The UNEP Magazine for Youth

TUNZA

UNEP

for young people · by young people · about young people

Health and the environment

A model for life

Leading the charge

Nature in their hands

The green ark

Waste not, want not

The water challenge

TUNZA
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Partners for Youth and the Environment

UNEP and Bayer, the German-based multinational involved in health care, crop protection and high-tech materials, are working together to strengthen young people's environmental awareness and engage children and youth in environmental issues worldwide.

A partnership agreement, originally signed in 2004 and renewed in 2007 and 2010, runs through 2013. It lays down the basis for UNEP and Bayer to implement the projects under the partnership. These include: TUNZA Magazine, the International Children's Painting Competition on the Environment, the UNEP Tunza International Youth and Children's Conferences, youth environmental networks in Africa, Asia Pacific, Europe, Latin America and the Caribbean, North America and West Asia, the Bayer Young Environmental Envoy Program and a photo competition, 'Ecology in Focus', in Eastern Europe.

The long-standing partnership between UNEP and Bayer has become a public-private partnership that serves as a model for both organizations.

numbers

2.1 trillion hectares – the area of the world once covered by rainforest. Today, just 6 per cent remains.

11 billion – the number of trees planted worldwide under UNEP's Plant for the Planet Campaign. Of these, nearly 4 million have been planted by the Children's Initiative. UNEP has set an overall goal of 13 billion trees.

2 billion tonnes – the amount of carbon dioxide released into the atmosphere each year by deforestation. That's more than is emitted by all the world's cars and trucks.

13 million hectares – the area of forest lost worldwide each year. That's about the size of Greece.

800,000 hectares – an area of forests, wilderness and rivers – known as Europe's Amazon – that Austria, Croatia, Hungary, Serbia and Slovenia have agreed to protect as a transboundary UNESCO Biosphere Reserve.

300,000-400,000 – the number of plant species described by scientists. More than two thirds come from forests, particularly rainforests. Yet only 5 per cent of these have had their chemical composition explored.

100,000 – the (approximate) number of tree species in the world.

42,000 kilometres – the distance an average car travels to produce the carbon absorbed by one tree in one year.

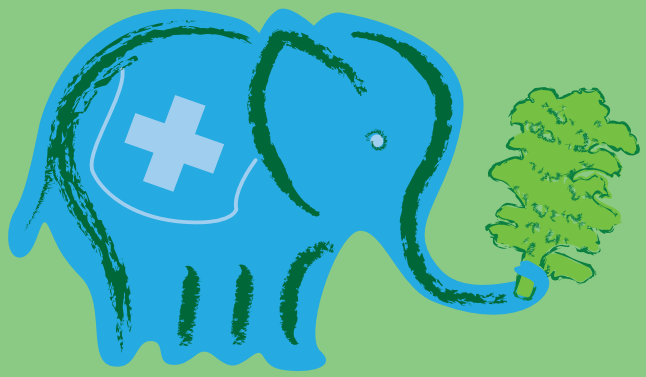
9,550 years – the age of Old Tjikko, a 4.87 metre high Norway spruce growing in Sweden. That means Old Tjikko took root just after the last ice age and for thousands of years was kept in shrub form by the tough climate of the tundra, only becoming a full tree as the climate warmed during the 20th century.

465 – the number of trees needed to supply the paper used by the average American in one year.

120 kilos – approximately the amount of oxygen a single tree produces in a year. That means two mature trees can supply enough oxygen to support a family of four.

20 per cent – the contribution to global warming from forest destruction and degradation.

5 per cent – the area of commercial forests owned by the world's faiths.



EDITORIAL

5 JUNE

UNEP

WORLD ENVIRONMENT DAY

Forests: Nature at Your Service

In support of the UN International Year of Forests

In this International Year of Forests, ***nature at your service*** is the theme of World Environment Day 2011 – being commemorated all over the world with the main celebrations taking place in India.

Forests are the green lungs of the world and play a key role in the health of the planet. They battle against climate change, releasing oxygen into the atmosphere while storing carbon. They regulate rainfall, feed our rivers and are essential to supplying the water for nearly half of our largest cities. They create and maintain soil fertility and protect us from storms and floods.

Awe inspiring, forests are the most biologically diverse ecosystems on land, and are home to more than half of the terrestrial species of animals, plants and insects. They also provide shelter, jobs, security and cultural relevance for forest-dependent populations – around 1.6 billion people.

Forests embody much of what is good and healthy in our lives, yet we are destroying them. Global deforestation continues at a rate of 13 million hectares each year; that's an area roughly the size of Greece.

But it's not too late to transform life as we know it into a greener future – one in which forests are at the heart of our sustainable development and green economies.

Conserving forests and expanding them must be recognized not just as essential to our well-being but also as a business opportunity. UNEP has calculated that an investment of US$30 billion to fight deforestation and degradation could provide a return of US$2.5 trillion in new products and services – that's a return of nearly US$100 for every US$1 invested.

These investments could generate up to 10 million new jobs. Leaders around the world are beginning to understand the potential of renewable energy and nature-based assets, but for a real change to happen, forests need to become a universal political priority. The services forests provide are essential to every aspect of our life. The answer is sustainable forest management, moving towards a green economy, and it lies in our hands.

"Climate change will steal your future. Shrink your carbon footprint: improve your health!"

THAT'S THE WORLD HEALTH ORGANIZATION'S message to the world's youth.

Everybody will be affected by climate change. Those living in the industrialized world will get off relatively lightly: food and other goods will become more expensive; extreme weather events such as heat waves and floods will take their toll; respiratory and heart disease will rise; infectious diseases will become more prevalent in some areas; insurance costs will soar; and infrastructural services like water supply and drainage will be under increasing stress. But this is nothing compared to what will be experienced in much of the developing world, where most people have little or no health care.

Disease and mortality

The intensity and geographic range of infectious and water- or insect-borne diseases like cholera and malaria will expand with higher temperatures, increased rainfall and sea-level rise. At present, for example, there are some 250 million cases of malaria each year, mostly among children in sub-Saharan Africa: this is expected to more than double by 2080. There will be more opportunities for cholera to take hold as floods spread and warmer waters encourage bacterial growth. Heat waves, like the one that claimed 70,000 lives in Europe in 2003, will become more frequent. And there will be more deaths from unexpected events like landslides, floods and freak storms.

Food, water and sanitation

In 1995 the number of people suffering chronic hunger and malnutrition – mostly in sub-Saharan Africa and South Asia – reached its lowest point of 800 million; since then it has been on the rise, with the recent increases in food prices seeing it hit 925 million. More than a fifth of people in the developing world cannot regularly get clean water to drink: around a half don't have proper sanitation. Some 1.5 billion people already live in water-stressed regions. The changing climate will make things worse, with drought leading to crop failure, malnutrition and illness, and floods overstraining already inadequate sanitation systems and damaging cropland. Reduced rainfall and rising populations in Southern and Central Africa, Europe and the Mediterranean, and the southern USA, will increase the number of people living with water stress, again reducing crop yields. The melting of glaciers will lead first to flooding downstream, then drought as these natural water storage systems disappear. Changing patterns of plant and livestock diseases will also reduce agricultural productivity.

Towns and cities

The urban population of developing countries is expected to increase from 2.3 billion in 2005 to 4 billion by 2030. And as cities swell with inadequate housing and sprawling communities – many made up of people who have fled failing rural livelihoods – their vulnerability to climate change increases. Floods and landslides, contaminated water, food shortage and disease all hit the poorest urban people hardest. And many of these expanding urban conglomerations are on the coast, and thus at risk from sea-level rise, now averaging 4.2 millimetres per year.

Extreme events

Between 1998 and 2007, 2 billion people – around a third of the global population – were affected by natural disasters, many linked to such unusual weather as heat waves, cold waves, wind storms or excessive rainfall – all of which are expected to increase in range and intensity with climate change. The reinsurance company, Munich Re, says the number of major weather-related disasters grew from an average of less than two a year in the 1950s to six per year in the last decade. By 2100, summer temperatures in northeast India and Australia are expected to rise above 50°C, and in western and southern Europe to go above 40°C. More powerful storms will triple the number of people vulnerable to tidal storm surges. Apart from the immediate threat to life and limb, such events demolish infrastructure and so lead to food shortage, water contamination, malnutrition and disease.

