institute, Russian Federation Country Unit of the World Bank, Coca-Cola HBC Eurasia, Environmental Projects Consulting Institute

South Africa: Department of Water Affairs and Forestry, Department of Education, WRP Consulting Engineers (Pty) Ltd., University of Cape Town, University of Natal, Cape Technikon

Sri Lanka: ISB Environmental Services, ITT

Spain: AGBAR Foundation (Centre d'Estudis i Investigacio del Medi Ambient), Kemira Iberica S. A.

Sweden: Stockholm International Water Institute (SIWI), ITT Flygt AB, Svenskt Vatten, SYVAB, Urban Water

UK: Chartered Institution of Water and Environmental Management (CIWEM), the Institution of Water Officers and the Company of Water Conservators, United Utilities

Ukraine: Ukranian Publishing House EKOinform, Swedish Institute, "WILO-Ukraine", "Santekhplast", NTON

USA: Water Environment Federation (WEF), ITT, The Coca-Cola Company

Vietnam: Swedish International Development Cooperation Agency (Sida), Unilever Foundation, The World Conservation Union (IUCN)

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