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Building the future we want

European Environment Agency

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RIO+20
United Nations
Conference on
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Contents

Greening our economy

Most people will remember 2011 as a year of financial turmoil, the Japanese earthquake-tsunami-nuclear disaster, country bailouts in Europe and mass protests linked to the Arab Spring, the Occupy Wall Street movement and the Spanish Indignados. Only a few will remember that it was also the year scientists discovered more than 18 000 new species living on our planet. Even fewer can name one species that was declared extinct.

At first sight, the fate of threatened species might seem a world apart from the economy. Upon closer examination, however, we start to understand the connections between the two. The 'good health' of natural systems is a precondition for the 'good health' of our social and economic systems. Can one say that a society is thriving when it is exposed to air and water pollution and endures related health problems? Equally, can a society 'function' if a large proportion is unemployed or cannot make ends meet?

Despite gaps and uncertainties in our understanding, we can see that our world is changing. After 10 000 years of relative stability, the average global temperature is increasing. Although the European Union's greenhouse gas emissions are declining, fossil fuels release more greenhouse gases into the atmosphere than our land and oceans can absorb. Some regions are more vulnerable to the potential impacts of climate change — and these are often the countries least prepared to adapt to new climatic conditions.

With more than seven billion of us living on the planet, humans clearly have a role in steering and accelerating this change. In fact, our current consumption and production levels may be damaging the environment to the point that we risk making our home uninhabitable to many species — including ourselves. Many people in developing countries aspire to have lifestyles similar to those in developed countries, which could put additional pressure on our natural systems.

We are losing global biodiversity at a rate never before seen in history. Extinction rates may be up to 1 000 times higher than the historical background rate. The destruction of habitats is one of the main reasons.

Although the total forest area has been increasing in Europe in recent decades, globally it is a different story. The United Nations Food and Agriculture Organization estimates that every year about 13 million hectares of the world's forests (roughly equivalent to the size of Greece) are cut down and converted to other land uses, such as cattle grazing, mining, farming or urban development. Forests are not the only ecosystems under threat. Many other natural habitats are at risk because of human activities.

The way forward: inclusive green economy

When the primary day-to-day concern of billions is putting food on the table and sending their children to school in the hope of a better future, it may be almost impossible for many to avoid grasping short-term solutions. Unless they can be offered other and better opportunities...

It is clear that our economic activities require natural resources. But what might be perceived as a dilemma — a choice between preserving the environment and developing the economy — is actually misleading. In the long term, economic and social development necessitates sustainable management of natural resources.

At the end of 2011, one in ten people was unemployed in the European Union. This figure was more than one out of five for young people. Unemployment puts severe strains on individuals, families and the society as a whole. Nearly one quarter of the EU population was at risk of poverty or social exclusion in 2010. The global poverty rates are even higher.

Our current economic models fail to account for many of the benefits a healthy environment provides us. Gross domestic product (GDP) — the economic indicator most commonly used to convey a country's level of development, standard of living and status relative to other countries — is based on the value of economic output. It does not include the social and human price we pay for the side effects of economic activity, such as air pollution. On the contrary, the health services provided to those suffering from respiratory diseases is included as a positive contribution to GDP.

The challenge is to find out how we can redesign our economic models such that we can generate growth and improve the quality of life across the world without damaging the environment, while also protecting the interests of future generations. The solution has been termed 'the green economy'.

Although it seems like a simple concept, translating the idea into reality is much more complicated. Clearly, it will require technological innovation. But it requires lots of other changes, too — to the way we organise businesses; the way that we design cities; the way we move people and goods around; the way we live, essentially.

If we were to put it in business terms, we need to ensure long-term sustainability in all our domains of wealth creation: natural capital, human capital, social capital and manufactured capital, as well as financial capital. The concept of green economy could also be explained through these distinct but interlinked capitals.

In evaluating the costs and benefits of our decisions, we need to look at the impacts on all capital stocks. Investments in roads and factories may increase our manufactured capital but they can actually undermine our overall wealth if they imply destroying our forests (part of our natural capital) or damaging public health (part of human capital).

Opportunities ahead

Changing the way we live, produce and consume actually opens a new world of opportunities. Signals 2012 will give you an overview of where we stand today, exactly 20 years after the 1992 Earth Summit in Rio de Janeiro, Brazil. It will look into how the economy and the environment are linked and why we need to 'green' our economy. It will also give you a glimpse of the large variety of opportunities available.

There is no single solution that will help us make a quick transition or one that fits all. Besides common overall goals to manage waste effectively, Greenland's waste management might need to address a completely different reality on the ground than Luxembourg's.

Timing plays a crucial role. Today, we need solutions that address the environmental problems at hand with today's technology, bearing in mind that our policies and business decisions will have to be continuously improved and adapted to keep up with our growing understanding of the environment and technological developments. But there are many solutions already out there. And many more are on the way.

A question of choices

Ultimately, it will be a question of choices — policy choices, business choices and consumer choices. But how do we choose the best option?

Do we have the information and the tools we need to develop appropriate policies? Are we addressing the issue at the 'right' level? Do we have the 'right' incentives or market signals to invest in renewable energies? Do we have the 'right' information or labels on the goods we are buying so we can opt for the greener alternative?

What we know and when we acquire this knowledge will be instrumental in helping different communities to make their 'right' choices. Ultimately, knowledge will empower us to come up with our solutions and create new opportunities by sharing them with others.

Professor Jacqueline McGlade,
Executive Director

For more information

- For global and European discussions on green economy, see: **unep.org/greeneconomy** and: **www.beyond-gdp.eu**
- See also the EEA's new annual indicator report. The 2012 edition focuses on green economy.
- For the five capitals framework, see: **'Forum for the future'**.

The path to global sustainability

The path to global sustainability

Four decades of environmental governance helped us build institutions to better understand and tackle environmental problems. Twenty years after the Earth Summit of 1992, world leaders meet once again in Rio de Janeiro to renew the global commitment to the green economy and improve global governance.

It was at the UN Conference on the Human Environment (Stockholm, 1972) that the international community met for the first time to consider global environment and development needs together. The United Nations Environment Programme (UNEP), which will be celebrating its 40th anniversary in 2012, was established after this conference, as were environment ministries in many countries around the world.

Sustainable development means many things to many people. However, one landmark definition from 1987 describes it as: 'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (the Brundtland Commission report 'Our Common Future'). These 'needs' are not just economic interests but also the environmental and social foundations that underpin global prosperity.

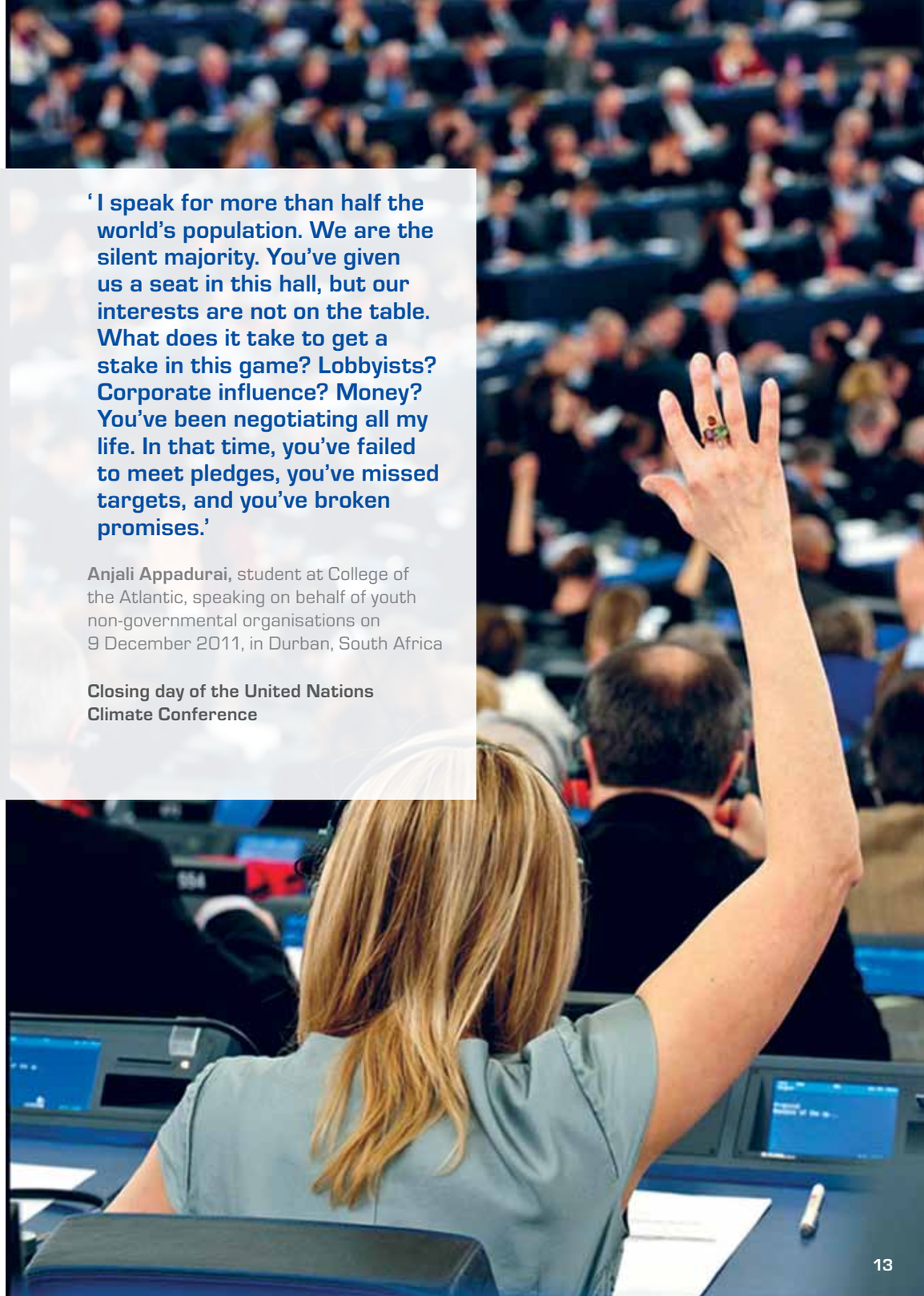
In June 1992, decision-makers from 172 countries met in Rio de Janeiro for the United Nations Conference on the Environment and Development. Their message was clear: 'Nothing less than a transformation of our attitudes and behaviour would bring about the necessary changes'. The 1992 Summit was a turning point in putting environment and development issues firmly into the public arena.

The Earth Summit laid the foundations for many key international agreements on the environment:

- Agenda 21 — an action plan for sustainable development
- the Rio Declaration on Environment and Development
- the Statement of Forest Principles
- the United Nations Framework Convention on Climate Change
- the United Nations Convention on Biological Diversity
- the United Nations Convention on Combating Desertification.

Exactly twenty years after the historic Rio Summit, the world comes together once more to discuss and decide how to move forward. Earth Summit 2012 will be the fourth summit of its kind and represents another milestone in international efforts to achieve sustainable development. The green economy and global environmental governance head the agenda.

There is no quick and easy route to sustainability. The transition requires a collective effort from policymakers, businesses and citizens alike. In some instances, policymakers need to provide incentives to promote innovation or support for environment-friendly businesses.



'I speak for more than half the world's population. We are the silent majority. You've given us a seat in this hall, but our interests are not on the table. What does it take to get a stake in this game? Lobbyists? Corporate influence? Money? You've been negotiating all my life. In that time, you've failed to meet pledges, you've missed targets, and you've broken promises.'

Anjali Appadurai, student at College of the Atlantic, speaking on behalf of youth non-governmental organisations on 9 December 2011, in Durban, South Africa

Closing day of the United Nations Climate Conference

In other cases, consumers may have to bear extra costs linked to more sustainable production processes. They may also have to become more demanding towards the manufacturers of their favourite brands or choose more sustainable products. Firms may have to develop clean production processes and export them globally.

Complex problems, complex solutions

The complexity of our global decision-making structures mirrors the complexity we find in the environment. It is difficult to strike the right balance between legislation, private sector initiatives and consumer choices. It is equally difficult to find the 'right level' to target — ranging from local to global.

Environmental policy becomes more effective if decided and implemented at different scales, and the 'right level' varies depending on the issue. Take water management. Fresh water is a local resource that is susceptible to global pressures.

Water management in the Netherlands, for example, is carried out by local authorities but is subject to national and European legislation. The Dutch water management does not only need to address local issues and what goes on in the countries upstream. Global warming is expected to raise sea levels, which means that the Dutch water boards need to start planning accordingly.