Population and migration

The global population is expected to increase to 9.2 billion by 2050, mostly in the developing world. This will interact with climate change to reduce further the health and well-being of ever larger numbers. Desertification, flooding and saltwater intrusion will reduce the amount of arable land and drive people from their homes: many of the 120 million inhabitants of the low-lying Bangladesh delta, for example, will have to flee sea-level rise. The stress of migration brings its own threats to health and well-being, and with hundreds of millions of people expected to be on the move by 2050, conflict can only increase.

Climate change massively increases the challenge to scientists, policy makers and a public that, in many parts of the world, struggles to achieve any reasonable level of health. If you shrink your carbon footprint and improve your own health, not only will you be increasing your resilience to whatever the future may hold; you will be working to reduce the impacts of climate change on everybody else.

For further detail see the full report by UCL/The Lancet at www.ucl.ac.uk/global-health/ucl-lancet-climate-change.pdf

NASA

JL Perret/UNEP/Topham

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Medical students lead the way

RENZO GUINTO, medical student, environmental advocate and Bayer Young Environmental Envoy 2007, thinks the global health and environmental movements should join forces, and explains how young doctors from around the world are leading the way.

Dozens of papers from all over the world clearly lay out the impact of climate change on human health. In 2009, a commission formed by *The Lancet* and University College London (UCL) called climate change 'the biggest global health threat of the 21st century'. Infectious diseases like dengue fever and cholera are on the rise. People are affected by increases in the severity and frequency of natural disasters like typhoons in countries including the Philippines, while drought in Africa impacts food supplies.

Yet at international negotiation tables and in community-based education, little emphasis has been placed on the health impact of climate change. Rather, it is presented as an economic and political issue, or merely an environmental problem. Yet even among environmentalists, people disagree about both the science and the solutions.

Health unifies all

But what if climate change were reframed as a health issue? Article 25 of the Universal Declaration of Human Rights says 'everyone has the right to a standard of living adequate for the health and well-being of himself and of his family'. Every member state of the United Nations is accountable to its citizens, and the failure to act on climate change is a violation of the human right to health.

The global environmental movement should focus on the health impacts of climate change. Communities may not comprehend terms such as 'carbon emission' or 'cap-and-trade', but they will understand how water and food scarcity threatens nutrition, how warming encourages malaria-bearing mosquitoes, and how flooding can lead to disease and death. With this understanding, they're more likely to take positive action.

Creating a movement

In October 2010, the International Federation of Medical Students' Associations (IFMSA), a federation composed of 1.2 million medical students worldwide, launched an online petition pushing governments to put 'health back into the climate change negotiations'. IFMSA calls for 'full participation and consultation of the international health community in the international negotiations within the United Nations Framework Convention on Climate Change' in the hope that the negotiations will 'achieve a fair, ambitious and legally binding global treaty'.

With this bold act, medical students hope to encourage the World Health Organization, the World Medical Association and all other international non-governmental organizations and foundations working for health to take leadership in this new movement.

Both global health and environmental movements should make use of this momentum, pooling resources, efforts and voices to create high-impact development projects that encompass health, environment and even poverty. A global forum on environment and health, for example, would allow activists to discuss and analyse issues through the combined lens of environment and health, and arrive at a global strategy for collaborative action.

If we tackle climate change as a health issue, I am certain that the world will come to agreement for action sooner.

For more information, visit: www.environmentalgovernance.org/featured/2010/11/youth-voices-climate-change-is-a-health-issue/

LEADING THE **CHARGE**

Photos : Stephen Osman

'Women and female children in Africa play a pivotal role in the health of the environment,' says Cora Neumann, director of RAND's African First Ladies Initiative, 'but they are often unaware of some of the basics of environmental health. For example, their work includes fetching water from either a stream or river, or a well if there is one, as well as disposing of waste. Bathing, and washing of clothing and pots and pans often use the same water source. Pollution of the limited water sources is a growing problem: human wastes, medical waste and much more all end up in the local rivers or water bodies. Cleaning compounds is also women's work, and soil contamination and pollution is an issue. Preventable diseases are a serious problem in the communities with whom we work.'

Then there's air pollution. Around the world, according to the World Health Organization, more than 1.6 million premature deaths a year are due to indoor air pollution – largely the result of burning wood, charcoal and other biomass for cooking. 'In Sierra Leone, with the support and help of First Lady, Sia Nyama Koroma, the initiative is working to introduce a new wonder stove designed at the local Njala University,' says Cora. 'These stoves are smokeless and use much less fuel. They are now being made from local clays with a tin outer stand and distributed all over the country. Not only do they reduce air pollution, they save trees as they are more efficient and reduce the time women and children spend foraging for fuel.'

Lightening women's workload and saving their time increases the likelihood that girl children get to school, and women can spend more time in income-generating tasks, farming and adult education. That's particularly important on a continent where 60 per cent of the children unable to attend school are girls, some 40 million of them in sub-Saharan Africa.

'First Ladies are well placed to lead the charge to improve the status of women and to bring about significant change,' continues Cora. 'We work to build on the First Ladies' commitment by fostering and coordinating partnerships between them, their offices and leading international development organizations such as CARE International and the International Planned Parenthood Federation as well as with our implementing partner based at the Public Health Institute. Together they build specific programmes that make a real difference, particularly to women and girl children, to improve health, education and economic empowerment.

'The initiative,' concludes Cora, 'is about empowering First Ladies to mobilize their potential as champions of improved health and development. Since 2008, we have engaged with First Ladies from 17 nations – from Burkina Faso to Zambia and Nigeria to Mozambique. Their dedication to improving the health, education and prospects of African women is inspirational.'

HE Thandiwe Banda of Zambia

HE Ida Odinga of Kenya

HRH Queen LaMbikiza of Swaziland

HE Ana Paula Dos Santos of Angola

HE Adelicia Barreto Pires of Cape Verde

Pursuing a passion

Ugandan radio journalist, **PATRICIA OKOED-BUKUMUNHE**, became the first winner of UNEP's Young Environmental Journalist Award in February 2011. TUNZA caught up with Patricia shortly afterwards, and talked to her about her career and motivation.

PNUE

Patricia receives her trophy from UNEP Executive Director Achim Steiner and USEPA Administrator Lisa Jackson.

Q: **What inspired you to become a journalist, and did your interest in journalism come before your interest in the environment?**

A: For as far back as I can remember I've had a passion for communication. In my first year at college I decided to get into radio journalism even though there was only one broadcaster in Uganda at the time. I just knew broadcasting was for me. But it's hard to say what came first... I am tempted to say my interests were intertwined, simply because I have always wanted to use journalism to communicate environmental issues. In my opinion, managing the environment is a prerequisite for handling other vital issues such as health. I have a saying: '*Take care of Mother Nature and she'll take care of you.*'

Q: **What was it that led you to radio journalism?**

A: I was particularly attracted to radio journalism because it allows people to speak for themselves. Developing features with a rainbow of characters draws listeners in and puts them right there, in the piece. Hearing people speak for themselves and adding sound effects brings the whole thing to life. But I write for magazines and newspapers, too... in Austria, France... as well as local ones.

Q: **What sort of stories do you focus on?**

A: I cover whatever affects the environment or society as a whole – and what's topical and crucial. I'm currently working on a feature on recent oil discoveries in wildlife parks and protected areas in Uganda. The question being asked as Uganda basks in the recent discovery of large amounts of oil is: 'Can oil exploration and wildlife coexist?' One of my pieces explores the impact and benefits of this coexistence.

Q: **And which stories do you most enjoy?**

A: I love pieces that involve the community because those stories show the wider impact of an issue and then bring the listener back to the everyday person to relate to.

Q: **What do you see as the most important issues of our time? Are these the same in Uganda as in the wider world?**

A: Issues to do with global warming and climate change are not receiving the attention they deserve. As the developed world races to advance technology and developing countries such as Uganda struggle to catch up, the world seems to be forgetting that this is having a disastrous impact on our planet. Forest cover is falling, lakes and rivers are drying up and weather patterns are changing. Floods, earthquakes and tsunamis are warning signs that the world should take seriously. We tend to forget that the well-being of our planet is the basis of our existence.

Q: **What would you advise our readers who might want to become environmental journalists to do?**

A: You need passion and interest in environmental issues before you dedicate yourself to communicating them. Another piece of advice is to keep the issues relevant and digestible, and to talk about them as simply as possible. That's the way to make an impact.

