

A low-angle photograph of a sailboat's mast and rigging on the left side of the frame, set against a bright blue sky filled with soft, white clouds. The mast is made of light-colored wood and has several ropes and pulleys attached to it. The overall mood is bright and hopeful.

MAKING RIO WORK

10 priorities for
sustainable development
& 10 best practices

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Preface

Much has changed since the Earth Summit in Rio de Janeiro in 1992. Millions of people, mainly in Asia and Latin America, have escaped the poverty trap and now dare to look to the future. Major steps forward have also been achieved in education, health care and women's rights, and more and more companies are joining forces with civil society organisations and research institutions to find ways of making their operations more socially and environmentally responsible.

On the eve of Rio+20, the United Nations Conference on Sustainable Development, which will be held in Rio de Janeiro in June, we must however conclude that more needs to be done to enable the seven billion people who currently populate the Earth – a figure set to grow to ten billion in the near future – to lead a good life without exhausting the planet's natural resources.

One of the most important lessons of Rio has been that sustainable development is a matter of trial and error. Sustainability is a concept that will always continue to evolve, because it is a reflection of our aspirations and the state of our knowledge. There is no absolute measure of sustainability. This can lead to confusion – all the more reason to keep talking to each other about this issue.

The ten Priorities in this publication also show that a sustainable future will require us to constantly reinvent our societies and the way we provide for our needs. Fortunately more and more people, companies and organisations are prepared to move towards sustainable development, as evidenced by the ten best practices featured in this publication.

Both the priorities and the best practices were chosen on the basis of the public consultation we conducted over the past year. We held special meetings for young people, women, companies and researchers. We also received many suggestions via the website (www.nprio2012) and from discussion on social media like Twitter, Facebook and LinkedIn. In selecting the priorities and examples we considered factors like their relevance to the global debate, the potential for scaling them up, the degree of collaboration between those involved and, of course, their potential contribution to sustainable development.

But the debate does not need to end here. On the contrary. We hope that it will now become broader and deeper, because sustainable development requires us above all to think and act together and be willing to learn from each other.

Professor Louise O. Fresco,
chair Netherlands Platform Rio+20

PRIORITIES FOR A SUSTAINABLE FUTURE

Priority 1 Reinvent the economy

- Pay social costs
- Greener taxes
- Develop indicators

Priority 2 Corporate social responsibility

- Financing
- Accountability
- More sustainable production chains

Priority 3 Close cycles

- Biological cycles
- Technological cycles
- 'Biobased' economy

Priority 4 Encourage system innovation

- Enabling environment
- Public or public-private management of public goods

Priority 5 Change routines

Priority 6 Enter into dialogue

Priority 7 Empower people

- Control of environment
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Priority 8 Share and use knowledge

- Give sustainable technology a place
- Share knowledge

Priority 9 Improve health care

- Health insurance
- Guarantee sexual and reproductive rights

Priority 10 Sustainable approach to land, water, energy & mobility

- Environmentally-sound intensification of agriculture
- Multiple land use
- Integrated water management
- More efficient energy consumption
- Promote active transport

PRIORITY



REINVENT THE ECONOMY

Pay social costs

To achieve genuinely sustainable development the economy needs to be reinvented. Integrating negative external effects into economic decision-making will play a crucial role in this transformation process. In other words: the social costs will also have to be paid. In some cases, quotas can be introduced to create scarcities of social goods.

The social costs include not only the environmental burden, exhaustion of natural resources, and loss of biodiversity, but also the negative impact of instant capital, child labour, and the underpayment and exploitation of workers. These things must be reflected in the price of products, on the basis of the 'polluter/user pays principle', thus ensuring a 'genuine' or 'fair' price. Given the impact this will have on the types of goods and services produced, the effect will be to green the economy, thus creating 'green' jobs.

Greener taxes

The internationalisation of external costs can be boosted by greening the tax system. This might take the form of an increase in taxes on environmental pollution, scarce natural resources and energy from fossil fuels, and a simultaneous reduction in taxes on labour. The focus here is on abolishing tax exemptions or implicit subsidies on the use of fossil fuels such as coal.

Greener taxes also have social benefits, particularly in countries that do not yet have a fully developed tax system and are still mainly producers of raw materials. 'Green' tax revenue replaces tax on labour, which is often difficult to collect.

Taxes can also be made greener by introducing differentiated rates of VAT, whereby the greener the product or service, the lower the rate of VAT. Levies on polluting activities have also proved an effective means of steering individuals and companies towards more efficient use of energy and materials, less environmental pollution and technological innovation. The revenue can be used to reward pioneers for their efforts, which often involve a certain degree of risk.

Another option is to tax waste, thus encouraging the recycling of materials. One variation would be to create national or international markets for pollution rights, such as for nitrogen oxides and carbon, in which falling quotas encourage individuals and companies to reduce their emissions.

Develop indicators

At national level, the authorities are developing indicators of Green or Sustainable Gross National Product, taking account of the environmental costs (with a correction for environmental pollution and exhaustion of natural resources). Other indicators reveal social factors, such as income development and distribution. Such indicators show whether a country is developing sustainably and, if so, to what degree. The figures are public.

At the product level, companies and researchers are developing methods of calculating social costs, which can be used to determine the 'true' price and incorporate it into the cost price of the product.

PRIORITY



CORPORATE SOCIAL RESPONSIBILITY

Financing

Exploitation, pollution and the exhaustion of natural resources are all fostered by instant capital in search of ever higher profits. This produces a growing gap between the interests of shareholders (short-term profit) and those of other stakeholders in a company who benefit from continuity and corporate social responsibility. A tax on capital flows could help remedy the situation.