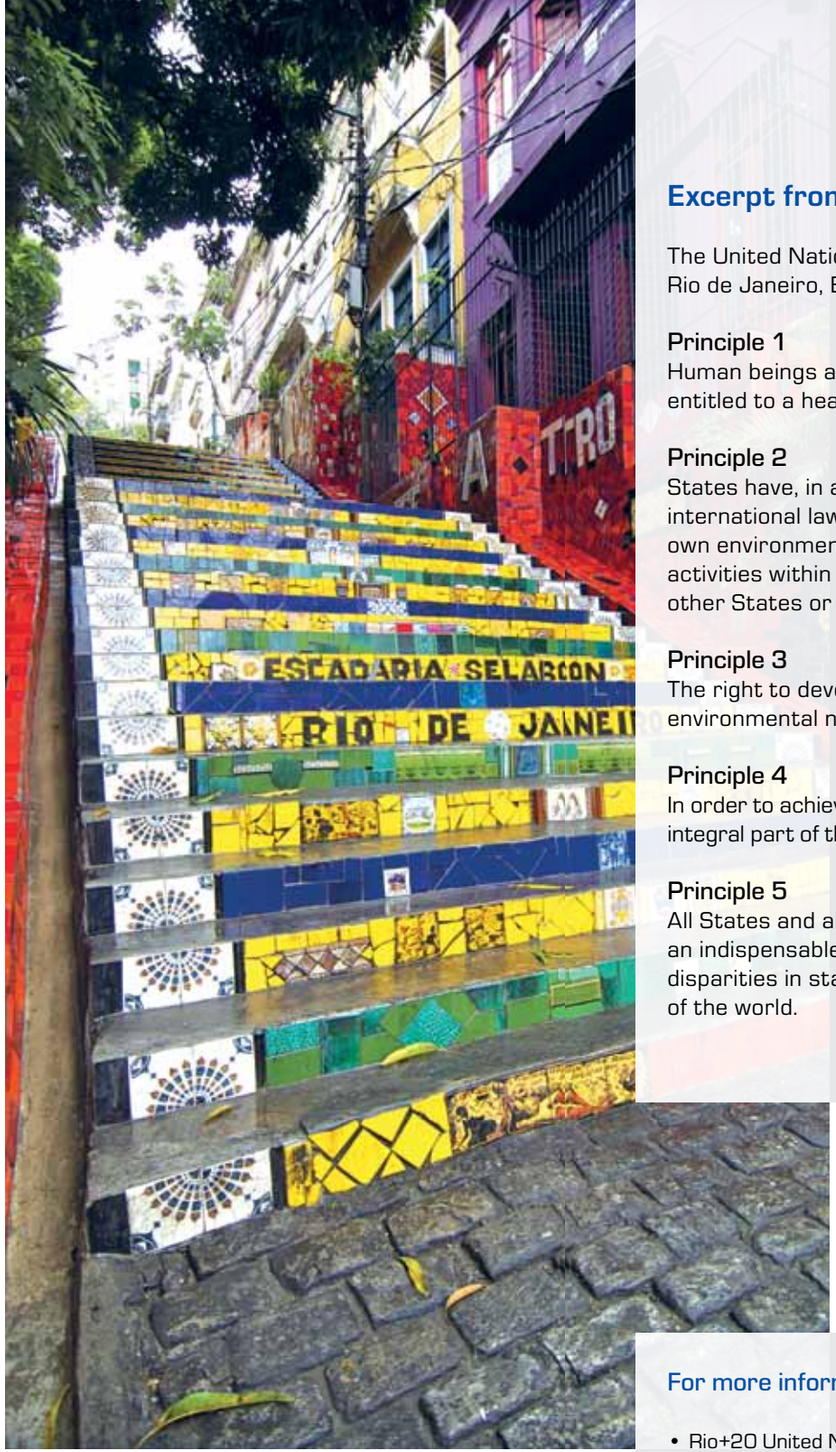
Most of the existing global policies and institutions, including UNEP, were established because local or national solutions fell short of tackling the problems, and global or international coordination was expected to achieve better results. UNEP was created following the Stockholm Conference because participants agreed that some environmental issues could be better addressed at the global level.

Renewed commitment needed

Today, global trade enables many of us to enjoy tomatoes and bananas throughout the year, as well as products drawing together components from around the world. This connectivity brings many advantages but it can also bring risks. Pollution caused by another person can end up in our own backyard. This connectivity means that we cannot ignore our responsibility in protecting the global environment.

The UN Framework Convention on Climate Change (UNFCCC) was one of the achievements of the 1992 Rio Earth Summit. It aims to stabilise greenhouse gas emissions, which contribute to climate change. The success of many international agreements, such as the UNFCCC, depends on the commitment of the parties involved. Unfortunately, if only a limited number of countries are engaged, then it will probably be insufficient to protect the environment, even if they embrace green economy principles fully.

This year's summit offers an opportunity to renew the global commitment to sustainability. As citizens, consumers, scientists, business leaders, policymakers, we all need to assume responsibility for our actions — as well as for our inaction.



Excerpt from the Rio Declaration on Environment and Development

The United Nations Conference on Environment and Development, 3–14 June 1992, Rio de Janeiro, Brazil

Principle 1
Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2
States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3
The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4
In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5
All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

For more information

- Rio+20 United Nations Conference on Sustainable Development: **www.uncsd2012.org/rio20**
- Earth Summit Stakeholder Forum: **www.earthsummit2012.org**

Living in a consumer society

Living in a consumer society

Decades of relatively steady growth in Europe have changed the way we live. We produce and consume more goods and services. We travel more and live longer. But the environmental impacts of our economic activities at home and abroad have become bigger and more visible. Environmental legislation, when implemented thoroughly, achieves results on the ground. After taking a look at what has changed in the last twenty years, however, can we say that we are doing our best?

When Carlos Sánchez was born in 1989, almost 5 million people lived in the larger Madrid metropolitan area. Carlos's family lived in a two-bedroom flat in the city centre; they did not have a car but had a television.

Carlos's family was not the only Spanish family not to own a car then. In 1992, six years after joining the European Union, Spain counted 332 passenger cars per 1 000 inhabitants. Nearly two decades later, in 2009, 480 out of 1 000 Spaniards had cars, slightly above the European Union average.

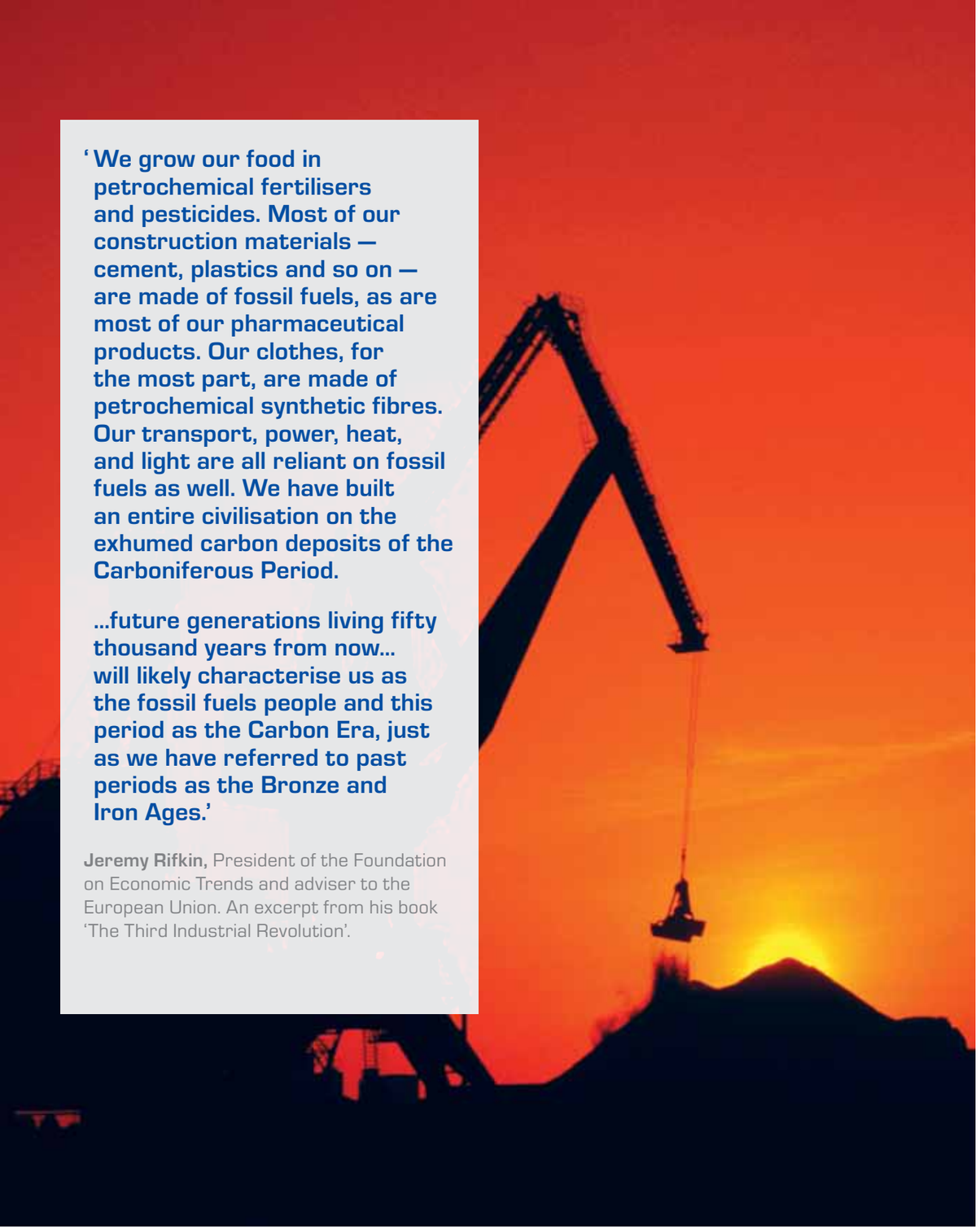
When Carlos was five years old, the Sánchez family bought the flat next door and merged the two together. When he was eight, they bought their first car but it was second hand.

Ageing societies

It is not only our modes of transport that have changed. Our societies have changed too. With few exceptions, the number of children borne per woman has not changed significantly in the EU Member States with data spanning the last 20 years. Spanish women had 1.32 children on average in 1992 and in 2010 the figure had risen slightly to 1.39 — far below the generally accepted replacement level of 2.1 children per woman. The total fertility rate in EU-27 was around 1.5 in 2009.

Yet, the EU population is growing, mainly due to immigration. We also live longer and better. In 2006, EU life expectancy at birth stood at 76 years for men and 82 for women. At the end of October 2011, the world population reached 7 billion. Despite the decline in fertility rates in the last two decades, the world population is expected to continue growing until stabilising at around 10 billion in 2100.

There is also an upward trend in urbanisation rates. More than half of the global population now lives in urban areas. In the EU, around three quarters live in urban areas. The effects are also visible in many European cities, including Madrid. The population in the greater Madrid area reached 6.3 million in 2011.



‘We grow our food in petrochemical fertilisers and pesticides. Most of our construction materials — cement, plastics and so on — are made of fossil fuels, as are most of our pharmaceutical products. Our clothes, for the most part, are made of petrochemical synthetic fibres. Our transport, power, heat, and light are all reliant on fossil fuels as well. We have built an entire civilisation on the exhumed carbon deposits of the Carboniferous Period.

...future generations living fifty thousand years from now... will likely characterise us as the fossil fuels people and this period as the Carbon Era, just as we have referred to past periods as the Bronze and Iron Ages.’

Jeremy Rifkin, President of the Foundation on Economic Trends and adviser to the European Union. An excerpt from his book ‘The Third Industrial Revolution’.

Growth everywhere

In these last two decades, Spain, very much like many other European countries, experienced steady economic growth, increased incomes and, until recently, what looked like a real solution to Spain’s unemployment problem. The economic boom was fuelled by readily available loans — public and private — an abundance of raw materials and an inflow of immigrants from Central and South America and Africa.

When Carlos was born, besides a few interconnected IT networks, the Internet (as we know it today) did not exist. Mobile telephones were rare, cumbersome to carry around and unaffordable for most people. Online communities or social networks were unheard of. For many communities across the planet, ‘technology’ stood for reliable provision of electricity. Telephone was costly and not always accessible. Holidays abroad were only for the privileged few.

Despite several downturns in the last 20 years, the European Union economy grew by 40 %, with slightly higher averages in countries that joined the European Union in 2004 and 2007. Construction linked to tourism was a particularly important driver in the Spanish case. In other European countries, economic growth was also triggered by sectors such as services and manufacturing.

Today, Carlos lives with his parents at the same address. They each have a car and a mobile phone. The Sanchez family’s life style is not unusual by European standards.

Bigger global footprint

Europe’s impact on the environment has grown in parallel with economic growth both in Europe and the world. Trade has been instrumental in fostering prosperity in both Europe and developing countries, as well as in spreading the environmental impacts of our activities.