I have had the pleasure of meeting some Tunza members and I was impressed by their interest in environmental issues. It was particularly inspiring to learn that architects, IT specialists and teachers in the making are all looking for ways to use their professions to communicate environmental issues.

I should end by saying that my pleasure in winning the UNEP award is not about the winning, but more about the knowledge that it is being used as a tool to communicate the impacts of climate change.

Waste not, **want** not: BYEE 2010

'I don't care if it smells. This is my dream plant!' said Claudia Ramírez, a chemical engineering student from Venezuela. The delegate to the Bayer Youth Environmental Envoys (BYEE) 2010 conference stood enraptured among mountains of recycled waste in a sorting plant near Leverkusen, Germany.

'I run a project at university collecting and selling recyclable materials,' she said. 'So it's fascinating to see how machines separate plastics, metals and paper into bales that will provide raw materials for other products.'

Bayer has hosted the BYEE conference annually since 1998, rewarding youth who make substantial contributions to environmental protection with a five-day field trip to Bayer headquarters in Leverkusen. Here, delegates learn how Germany's Government, industry and citizens cooperate to protect the environment in North Rhine-Westphalia, its most densely populated and industrialized state. They exchange ideas, meet scientific, industrial and legal experts, and study the state-of-the-art technologies that help protect Germany's environment.

The key theme emerging in 2010 was waste: how to manage it, reduce it and use it as a resource. Field trips included visits to the Emscher Genossenschaft wastewater treatment plant; AVEA, a municipal recycling facility; and the Bürrig waste incineration plant, where toxic industrial wastes are processed to recover precious metals.

Software engineer Aswin Chandrasekharan, from India, was impressed by the way the plant recovered heat from the incineration process to generate steam power. 'I write energy audits for business plans, and this system is breathtakingly efficient,' he said. Likewise, many of the envoys' projects featured waste. Asmak Afriliyana transforms waste from coffee production in East Java (Indonesia) into compost blocks for plants; Jerry Lee from Malaysia runs campaigns to get the public to accept sewage sludge as a fertilizer and building material; and Pondet Ananchai, from Thailand, seeks ways to harvest heat from electrical devices and convert it into electricity.

The goal of the programme is for young people to share and implement new ideas in their own countries, and to encourage them to pursue careers in environmental protection. 'There's much creativity and innovation here,' acknowledged Kennedy Liti Mbeva, from Kenya. 'But what's important is capacity building, so that people in developing countries can come up with solutions to fit their own contexts.'

BRIGHT **IDEAS**

An exciting highlight of the 2010 BYEE conference was the launch of the Bayer Young Environmental Leader Award to encourage environmental projects that demonstrate originality, potential impact and sustainability. Each participating country nominated an Envoy to present a project to a panel of judges, who awarded four projects with special support from Bayer.

Vaibhav Tidke, India

Since 2007, I've worked on solar drying, an initiative to develop a technology that will improve the economic condition of Indian farmers.

Much of the produce farmers harvest – fruit, vegetables and marine products – is highly perishable. The lack of power supply in rural areas means that there are no processing or storage facilities, leading to a 30 per cent loss of food. Most produce is seasonal, too, so gluts push down the market value. These factors help trap people in poverty.

But what if farmers had a way to process fresh food on site without electricity? My professor asked me to look at the technologies available, and solar proved a good option: we developed a simple, easy-to-operate technology for dehydration based on polyurethane and metal. Microorganisms cannot survive in dehydrated food. It can be more easily stored and transported, and provide an off-season income. And even taking into account the cost of production, the profit margin of dehydrated food is high: dehydrating a kilo of onions costs 50 rupees, but the market value is 100 rupees.

We've already produced demonstration units, and the next step is training the farmers. I have also started a social enterprise, Science for Society, helping village farmers become entrepreneurs, and we're working on developing new products for dehydrated foodstuffs, such as powdered soup.

Solar drying has the support of the Indian Government and won an award from UNESCO, but we need materials to produce more units, a testing facility to analyse dehydrated food, and farmer training. There's still a long way to go.

Michael Rennertz/Bayer

Christopher Millora, Philippines

In the Philippines, we don't underestimate the power of even the smallest member of our family. My project, the Little Ilonggo Environmental Heroes Story Caravan, educates young children about recycling. I travel to local schools to present a puppet show and environmental workshop, entertaining and educating children and offering concrete ways to participate in environmental clean-ups.

The puppet show tells the story of *The Little Ilonggo Green Rangers Adventures: The Defeat of Basuramon*, which I wrote and published in book form in English, German and three local dialects. It's about a little boy, Pot Pot, whose *barangay* – a small community – is being threatened by the evil garbage monster Basuramon. He calls his friends to help fight it, and a magic tree gives them superpowers: Wanda Walisse's superpower is to pick up rubbish; Ramboy Recycle recycles; Tinay Katubigan cleans waterways; Cora Conservation turns off lights and taps; and Pot Pot the Puno Planter plants trees. Together, they defeat Basuramon and the community becomes beautiful again.

I ask the children: 'Who wants to be like Wanda Walisse?' And of course every child wants to be a superhero. I distribute superhero masks, and they zoom around cleaning their school grounds as superheroes!

Bayer

I've reached more than 800 children, and hope to expand into the inner city and provinces. I'll ask my fellow Envoys from the Philippines to help translate the book into their dialects.

Nguyen Thi Thanh Thao, Viet Nam

I study English literature, and work with children between the ages of 6 and 14 in Ho Chi Minh City. Vietnamese children spend a lot of time studying maths so there isn't much time for extracurricular study, but I thought it was important to teach them about environmental issues.

Nguyen Thi Thanh Thao

That's why I wrote *Green Maths Exercises*, a textbook combining environmental education with maths for young children. The exercises are based on numbers and data on environmental issues published by official institutions such as the Viet Nam Ministry of Natural Resources and the conservation organization WWF.

Here's a sample problem: every day, 6,000 tonnes of garbage is discarded in Ho Chi Minh City. But the city only has the capacity to collect 5,000 tonnes a day. How much garbage is left in the city each day?

The feedback from children and teachers has been positive. In the next phase, children will produce the books themselves, incorporating creative writing into the process.

Daniel Isfer Zardo, Brazil

My project, ECOHABITARE, a student-led research centre at Pontifícia Universidade Católica Paraná, focuses on transforming municipal and industrial wastes into sustainable building. Our group includes students in disciplines ranging from civil engineering to environmental engineering, biology, architecture and design.

One common local waste is marble dust, a by-product of marble mining, similar to the clay used to make conventional bricks. We took this to a brick maker, who used it to our specifications to create the 'ecological brick'. It stacks well, so doesn't need much mortar, and the design, which originates from the USA, accommodates supporting rods, saving on wooden supports.

We've patented these bricks and are building demonstration structures on campus, including a waste shelter where the public can bring materials to be recycled, and a demonstration house to showcase our innovations and serve as an education centre for the neighbouring community.

We've also designed a recycled-materials green roof made of wood and PET bottles, and a rainwater collection system of 200-litre alcohol barrels, filtered through 10-litre plastic bottles filled with sand, rocks and mesh.

Ultimately, we'll share knowledge by building more demonstration buildings, and by producing an easy-to-understand self-construction guide, enabling communities to apply these ideas anywhere.

Ecohabitare

The green ark

RBGKew

Nothing could survive without plants. They are the foundation for most of Earth's ecosystems, help regulate the climate, and provide building materials, medicines, fuel, clean water and food, all essential for human health. But we're losing plants fast: according to the recently published IUCN *Sampled Red List Index for Plants* – a study conducted by the Natural History Museum (London), the International Union for Conservation of Nature (IUCN), and the Royal Botanic Gardens, Kew (London) – one in five of the world's 380,000 known plant species is threatened with extinction due to climate change and habitat loss.

In response, Kew's Millennium Seed Bank project (MSB) is racing to save as much plant biodiversity as possible, giving priority to the world's most useful and most threatened plant species. Part of the botanical research institute's mission to learn about and conserve plant biodiversity, the MSB was launched in 2000 to collect and catalogue seeds from around the world. Working with partners in 50 countries, MSB helps identify which seeds are in most urgent need of saving, offers conservation training and equipment, and helps develop long-term conservation programmes. The seeds are analysed for their DNA, tested for viability and, where possible, made available for non-commercial scientific research.