There is also a need for new forms of financing, with those who provide capital stipulating not only economic criteria, but also social and environmental criteria and being prepared to enter into a long-term relationship with a company. Long-term relationships allow companies to focus continuous and consistent attention on sustainability, despite any setbacks they may encounter. New methods such as crowd financing and the tried and tested formula of cooperatives also bring opportunities for corporate social responsibility and sustainable enterprise.

Accountability

Indicators are needed at company level for external or social costs to be identified. Companies can use life cycle analysis (LCA) to calculate the 'ecological footprint' of their products relative to that of others, for example. The price of a product should reflect the total costs throughout its life cycle, including disposal.

Corporate social responsibility also means being accountable to society. One useful tool is the 'annual sustainability report', which includes not only economic but also social and environmental figures (people, planet and profit, together known as 'triple P'), all of which have been audited by an external accountant. Managers are assessed on the basis of these figures.

LCAs and triple P figures also make benchmarking possible, leading to gradually more stringent minimum standards of corporate social responsibility.

More sustainable production chains

The Netherlands is the birthplace of sustainable production chains. Most production chains are international, and involve many actors. Industry plays a key role. Companies can make production chains more sustainable by assuming responsibility for the social effects in them, which is one of the foremost means of introducing corporate social responsibility.

Companies develop criteria in collaboration with civil society organisations. These are put into practice through certification, and monitoring of compliance. Points of intervention exist in all triple P areas. In terms not just of environmental issues, therefore, but also of employment and working conditions, training and trade union facilitation.

Besides fostering transparent, sustainable production chains, private initiatives also need a statutory basis to force laggards to catch up with pioneers, and prevent 'free rider' behaviour. A level playing field is vital to stop certain companies and/or countries from flouting the rules. Steps are being taken here and there to close loopholes, but more is needed: at a national level, in terms of legislation and procurement policies; at international level by promoting transparency and agreeing differentiated import tariffs.

PRIORITY



CLOSE CYCLES

Biological cycles

The finite supply of natural resources makes it imperative that we close resource cycles. This has proved difficult in the case of biological resources, despite their capacity to regenerate. The loss of soil fertility in large areas of the world, undermining their agricultural production capacity, is a particular cause for concern. There is an urgent need for technologies and institutional mechanisms to halt and reverse the loss of soil fertility.

To halt the loss of biodiversity we need ways of assigning an economic value to biological capital, and of factoring that value into financial and policy instruments. At the same time, we also need more, and more reliable, data on species biodiversity, as well as agreements on the free exchange of data and objects.

Technological cycles

Scarcity and the environmental burden caused by mining and other methods of extraction mean we will have to drastically reduce our consumption of primary resources. Besides recycling, we must also focus on reduction (dematerialisation), and the multiple use and redesign of products (known as the 5 Rs: reduce, reuse, recycle, replace and redesign). The energy capacity of materials must also be exploited to the full.

In practice, it has been found that, although there have been many innovative developments in terms of reducing, reusing, recycling, replacing and redesigning, legislation and practical obstacles often stand in the way. A critical review of legislation combined with a tax on waste would foster the safe reuse of materials and products. Many initiatives also fail because of a lack of cradle-to-cradle management. Government authorities and international bodies have a role to play in bringing the various parties together.

Biobased economy

The development of a biobased economy could mean a major boost for the circular economy. Finite fossil fuels would be replaced by green sources (biomass) such as plants and microorganisms, and waste streams from the farming and food industries.

Smart technologies for biorefining are needed to ensure we exploit the full potential of green energy sources. The capacity for their production is after all limited, and it must not displace food production or lead to a loss of biodiversity.

PRIORITY



**ENCOURAGE
SYSTEM
INNOVATION**

Enabling environment

Sustainable development is a transition process that will entail radical technological and social innovation (system innovation). The priority should therefore be to develop new ideas and concepts and to translate them into new goods and services. Industry has a key role to play in this.

An innovational environment allows room for start-ups and growing companies and gives stakeholders a say on new goods and services from an early stage, ensuring that they address major social challenges such as underdevelopment and poverty, demographic ageing and rejuvenation and shortages of energy and natural resources.

Groups that are not naturally inclined to make their views known will require particular attention. The government can contribute to the innovation process by taking account of social and environmental factors in its procurement policy and developing criteria for sustainable procurement, in consultation with industry and civil society.

Public-private partnerships can accelerate and extend sustainable development, in both developed and developing countries. A good business and investment climate is essential in this respect. This involves creating decent work for a decent income and putting in place a social safety net that enables people to survive difficult times. Independent trade unions are an important guarantee of fundamental labour standards. A social dialogue between representative employers' organisations and trade unions helps promote good governance, reconcile incompatible social and economic interests and foster social cohesion.

Public or public-private management of public goods

If shareholder value dictates corporate decision-making, there is a good chance that social and environmental interests will suffer. This can be addressed to some extent through agreements and

legislation. Public goods and services like drinking water supplies and sanitation, waste collection and processing, the electricity network and other utilities, decentralised energy generation and storage, and the management of land registry information, in particular, require a different form of management.

Not-for-profit public companies are a good alternative at local and national level. Sometimes shares will be held by local or regional authorities, as is the case in Dutch drinking water supply companies; sometimes the shareholders will be housing or other associations with primarily social objectives. Public companies have the advantages of company-based production without the disadvantage of shareholder value unduly influencing policy. The public interest is the primary concern.

At international level, it is a matter of managing global public goods, such as biodiversity, the ozone layer, oceans and climate. Good management requires collaboration between and collective action by many parties, including public authorities and other stakeholders. Given the rate at which public goods are being lost, there is a pressing need for new forms of public-private management of these goods, which are our common heritage.