In 2008, in terms of weight, the European Union imported six times more materials than it exported. The difference is almost entirely due to the high level of imports of fuel and mining products.

Policy works, if well designed and implemented

Growing global recognition of the urgent need to tackle environmental issues started much earlier than the Rio Earth Summit in 1992. EU environmental legislation dates back to the early 1970s and experience since then has demonstrated that, when implemented effectively, environmental legislation pays off.

For example, the EU Birds Directive (1979) and the Habitats Directive (1992) provide a legal framework for Europe's protected areas. The European Union has now designated more than 17 % of its land area and more than 160 000 km^2 offshore as part of its nature protection network, 'Natura 2000'. Although many European species and habitats are still threatened, Natura 2000 is a vital step in the right direction.

Other environmental policies have also had a positive impact on Europe's environment. Ambient air quality has generally improved significantly in the last two decades. But long-range air pollution and some local air pollutants continue to affect our health. The quality of European waters has also improved substantially thanks to European legislation, but most pollutants released into air, water and land do not easily disappear. On the contrary, they accumulate.

The European Union has also started to break the link between economic growth and greenhouse gas emissions. Global emissions, however, continue to increase, contributing to the concentration of carbon dioxide in the atmosphere and the oceans.

There is a similar trend in material use. The European economy produces more with less resource input. But we are still using far more resources than the European land mass and seas can provide us. The EU is still generating large amounts of waste but is recycling and re-using a growing share.

Unfortunately, when we try to address one environmental problem, we realise that environmental issues cannot be tackled in isolation and one-by-one. They have to be integrated in economic policies, urban planning, fisheries and agricultural policies, so on.

Water extraction, for example, affects the quality and quantity of water at the source and downstream. As the water quantity at the source goes down because of higher extraction, pollutants released into water are less diluted and have a larger negative impact on species dependent on that water body. To be able to design and achieve significant improvements to water quality, we also need to address why the water is extracted in the first place.

Change in small steps

Despite the gaps in our knowledge, the environmental trends we see today call for decisive and immediate action involving policymakers, businesses and citizens. Under a business-as-usual scenario, global deforestation will continue at critical rates and average global temperatures could increase by as much as 6.4 °C by the end of the century. Sea level rise will put at risk one of our most valuable resources — land — in low-lying islands and coastal zones.

International negotiations often take years to conclude and to implement. Well-designed national legislation works when implemented fully but is limited by geopolitical boundaries. Many environmental issues are not confined within national borders. Ultimately, we may all feel the impacts of deforestation, air pollution or marine litter.

Trends and attitudes can be changed — step by step. We have a good understanding of where we were 20 years ago and where we stand today. We might not have one miraculous solution that will remedy all our environmental problems instantly, but we have an idea, actually a package of ideas, tools and policies, to help us transform our economy into a green one. The opportunity to build a sustainable future in the next 20 years is there for us to seize.

Seizing the opportunity

Seizing the opportunity in front of us depends on our common awareness. We can create enough momentum to transform the way we live only by understanding what is at stake. Awareness is increasing but is not always sufficient. Economic insecurity, fears of unemployment and health concerns seem to dominate our day-to-day concerns. And it is no different for Carlos or his friends, especially given the economic turbulence in Europe.

In-between worries about his biology studies and career prospects, Carlos is not sure how aware his generation is of the environmental problems in Europe and the world. As an urban resident, however, he does recognise that his parents' generation had a closer link to nature because, in most families, at least one of the parents was raised in the countryside. Even after they moved to the city for work, they maintained a closer relationship to nature.

Carlos may never have a similar connection to nature but he is quite keen on doing at least something — bicycling to his university. He has even convinced his father to cycle to work.

The fact is that economic insecurity, health, quality of life and even tackling unemployment all depend on ensuring a healthy planet. Rapid depletion of our natural resources and destroying the ecosystems that provide us so many benefits will hardly provide a secure and healthy future for Carlos or his generation. A green, low-carbon economy remains the best and most viable option for ensuring economic and social prosperity in the long term.

For more information

- EEA — SOER 2010: **Assessment of global megatrends**.
- UNEP — Keeping track of our changing environment: **From Rio to Rio+20**.

From mine to waste, and beyond

From mine to waste, and beyond

Almost everything we consume and produce has an impact on our environment. When faced with daily choices to buy certain goods or services, we often do not think about their 'footprints' on the environment. Their shelf prices hardly ever reflect their true costs. But there are many things we can do to green our consumption and production.

In May 2011, the Apple Store on Fifth Avenue in New York was packed with crowds coming from all over the world to buy Apple's latest iPad2. Whatever was shipped in that day was sold within hours. The Fifth Avenue store was one of the lucky ones. Many Apple stores around the world could only take orders and deliver weeks later.

The delay was not caused by deficient business planning or an exceedingly successful marketing campaign. It was triggered by a series of disasters on the other side of the planet. Five of the iPad2's main components were manufactured in Japan at the time of the earthquake of 11 March 2011. The production of some of these components could easily be shifted to South Korea or the United States of America, but not the digital compass. One of its key manufacturers was located within 20 km of the Fukushima reactors and had to close its plant.

Resource flows to feed production lines

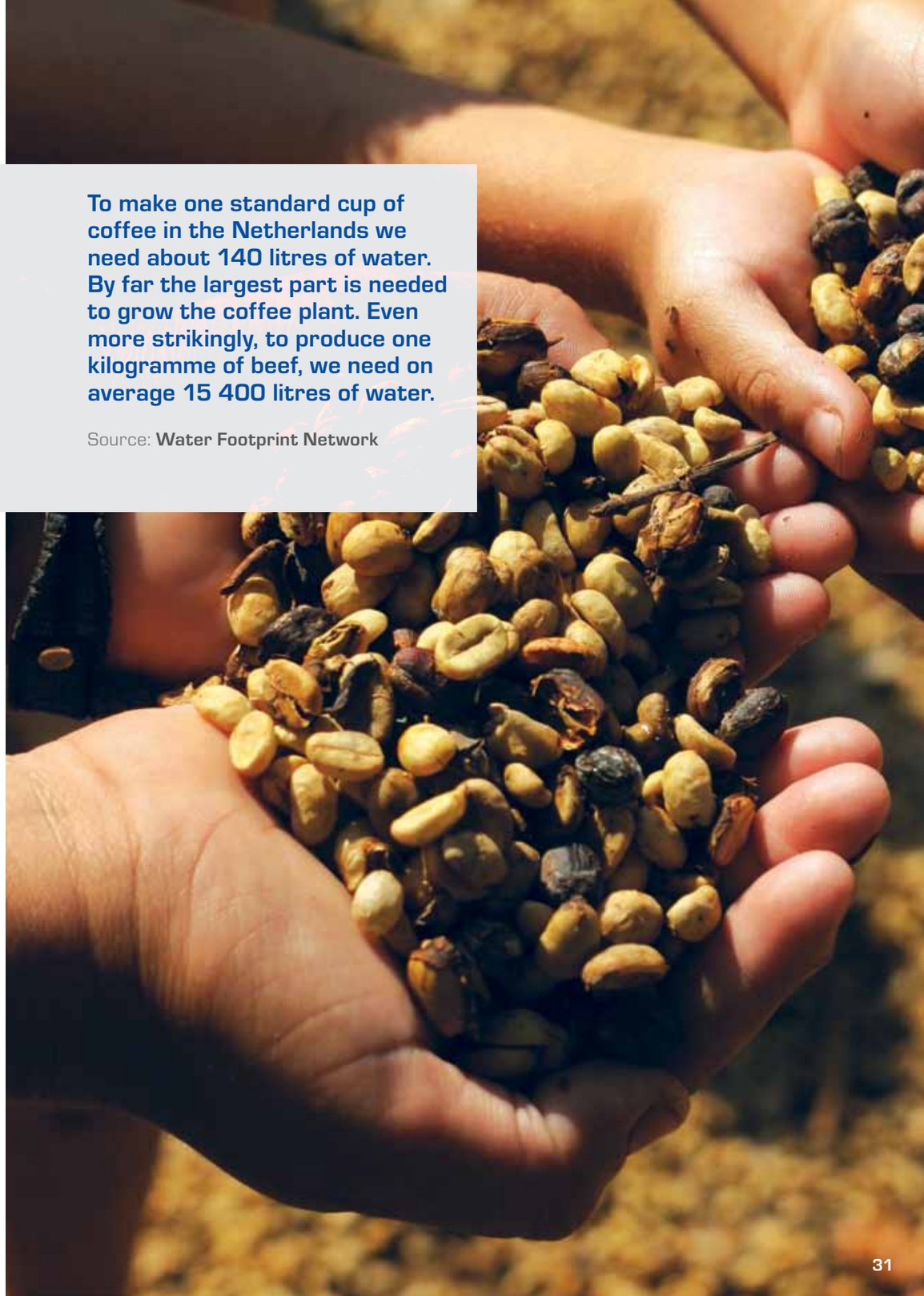
In our interconnected world, the journey of many electronic devices starts at a mine, mostly located in a developing country, and a product development centre, most often in a developed country. Today, the production of laptops, mobile phones, cars and digital cameras require rare earths, such as neodymium, lanthanum and cerium. Although many countries have unexploited reserves, extraction is costly, and in some cases toxic and radioactive.

After extraction, material resources are generally transported to a processing location and turned into various product components, which are in turn shipped to other locations for assembling. By the time we buy our device, its various components have already travelled around the world, and at every stage of their journey, they have left their footprint on the environment.

The same goes for the food on our tables, the furniture in our living rooms and the fuel in our cars. Most materials and resources are extracted, processed into a consumable product or service and transported to our mainly urban homes. The provision of freshwater to European households, for example, does not only mean extracting the quantity used from a water body. To make the water ready for consumption, we need infrastructure and energy to transport, store, treat and heat it. Once 'used', we need yet more infrastructure and energy to dispose of it.

To make one standard cup of coffee in the Netherlands we need about 140 litres of water. By far the largest part is needed to grow the coffee plant. Even more strikingly, to produce one kilogramme of beef, we need on average 15 400 litres of water.

Source: **Water Footprint Network**



All up for consumption

Some of the environmental impacts of our consumption levels and patterns are not visible at first. Generating the electricity to charge mobile phones and freeze our food releases carbon dioxide emissions into the atmosphere, which in turn contribute to climate change. Transport and industrial facilities release air pollutants such as sulphur oxides and nitrogen oxides, which are harmful to human health.

Millions heading south in the summer put additional strains on their holiday destinations. In addition to greenhouse gas emissions from their trip, their need for accommodation boosts the construction sector's demand for material resources and energy. The seasonal increase in the local population demands extra water extraction for sanitation and leisure purposes during dry summer months. It also means treating more wastewater, transporting more food to these areas and managing increased volumes of waste.

Despite uncertainty about the exact extent of our environmental impacts, it is clear that current levels and patterns of resource extraction cannot continue. Quite simply, we have limited quantities of vital resources, such as arable land and water. What often starts as a local problem — water scarcity, clearing forests for grazing land or emitting pollutants from an industrial facility — can easily become a global and systemic problem, which affects us all.

One indicator of resource consumption is the ecological footprint, developed by the Global Footprint Network. It estimates countries' consumption in terms of land use worldwide, including indirect land use to produce goods and absorb CO_2 emissions. According to this methodology, in 2007 each human had a footprint corresponding to 2.7 global hectares.

That far exceeded the 1.8 global hectares available to each of us to sustain our consumption without endangering the productive capacity of the environment (Global Footprint Network, 2012). In developed countries, the difference was even more striking. The EEA countries consumed 4.8 global hectares per resident despite an available 'biocapacity' of 2.1 global hectares per person (Global Footprint Network, 2011).

But consumption also means jobs

Our urge and need to consume natural resources presents only one side of the story. Building summer houses in Spain, growing tomatoes in the Netherlands, going on holiday in Thailand also mean jobs, income and ultimately livelihood and a higher quality of life for construction workers, farmers and travel agents. For many people around the world, a higher income means the possibility to meet basic needs. But what constitutes a 'need' is not easy to define and varies considerably depending on cultural perceptions and income levels.

To those working in rare earth mines in Inner Mongolia in China, mineral extraction means food security for their families and education for their children. To factory workers in Japan, it can mean not only food and education, but also a few weeks of holiday in Europe. To the crowds flocking the Apple store, for some the final product might constitute a must-have professional tool, and for others an entertainment device. The need for entertainment is also a human need. Its impact on the environment depends on how we meet that need.

Off to the bin

The journey made by our electronic devices, food and tap water does not end in our homes. We keep our television or camera until it is no longer fashionable or compatible with our DVD player. In some EU countries, around one third of the food bought is thrown away. What about the food wasted even before we buy it? Each year, 2.7 billion tonnes of waste is thrown away in the 27 Member States of the European Union.