SEARCH AND RESCUE

Loss of biodiversity is particularly worrying when it comes to food security. The MSB recently joined the UN Food and Agriculture Organization's Global Crop Diversity Trust (GCDT) on a rescue mission to save the genetic resources stored in the wild relatives of the crops we rely on. More than 30,000 plant species are edible, but we cultivate fewer than 150 for food, and just 12 species provide 80 per cent of world food. This dependence on only a few plants could spell disaster as temperatures rise, growing seasons change, the world population grows and productive arable land shrinks.

More than 1.5 billion people live in countries suffering from water scarcity, which is when supplies drop below an average of 2,750 litres per person per day. This hampers food production and economic development, making communities particularly vulnerable, and has serious consequences for human health – with poor sanitation the world's leading cause of premature death.

As human populations continue to expand, the world's fixed supply of freshwater will have to stretch ever further. And on top of that, climate change is altering evaporation and precipitation patterns, so while an excess of water may occur at times or in places with no infrastructure to deal with it, some existing water sources are expected to dry up. The world's two most water-short regions – Africa and the Near East – have the fastest-growing populations, and may also suffer extreme drought conditions associated with climate change. Putting climate change and population growth together, the number of people living with water scarcity is set to more than double during the coming decades.

People are working to squeeze every drop from the available resources, introducing techniques that range from the very high-tech – including desalination – to simple storage systems, like water butts, that can be installed at home. Here are a few examples.

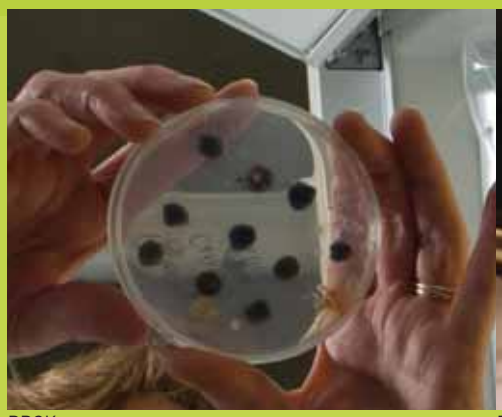
Rainwater harvest

'I designed a rooftop rainwater harvesting system for drinking water using four layers of physical filtration: sand, gravel, sand with aluminium, and sulphate and activated carbon. A chemical filtration layer uses a chlorine gas pump. Finally, UV radiation kills bacteria. My goal is to save more than a fifth of rainwater runoff that would otherwise be wasted. Next I hope to raise the water quality to government standards, and scale things up.'

Liu Zhihao, Singapore

Dry rice

Farmers around the world are beginning to adopt rice production methods that require less water than the traditional paddy field. Seedlings are planted very young and the ground is kept moist rather than flooded. This not only reduces the amount of water needed to get a crop, but also the fertilizer and pesticide requirement. And it also reduces emissions of methane (a greenhouse gas associated with waterlogged ground) so it's good for the climate as well as for human health.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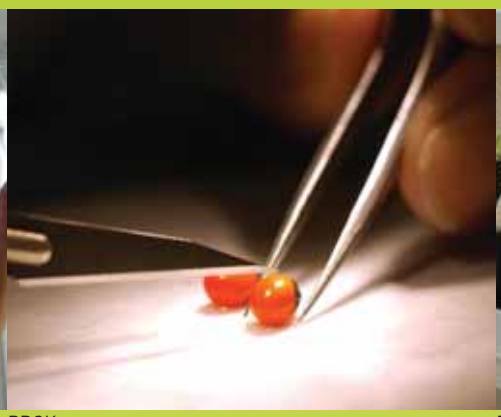
RBGKew


RBGKew

Cary Fowler, Executive Director of the GCDT, explains that we need the genetic diversity of wild relatives because they hold the solutions to such problems as drought tolerance, pests and temperature sensitivity. 'All our crops were originally developed from wild species,' explains Fowler, 'and they were adapted from the plants best suited to the climates of the past. We now need to go back to the wild to find any of their relatives that can thrive in the climates of the future. A change of only 1ºC during rice flowering, for example, can reduce yields by a tenth, causing major shortages,' says Fowler. 'If genes from a night-flowering wild rice variety could be bred into farmed rice, it could sustain or improve yields.'

The GCDT has already collected and stored millions of seed samples in its Arctic vault in Svalbard, Norway. Its partnership with the MSB is a focused effort to gather, save and research the useful genetic traits of wild relatives of 23 staple food crops: alfalfa, bambara groundnut, banana, barley, bean, fava bean, chickpea, cowpea, finger millet, grass pea, lentil, oat, pea, pearl millet, pigeon pea, potato, rye, rice, sorghum, sunflower, sweet potato, vetch and wheat. Over 10 years, the collected seeds will be put through a process called 'pre-breeding' to identify what could be incorporated into domesticated plants. Once this is identified, the material is made available to crop breeders. It takes up to 10 years to breed a new crop variety, so it's a race against time.

SPROUTING SUCCESS

So far, the MSB has banked seeds from more than a tenth of the world's flowering plants, with banked seeds already being used to restore damaged habitats and help poor communities adapt to harsh conditions. Kenyan communities in the Makeuni district, for example, replanted forest degraded by overgrazing, deforestation and erosion with seedlings of indigenous trees grown from seeds collected by the MSB. The next step: to bank 25 per cent of the world's seeds by 2020.

THE **WATER** CHALLENGE

Solar purification

A Swedish company has come up with a solar-powered water purification system that promises to deliver 100,000 litres of clean water a day by using solar power to filter dirty or salt water. The cost of installing the system is high, but over the 20 years that the system should continue to function, it averages out at less than $0.03 per litre of clean water.

Water quality

'I'm trying to improve water quality for 40,000 São Carlos inhabitants. At Universidade Federal de São Carlos, I study organisms in the ecosystem to determine water quality. I focus particularly on macroinvertebrates in sediments, because they are great indicators of the real condition of the water. Based on our findings, the city's environmental ministry is restoring streams, which is more cost-efficent than treating the water, and prevents disease.'

Amanda Baldochi Souza, Brazil

Seawater greenhouse

The seawater greenhouse uses seawater and sunlight to grow food and flowers in arid coastal regions such as Australia, Oman and the Canary Islands. Wind blows through porous cardboard walls over which seawater is trickled, creating cool humid growing conditions. Moving across sun-heated pipes, the evaporated seawater condenses as freshwater for irrigating crops in the greenhouse and vegetation outside it, helping to green the landscape.

Ion towers

A company in Abu Dhabi is attempting rainmaking using arrays of 10-metre towers that emit ions – negatively charged particles – which attach to cloud condensation nuclei, particles around which water vapour condenses. This new technology has yet to be proven, but is similar to the old practice of cloud seeding: the theory is that ionizing condensation nuclei allows them to survive longer, giving water droplets more time to form.

FROM DESPAIR TO HOPE

By Linh Do, Tunza Youth Advisory Council member for Asia and the Pacific

Ashley Cooper/Specialist Stock

I attended the last two big United Nations Climate Change Conferences – in Copenhagen and Cancun – as an observer, lobbyist and activist in the International Youth Climate Movement. Doing so has changed my capacity for hope.

In 2009, I went to Copenhagen filled with anticipation. It was being billed as 'Hopehagen' and everyone, including me, was buying into optimism. I had no illusions about the difficulty of reaching a fair, ambitious and binding treaty there, but I was hopeful, like many others, that it was a real possibility. I believed heads of states would demonstrate that they possessed the political will needed to act on climate change.

I felt hopeful until the final night, only to wake to a world without a climate deal. The outcome – the Copenhagen Accord, which set a goal of limiting global warming to below 2ºC above preindustrial times – fell short of what is needed to avoid the worst consequences of global warming, and left individual nations to set their own targets. This was not a failure of the United Nations system, nor was the public misguided in its ideals. No, it seemed to show that many political leaders were still not ready to face the global problem of climate change.

So I was slightly hesitant going to Cancun. The obvious question – 'Why even bother?' – ran through my head, but then would come a stronger question: 'Why shouldn't I bother?' Determined, I headed off, keeping quieter about what was possible and surrounded by negative media discourse that left me with a feeling of trepidation.

In the final hours, as the agreement became more concrete and most nations looked as if they'd reach consensus, I couldn't believe I was witnessing agreement of a text that would slowly move the world in the right direction. I was unwilling to leave even at 3am: illogically, I was fearful of the consequences of an early departure. I did not want an ending like Copenhagen's. But when I woke the following morning, I read that Cancun was a success.