PRIORITY



CHANGE ROUTINES

Consumers (and organisations) act partly on the basis of values and ethics, and partly on the basis of routine. Routine dominates daily life. Our lifestyles and actions, including our choice of particular products, are therefore difficult to change. This explains, for example, why people say one thing as 'citizens' and do another as 'consumers'. The search for ways to break non-sustainable routines therefore deserves priority.

One possibility is to inform consumers 'on the spot' (in the actual or online shop) about the extent to which a product is compatible with certain aspects of sustainability. This can be done using a QR code, for example, which can be read with a smart phone.

Another possibility is to use smart communication and marketing techniques to make the sustainable alternative the most desirable, and to restore the link between sustainability and quality. Role models and attractive examples can help.

In sustainable construction, for example, the transition could be accelerated if designers and clients were aware that the attractiveness of a building is determined not only by its aesthetic and social quality but also by the energy and materials used.

Routines can also be changed by making the shift from ownership to use. If people have to rent a car every time they make a journey, they will be more inclined to consider whether it might be better to go by bike or public transport, because the actual costs become visible, and can therefore be readily compared. In general, renting capital goods – the supplier retaining ownership and the consumer paying for the use of the goods – promotes thinking in terms of cycles, and thus of sustainability.

PRIORITY

ENTER INTO DIALOGUE



Sustainable development benefits from dialogue between various parties, at various levels. The issues discussed can range from defining a course for the coming years (strategic dialogue) to developing specifications for sustainable products (operational dialogue).

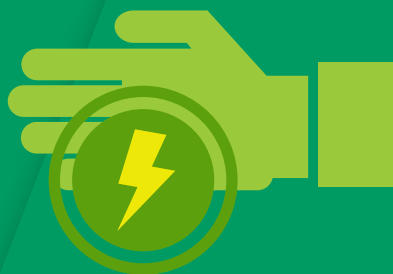
The involvement of strong, independent social partners in efforts to shape sustainable development strengthens support in the long term, ensures better distribution of the benefits and prevents conflict. A social dialogue and an active role for civil-society organisations are therefore essential ingredients of sustainable development.

For a fruitful dialogue stakeholders must not only be involved, but must also receive any help they need in defining and defending their interests. Special attention should be focused on groups that, for whatever reason, are unable to represent their own interests.

It is also important that all parties to the dialogue are aware of their own value and values, and those of other actors. This is the only way to arrive at a common strategy or design, despite differences in ethical standards, values and interests.

PRIORITY

EMPOWER PEOPLE



Control of environment

Social dialogue depends on the degree to which people feel responsible for the environment in which they live (including towards future generations). And they need to have the opportunity to live up to that responsibility. That is why community innovations, giving people control of their immediate environment, should have priority.

One example is city farming, combining management of green spaces with food production. Although it makes only a modest contribution to the food supply (in the order of 5%), city farming does help reconnect people with food production.

Building on this, and thanks to the internet, a new relationship is growing between local and global activities, as well as a shared responsibility for the greater whole. This creates potential for mobilising the knowledge and creativity of the masses to generate ideas for sustainable development, both in and beyond their own immediate environment. Games and social media can be used to develop sustainable goods and services collectively.

Sustainable learning

Sustainable development means learning to deal with uncertainty, and learning from your mistakes. The acquisition of the required knowledge and skills deserves priority. They must be incorporated into staff training, at all levels. Core qualities include:

- appreciating one's own value and values and those of others
- the capacity to think in terms of systems
- the capacity to distinguish between fact, opinion and supposition
- the capacity to learn from mistakes

Some of the required skills and knowledge can be acquired through the mainstream education system, while others will require permanent workplace and professional training and informal learning via the media and other sources. This means education will need to be adapted, incorporating sustainable development into all subjects, for example. It will also require adjustments to corporate culture and a focus on sustainable development in media and marketing.

PRIORITY



SHARE AND USE KNOWLEDGE

Give sustainable technology a place

Twenty years ago technology was seen as part of the problem. Many believed the rapid development of technology was largely responsible for the exhaustion of natural resources and the unequal distribution of wealth. It has since become clear that technological development is at least part of the solution. Scientific research and new technology are essential prerequisites for the development of more efficient ways of using natural resources (solar energy, for example). At the same time, more research and more new technology do not necessarily lead to a more sustainable society. This requires both social embedding and technology that encourages people to adopt sustainable behaviour.

Practice shows that the success of innovations, and therefore also of sustainable innovations, is determined largely by the interaction between research institutions, civil-society organisations, companies and public authorities. Exchange of knowledge and the formation of coalitions (including between North and South) create the conditions required for technological innovations to find a place in society. They create a joint design process, as it were, based on a widely supported programme of requirements.

Share knowledge

Sustainable development is often delayed because the results of scientific research and technological development are not accessible to the organisations and individuals who can benefit from them. This is partly due to the inadequate research infrastructure in some developing countries and the lack of funding. To some extent, accessibility is also hampered by intellectual property rights, which mean that research results may not be used, or only for payment. The first of these obstacles can be removed by making the results of scientific research accessible online either free of charge or for a very small fee. Organisations that fund research can play an important role by stipulating this in their terms and conditions. Collaboration and exchange can help strengthen the research infrastructure in developing countries.

The protection of intellectual property cannot simply be abolished, because it is an important incentive both for researchers and for providers of capital, including risk capital. However, protection currently extends to knowledge that has been acquired in the public domain, using public funds. Given the importance of research and innovation for sustainable development, a new balance must be struck between protection and availability of knowledge, perhaps by obliging companies to issue licences.