But where does all this waste go? The short answer would be out of our sight. Some is actually traded — legally and illegally — on global markets. The long answer is much more complicated. It depends on 'what' is thrown away and 'where'. More than one third of the weight of the waste generated in 32 EEA countries consists of construction and demolition waste, strongly linked to economic booms. Another quarter is mining and quarrying waste. Although ultimately all waste is driven by human consumption, only less than one tenth of the total waste weight comes from households.

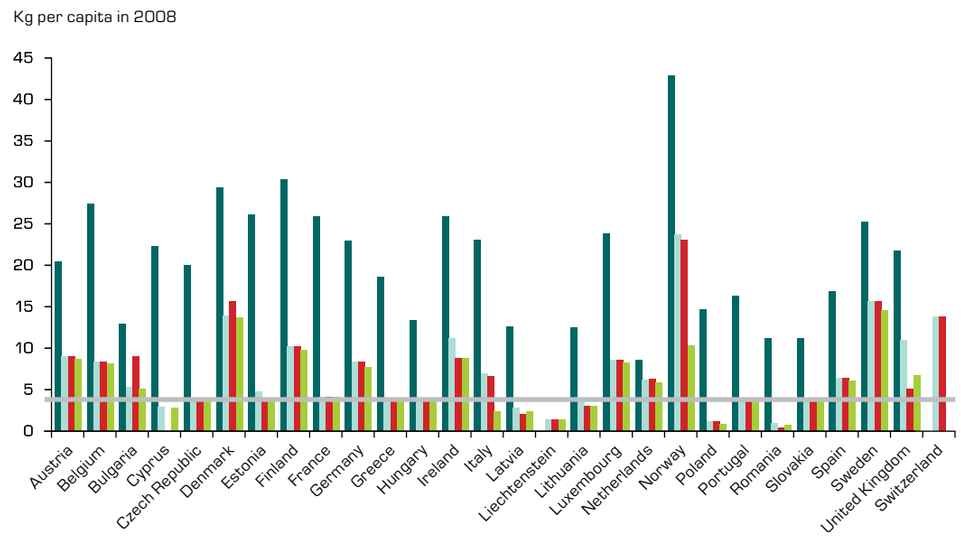
Our knowledge of waste is as incomplete as our consumption data but it is clear that we still have a lot to do when it comes to waste management. On average, every EU citizen uses 16–17 tonnes of materials per year and much of this amount is turned into waste sooner or later. This amount would rise to about 40–50 tonnes per person if unused extraction (e.g. mining overburden) and ecological rucksacks (total quantity of the natural material that is disturbed in its natural setting) of imports were taken into account.

Legislation, such as the EU directives on landfill, end-of-life vehicles, batteries, packaging and packaging waste, has helped the European Union divert a larger share of its municipal waste from landfills to incineration and recycling facilities. In 2008, 46 % of the solid waste in the EU was recovered. The rest was sent to incineration (5 %) or landfill (49 %).

Looking for a new type of gold mine

Electric household appliances, computers, lighting equipment and telephones contain hazardous substances that pose a threat to the environment, but they also include valuable metals. In 2005, the electrical and electronic equipment on the market was estimated to contain 450 000 tonnes of copper and seven tonnes of gold. At the London Metal Exchange, these metals would be roughly worth EUR 2.8 billion and EUR 328 million, respectively, in February 2011. Despite significant variations among European countries, only a small part of such electronic equipment is currently collected and reused or recycled when discarded.

Precious metals 'discarded as waste' also have a global dimension. Germany exports some 100 000 used cars every year through Hamburg to outside the European Union, mainly to Africa and the Middle East. In 2005, these cars contained around 6.25 tonnes of platinum group metals. Unlike the EU, most importing countries lack the necessary regulations and capacity to dismantle and recycle used cars.



Source: **Compiled by ETC/SCP based on data from Eurostat Data Centre on Waste.**

Waste Electrical and Electronic Equipment (WEEE) put on the market, collected and recycled/recovered/reused in 28 European countries (kg/person, 2008 data)

The European Union has specific legislation tackling WEEE. This directive provides for the creation of collection schemes where consumers return their used e-waste free of charge. The objective of these schemes is to increase recycling and/or re-use. An accompanying piece of legislation on restriction of hazardous substances also requires heavy metals such as lead, mercury, cadmium and hexavalent chromium, and flame retardants such as polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in electrical equipment to be replaced with safer alternatives.

This represents an economic loss and also leads to additional extraction, causing avoidable damage to the environment, often outside the EU.

Better municipal waste management offers significant benefits — turning our waste into a valuable resource, avoiding damage to the environment, including greenhouse gas emissions, and reducing demand for new resources.

Take the example of paper. In 2006, close to 70 % of paper from municipal solid waste was recycled, equivalent to one fourth of the total consumption of paper products. Increasing the recycling rate to 90 % would allow us to meet more than one third of paper demand with recycled material. That would reduce demand on new resources and lead to less paper waste sent to landfill or incineration, and less greenhouse gas emissions.

Where can we go from here?

It is not consumption or production as such that harms the environment. It is the environmental impacts of 'what we consume', where and how much, and 'how we produce'. At the local to global levels, policymakers, businesses and civil society all have to take part in greening the economy.

Technological innovation offers many solutions. Using clean energy and clean transport has a smaller impact on the environment and can meet some of our needs, if not all of them. But technology is not enough.

Our solution cannot only be about recycling and re-using materials so that we extract lower amounts of resources. We cannot avoid consuming resources, but what we can do is consume wisely. We can shift to cleaner alternatives and green our production processes and learn to turn our waste into a resource.

Better policies, better infrastructure and additional incentives are certainly needed but they can only take us a part of the way. The final leg of the journey depends on consumption choices. Whatever our background and age might be, our day-to-day decisions to buy certain goods and services have a say in what is produced and how much. Retailers can equally be influential in what is put on the shelves and can propagate the demand for sustainable alternatives up the supply chain.

A moment of reflection in front of supermarket shelves or the waste bin is perhaps a good start for our personal transition to sustainable living. *Can I use the leftovers from yesterday instead of throwing them out? Can I borrow this machine instead of buying it? Where can I recycle my old mobile phone?...*

For more information

- EEA — SOER 2010 Thematic assessments: **http://www.eea.europa.eu/soer/europe**

Food waste

Around one third of the food produced globally is lost or wasted. When more than one billion people around the world go to bed feeling hungry, it is impossible not to ask what can be done. But food waste is not only a missed opportunity to feed the hungry. It also represents a substantial loss of other resources such as land, water, energy — and labour.

Rich or poor, young or old, we all need food. It represents much more than nutrition and a rich variety of tastes in our mouths. More than 4 billion people depend on three staple crops — rice, maize and wheat. These three staples provide two thirds of our energy intake. Given that there are more than 50 000 edible plant species, our actual daily menu looks very dull with only a few hundred species contributing to the food supply.

With billions depending on a few staples, the rise in food prices from 2006 to 2008 was felt across the world. Although developed countries generally succeeded in feeding their populations, parts of Africa struggled with famine. This was not only because the market failed.

Climate change adds to the pressures on food security and some regions feel the strain more than others. Droughts, fires or floods directly hamper production capacity. Unfortunately, climate change often affects countries that are more vulnerable and less likely to have the means to adapt. But food is also in one sense just another 'good'. Its production requires resources such as land and water. Similar to other products on the market, it is consumed or used, and can be wasted. A substantial amount of food is wasted, particularly in developed countries, and that means also wasting the resources used in producing that food.

The food sector and food waste are among the key areas highlighted in the European Commission's 'Roadmap to a resource-efficient Europe' from September 2011. Although it is widely recognised that we are wasting some of the food we produce, it is quite difficult to come up with an accurate estimate. The European Commission calculates that in the EU alone, 90 million tonnes of food or 180 kg per person are wasted every year. Much of this is food still suitable for human consumption.

Not only about food

The environmental impacts of food waste are not limited to land and water use. According to the European Commission's roadmap, the food and drink value chain in the EU causes 17 % of our direct greenhouse gas emissions and 28 % of material resource use.

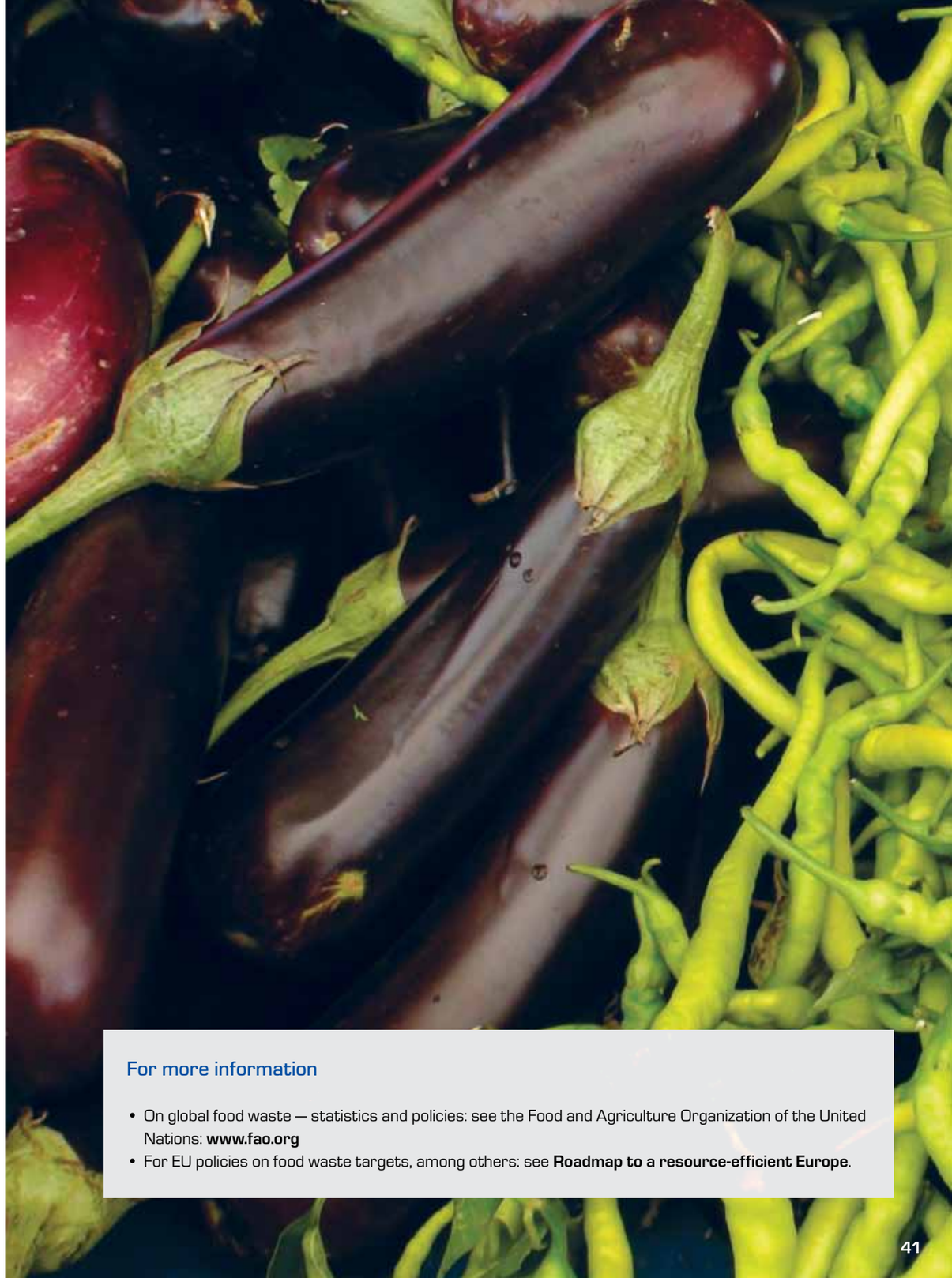
Tristram Stuart, author and one of the key organisers behind 'Feeding the 5k' (an initiative of feeding 5 000 people on Trafalgar Square in London), reckons that most rich countries waste between a third and half of all of their food.

'It is not only a rich world problem. Developing countries suffer from food wastage levels sometimes almost as high as those in rich countries, but for very different reasons. The lack of adequate agricultural infrastructure, such as post-harvest technology, is mostly to blame. You can estimate that at least a third of the world's entire food supply is wasted,' Tristram says.

Food waste happens at every stage of the production and supply chain as well as at the consumption stage. And it can have many reasons. Part of food waste is caused by legislation, often put in place to protect human health. Another part could be linked to consumer preferences and habits. All the different stages and reasons need to be analysed and targeted as necessary to reduce food waste.

The European Commission's Roadmap calls for a 'combined effort by farmers, the food industry, retailers and consumers through resource-efficient production techniques, sustainable food choices'. The European target is clear: halve the disposal of edible food in the EU by 2020. Some members of the European Parliament have actually called for 2013 to be designated as the 'European year against food waste'.