The Cancun agreements built on precedents established in the Copenhagen Accord by calling, among other things, on developed countries to provide more financial support to developing ones for green technology. It remained a far cry from a fair, ambitious and binding treaty, but the secret of success was the collaborative and transparent way in which the agreement was achieved. Unlike the Copenhagen Accord, it was not negotiated by a few powerful countries behind closed doors.

Much must be done to build on this progress. All governments need to implement domestic policies, too. Then they'll be able to arrive at the next big conference in Durban at the end of this year with the political backing needed to take climate change action to the next level. One focal point of discussions will be the future of the Kyoto Protocol, with its current provisions expiring at the end of the year.

I'm excited about Durban, but I'm more excited about the Rio+20 Earth Summit in 2012, the 20-year follow up to the Rio Earth Summit 1992, which cemented sustainable development as a political issue and signed the first climate treaty. I'm working with the International Youth Climate Movement on a bridging campaign between the two conferences.

If we don't expect the best possible outcomes from these conferences, they simply won't occur. I am now unashamedly hopeful that the small steps taken in Cancun will lead to big outcomes for the future.

UN Photo

A model for LIFE

'The environment has always been my passion. Mother Earth is our fundamental life-support system, and by becoming aware and responsible now, we can help preserve the planet.'

You'd know Gisele Bündchen's face anywhere. The Brazilian-born beauty is the world's highest-paid supermodel, is often seen gracing the covers of the top international fashion magazines, and is the face of advertising campaigns for such companies as Apple, Christian Dior and Versace.

But when she's not in front of the camera or on the catwalks, Gisele is a devoted environmental campaigner, using her fame to raise awareness and encourage us to protect the planet.

Gisele grew up surrounded by nature in southern Brazil, and was aware of the destruction of its forests and how that affects the people who depend on them. Her involvement in environmental causes began in 2006, after a visit to an Indian tribe on the Xingu River in the Amazonian rainforest. Seeing how the tribe suffered from water pollution and other problems caused by deforestation for cattle ranching, soy production and logging, Gisele worked with her footwear company, Grendene, to create a line of sandals to raise awareness of environmental causes and raise money for forest- and water-related projects in Brazil's Atlantic and Amazon rainforests.

In 2008, Gisele returned to her home town of Horizontina to launch Projeto Água Limpa (Clean Water Project) with the help of her family. The project promotes sustainable environmental management in the region, and aims to aid the recovery of river-based vegetation and local water sources in the state of Rio Grande do Sul. During the first phase of the project, 40,000 native tree saplings were planted.

Then Gisele personally joined in planting the Gisele Bündchen Seeds Forest: 25,500 trees of 100 species covering more than 15 hectares in Campinas and Bahia, Brazil. The project is part of conservation efforts to save what remains of Brazil's Atlantic forest, which once covered 15 per cent of the country.

In 2009, Gisele was named a UNEP Goodwill Ambassador to raise awareness and inspire action to protect the environment. For World Environment Day 2011, Gisele and actor Don Cheadle issued a challenge: for every activity registered at http://www.wedchallenge.org they will plant three trees. As Gisele says, she has a lot of goodwill to share.

HERE ARE JUST A FEW OF GISELE'S ENVIRO TIPS:

Reduce your computer's emissions

Reduce CO_2 emissions by setting your PC to sleep when idle, letting the system hibernate until you come back.

Water tank health

Keep your water tank covered to keep out insects and small animals that can contaminate water and cause serious diseases.

Help stop wild animal trafficking

There are many different species in a habitat, and they are part of a balanced ecosystem that took millions of years to stabilize. Removing one disrupts the balance. Don't buy objects and jewellery ornamented with feathers, and don't buy wild animals.

Dispose of cooking oil properly

When poured down the drain, oil forms gluey lumps that block pipes. Besides, just 1 litre of used cooking oil can contaminate 25,000 litres of water. Dispose of oil at appropriate places, where it will be recycled or reused. Oil can be made into soap: 25 litres of oil are enough to produce 120 bars of soap.

Together, we will be stronger

With everyone doing their bit, we can do a lot. Environmental preservation is not only up to governments, policy makers and non-governmental organizations. The power of people is limitless.

Photos: Karen Eng

Nature in their hands

Shouts of excitement rang out across a rice field as children walked along the rows, nets in hand, scanning the ground for frogs, spiders, crickets, dragonflies and many other creatures living there. Nearby, more children waded into a river to gather freshwater crabs, Japanese brown frogs and water scorpions. Others explored a fragrant, dense forest identifying and measuring such trees as cypress, Japanese chinquapin, Japanese chestnut oak and camellia.

These 112 children had gathered from 34 countries to participate in the International Children's Conference on Biodiversity (ICCB) in Nagoya, Japan, hosted by UNEP in cooperation with the Aichi Prefectural Government and the City of Nagoya, in October 2010. The ICCB coincided with COP10, a United Nations conference also taking place in Nagoya, where governments met to discuss a new global strategy for biodiversity conservation.

The ICCB gave the children an opportunity to discuss problems and solutions around biodiversity loss, while making new friends, learning about Japanese culture and experiencing Japanese biodiversity first-hand. They discovered how humans can work with nature – not against it – to develop and care for biodiversity and ecosystems.

Catching creatures

Hands-on experience meant going outdoors, so the adventure began in the Hirabari *satoyama*. A *satoyama* is a centuries-old Japanese method of managing land, where generations of farming families have maintained a sustainable system of cultivation while preserving the natural landscape and habitat. Within its 12 hectares, the Hirabari *satoyama* encompasses a natural forest, which provides firewood and wood for charcoal; a cultivated forest for timber; rice fields; ponds that water the fields; the river; and a spring whose water is bottled and sold to cities.

Afterwards, the children reflected on how biodiversity in the *satoyama* differed from their expectations. 'I expected to see snakes and lizards,' said Jahmali Bridgewater, 12, from Bermuda, 'not water skaters and crabs'. Others were surprised to see so many spiders, dragonflies and other small creatures in the rice field. 'Wherever you stepped, there was a spider scurrying around, and there were webs everywhere,' said Dawn Lee, 14, from the USA. 'Frogs, too!'

Hip-deep in mud

The next day, delegates literally waded into action at nearby Kanshiro pond. Here, the children learned, the endangered Japanese bitterling fish are threatened by invasive species, including the large-mouth bass and the American bullfrog, both from North America.

'When I saw the pond, I thought, "I don't want to get dirty!",' said Nadhirah Mohar, 13, from Malaysia. 'But it was choked with mud and needed to be drained and cleaned, so we were given nets and buckets in order to save fish and other animals.'

As farmers drained the pond, the delegates, joined by 150 Japanese schoolchildren, waded into the water to catch bass, carp, bitterling, giant bullfrogs, turtles, mussels and more, sorting the creatures in buckets for identification. The useful and native species would be put back after the pond was cleaned and refilled, and the alien species removed.

'I feel bad that the large-mouth bass were left in a tank without any water to die,' said Nadhirah. But Phuong Nguyen Hoang, 13, from Viet Nam, was impressed. 'Pond dredging was very hard work. But I learned that our actions have a direct effect on biodiversity.'

Mapping solutions

After two days of intensive splashing, delegates travelled to the seaside town of Mihama to create a Biodiversity World Map. The children worked in groups, brainstorming about threats to biodiversity in their regions.

ICCB: mini interview

Adeline Suwana, Indonesia

Q: What does your environmental group do?

A: My organization is called Sahabat Alam, or 'friends of nature', and we plant trees and coral reefs. We cut up small pieces of coral and put them in artificial rock, scuba dive into the ocean and put them on the seabed. This year we held a special programme called Save the Planet. Lots of kids who live in rural districts don't know about global warming or climate change, even though they can feel the effects. We hold seminars about change, and help them draft a declaration of things they can do. We have gone to eight schools so far.

Q: What have you got from this conference?

A: I became much more aware of the biodiversity of other countries during the biodiversity map project. But the most fun thing was getting to know people from other countries.

ICCB: mini interview

Nadhirah Mohar and Jes Ismael Izaidin, Malaysia

Q: What did you learn at the conference?

A: We discovered that campaigns can be an effective way to focus efforts on sending messages and taking action for a cause. This year we discussed the many eco-problems in our community. We needed a new campaign to stop illegal logging, wildlife poaching and deforestation, and to show the beauty of nature and wildlife and the value of forests. Our campaign is called Ghost Tiger, a dance performance that calls attention to the plight of the tiger. A 'ghost tiger' is a dead tiger, killed for its skins, for medicine and to protect livestock, and a victim of habitat loss, disease and hunger. Tigers are apex predators: they keep the wildlife population balanced for healthy biodiversity. So please support Ghost Tiger.