PRIORITY



IMPROVE HEALTH CARE

Health insurance

The number of years a person can expect to spend in good health is heavily dependent on their income. The health gap between rich and poor is growing. One way of closing the gap is to prevent infectious disease and diseases of prosperity. Another is to ensure that health care is accessible to all, irrespective of income. Health insurance schemes play an important role, by reimbursing the medical expenses incurred by their members, and by using part of their capital to invest in improving health care. This allows a sustainable healthcare system to be built, which is accessible to people on the lowest incomes.

Guarantee sexual and reproductive rights

Men and women must have the freedom to choose whether, when and with whom they want to have children, and how many they have. Although the UN formally recognises sexual and reproductive rights, it still does too little to protect them. Forty per cent of pregnancies are unplanned, partly as a result of a lack of contraceptives. UNFPA figures show that over 200 million women would like to use family planning if they had access to it.

Sex education for both girls and boys is the first step towards protecting their sexual and reproductive rights, enabling them to make healthy choices. This requires national and regional knowledge centres to train teachers, healthcare workers and others who provide sex education. There is also a need for local centres where anyone can go anonymously for information and contraceptives.

At the same time, women's economic independence must be enhanced by offering them more and better education, tackling discrimination in job recruitment and in the workplace, and by registering property rights. Investing in women and in sexual and reproductive health yields double benefits in the form of greater economic growth and lower population growth.

PRIORITY



SUSTAINABLE APPROACH TO LAND, WATER, ENERGY AND MOBILITY

Environmentally-sound intensification of agriculture

Increasing prosperity and global population growth will cause the demand for food to double over the next few decades. Agriculture will also become a supplier of building materials and components for chemicals. This means that agriculture must be intensified in regions where soil fertility, climate and water supply allow and that measures will also have to be taken to minimise waste, including changes to our consumption patterns.

Agriculture will require radical environmentally-sound modernisation to prevent a disproportionate increase in its environmental burden, including exhaustion of resources and the threat of water shortages. Yields per hectare, per cubic metre of water, per kilo of nutrients, per gram of pesticides and per hour worked must all be raised.

Despite the depopulation of rural areas as cities grow, many millions of people will remain dependent on largely small-scale arable and livestock farming for their income and food supply. Women's pivotal role here still goes largely unacknowledged. Environmentally-friendly modernisation in these circumstances will not only require improved crops and other technical measures appropriate to local conditions and farm size, but also training, financing (including microcredit) and infrastructural improvements.

Multiple land use

Growing cities, new infrastructure, energy generation (mining, dams, windfarms, CSP) and of course the production of food and green resources, are swallowing up more and more farmland. The loss of natural habitats, including large areas of forest, has a negative impact on species and ecosystems, and thus on the life support systems of planet Earth.

Multifunctional use of space is thus needed. The challenge is to combine functions like housing, work, leisure, wildlife habitats, extensive agriculture and water management in such a way as to minimise the negative effects on people, animals and the natural environment.

Integrated water management

Almost a billion people worldwide have no access to safe drinking water, and nearly three billion live without decent sanitation. At the same time, floods are causing more damage, mainly because more and more people are living and working in low-lying delta areas. And we are seeing more damage from drought caused by climate change, as well as the exhaustion of scarce resources. To meet the water needs of people and ecosystems now and in the future, water management must become much more integrated.

Besides technologies that allow us to use water more efficiently, we also need institutional mechanisms with which we can responsibly balance different 'water interests', ranging from water abstraction for industry, households and irrigation, to preventing water pollution and preserving and strengthening wetland ecosystems.

More efficient energy consumption

Paradoxically enough, over the next few decades at least, sustainable development for four-fifths of the world's population will mean rising energy consumption, mainly in the form of unsustainable fossil fuels. Besides research into and development of more efficient energy sources – particularly solar energy – we will also have to continue investing in methods and technologies to minimise the impact of burning oil, gas and coal, preferably by making the process more efficient.

Promote active transport

Transporting people and goods places great demands on energy reserves and other resources. More freight could be transported by ship, even perishable cargoes like food. When it comes to transporting people, active transport (walking and, above all, cycling) should be given priority. This is not only good for the environment and the climate, but also for health. A leap to half of all journeys on foot or by bike should be possible, certainly in flat, densely-populated areas. This will not only require infrastructure that allows people to walk and cycle safely, but also spatial and economic policies that promote active transport.

BEST PRACTICES

- 1 New sanitation in Sneek
- 2 Groasis: Collecting water in the desert
- 3 Liberty: Fuel from plant waste
- 4 ICSR: International Corporate Social Responsibility
- 5 Energy from Greenhouses
- 6 Pharmaccess: Affordable care thanks to sustainable finance
- 7 Floating Pavilion: Building on water
- 8 Overdiepse polder: Room for the river
- 9 Cleaner laundry: Saving energy and water
- 10 Zeeland sole council: Farming in a salty cycle



BEST PRACTICE 1

NEW SANITATION IN SNEEK

Domestic wastewater in the Netherlands is extremely diluted and is carried away by the sewerage system to a treatment plant where it is purified. The sludge that remains is burnt in a kiln and the ashes are disposed of in landfill. According to Dutch water engineers, the whole process could be made much more efficient. Just how can be seen in the Frisian town of Sneek.

In the Noorderhoek district nearly 300 derelict houses are being replaced by 250 new homes. The first 60 apartments are already finished. There is no obvious difference from a normal home, except when it comes to the bathrooms, which have special water-saving toilets. The bowl is made of normal porcelain, but when you flush you hear a loud 'SWOOSH' similar to that of a toilet on board a plane. The flush uses only one litre of water instead of the usual six, no matter what you're flushing away. Another difference is the kitchen sink, which has a waste disposal unit. These are commonplace in America, but rare in the Netherlands. They allow you to dispose of all your kitchen waste down the sink and wash it away with a bit of water. The waste disposal unit grinds it so finely that it passes easily down the drainage pipe.