'There is no silver bullet. Every single different problem needs a different solution,' says Tristram, adding, 'The wonderful news is that we can reduce our environmental impact and it does not need to be a sacrifice. It's not like asking people to fly less, eat less meat or drive less, all of which we may also have to do. It's actually an opportunity. We simply need to stop throwing away food and enjoy it instead.'



For more information

- On global food waste — statistics and policies: see the Food and Agriculture Organization of the United Nations: **www.fao.org**
- For EU policies on food waste targets, among others: see **Roadmap to a resource-efficient Europe**.

Waste in Greenland

From densely populated cities to remote settlements, everywhere we live, we generate waste. Food leftovers, electronic waste, batteries, paper, plastic bottles, clothing, old furniture — they all need to be disposed of. Some end up re-used or recycled; others are burned for energy or sent to landfills. There is not a single way to manage waste that would work everywhere. How we do it needs to take into account local circumstances. After all, waste starts as a local issue. Given its sparse population, long distances between settlements and lack of road infrastructure, here is how the Greenland government approaches the country's waste issue.

Interview with Per Ravn Hermansen

Per Ravn Hermansen lives in Nuuk, the capital of Greenland. He moved from Denmark to work on waste management at Greenland's Ministry of Domestic Affairs, Nature and Environment.

What is it like to live in Greenland?

'Living in Nuuk is not much different than any mid-sized town, very much like the towns you would find in Denmark. You have the same type of stores and facilities. Around 15 000 people live in Nuuk. While both Greenlandic and Danish are widely spoken in Nuuk, it is almost entirely Greenlandic in the smaller settlements.

I have been living there since 1999 and I think that people consume the types of products similar to the rest of the world, like personal computers and mobile phones. And I also think that people are getting more aware of the waste issue.'

What makes Greenland's waste problem unique?

'Some 55 000 people live in Greenland and much like the rest of the world, people generate waste. In many respects, Greenland's waste 'problem' is a quite common one. Greenlandic businesses and households generate various types of waste and we need to manage it in a way not to damage the environment.

In other respects, Greenland's waste problem is unique because of its size, more precisely its scattered settlements. There are six relatively big towns, 11 smaller towns and around sixty settlements of 30 to 300 inhabitants scattered along the coast. The majority of the population live on the west coast, but there are small settlements and towns on the east coast as well.

Only six towns have incineration plants and that's not enough to reach an environmentally sufficient treatment of burnable waste. And there are no roads connecting towns and settlements to each other, which means that we cannot easily transport the waste to the incineration plants. Goods are transported by sea primarily.

At the moment, we have only a rough idea about the amount of municipal waste generated in Greenland and we think it is increasing. Half of the settlements have what I would call incineration ovens, as for the rest, it is open air burning or landfills.

Ultimately, I think all waste problems have many common elements, but they are all unique. Waste is a local issue with wider implications. Solutions must take this duality into account.'

What about hazardous waste and electronic waste?

'The facilities in the largest towns dismantle e-waste and handle hazardous waste, which are then stored on site until they are shipped to Denmark. Greenland imports all sorts of products, including food, clothing and cars, mostly shipped from Aalborg. Hazardous waste and e-waste are loaded on the ships heading back to Denmark on their return trip.'

In recent years, mining multinationals have started looking for unexploited oil or mineral reserves. What happens to mining waste?

'In Greenland we have a one-door policy, allowing mining companies to obtain all necessary permissions from the same public authority. This means that they submit their applications, covering all aspects of their operations, including waste to the Bureau of Minerals and Petroleum.

Almost all of their activities happen away from towns and settlements. For burnable waste, the companies can make deals with local municipalities for using the incineration plants. This extra demand for incineration puts extra strain on local incineration capacity.'

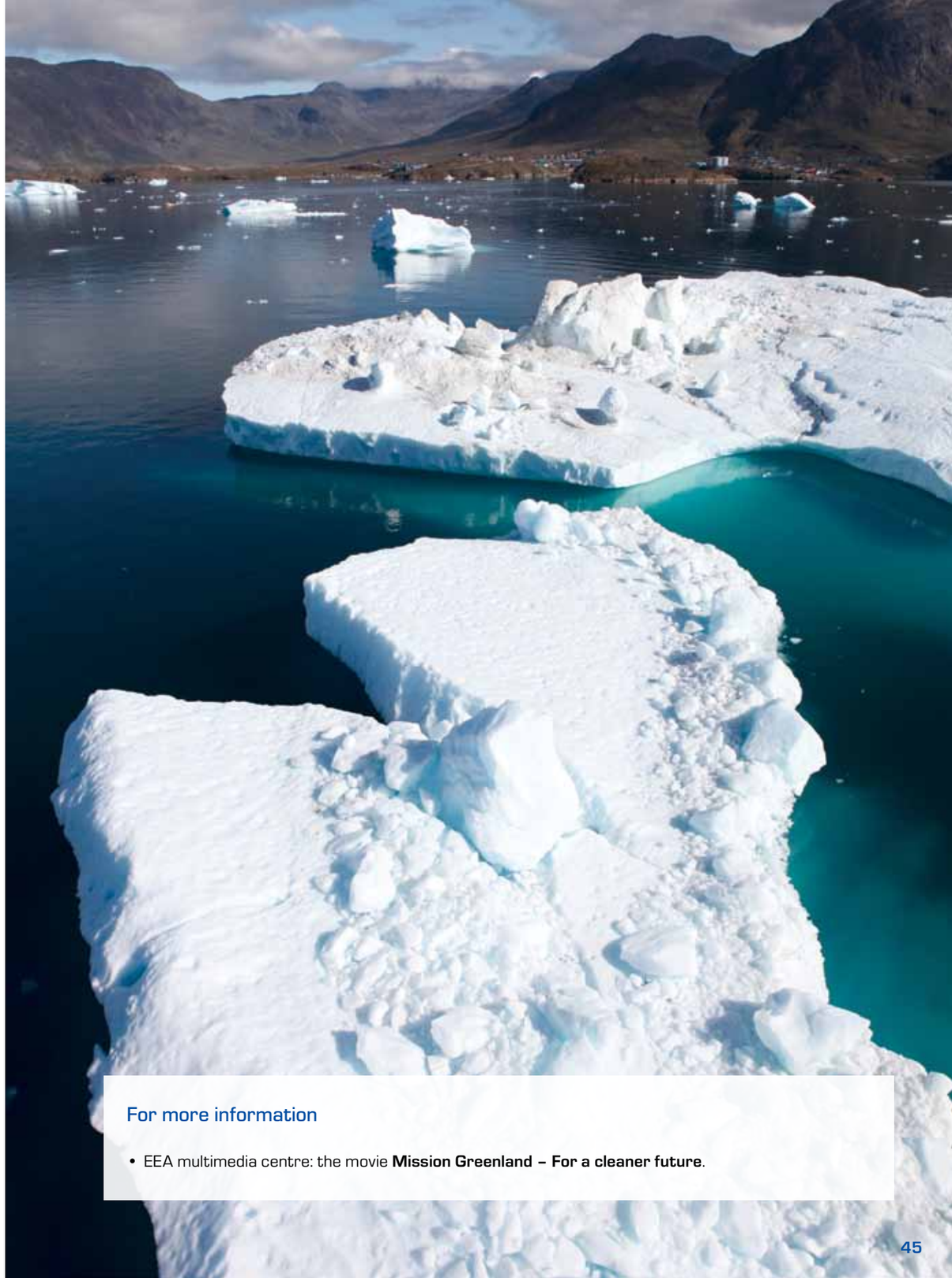
How are you approaching this problem?

'One of the options currently on the table consists of building regional incineration plants and transporting the waste. It is clear that we cannot build waste treatment plants in every town. We are also looking into heat generation — heating households by burning waste.

In the smaller towns, we are starting to establish facilities to dismantle e-waste and handle hazardous waste. For small settlements, we are placing containers for electronic waste and hazardous waste, which then can be transported to the facilities in towns.

We are currently implementing two pilot projects for transporting burnable waste to towns with incineration plants.

The Government of Greenland has a national waste management plan and the activity I have just mentioned is part of this plan.'



For more information

- EEA multimedia centre: the movie **Mission Greenland – For a cleaner future**.

Getting the price ‘right’?

Getting the price 'right'?

Many developing country economies are centred on exploiting natural resources to lift their populations out of poverty, potentially damaging the natural systems they depend on. Short-term solutions often undermine the population's well-being in the long-term. Can governments help the markets set the 'right' price for nature's services and influence economic choices? Here is a closer look at what water use in cotton production means for Burkina Faso.

Globally, more than a billion people live in 'extreme poverty', according to the World Bank definition of surviving on less than USD 1.25 a day. And although the proportion of the world population living in poverty has fallen dramatically during the last 30 years, a substantial number of countries — many of them in Africa —have struggled to make progress.

In these countries, economic activity is often centred on exploiting natural resources — through farming, forestry, mining and so on. As a result, efforts to boost economic growth to meet the needs of fast growing populations can put ecosystems under considerable strain.

In many cases, resources, such as cotton, are cultivated or extracted in developing countries and exported to richer regions such as Europe. This reality gives consumers in the industrialised world an important role: potentially helping to lift the 'bottom billion' out of poverty; potentially undermining their chances by damaging the natural systems that they depend on.

'White gold'

In Burkina Faso — an arid, landlocked and very poor country on the Sahara's southern fringe — cotton is big business. It's enormous business, in fact. Having increased output rapidly in recent years, Burkina Faso is now Africa's largest cotton producer. 'White gold', as it's known in the region, accounted for as much as 85 % of Burkina's export revenues in 2007 and 12 % of economic output.

Crucially, earnings from cotton are widely dispersed. The sector employs 15–20 % of the workforce, providing direct incomes to 1.5–2 million people. And as a key driver of economic growth in the last decade it has generated tax revenues that can fund improvements in areas such as health and education.

For the people of Burkina Faso, the benefits of cultivating cotton are clear. The costs are often less obvious.

Water concepts in brief

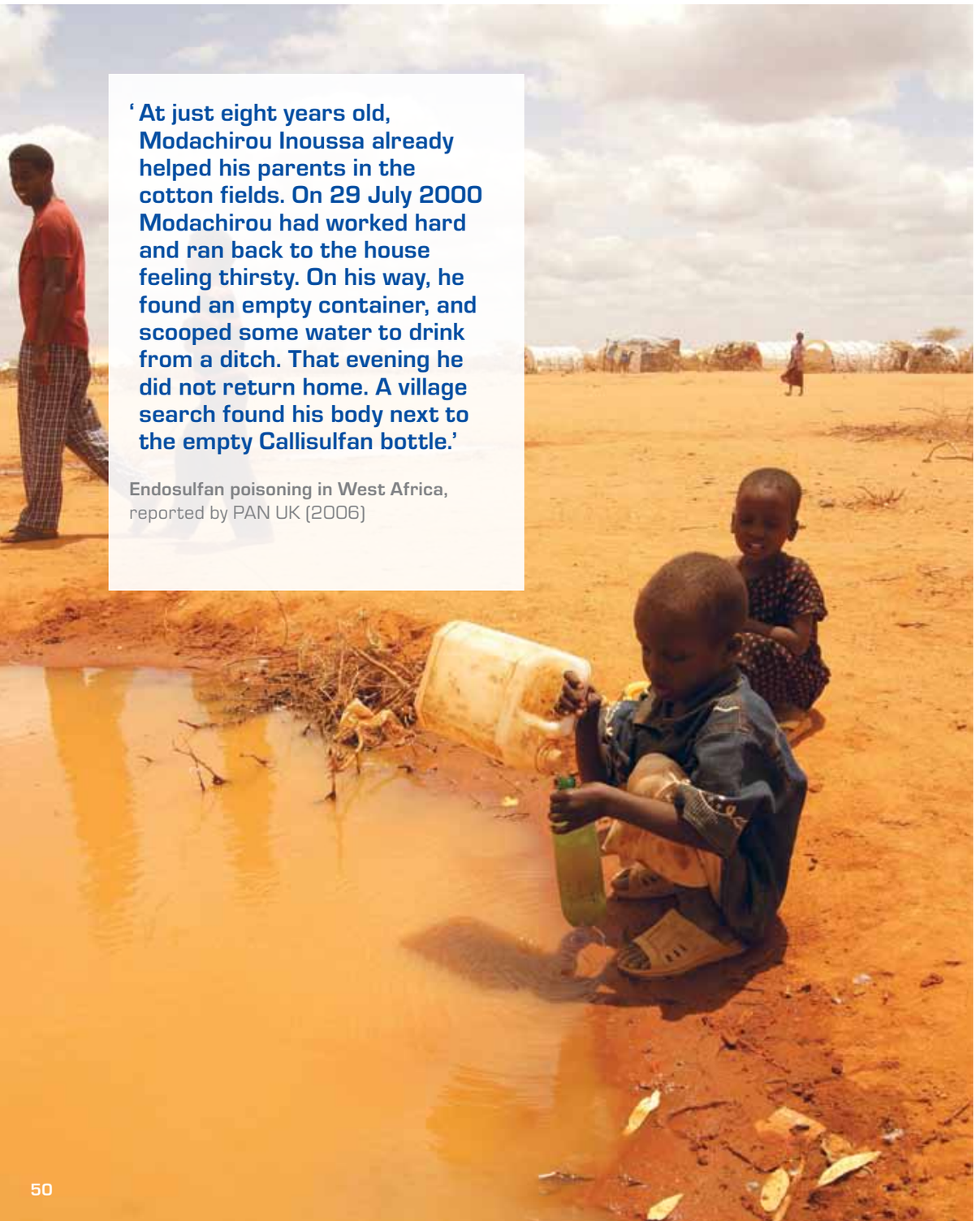
Water footprints and **virtual water** are concepts that help us understand the amount of water we consume.