'We're creating a world map indicating biodiversity issues like poaching, deforestation, pollution and so on, narrowing these down to the most crucial issues, and finally finding those common around the world, as well as identifying possible solutions,' said Annie Collins, 14, from Canada.

'Coal plants are a big problem in the Asia-Pacific region,' said George Byrne, 11, from Australia. 'Solutions are renewable energy sources, like solar, hydro and wind.' Logein Taybah, 14, from Saudi Arabia, said that the Middle East group identified such threats to biodiversity as marine pollution, industrial air pollution and desertification, while Rufat and Aytakin Dargahli from Azerbaijan said, 'In Europe, the two biggest problems are global warming and improper disposal of rubbish,' adding that marine garbage dumping was a major problem in their country.

'The challenge has been trying to agree on what problems are more pressing,' said Annie. 'We're having a hard time deciding between deforestation and invasive species, for example.' She noted that it was interesting to debate what's important, defend positions and come to agreement – the first step towards finding solutions.

Statement to the world

The biodiversity map was just a start towards the main outcome of the ICCB, a formal children's statement to be delivered to participating nations at COP10. Joined for a special day-long session by 200 Japanese schoolchildren, the delegates worked to generate lists of problems and solutions for conservation and sustainable use. The groups chose the most prevalent and urgent issues threatening biodiversity – such as global warming, poaching and deforestation – to be addressed in the final statement, which detailed how both children and adults should act to help preserve biodiversity.

The children pledged actions such as tree planting, educating themselves about nature, recycling and not wasting food. They asked adults to commit to using local resources and avoiding development in the habitat of rare species. The children's declaration was approved at a final ceremony attended by the mayor of Nagoya, and presented by UNEP Junior Board members Annie Collins and Francesco Govender to world leaders at COP10.

Final fun

The week wound down with a final day of field trips to a Toyota automobile plant, the forests of Mount Fuji and a Japanese elementary school. But when asked what was most unforgettable about their experience, most agreed on the pond dredging, proving that the only real way to appreciate nature is to immerse yourself in it. Francesco Govender, 14, from South Africa, summed it up nicely, saying, 'When I waded into the water, the mud came up to my hip. It was disgusting – but it was also exciting!'

ICCB: mini interview

Emily Keal, UK

Q: In what way was this children's conference different from others you've attended?

A: We've never done anything as active as pond dredging before! We normally observe power plants and such like. It's much more about wildlife this year rather than about global warming, which is what we usually focus on.

Q: How has coming to children's conferences helped you make a difference?

A: We have done a lot more tree planting since we started attending conferences. My environmental group makes films to spread awareness about wildlife in our local area of north Yorkshire. We focus on the river and wetlands, take children out and observe wildlife with them.

EXPOSURE

Toxic Baby

MANMADE CHEMICALS are everywhere, from food to furniture, cosmetics to computers, toys to toothpaste. They have brought great benefits, swelling our harvests, beating previously unvanquishable diseases, making possible a host of consumer goods that add greatly to the quality of life. But there is growing concern that, as an unintended consequence, some cause harm to human health and the environment.

Documentary film-maker **Penelope Jagessar Chaffer** – the first black female director to be nominated for a British Academy of Film and Television Arts award – has spent years researching the effects of exposure to chemicals, especially for children. Discussions with doctors, researchers and scientists around the world all contributed to her documentary, *Toxic Baby*. TUNZA spoke to her.

Why is there cause for concern?

In the industrialized world, adults can have up to 50,000 more chemicals in their bodies than their grandparents had, according to Dutch paediatrician Dr Gavin ten Tusscher, Chairman of the European arm of Health Care Without Harm, an international coalition working to make health care safe for people and the environment. And almost anywhere in the world, children have more chemicals in their bodies than their parents, reflecting an increase in their use.

No one has a definitive figure of how many chemicals are in circulation, but in the European Union (EU), more than 100,000 are available, in the USA 80,000, while about 2,000 new chemicals are launched each year. Meanwhile, the volume of chemical production doubles every 25 years. At the same time, science is learning more about how chemicals affect human health and the wider environment.

Aren't there laws regulating chemical safety?

There are efforts at regulation under way both in the USA and the EU. But at the moment, chemicals are not regulated anywhere in the world in the same way as pharmaceutical drugs, which go through strict testing for up to 12 years before they can be licensed for use. Chemical manufacturers are responsible for their own safety thresholds, and don't have to demonstrate the long-term health effects of individual substances,

much less how these might interact with one another in the environment and in humans.

Of course, not all chemicals have a negative effect on human health, but the problem is what we don't know. Meanwhile, once we release a chemical, it can't be taken back. Some take a long time to degrade; some accumulate in the body. For example, in 1976 the USA banned the manufacture, processing, distribution and use, except in a 'totally enclosed manner', of polychlorinated biphenyls (PCBs), which disrupt hormone, nervous and immune systems. Similar restrictions exist in Japan, Canada and Western Europe, while the Stockholm Convention, signed in 2001, targeted PCBs and 11 other persistent organic pollutants for elimination. But despite lowered production, they are still turning up in the environment and in people's bodies.

Until now, we've gone along with the idea that if you haven't proved something is dangerous – if it doesn't harm someone immediately – it's assumed to be safe. But we could avoid much potential harm by instead applying the precautionary principle. This was first articulated at the Rio Earth Summit in 1992: 'Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.' As enshrined in Canadian and EU legislation today, the principle justifies action whenever there are reasonable grounds for concern.

Why did you focus on children?

A foetus grows from one cell to billions very quickly, a process determined by finite amounts of hormones. If this delicate balance is disrupted, the results can be disastrous. Once born, children go through rapid development until they are 16 years old. Kilo for kilo of body weight, they drink more, eat more and breathe in more air than adults. It's known that their systems are immature, their detoxification processes differ from those of adults, absorption of substances into the skin is thought to be higher, and they live nearer the ground which brings them into closer contact with some chemicals. We know that children have more synthetic chemicals in their bodies than their parents, some of which were absorbed in the womb.

You focus attention on xenoestrogens, manmade compounds that mimic oestrogen. What are they, and how do we know they affect us?

Xenoestrogens are part of a range of substances known as endocrine disruptors: these interfere with hormone systems, which in people regulate functions like body growth, reproduction, production and use of insulin, and the metabolism.

For 30 years, until the 1970s, doctors administered a synthetic oestrogen to prevent miscarriage in pregnant women. The mothers were fine, but the children, particularly daughters – and even in a few cases grandchildren – were susceptible to developing previously rare forms of cancer.

In that case, exposure was deliberate and carefully recorded. But we regularly come into casual contact with xenoestrogens. Water bottles, food tins and baby's bottles and drinking cups can contain bisphenol A (BPA), for example. It's estimated that 93 per cent of the people of the USA have BPA in their systems, and concerns about the chemical's possible effects, including hormone-related cancers, impaired brain development and birth defects, have prompted an EU ban on the manufacture, import and sale of baby bottles containing it.

Another group of xenoestrogens of concern are parabens, preservatives found in many household products used by children, like toothpaste, shampoo, moisturizers and sunscreen. These are absorbed into the body through the skin.

What other chemicals do you cover?

We tried to focus on chemicals to which children are regularly exposed. There are many. Phthalates, used in toys and baby-care products, may have adverse effects on the reproductive system. Brominated flame-retardants, found in furniture, clothing and electronics, disrupt thyroid hormones and brain development.

Why has it taken so long to work out that some chemicals harm humans?

Things aren't tested for long-term safety, for various reasons. We can't test on humans: we can't get into the uterus and do controlled studies on foetuses. The Nuremburg Code, established after World War II to prevent atrocities, lays down that tests can only be carried out on humans for medical research with therapeutic intent. It's also expensive and time-consuming to research and reformulate. Finally, it's difficult to monitor the effects of exposure over a lifetime even when substances are administered purposefully, never mind those of random, inadvertent dosing.

Is this a new field of study?

Environmental toxicity research has been around for the past 30 to 40 years, but interest is growing, reflected in increasing research in scientific institutions. Research and methodology is also now advanced enough to show toxicological effects at much lower doses, and that lower levels of different chemicals combine to have an additive effect. This is changing the way toxicologists and environmental scientists think.