The water from the toilet and the ground up kitchen waste go to a central plant in the neighbourhood. This 'black water' is fermented, bacteria converting the organic material to biogas. The water that leaves the fermentation unit then has all phosphate, nitrogen and micropollutants (including the remains of medicines) removed, so that the clean water can be drained into surface waters without any problem. The sludge that remains after fermentation could be used as artificial fertiliser, though this would require a change in the law. Work on new legislation is underway.

Besides 'black' water, a household also produces 'grey' wastewater from showers and washing machines. In Sneek this goes via a separate pipe to a local activated sludge treatment unit. This produces large amounts of extra sludge, which is mixed with the toilet water and ground kitchen waste. After all pollutants have been removed from the grey water, the heat is extracted from it. The

biogas from black water is used to produce hot water. The heat generated in the process is combined with that from the grey water and used to heat local homes.

Thanks to this new sanitation system, households are able to cut their water consumption by a quarter to a half. The underground heat storage system keeps their homes cool in summer and warm in winter. Heating costs are 25% lower than in normal homes.

Energy factory

Wastewater contains much more energy than is needed to purify it. Water authorities are developing all kinds of techniques to convert traditional wastewater treatment plants into suppliers of energy and raw materials. These techniques range from biogas production from sewage sludge to the use of urine to produce electricity and artificial fertiliser (phosphate).



BEST PRACTICE 2

GROASIS: COLLECTING WATER IN THE DESERT

Pieter Hoff of Steenberghe has a dream. He wants to plant two million square kilometres of forest – an area the size of Mexico. This is the area of forest that man has cleared so far. Hoff used to be a gardener, but for the past ten years he has been working to make this dream come true. And it looks like he's about to pull it off. His Groasis waterboxx is already being used in hundreds of places all over the world.

Water Pyramid

Aqua Aero WaterSystems has developed a 'Water Pyramid' for producing pure drinking water in remote areas. The heat of the sun is used to evaporate dirty or saline water in an inflatable plastic tent. Water vapour condenses on the inside of the tent and is collected in a gully at the bottom. The outside of the tent can be used to harvest rainwater. The tent can collect 600 cubic metres of condensed water and rainwater a year, or just under 2000 litres a day.

The Groasis waterboxx is a simple round box with a ribbed lid. In the middle is a hole in which a seed can germinate and grow. It might grow into a tree, or a tomato plant, an aubergine or melon. The box is made of plastic and can be reused ten times to plant ten trees over a period of ten years. There is also a paper version that can be used once and is then converted to nutrients by microbes in the soil. In dry areas the days are often hot and the nights cold. Water vapour condenses on the lid of the Groasis waterboxx and drips into a container, keeping it topped up. From the container the water runs via a thread into the soil to provide the germinating seed and later the young plant with enough moisture.

The Groasis waterboxx serves several purposes. It has been used in California to restore the original vegetation in a nature reserve. Further to the south, in the Baja California Desert, it is being used to cultivate nut and fruit trees. In dry northern Kenya, the Groasis waterboxx is used to grow trees whose leaves and seed pods are used as food for goats, and whose wood is used to produce charcoal or to build homes. And in Ecuador it is used not only for fruit trees, but also for growing produce such as tomatoes, aubergines and melons which provide farmers with some income while they wait for the fruit trees to bear fruit and earn money.

A clever invention is not a solution in itself. So Hoff developed a more comprehensive approach (Groasis) which focuses not only on soil fertility, water regimes and the right choice of trees and plants, but also on social and economic factors so that the Groasis waterboxx becomes a feature of the local community.



BEST PRACTICE 3

LIBERTY: FUEL FROM PLANT WASTE

Dutch multinational DSM has developed a technology for converting waste and inedible parts of plants into biofuel. It has joined forces with American firm POET and is building a plant in Emmetsburg in the US state of Iowa to produce these 'advanced biofuels'.

The use of bio-ethanol to power cars is controversial because so far the ethanol has been made from sugar and starch, which are also important nutrients for people and animals. Any competition between fuel and food could have a negative impact on people in developing countries, in particular, as it drives up food prices. POET-DSM's Project Liberty will therefore mainly use the waste left behind after the maize harvest – cobs, leaves, stalks and so on – as the feedstock for bio-ethanol. However, it will use only a quarter of what remains in the field after the harvest. The rest will be left in order to prevent erosion and maintain soil fertility.

After arrival at the plant, the feedstock will be finely chopped and simmered for a while in sulphuric acid solution, causing the ligno-cellulose, which gives the plant its rigidity, to disintegrate into long chains of sugar molecules (polymers). Enzymes will then break these long chains of cellulose and hemi-cellulose into their building blocks – sugar molecules. These will then be converted to alcohol using baker's yeast. However, inedible parts of plants consist largely of sugars that baker's yeast cannot normally digest.

In collaboration with TU Delft and other partners, DSM recently succeeded in genetically engineering a yeast that digests not only ordinary sugars, but also 'C-5' sugars. The genetically engineered yeast contains a genetic property of a certain fungus. In its search for the fungus with this special property, DSM conducted a wide-ranging study of nature's toolkit, including the microorganisms in elephant droppings.

Thanks to the specially engineered yeast, it is now technically possible and economically viable to convert inedible parts of plants into bio-ethanol. The bio-ethanol plant currently being built in Iowa will eventually produce 100 million litres a year. But this is just the first step. In ten years' time, demand for bio-ethanol is set to reach

60 billion litres a year in the United States alone. DSM believes that, by that time, bio-ethanol from inedible plant parts will be cheaper than normal petrol. This will also be good for the climate in the sense that – taking the entire production chain into account – its greenhouse gas emissions are 111% lower than those of petrol, because the process actually leads to net consumption of greenhouse gases.