A water footprint is the volume of freshwater used to produce the goods and services consumed by an individual or community or produced by a business. It consists of three components. The **blue water footprint** is the volume of surface water and groundwater used to produce goods and services. The **green water footprint** is the amount of rainwater used in production. And the **grey water footprint** is the volume of water polluted by the production.

Any exported good or service also implies exporting **'virtual water'** — the water used in producing the good or service in question. Virtual water exports happen when a good or service is consumed outside the boundaries of the catchment area where the water was extracted.

For importing countries or areas, importing 'virtual water' enables domestic water resources to be used for other purposes, which can be very useful for water-scarce countries. Unfortunately, many countries exporting virtual water are actually water scarce but have sunny climates, which suits agricultural production. In these water-scarce countries, exporting virtual water puts extra strains on water resources and often imposes social and economic costs because insufficient water is available for other activities and needs.

Source: **Water Footprint Network**



‘At just eight years old, Modachirou Inoussa already helped his parents in the cotton fields. On 29 July 2000 Modachirou had worked hard and ran back to the house feeling thirsty. On his way, he found an empty container, and scooped some water to drink from a ditch. That evening he did not return home. A village search found his body next to the empty Callisulfan bottle.’

Endosulfan poisoning in West Africa, reported by PAN UK (2006)

A quarter of inhabitants lack access to safe drinking water. More than 80 % are subsistence farmers, relying on water to meet their basic needs for food and shelter. And according to the WMO, annual demand on water resources exceeds availability by 10–22 %.

In this context, the huge increase in cotton production in recent years looks risky. Cotton is a thirsty crop — it requires irrigation during drier months and consumes much more water than other widely cultivated crops.

Assigning water to cotton production implies diverting water from other possible uses. Most of the harvest is exported, meaning that large amounts of water are used to satisfy the demands of consumers overseas. This process is known as exporting ‘virtual water’.

Half of Burkina Faso’s cotton is exported to China where it is sold to local spinning factories and from there to garment manufacturers serving global markets. At the end of the supply chain, consumers of cotton products effectively import substantial volumes of water — sometimes from much drier parts of the world. In the case of cotton, one study has found that 84 % of Europe’s water footprint lies outside Europe.

For dry countries like Burkina Faso, it’s normally preferable to import water-intensive products, not export them. After all, exporting ‘virtual water’ can mean that there’s not enough left for local people and ecosystems. That said, the only way to judge whether it’s a good idea for Burkina Faso to use water to cultivate cotton is by evaluating the full costs and benefits compared to other uses. By itself, the virtual water concept can’t tell us how best to manage water, even if it does convey very useful information about the impacts of our production and consumption choices.

More pollution, less forest

Water consumption isn’t the only worry associated with cotton production in Burkina Faso. Cultivating cotton normally involves heavy use of pesticides. Indeed, cotton accounts for a remarkable 16 % of world pesticide use, despite covering just 3 % of cultivated land globally.

The impacts can be severe for local people and ecosystems. But since the individuals applying the pesticides don’t feel all these effects and may not even be aware of them all, they won’t reflect them fully in their decision-making. For this reason, it can be important to educate and inform local growers about pesticides and their effects.

Water isn’t the only resource being used. Another crucial one is land. As in most places, in Burkina Faso land can be used in numerous different ways. Do the Burkinabe gain most welfare from converting land to cotton production?

Good for one might not be good for all

This question isn't an idle one. Burkina Faso's forest area declined by 18 % in the period 1990–2010, partly driven by expanding agriculture, and the rate of loss is accelerating. A private owner of forest in Burkina Faso may prefer to cultivate cotton because it's more profitable for him or her to sell the wood (or use it as fuel) and cultivate the land, rather than preserve the forest. But this may not necessarily be the best outcome for Burkina Faso — its people and its ecosystems.

Forests provide humans — near and far — with a lot more benefits than just the value of the timber. They supply a habitat for biodiversity, prevent soil erosion, absorb carbon dioxide, provide recreation opportunities and so on. If society as a whole were deciding how to use the land — and could make its decision based on a full assessment of the costs and benefits of the different options — it would probably not exhaust all the land and water just for cotton production.

This difference between the benefits and costs facing individuals and those facing society is a crucial issue.

In answering key questions — how much water to use in producing cotton, how much pesticides, how much land — farmers across the world takes decisions based on the relative costs and benefits. But whereas the farmer can capture the full gains of selling the cotton, he or she usually doesn't bear all the costs. The expense of purchasing pesticides, for example, is often dwarfed by the health impacts of pesticide use. So costs are passed on to other people, including future generations.

Problems arise because, much like the rest of us, the farmer is making most decisions based on his own self-interest. And this distortion is passed on via global markets. The prices paid by traders, clothes manufacturers and, ultimately, consumers misrepresent the cost and benefits involved in using resources and producing goods.

This is a serious problem. In most of the world, markets and prices are used to guide our decision-making, so if prices give us a misleading picture of the impacts of production and consumption then we'll make bad decisions. History tells us that markets can be a very effective mechanism to guide our decisions about resource use and production and maximise prosperity. But when the prices are wrong, markets fail.

> ’99 % of the world’s cotton farmers live in the developing world. That means that the pesticides are applied in fields where illiteracy is high and safety awareness is low, putting both the environment and lives at risk.’
>
> **Steve Trent,** Director of Environmental Justice Foundation

When markets fail: corrections and constraints

What can we do about it? To some extent governments can take steps to correct market failures. They can impose regulations and taxes on using water and pesticides so that farmers use less or find less harmful alternatives. Conversely, they can organise payments to forest owners to reflect the benefits that forests supply to society nationally and internationally — and thereby provide an alternative source of revenues. The key lies in aligning the incentives of the individual with those of society as a whole.

It’s also important to provide information to consumers to complement the information carried in prices. In many countries we see ever more labels informing us about how goods are produced, along with campaigns by interest groups to increase awareness and understanding of these issues. Many of us would be willing to pay more or consume less if we understood the impacts of our choices.

In some instances, governments need to go beyond correcting the market and actually constrain its role in allocating resources. Humans and ecosystems alike need water to survive and prosper. Indeed, many would argue that people have a right to sufficient water for drinking, food, sanitation and a healthy environment. Governments may therefore have a duty to ensure that their needs are met before using the market to share out the rest.

Back in Burkina Faso, the government and international partners have focused on meeting the basic need for access to safe drinking water. Although this is not yet a reality for a quarter of inhabitants, the situation today constitutes a huge improvement on 20 years ago, when 60 % lacked such access.

Changing incentives

Globally, efforts are under way to correct and constrain open markets, while exploiting their many benefits. Right now, however, market prices often give misleading information — and the result is bad decisions by producers and consumers alike.

If markets were working properly and prices reflected the full costs and benefits of our actions, would Burkina Faso produce cotton?

Although it is hard to know for sure, it seems very likely that it would. For a very poor, landlocked, resource-poor country like Burkina Faso, there are no easy routes to prosperity. The cotton sector at least offers considerable earnings, potentially providing a platform for economic development and improved living standards.

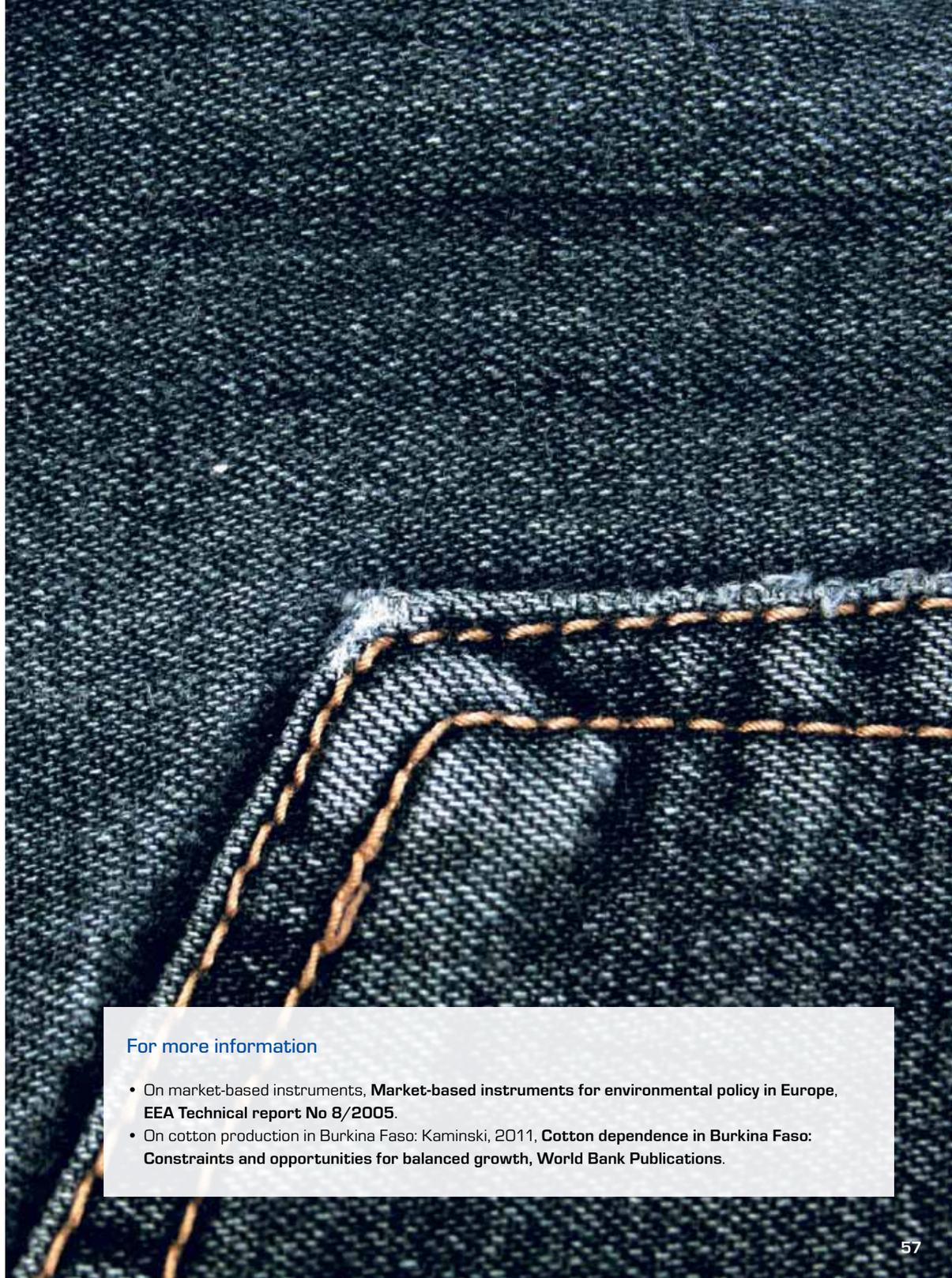
But continuing to produce cotton does not have to mean continuing to use water- and pesticide-intensive production techniques. Or continuing to reduce forest areas. Alternatives methods, such as organic cotton production, can lower water use and exclude pesticide use altogether. The direct costs of cultivating organic cotton are greater — meaning that the prices that consumers face for cotton products are higher — but they are more than offset by the reduction in indirect costs imposed on cotton growers and their communities.

You choose

Certainly, policymakers have a role to play in helping markets to function properly, so that price signals provide incentives for sustainable decision-making. But it's not just up to policymakers — informed citizens can also make a difference.

Global supply chains mean that the decisions of manufacturers, retailers and consumers in Europe can significantly impact the wellbeing of people in lands as far away as Burkina Faso. Such impacts can include generating employment and earnings, but they can also include over-exploiting limited water resources and poisoning local people and ecosystems.

Ultimately, consumers have the power to decide. Just as policymakers can guide our consumption by influencing prices, consumers can send signals to producers by demanding sustainably grown cotton. It's a point worth reflecting on the next time you go to buy a pair of jeans.