We're also seeing an awakening of public awareness. This seems to go in cycles. People were stunned when author Rachel Carson drew attention to the effects of synthetic pesticides on wildlife in her 1962 book *Silent Spring*, or when Dr Theo Colborn discovered the effects of endocrine disruptors in the late 1980s. It seems to take a crisis to focus people's attention.

What do you want young people to come away with from your film?

Our bodies are the single most important environment we have. Inform yourselves, be aware of the products you consume and support organizations advocating safer practices. We're not separate from the environment, but part and parcel of it. Environmental toxins are a problem youth will inherit, along with climate change. And young people are future mothers and fathers. We have a responsibility to face the problem together.

Urban health

Just because most of us live in cities doesn't mean we can't get out and play. It's good for us: according to the World Health Organization, at least 30 minutes of moderately intense physical activity almost daily reduces the risk of cardiovascular disease, diabetes and some cancers. And getting out of our cars and away from our computers is good for the environment, too, as we unplug from the grid and replug into nature.

A stroll to school

In Switzerland, children are picked up by a 'walking bus' – an adult 'chauffeur' walks with children to school, stopping along the way to pick up others. Elsewhere in the world, community initiatives are popping up to make walkways themselves safer. In Dhaka, a non-profit health advocacy group called Safe has started Safewalk, an initiative that encourages community members to walk safely to school

Genevalunch.com

and work, teaching pedestrian road safety while working to reduce traffic congestion. Meanwhile, Samsuda and Arunee, students in Thailand, made a video to show how unsafe pedestrian routes are and have started a project called Footpath Please to gather ideas on how to make walking safer in their city.

Cycle madness

Cycling to work or school improves cardiovascular health and overall well-being, and getting people out of their cars makes a significant dent in a city's carbon emissions, not to mention cutting down on noise pollution and road accidents and raising air quality. Increasingly, towns and cities are encouraging cycling as a form of transport as well as recreation, but the onus is on city planners and law-makers to create the infrastructure to make it safe. There are many things to consider. One is the need to allocate road space or close roads altogether to accommodate more bicycles: Denmark has demonstrated that segregated cycle lanes reduce accidental road deaths by more than a third. Another is encouraging people out of their cars by introducing charges for motor-vehicles coming through busy parts of cities. London's congestion charge has resulted not only in a 20 per cent increase in cycling but a 20 per cent decrease in the city's traffic-related carbon emissions. Even car-choked Los Angeles has earmarked $230 million for cycling infrastructure, including more than 2,000 kilometres of cycle paths and storage areas. In Venice, Italy, senior citizens volunteer as pensioner bicycle officers to accompany child cyclists safely to school, and then guard the bicycles during school hours.

Cities are also making cycling easier by allowing anyone to rent a bike from a bike station, using coins or a smart card. The first such scheme, the White Bicycle Plan, started in the 1960s in Amsterdam – possibly the world's most cycle-friendly city – and one of the most famous today is Vélib' in Paris. The idea is catching on quickly: around 200 bike rental schemes have been or are being launched in cities as far flung as Shanghai, Buenos Aires, Tehran, Seoul, Brisbane, Prague and Thane, India.

Cycling-related resources are important too, such as Jakarta's Bike to Work centre, which offers a meeting point for cyclists, a maintenance workshop, a library, and a shop selling biking gear.

In the United Kingdom, the sustainable transport charity Sustrans provides maps of the nation's more than 20,000 kilometres of walking and cycling routes.

Evidence shows that the more bikes there are, the safer it becomes as drivers get used to them, car use decreases, and the activity gets public support for cycle infrastructure and safety programmes. Some cyclists have taken matters into

Ben Challis/www.agreenerfestival.com

their own hands, reclaiming city streets for themselves. In 1992, San Francisco citizens started riding en masse through the city on bikes to advocate for cycle safety. The monthly ride, called Critical Mass, has grown, and now groups in more than 300 cities around the world – including Maputo, Cape Town,

Johannesburg, Jakarta, Buenos Aires, Anchorage, Bangalore, Mumbai, Jerusalem, Beirut and Moscow – organize themselves to ride once a month, creating an independent movement aiming to make cities more cycle-friendly.

A walk in the park

Urban green spaces offer places to run, skate, cycle, row or just wander with friends and family. Even small green spaces provide habitat for biodiversity and contribute to rainwater absorption, a cooler atmosphere and cleaner air, filtering harmful particulate matter, nitrogen dioxide, sulphur dioxide and ozone. Researchers at Columbia University found that asthma rates in children aged four to five dropped by 25 per cent for every 343 trees per square kilometre. Other studies have shown that access to fresh air and open space benefits mental health, alleviating mild depression and anxiety.

www.simplyairlines.com

Some of the world's most famous urban parks include Central Park in New York, Tiergarten in Berlin, Ibirapuera Park in São Paulo and Monsanto Forest Park in Lisbon. Recognizing health and environmental benefits, cities are now creating more green space. Kuala Lumpur's green space grew from 586 hectares in 1984 to 1,580 hectares in 2000, while Singapore is constructing three parks along 94 hectares of waterfront, featuring tropical garden landscapes, an edible plant garden and a quay for water sports.

Some cities are cleverly greening reclaimed spaces. In Seoul, Republic of Korea, planners restored a natural stream that had been paved over, creating Cheonggyecheon Public Park. The Vitor Civita Park in São Paulo is built over an old incineration plant, and in Lima, abandoned land slated for a railway was transformed into the Ghost Train Park for local children, using recycled materials such as discarded tyres.

Dancing, skating and swimming in the streets

Every Friday night, roller-skaters in Paris take to the streets for a three-hour ride through the city. The Pari Roller was established in 1994 just for fun, exercise and to get to know the city and meet people, and has become a famous weekly community event. Pari Roller has inspired similar events in Berlin, Buenos Aires and Putrajaya, Malaysia, but Paris still boasts the largest number of regular skaters, with up to 35,000 per tour.

Pari Roller/www.pari-roller.com

Paris also turns the Seine into a beach every summer, laying out 1,350 tonnes of sand and hundreds of chairs, umbrellas and boats, climbing walls and even books on loan, allowing citizens to cool down and enjoy the beach without leaving the city.

If dancing's your thing, head to San Francisco's Golden Gate Park any Sunday afternoon, where you can get a free swing lesson and hours of outdoor jitterbugging at Lindy in the Park, a 15-year-old community-run event.

Car-free Sundays

In 1976, Bogota, Colombia, closed off a small portion of its city streets, allowing people to reclaim the space to cycle, skate, dance, walk and socialize. The Ciclovía now opens 120 kilometres of road to up to 1.3 million people, and was the pioneer for what is now a worldwide movement called car-free Sundays. Streets are closed to cars and everyone can come out to improve their physical and emotional health, promote the ease and pleasure of getting about town without cars, and encourage cities to plant greenery on streets. There are many car-free schemes and trials happening in cities worldwide, from Quito to Winnepeg or Melbourne. San Francisco's Sunday Streets, which opens 65 kilometres of road several times a year to up to 20,000 people, offers guided walks, yoga, programmes for people with pets and even free bike rentals.

Ciclovías Recreativas de las Américas (CRA Network)

Healing the Earth through myths and dance

Mark Edwards/Still Pictures

'MOTHER EARTH, true, does not need any help to heal herself. If left to herself, she will in her own time renew the Earth. But do we stand back and leave her to her own resources? If we do, if we wait for her to reach the saturation point of absorbing the abuses done to her, she might have no recourse but to take drastic and radical action to balance the extreme negative and destructive energies heaped upon her. Do we have to wait for this to happen, and all be wiped out? Or do we join efforts to ensure that she is not forced to reach saturation point ... to get the process of healing under way right now? Do we innovate or stagnate?'

So says Grace Odal-Devora of the University of the Philippines Manila, who studies Philippine myths and legends, particularly how ancient Filipinos perceived humans' relationship with the environment. She also practises Sayaw-Bathala ('Dance of God'), inspired by the traditions of *babaylans*, tribal leaders of ancient, precolonial Filipino society. TUNZA talked to Professor Devora about green lessons from Philippine mythology and how dancing can heal the Earth.

Q You have a close relationship with and a deep respect for nature. How did you develop this?