BEST PRACTICE 4

ICSR: INTERNATIONAL CORPORATE SOCIAL RESPONSIBILITY

'A world to be won' was the subtitle of the Social and Economic Council of the Netherlands' advisory report on sustainable globalisation, published four years ago. One way of bringing about sustainable globalisation would be to call upon the corporate social responsibility of international companies, it said. Now, four years later, international corporate social responsibility (ICSR) has almost become commonplace.

The Council's report prompted a declaration by employers' organisations and trade unions to the effect that international corporate social responsibility must be encouraged at all levels. The declaration also called upon all companies and sectors not simply to leave it at fine-sounding words, but to take genuine action. And they have. In 2010 the employers' organisations published a pamphlet presenting their vision of sustainable growth and jobs, including ICSR with a focus on the three Ps: people, planet and profit.

Trade unions seized the opportunity to put ICSR on the agenda in their talks on terms and conditions. They also collaborated with civil society organisations to inform consumers about banks' investment policies, and about where clothes are made. The international trade union movement has also become more actively concerned with outsourcing and flexibilisation among suppliers in developing countries.

In recent years, an encouraging number of CSR and sustainable development initiatives have been introduced at sector level, ranging from the Sustainable Palm Oil Task Force to the Dutch Sustainable Coal Dialogue, and from the Fair Wear Foundation (for sustainably produced clothing) to the WeCycle initiative for the collection and responsible disposal of consumer durables.

Dutch companies and organisations have been putting up a good show internationally, too. The Dutch network of Global Compact, a global organisation that promotes human rights, better working conditions, environmental protection and protection from corruption,

has around 70 member companies. Dutch companies lead the field when it comes to sustainability policy and reporting, as evidenced by their position in the Dow Jones Sustainability Index.

Corporate social responsibility is part of a global trend. We already have guidelines, such as those drawn up by the OECD for multinational companies; we have standards, such as ISO 26000 for corporate social responsibility; and from the United Nations we have Ruggie's Guiding Principles on Business and Human Rights (Protect, Respect, Remedy).

The SER's ICSR project shows the added value of dialogue in working out the details of international corporate social responsibility. Things are progressing slowly, but the Netherlands did not create its great polders overnight. Now that the ICSR project is coming to an end it is becoming clear that the supertanker of the consensus economy is irreversibly heading towards sustainable development.



BEST PRACTICE 5

ENERGY FROM GREENHOUSES

The cultivation of flowers and vegetables in greenhouses takes a lot of energy (which currently still comes from fossil fuels), particularly for heating in winter. At the same time, all those greenhouses together form a 10,000-hectare bed of solar collectors, which capture much more heat from the sun than the plants actually need.

In summer, the windows often have to be opened wide to let out the excess heat. Dutch horticulturalists felt this was a shame, as it effectively meant throwing away huge sums of money. Some ten years ago, they got together with universities and research institutions to find a way of using sunlight (which is free of charge) to more effect.

The sector has undertaken to improve energy efficiency in greenhouse horticulture by 2% a year, mainly through energy conservation and the use of sustainable resources. From 2020, new greenhouses must have zero net fossil fuel consumption. These agreements with the government have led to a wave of innovation in the sector, with researchers, horticulturalists and their suppliers working together to achieve the targets. They are looking at each part of the greenhouse, starting with the glass.

The glass for tomorrow's greenhouses is a high-tech product which looks like normal glass only from a distance. The Venlow Energy Greenhouse has a double-glazed roof with two three-millimetre panes, which makes it a good insulator. Normally, thicker glass lets less light through – which is why horticulturalists are not keen on it – but this special glass does not reduce the amount of light entering the greenhouse. It does however cut its energy needs, allowing an autumn crop of cucumbers to be grown using 70% less energy, for example.

Sunlight consists of roughly 50% light that plants use to grow – known as photosynthetic active radiation, or PAR – and 50% heat (near infrared radiation, or NIR). Researchers at Wageningen University have developed a glass that can separate these two light sources.

In the ELKAS the sunlight is captured by special foil suspended like hollow mirrors, which reflects only the NIR. The PAR passes through the film to the plant, which uses it to grow. The heat is reflected and focused on a thermophotovoltaic cell (TPV), which converts it to electricity.

Another new development is the Fresnel greenhouse. Using special lenses of the same type used in lighthouses (Fresnel lenses) direct sunlight is diverted to a solar cell that immediately converts it into electricity. Only the diffuse sunlight reaches the plants. Potted plants fare particularly well in the absence of direct sunlight.

The latest innovations not only involve the glass in greenhouses. Some horticulturalists use heat exchangers to heat groundwater on hot summer days and store it underground to use for heating in winter. Some also use geothermal energy to heat their greenhouses.

Technology is important, but the change in attitude in the horticultural sector is even more so. Horticulturalists are now no longer concerned only with the harvest from their crop, but also with harvesting sunlight.



BEST PRACTICE 6

PHARMACCESS: AFFORDABLE CARE THANKS TO SUSTAINABLE FINANCE

Every year tens of millions of households fall into poverty because they face huge and often unexpected bills for medical care. PharmAccess Foundation of Amsterdam has developed an innovative approach to make medical care accessible to people in low and middle income groups in Africa, while at the same time improving the quality of care.

It's a vicious circle. The vast majority of Africans have no health insurance. If they fall ill or have an accident, they have to pay all their medical costs themselves. Every year more than 50 million households face huge bills for medical care, causing more than half of them to fall even deeper into poverty.