For more information

- On market-based instruments, **Market-based instruments for environmental policy in Europe, EEA Technical report No 8/2005**.
- On cotton production in Burkina Faso: Kaminski, 2011, **Cotton dependence in Burkina Faso: Constraints and opportunities for balanced growth, World Bank Publications**.

Makes ‘business sense’?

From small enterprises to multinationals, many companies are looking for ways to retain or increase their market shares. In times of tough global competition, the pursuit of sustainability suggests much more than ‘greening’ the corporate image and cutting down production costs. It might mean new lines of business.

Invasion by great apes was probably not mentioned among Unilever’s top business risks, but it happened. On 21 April 2008, Unilever’s headquarters in London and its facilities on Merseyside, Rome and Rotterdam were invaded by Greenpeace activists dressed as orangutans. The activists were protesting the damage done to Indonesian tropical rainforests by the production of palm oil, used in many of Unilever products. Soon after the raid, the company announced that it would draw all its palm oil from ‘sustainable’ sources by 2015. Since then, the company outlined a business plan to integrate sustainability to the core of its practices.

Many different reasons could motivate a multinational company to adopt more sustainable practices. It could be linked to the company’s corporate image or the image of its brands. Sustainability could also be demanded by the company’s investors who might shy away from putting their money into companies not addressing the risks of environmental change or not interested in reaping the benefits of eco-innovation.

As Karen Hamilton, Vice-President of Sustainability at Unilever, puts it: ‘We see no conflict between growth and sustainability. More and more consumers actually demand this.’

Or simply, adopting sustainable practices might make business sense. Companies might gain competitive edge and increase their market share. It could also mean new business opportunities for innovative eco-entrepreneurs responding to a growing demand for ‘green’ products.

Karen adds: ‘Sustainability also implies cost savings. If we can reduce packaging, we can cut down on energy use in the factory, hence saving money and increasing profitability.’

Where to look for ideas

Once large multinational companies start adopting greener practices, their size enables them to make a difference on the ground. They tend to call on their peers to adopt similar practices. Founded on the eve of the 1992 Rio Summit to give a voice to the business sector, the World Business Council for Sustainable Development (WBCSD) is a platform set up to promote sustainability in the business sector.

The WBCSD's 'Vision 2050' report, put together with leading CEOs and experts, outlines the must-haves that the business sector should put in place in the next decades to achieve global sustainability. In other words, it is a call for sustainability from within.

The main 'must-haves' identified by the WBCSD reflect many of the objectives of policymakers: getting market prices to include the costs of environmental damage; finding efficient ways to produce more food without using more land and water; stopping deforestation; reducing carbon emissions worldwide by shifting to environment-friendly energy; and using energy efficiently everywhere, including the transport sector.

The Carbon Disclosure Project (CDP) is another initiative promoting sustainability in the business sector. It is a non-profit organisation, aimed at achieving reductions in greenhouse gas emissions and water use by businesses and cities. CDP also helps investors assess business risks linked to the environment, such as climate change, water scarcity, flooding and pollution, or simply shortage of raw materials. Especially in the context of the current financial crisis, investors have an important say in which companies survive.

No one-size-fits-all solution

The question then remains: how can a company translate sustainability into business management? There is not a one-size-fits-all solution but plenty of advice and support is available.

Sustainable business platforms such as the World Business Council for Sustainable Development and the Carbon Disclosure Project provide guidance to companies willing to position themselves at the forefront. There are also more targeted recommendations such as the OECD Guidelines for Multinational Enterprises, which are annexed to the OECD Declaration on International Investment and Multinational Enterprises. They provide voluntary principles and standards for responsible business conduct for multinational corporations operating in countries adhered to the Declaration.

Most of the existing schemes are voluntary, however, and are usually addressed within the broader context of corporate social responsibility.

It is not only the top managers in various companies who steer the transition to sustainable practices. Governments and public authorities in general can help companies by creating a level playing field and providing incentives. Orangutan costumes might not always be necessary, but consumers and civil society can also send in a strong signal to the private sector, simply by showing there is interest in environment-friendly products.

Karen confirms this: 'Governments and civil society certainly need to work together. Businesses can particularly make a difference in cross-boundary supply chains and, of course, the scale at which they reach consumers.'

For more information

- World Business Council for Sustainable Development: **www.wbcsd.org**
- Carbon Disclosure Project: **www.cdp.net**

Local and global

Local and global

When faced with scarcity or increasing pressures on vital resources such as water and land, the question of who decides can be as important as how natural resources are managed and used. Global coordination is often essential but without local endorsement and involvement, nothing can be done on the ground.

We are probably all familiar with the tale of Hans Brinker, the young Dutch boy, who spent the night with his finger plugging the hole in the dyke to stop water seeping in and flooding the city of Harlem. That the story was actually written by an American author, Mary Mapes Dodge (1831–1905), who had never been to the Netherlands, is often a surprise.

Joep Korting is not quite so well-known but he is a key link in one of the most sophisticated water management systems in the world, which includes local, regional and national administration, as well as links with authorities in other countries and sophisticated computerised monitoring systems that use satellites to check the infrastructure around the clock.

Joep is also one of the links on the ground, essential to the implementation of one of the most ambitious and comprehensive pieces of EU legislation ever — the Water Framework Directive (WFD).

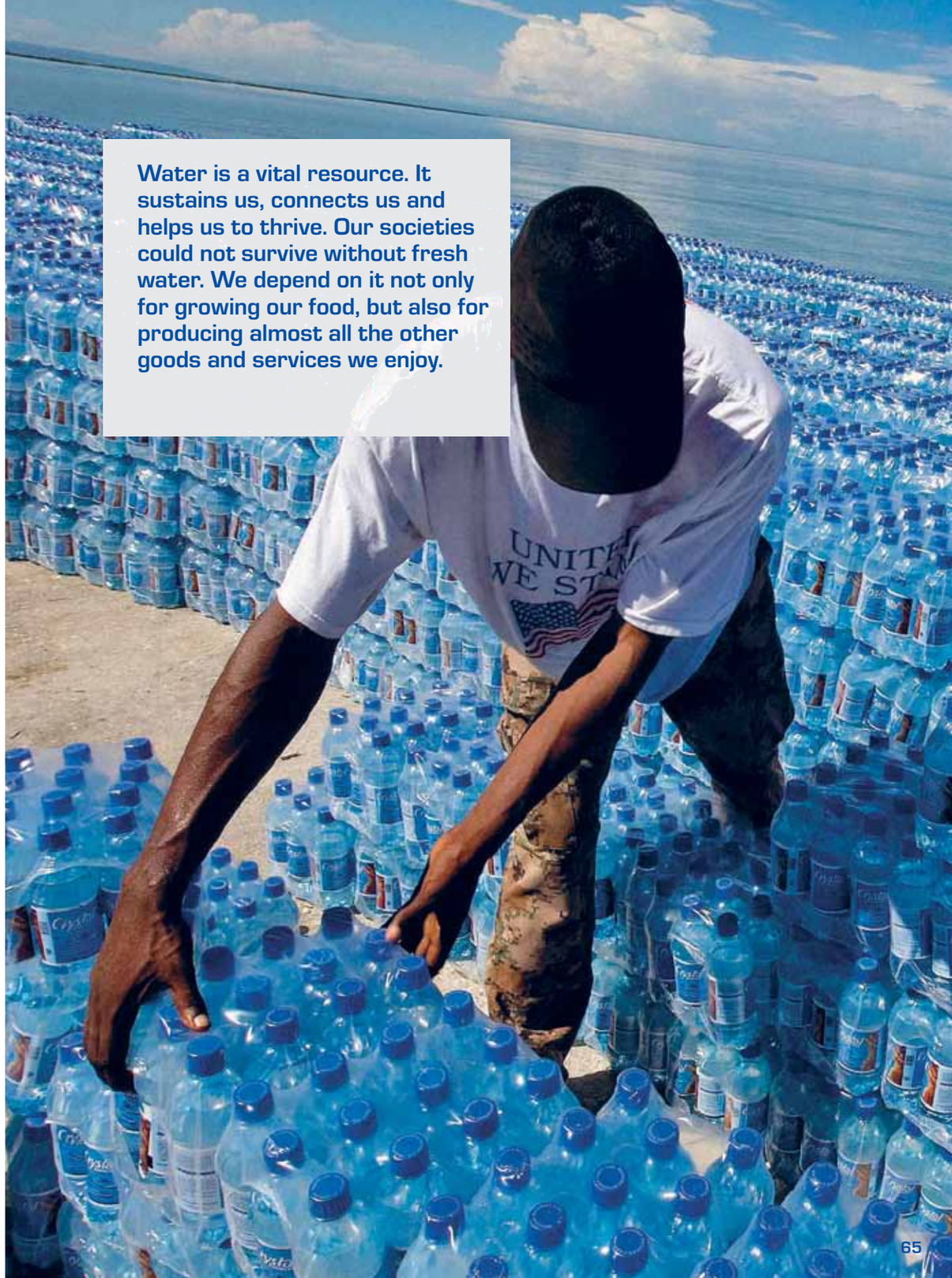
The Water Framework Directive calls for coordinated action to achieve 'good status' for all EU waters, including surface and groundwater, by 2015. It also stipulates how we should manage our water resources based on natural river basin districts. Several other pieces of EU legislation, including the Marine Strategy Framework Directive and the Floods Directive, complement the WFD in improving and protecting Europe's water bodies and aquatic life.

Re-thinking the way we live

It is no secret that water is a big issue in the Netherlands. Around 25 % of its land area — on which 21 % of the Dutch population lives — is below sea level. Fifty per cent of the land area is just one metre above sea level. But the Netherlands has more than the sea to deal with. The supply of fresh water to citizens and business, the management of rivers flowing from other countries as well as water shortages in warm periods are just some of the tasks at hand.

The Dutch are not alone. Water is becoming a critical issue around the globe. During the 20th century we experienced an unprecedented growth in population, economy, consumption and waste production. Water withdrawals alone have tripled over the last 50 years.

Water is just one of the resources under increasing pressure. There are many more environmental problems from air quality to land availability that have been seriously affected by key developments such as growing populations, economies and consumption.



Water is a vital resource. It sustains us, connects us and helps us to thrive. Our societies could not survive without fresh water. We depend on it not only for growing our food, but also for producing almost all the other goods and services we enjoy.

Although we do not have the complete picture, what we know about the environment urges us to re-think the way we use and manage our resources. This re-thinking — the green economy — could involve fundamentally changing the way we live, do business, consume and deal with our waste, changing our entire relationship with the planet. A key element of green economy is the efficient management of the natural resources on Earth. But what does efficient management of resources mean? What could it look like in the case of water?

Water management on the ground

Joep starts work at the local water authority in Deurne, the Netherlands, at 8 a.m. every morning. Among his main tasks is the checking a small number of the 17 000 kilometres of dykes in the small country — 5 000 kilometres of which protect against the sea and major rivers.

Joep also checks the canals, locks and sluices — sometimes removing waste or cuttings from agriculture, other times repairing damaged equipment. Whatever the task, he is constantly gauging the height of the water and noting possible tweaks to manage it.

The area where Joep works has 500 weirs that are monitored daily. By turning the weirs up or down the water level is increased or decreased in order to control the movement of water across the region. Despite all the hi-tech systems, Joep and seven colleagues manually work and check the locks every day. Water levels are constantly monitored and there is an emergency action plan and 24-hour emergency phone lines.

Stakeholder democracy

Joep and his colleagues are implementing decisions taken by the Dutch water boards. Currently there are 25 local water boards in the Netherlands. Together they represent an institutional concept dating from the 13th century when farmers got together and made agreements to drain water together from their fields. Uniquely, the water boards are completely autonomous from local government and even have their own budgets and their own elections — making water boards the oldest democratic institutions in the Netherlands.

‘This means when budget discussions or local elections come up, we are not competing with investments in local football pitches, school facilities, a youth club or new road — which may be more popular choices,’ says Paula Dobbelaar, Head of a district of the Aa en Maas water board and Joep’s boss.

'We also have day-to-day activities, for example, in relation to the Water Framework Directive, we are actually trying to give our rivers more freedom — allowing them to meander and find their own way and not only run in straight lines. By giving them this freedom and allowing more space they take on a very different nature — they become part of a more natural ecosystem again,' Paula says.

'The problem in the Netherlands is that we have been very well organised in the past and successful at dealing with water issues — we've kept everybody safe for 50 years — people now take it all for granted. For example, last year, we had very heavy rain in this part of Europe and while people in Belgium got very concerned about the whole thing, Dutch people didn't — they expected that it would be taken care of,' Paula adds.

As mentioned, local water authority members are elected but only 15 % of the population vote in these elections. 'It's not really representative and it's again a result of the fact that Dutch people have become a little immune to water issues,' she says.