A I was born near the foothills of Mount Apo, the Philippines' tallest mountain. I was a child of two teachers who were sent to work with the Bagobo people in the city of Davao, near the site where you can see the monkey-eating eagle, the Philippines' national and biggest bird. I spent my first five years there roaming fields, chasing butterflies, dragonflies and chickens. I learned to climb trees and fetch water from the river. I saw the magic of moonlit nights and danced in a garden full of flowers under the light of the full moon. I learned to commune with nature by walking in the rain and being amongst the trees.

Q As a cultural conservationist and scholar, how do you regard the environment?

A In Philippine culture, we have the term kapwa, which means 'the other as one'. The environmental challenges we face today tell us we have lost that sense of oneness and become alienated from nature. Instead of looking at nature as part of ourselves, we look upon it as 'other' – something to be exploited for our benefit. We look at it as separate and non-living. We abuse it because we have lost our kinship with it. If we considered nature as part of our selves, we would take care of it.

Q Can you give us an example of some 'green' lessons from the ancient Philippine myths and legends? How can we apply such lessons to protecting our world?

A In Philippine folklore, Mariang Makiling was the goddess of Mount Makiling, in Laguna province. This beautiful guardian of the forests and their flora and fauna was very friendly to human beings. She showed herself to good-hearted people, giving them gold and other precious items, as well as blessing them with prosperity and safety. However, there came a time when humans abused her

Grace Odal-Devora

N. Siriburanakit/UNEP/Topham

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kindness. They took her blessings for granted, and neglected to care for her mountain domain. So she vanished from the sight of humans, and humans lost a gift-giving goddess, a wealth-endower and the sense of beautiful magic pervading the forest air.

In this story, you can see the principle that nature has an 'inner being' that takes care of the environment and bestows abundance on humans. However, if taken for granted or neglected, it disappears, resulting in the suffering of people through the loss of nature's benevolent gifts and guidance. To maintain harmony with nature, people must develop an attitude of treating nature as a living being, responsive to our actions.

One way of respecting nature is by immersing oneself in it and learning about its subtle laws. In some regional cultures of the Philippines, if while walking in a forest you see an unusual thing, you are advised not to point at it. Doing so might displease the beings behind it, and they might play pranks.

Q You have danced the Sayaw-Bathala for rain, and for the healing of a severely polluted river. You also danced for the trees that were cut at a historical site, as well as for seedlings about to be sown. What can the art of dance offer the Earth?

A Dance is energy. Dance is vibration. When one dances, one releases energy and vibrations from the body, shaped by the intentions of the person doing the dance. If your intentions are positive, creative and healing, then the energies released by your body will communicate to the subtle world of nature beyond words. Dance becomes a form of dynamic meditation, connecting the dancer with nature through breath, heartbeats, movements, intentions and consciousness.

Groups of people who would like to save and heal the Earth can meditate together, or hold ritual dances that can generate tremendous positive energies. They can also convene conferences among college students or among young professionals to generate an awakened consciousness among youth, and work with the aim of global healing and planetary oneness.

Q Do you think our young people today need to be more spiritual in their approach to the environment?

A Young people, with their openness, love of experimentation and innovation, can help a lot in transforming society and the consciousness of people. In the first place, they have nothing to lose in the status quo. They are just beginning and building their lives for the future. They need and want to protect their future and that of their children. So they have a lot to hope for.

What should guide their work and service? I would recommend an alternative lifestyle not centred on material values and capital. We need to see that the essence of life is not just in the material and the economic. Oneness with all is the working principle: oneness with the self, oneness with others, oneness with nature, oneness with the unseen world, oneness with the Supreme Spirit.

If people could work around the principle of the spirit as the central core of life, the world of human beings and nature will harmonize according to the principle of unity in diversity.

7 wonder remedies

Treatment tree

In East Africa they call it *muarabaini*, 'the tree of the 40' because it is used to treat that number of different diseases. The healing properties of its fruits, seeds, oil, leaves, roots and bark are described in the earliest Sanskrit writings. And now modern science is confirming its powers: more than 150 compounds have been identified so far. The neem tree, as it is more commonly known – a fast-growing relative of mahogany from southern Asia – boosts the immune system. It has also been used against malaria for 4,000 years: an extract, gedunin, is as effective as quinine, and has been shown to have anti-cancer properties. And in rural India and Africa, its twigs are used to clean teeth and gums, while its seeds are used as an organic fertilizer and pesticide.

JM Garg/GNU FDL

Beneficial bloodsuckers

Leeches were once so widely used in medicine that they became synonymous with doctors. Used by the ancient Egyptians and the Aztecs – and so popular in the 1800s in Europe that the local species was driven into decline – they fell out of favour when modern medicine discredited bloodletting. But since 1985, when Harvard plastic surgeon Joseph Upton used them to heal the wound after reattaching a boy's ear, they have made a comeback. Leech saliva contains compounds that reduce pain, prevent clotting and dilate blood vessels. In 2004, the US Food and Drug Administration cleared the use of medicinal leeches for wound healing, limb reattachment and reconstructive surgery, and they're now also employed to treat arthritis, blood clotting disorders and varicose veins.

US Fed Gov

Fly doctors

Maggots, or fly larvae, are usually evidence of putrefaction, but there is a long history – from early Mayan civilization – of using them to heal wounds. They are now used to treat wounds infected with bacteria resistant to antibiotics, particularly MRSA which can be fatal. When injuries do not respond to conventional treatment, up to 10 maggots are placed over the wound and covered with a protective dressing. Over the next 48 to 72 hours, they secrete enzymes that dissolve the dead tissue and kill the bacteria. The process also stimulates the production of new blood vessels and tissue, speeding up the healing process. Researchers have also found that maggots can heal foot ulcers in diabetics in just three weeks, a tenth of the time that can be taken by conventional treatment.

Marc Steinmetz/VISUM/Still Pictures

Savoury saviour

Salt is so valuable that it was once spent like money: it was used to pay Roman soldiers and was exchanged for slaves in ancient Greece. Its main use then was to preserve food, but it also has medical uses. It helps maintain fluid balance in the body and to regulate nerve and muscle function. It is now the mainstay of the chlor-alkali chemical industry, which helps produce clean water, soaps, medicines and even protective suits for scuba divers. And it remains a useful all-round healer. It scrubs, exfoliates and disinfects skin; gargling with salt water soothes sore throats; spraying salt into the nose is a traditional yogic practice to clear blocked sinuses; and it is a natural disinfectant for scouring work surfaces.

Narbeburu/UNEP/Topham

Sweet salve

Prehistoric cave paintings in East Africa and Spain depict people gathering honey, and it features in both the Bible and the Koran. It's not just good to eat. Its anti-inflammatory qualities make it a good skin salve, while hot honeyed drinks boost energy and soothe anxiety, sore throats and insomnia. Rich in antioxidants, honey helps prevent narrowing of the arteries, while its high acidity, high sugar content, and hydrogen peroxide content all work to suppress bacterial growth. So it's great for treating wounds and pressure sores. Honey made by bees gathering nectar from New Zealand's manuka bush has proved particularly powerful in fighting bacteria, fungi and protozoa, but the extra component that makes it special has yet to be identified.

Horst Sollinger/Imagebroker/Still Pictures

Hot healing

If you dare eat it, the chili pepper can be good for you. Cultivated for over 5,000 years in Central America – and known in Europe for over 500 – it ranges from mild to so dangerously 'hot' that it can only be handled with gloves. Its uses go far beyond the culinary. The stuff that makes chilies spicy is capsaicin, which stimulates the release of endorphins in the body, relieving pain. The pepper also increases blood circulation and makes us feel fuller, faster. A mild tincture of cayenne chilies can be used to treat eye infections, and cayenne powder applied to a wound stops bleeding. And just one chili contains an entire day's requirement of beta carotene and twice the recommended daily dose of Vitamin C.

UNEP/Topham

Cup that cures

By legend, an Arabian shepherd found his goats prancing with energy near shrubs with bright red cherries. He tried them himself, with the same effect. In fact coffee seems to have originated on the plateaus of central Ethiopia, though it has been cultivated in the Middle East since the sixth century and has even been credited with helping to jump-start the Age of Enlightenment in Europe. It is, of course, best known for stimulating and focusing mental energy, but has also been found to be rich in antioxidants. Regular consumption is linked to reduced risk of liver and colon cancer, type II diabetes, gallstones and Parkinson's disease. It has been used to relieve whooping cough, heart palpitations and chronic diarrhoea, and is active against salmonella and streptococcus.

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