At the same time, little is invested in private health care because doctors, midwives and hospitals have insufficient regular income to be able to borrow on the capital markets. But they desperately need money to continue providing care. Though governments and foreign donors do put money into public health care, demand still far outstrips supply.

PharmAccess and a number of partner organisations have developed a mechanism to break this vicious circle. It does so by fostering both demand for and supply of care.

The Health Insurance Fund provides insurance to give people access to affordable care. People on a low income, such as market traders, smallholders and small entrepreneurs, pay a low monthly premium for a broad basic package of healthcare services. The Health Insurance Fund supplements the premium.

The Medical Credit Fund ensures that clinics and hospitals are able to improve the quality of their care by providing small loans combined with extensive training. Clinic owners also receive training to improve their entrepreneurial skills and ensure they meet the criteria for loans from private capital providers. The loans come from local banks, and are guaranteed by the Medical Credit Fund.

The SafeCare Foundation has developed internationally recognised care standards for small clinics in Africa. Using a detailed, step-by-step plan, the clinics can improve their services and gain recognition as providers of safe, good-quality patient care. Finally, the Investment Fund for Health in Africa invests in healthcare enterprises such as insurance companies, drug distribution companies and pharmacists, so that they too can improve and expand their services. This is one of just a few organisations in the world that provide capital for such organisations with the aim of improving the healthcare infrastructure.

PharmAccess's innovative approach of involving the private sector is receiving growing support from the Dutch Ministry of Foreign Affairs, African governments, the World Bank and USAID, companies like Heineken and Shell, and from the Rockefeller Foundation and a number of private investors. They are all active in Sub-Saharan Africa, and are hopeful of success in their efforts to break the vicious circle in health care.



BEST PRACTICE 7

FLOATING PAVILION: BUILDING ON WATER

Three huge half-domes float on the water in Rotterdam's Rijnhaven. They are the 'Floating Pavilion', housing the National Water Centre's showroom. They are also a symbol of the Netherlands' ambitions to build on water.

Living on water is nothing new, as evidenced by the many houseboats on the Netherlands' canals. But building on water was given a renewed sense of urgency by the flooding in the country's major rivers in the mid-1990s and the threat of sea-level rise. The serious shortage of space in the Randstad conurbation has also prompted interest in water as a new building location.

Many different parties will have to work together on this new development. There must, for example, be agreement on the legal status of floating buildings. If they were to be regarded as houseboats, they would pay only modest annual mooring fees, but they could also lose their mooring. They have, therefore, been given the status of 'built structures', which offers more security, but also means that future owners will have to buy a 'water plot'. And ownership of a water plot raises a whole range of other questions about rights and obligations.

Living on the water also has to be safe. A 'wet' residential area must be accessible for the emergency services, for example. The homes themselves must be stable so that they do not rock in high winds, or if a large ship passes by. The safe supply of drinking water, gas and electricity and sewage disposal will also require solid agreements. The Dutch Standards Institute has therefore published a 'technical agreement' (NTA) on building on water.

Legislation and agreements have laid the virtual foundations for floating buildings. Construction company Dura Vermeer has developed physical foundations that are strong enough to hold the weight of a multi-storey building. Flexbase consists of large blocks of expanded polystyrene in concrete formwork covered with a sheet of concrete, which floats in the water like an inverted box.

Over the past few years FlexBase has been used to provide floating foundations for a prototype greenhouse and as the basis for a special island that provides a breeding sanctuary for birds in the Maasvlakte industrial area. The Floating Pavilion in Rotterdam's Rijnhaven also floats on this combination of polystyrene and concrete. Preparations are currently underway for a range of other projects, including a 4.5-hectare floating rose greenhouse (known as 'Floating Roses') in Lansingerland, a 500-home residential area in Roermond, and a floating resort in the Maldives. All these projects combine water storage and various urban functions, with the added benefit that users will keep their feet dry when the waters rise.



BEST PRACTICE 8

OVERDIEPSE POLDER: ROOM FOR THE RIVER

Over the next century, the Netherlands' rivers will have to carry more and more water from upstream. To give them the space to do so, flood storage areas are being created in a number of places. When water levels are excessively high, they will be allowed to flood, enabling people upstream to keep their feet dry.

One of these flood storage areas is Overdiepse Polder in northwest Brabant, which is largely an arable farming region. To the north, it is bordered by the Bergse Maas river, and to the south by the Oud Maasje. At an information evening in 2001 farmers were shown a map on which their polder had been shaded blue, and told they would have to move away. Most of them were not happy with this idea. So they got together and developed an alternative plan. Instead of moving away to make way for the water, they proposed that dwelling mounds (or terps) be constructed for their homes and farm buildings. At times of extremely high water levels in the rivers – which happens once every 25 years on average – the polder would be allowed to flood, and they would stay dry on their terps.

Roman officer Pliny the Elder wrote about the Frisians in 47 BC, living in an area where inland waters could barely be distinguished from the sea. 'There, those poor people inhabit high mounds or dams which they have built with their own hands. In their huts they are like sailors when the water covers the surrounding land, and like shipwrecked persons when the waters recede. 'Pliny was not terribly impressed. 'Fate lets many people live simply to suffer hardship,' he concluded.

But in Overdiepse Polder, living on the terps will certainly be no hardship. Eight are to be created up to 2015, each one measuring more than two hectares. They will all be located by the dike along the river Oud Maasje. The dike is to be raised to protect the land behind, and also to ensure that the farms remain accessible by road when the polder is under water.

On the northern edge of the polder the dike is to be lowered, so it can overflow when water levels are extremely high. This overspill will allow the water level to be kept 30 centimetres lower than would

otherwise be possible. The effects will be felt as far away as Den Bosch, almost 30 kilometres upstream.