The wide spectrum between local and global

The main policy options for effective sustainable water management must include technological innovation, flexible and cooperative governance, public participation and awareness and economic instruments and investments. The involvement of people at local level is essential.

'Water certainly connects us globally and locally — the problems and the solutions,' says Sonja Timmer who works in the International Department of the Dutch Association of Regional Water Managers, the umbrella organisation for water management across the Netherlands.

'The fact is that despite a high level of safety standards in the Netherlands, we are experiencing higher sea levels, very dry winters followed by increased incidents of 'freak' rainfall in August and in recent years, as a result of heavy rain in Switzerland and Germany, the Rhine has been very high. That water ends up here.'

Keeping the spotlight on the environment

'Dealing with more water at certain times flowing across international borders or higher sea levels obviously involve international action. We are part of an international network and we see from our shared experiences that if water is not in the news every day, our job becomes more difficult,' Sonja says.

'For me, our work at a local level is tied to the national and the international' Paula says. On the one hand we have employees going around checking weirs and water courses .... And making sure they are kept clean and water levels are what our clients (farmers, citizens, nature conservation organisations) want. On the other hand we have great plans that are translated from high abstract EU WFD principles to actual protocols for Joep to work with in the field. I now appreciate this local aspect. Previously, I worked around the world at a strategic level — at a high level with very little understanding of the need to get the local structures right.'

'Sitting with ministers talking about global water strategy it's very hard to keep two feet on the ground. This has been a major issue for developing countries — lots of strategy at high level — very little understanding, infrastructure, investment on the ground.'

'Now as water issues become a pressing reality in Europe, we also need this 'feet on the ground' local approach as well as the grander plans', Paula says.

'I have eight people out checking the locks every day. They all live here and they understand the local people and the local conditions. Without these things you end up with one plan failing and simply being replaced with another. We all need to work at that — making a difference locally — empowering people to look after their own water issues,' she says.

'The local level is also key,' Sonja agrees. 'Governance, the functional, decentralised approach, can take many forms and that's what makes it work. We just have to engage people again and explain to them that there is a risk and we need them to stay involved,' she says.

A governance crisis

Although parts of the world are faced with the risk of water scarcity and others with the risk of flooding, talk of a global water crisis is inaccurate. Instead, we face a water governance crisis.

Meeting the needs of a resource-efficient, low-carbon society, sustaining human and economic development and maintaining the essential functions of water ecosystems requires that we give our largely silent ecosystems a voice, a lobby. We are talking about political choices — choices that must be based on the right governmental and institutional framework.

The story of the small boy who stuck his finger in the dam is often referred to today to describe several different approaches to managing a situation. It can refer to taking a small action to avert a major disaster. It can also mean trying to cure the symptoms rather than dealing with causes.

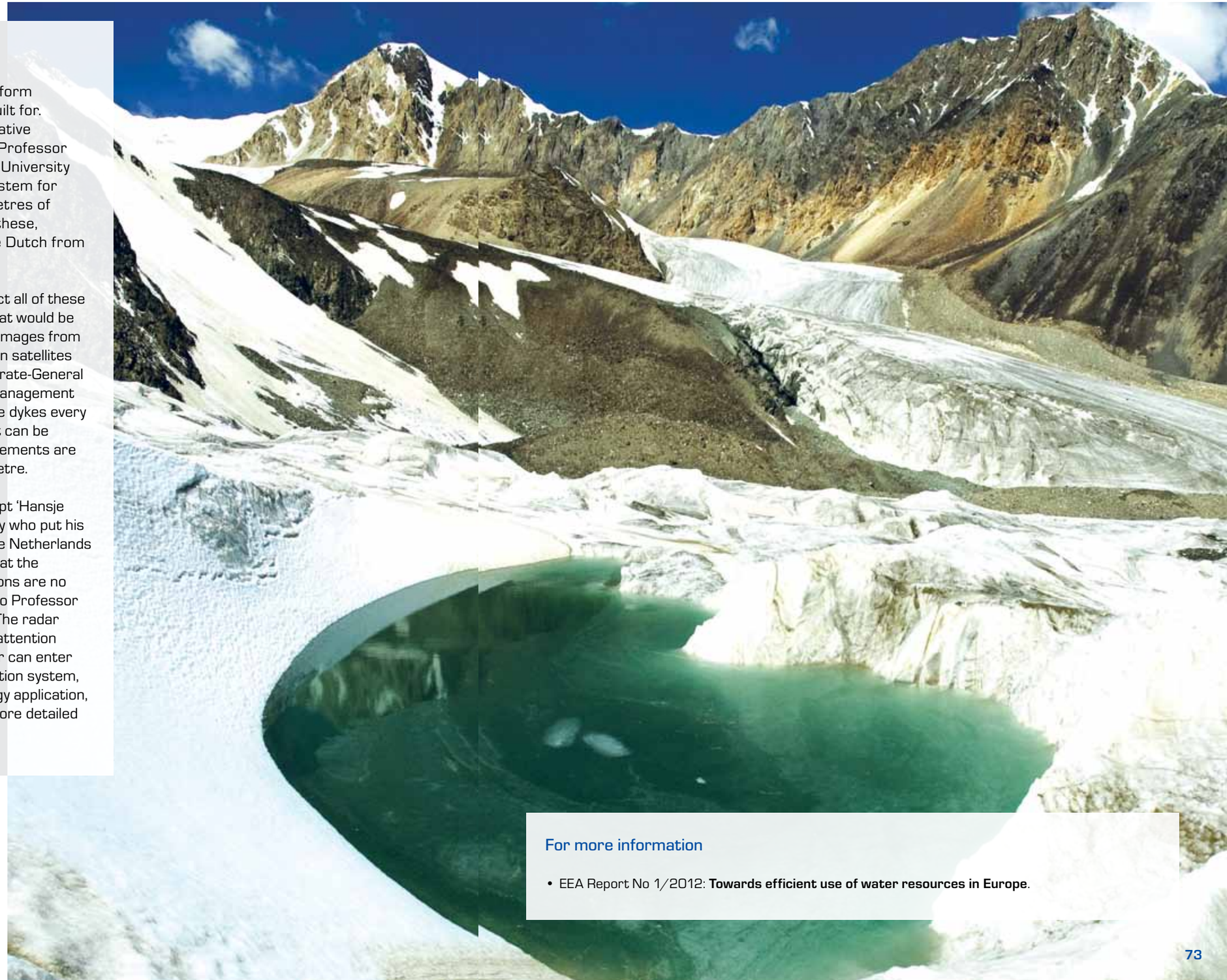
The reality is that effective water management, like the management of many other resources, will require solutions that draw upon a combination of actions and decisions at various levels. Global targets and commitments can only be translated into concrete achievements if people like Joep and Paula are there to implement them.

The Information Revolution

Satellites can sometimes perform more tasks than they were built for. Together with a couple of creative colleagues, Ramon Hanssen, Professor of Earth Observation at Delft University of Technology, developed a system for monitoring the 17 000 kilometres of dykes in the Netherlands. Of these, 5 000 kilometres protect the Dutch from the sea and the major rivers.

It would be impossible to inspect all of these frequently from the ground. That would be far too costly. Using the radar images from the European Earth observation satellites Envisat and ERS-2, the Directorate-General for Public Works and Water Management (Rijkswaterstaat) can check the dykes every day. Even the tiniest movement can be detected, because the measurements are accurate to the nearest millimetre.

Hanssen christened the concept 'Hansje Brinker' after the legendary boy who put his finger in the dyke to protect the Netherlands from floods. Does this mean that the Directorate-General's inspections are no longer necessary? According to Professor Hanssen, this is not the case. The radar indicates which areas require attention due to movement. An inspector can enter the coordinates into his navigation system, which is also a space technology application, and then set off to carry out more detailed research on the ground.



For more information

- EEA Report No 1/2012: **Towards efficient use of water resources in Europe**.

A European view on sustainability

Through a series of legislative measures, EU policymakers aim to make Europe more 'resource efficient'. But how does Europe strike a balance between the economy and nature? In the context of the Rio+20 conference, what does sustainability mean for the EU and the developing world? Here is one point of view.

Interview with Gerben-Jan Gerbrandy

Gerben-Jan Gerbrandy has been a member of the European Parliament in the Alliance of Liberals and Democrats for Europe group since 2009. He is a politician from the Dutch liberal party 'Democrats 66'.

What is the biggest challenge facing the environment? How can we tackle it?

'The biggest challenge is over-exploitation of natural resources. Human consumption goes beyond the natural boundaries of our planet. Our way of life, more specifically the way we run our economy, is simply not sustainable.

The world population will reach nine billion in a few decades and will need 70 % more food. Consequently, a second challenge is to find ways to feed our growing population when we already face scarcity of many resources.

To address these challenges, we have to adjust the fundamentals of our economy. For instance, our economies do not put an economic value on a large number of benefits we receive for free. The value of a forest is taken into account when it is turned into timber, but not when it is kept intact. The value of natural resources should somehow be reflected in the economy.'

Can we truly change the fundamentals of our economy?

'We are working towards that. I think we are very close to finding ways to include the full value of natural resources in the economy.

But more importantly, three drivers are forcing industry to become much more resource efficient. The first is scarcity of resources. We are actually observing what I call a 'green industrial revolution'. Resource scarcity forces companies to set up processes for resource recovery and re-use, or look for other ways to use resources efficiently.

Consumer pressure is another driver. Look at advertisements. Big car manufacturers don't talk about speed anymore but about environmental performance. Moreover, people are much more conscious about the image of the company they are working for.

A third driver is legislation. We continuously need to improve environmental legislation because not everything can be achieved through market pressures, resource scarcity and consumer pressure.'

What is the most important factor determining consumer choices?

'It is definitely price. For large segments of society, it is a luxury to choose for any reason other than price. But it is still possible to choose to consume seasonal and local food products, or fresh products, and often they are even cheaper. There are clear health benefits for those individuals and for society as a whole.

Choosing a more sustainable option depends on infrastructure as well as people's awareness of their impact on the environment. If there is no public transport infrastructure, we cannot expect people to stop driving to work.

Or in the case of legislation, if we cannot explain the value of certain rules or laws, it would be almost impossible to enforce them. We need to involve the people and convince them.

This often requires translating scientific knowledge into everyday language for the benefit of not only citizens but also policymakers.'

What would make the Rio+20 conference a 'success'?

'We need concrete results, such as an agreement on a new institutional framework or specific targets on the green economy. But, even without concrete results, the conference can become very influential.

I am very much in favour of the creation of an international court for environmental crimes or an institutional setup that would prevent the type of deadlocks we experienced in recent rounds of environmental negotiations.

Regardless of progress in establishing such institutions, just the fact that we are discussing and trying to find joint solutions is already a huge step forward. Until recently, global environmental negotiations divided the world into two: the developed and the developing countries.

I believe we are shifting away from this bipolar approach. Because of their higher economic dependence on natural resources, many developing countries will be among the first ones to be affected by global resource scarcity. If the Rio conference convinces many of them to adapt more sustainable practices, I will consider it a big success.'

In this context, could Europe help the developing world?

'The green economy concept is not only relevant to developed countries; it actually foresees a longer perspective. At the moment, many developing countries are selling their natural resources at very low prices. Short-term prospects are tempting, but they could also mean the countries are selling off future welfare as well as growth.

But I think this is changing. Governments are becoming more concerned about the long-term implications of resource exports. Industry in many developing countries has also started investing in sustainability. Like their counterparts in the developed world, they face resource scarcity. This is a very strong financial incentive for companies all over the world.

For my part, I think we could help by opening our agricultural markets and enabling these countries to generate more added value. At the moment, foreign companies come and extract resources and there is very little economic input from the local people.

Agriculture in general is crucial. If we look ahead at the challenges linked to global food production, it is clear that we need more food and this requires increasing production efficiency in developing countries. Increased agricultural output in developing countries would also reduce their food imports.'

As a European citizen, what does 'living sustainably' mean to you?

'It means a series of small things, such as putting on a sweater instead of turning the heat up, taking public transport instead of driving, and not flying if possible. It also means making my own children and others aware of the concept of sustainability and the impacts of their day-to-day choices.

I cannot say that it is always possible to avoid flying given my position. But that's why we have to make flying much more sustainable along with all our unsustainable consumption patterns. That's the challenge of the green economy.'

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Signals 2012

The European Environment Agency (EEA) publishes Signals annually, providing a snapshot of issues of interest to the environmental debate and the wider public in the coming year.

Signals 2012 brings together environmental issues such as sustainability, green economy, water, waste, food, governance and knowledge sharing. It is prepared in the context of the United Nations Conference on Sustainable Development — Rio 2012.

This year's Signals will give you a flavour of how consumers, forward-thinking businesses and policymakers can make a difference by combining new technological tools — from satellite observations to online platforms. It will also suggest creative and effective solutions to preserve the environment.

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