The terps in Overdiepse Polder are part of the Room for the Rivers programme, a new way of protecting people and property from flooding. Instead of building the dikes higher and higher, the rivers will be given more space to drain the water away. Dikes on the landward side will be moved, water meadows will be excavated to enlarge the winter riverbed, while the summer riverbed will be deepened. Lowering the dikes will also give the rivers more room.



BEST PRACTICE 9

CLEANER LAUNDRY: SAVING ENERGY AND WATER

More than three-quarters of the environmental burden from detergents is caused by their use in doing the laundry – whether by hand or machine. Anglo-Dutch multinational Unilever has developed a detergent that can be used at lower temperatures, and takes less rinsing water. This not only saves water and energy, but in the case of hand washing it also saves labour.

Every year, Unilever products are used to wash 125 billion loads of laundry, both large and small. If we look at the entire chain from raw materials to clean laundry, three-quarters of all greenhouse gas emissions are emitted by the end user: the consumer. When it comes to water consumption, the figure is as high as 95%.

Unilever has developed a fabric conditioner that removes the suds quickly so the wash requires only one rinse. This is ideal for regions that face water shortages, as it saves two of the three buckets of water needed to rinse a hand wash.

For India, this meant a saving of 14 million cubic metres of water last year. In Vietnam, where the product has also been launched, the saving was 1 million cubic metres. Another benefit is the reduction in time and energy achieved by only having to rinse the laundry once, rather than the usual three times.

In Western Europe and other regions where water for washing is not in short supply (yet), and consumers generally wash by machine, the focus is on energy saving. This has given rise to the concentrated washing detergents that are marketed under various names. The environmental benefit of these concentrated detergents lies in the fact that the temperature of the water used – for white, coloured or delicate washes – can be reduced by at least ten degrees. Furthermore, because they are so concentrated, they require less packaging material and less fuel to transport, and that helps reduce energy consumption too.

The new detergents can by no means be called 'green washing'. As part of its sustainability strategy, it is Unilever's ambition to halve the environmental impact of its products by 2020 relative to 2008. In 2009 the company embarked on a life-cycle analysis of 1600 products, focusing on greenhouse gas emissions, water consumption and waste. It then systematically explored the best and worst case scenarios for reduction, eventually coming up with environmental action plans. All the Unilever divisions' plans together should achieve the target of halving the company's environmental impact.

Technological innovation plays a key role, but persuading consumers to change their routines is at least as important. The key thing is to find the 'sweet spot' at which customers are convinced, where both they and the environment benefit. Where they decide not to use two caps full 'because it doesn't seem like much', but one because it saves money, is better for the environment and does what it should – gets the laundry clean.



BEST PRACTICE 10

ZEELAND SOLE COUNCIL: FARMING IN A SALTY CYCLE

More than half the world's population lives in low-lying coastal areas and river deltas where – by no coincidence – the soil is most fertile. Subsidence and rising sea level are however causing that fertile ground to become more and more saline. So entrepreneurs, researchers and the authorities have joined forces to form the Zeeland Sole Council, an integrated trial farm in a saline environment.

The people behind the Zeeland Sole Council got a pleasant surprise in spring 2011. After a rather dramatic winter during which many fish died of the cold, they found large numbers of young sole in their ponds. The sole had spontaneously reproduced in captivity.

It is barely possible to overstate the importance of this discovery. Because sole reproduces in captivity, it can be domesticated. Selection of the fastest growers will allow production to gradually increase, providing access to a viable source of protein near to a densely populated area.

Sole is only one of the products of this trial farm. The cycle begins with algae that convert sunlight and CO₂ into food for ragworm, which are popular with anglers. The algae also provide food for shellfish like oysters, mussels and common periwinkles. The ragworms provide food for the sole, and the fish produce manure that can be used to feed the algae. Saline plants like marsh samphire and sea aster, which have long been harvested in the Netherlands' delta region, also benefit from the fish manure.

Zeeland Sole Council is not the only initiative to take a creative and productive approach to the salinisation of the delta. Further up the Eastern Scheldt, at Schelphoek, there are underwater fields of kelp, a rapidly growing plant that can grow several metres high.

Kelp is also edible. It is a rich source of protein, vitamins and carbohydrates, as well as being an important natural resource for the food industry, providing ingredients for margarine and toothpaste. It is also interesting for the chemical industry, and can be used in the production of plastics, for example.

Both Zeeland Sole Council's algae and Schelphoek's kelp do well in coastal waters, which are rich in nutrients like phosphate and nitrogen. There is indeed an excess of these nutrients, because large amounts run off the land. Their ability to fix CO₂ dissolved in the water also means they help curb the gradual acidification of the seas and oceans.

All told, farming at sea offers good prospects. It not only provides healthy food for nearby urban areas, if it is properly set up and conducted it can also help maintain marine and coastal ecosystems. No wonder the idea of farming in a salty cycle is attracting a lot of interest from the world's delta regions.

COLOPHON

'Making Rio Work' (May 2012) is a publication of the Netherlands Platform Rio+20 (www.nprio2012.nl)



Editorial team

Machtelijn Brummel (NL Agency)
Hans Buskes (Communicabus)
Joost van Kasteren (Mediaproducties)
Alide Roerink (NCDO)
Ton van der Wijst (Social and Economic Council of the Netherlands)

Text

Joost van Kasteren

Translation

Liz Vos (Ministry of Foreign Affairs)

Design

Smidswater

Print

SER-printing office

Photos

Cover Joost van Kasteren **Best practices** **1** Desah, **2** Groasis, **3** DSM, **4** SER, **5** WUR, **6** Pharmaccess, **7** City of Rotterdam, **8** Rijkswaterstaat, **9** Joost van Kasteren, **10** Zeeland Sole Council.

