Unilever & Sustainable Agriculture

Water

Unilever

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Acknowledgements

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Design A10plus, Rotterdam, www.a10plus.nl
Photos All the photos are the property of Unilever & the Sustainable Agriculture Team

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Water

Unilever at a glance

As one of the world's leading consumer goods companies with a strong portfolio of trusted brands, Unilever's mission is to add vitality to life by meeting the everyday needs of people for nutrition, hygiene and personal care.

Consumers are increasingly seeking out products with a positive social or environmental benefit, or avoiding those perceived as having a negative impact. Our ultimate goal is to buy all our agricultural raw materials from sustainable sources, and this includes careful management of water availability and quality.

The impacts we have on the world come largely through our brands, and this is why we are embedding sustainability thinking into day-to-day activities via the Brand Imprint process. This prompts our brand teams to analyse how social, economic, and environmental issues present risks and opportunities for our business.

For over a decade, Unilever's Sustainable Agriculture Programme has worked with the suppliers and farmers who produce our agricultural raw materials to become more sustainable.

This booklet outlines our activities and programmes aimed at the responsible use and management of water in agriculture.

Content

Water use and scarcity

Water is essential for the survival of all forms of life. The UN recommends a minimum of 50 litres of water per person per day to drink, wash and cook.

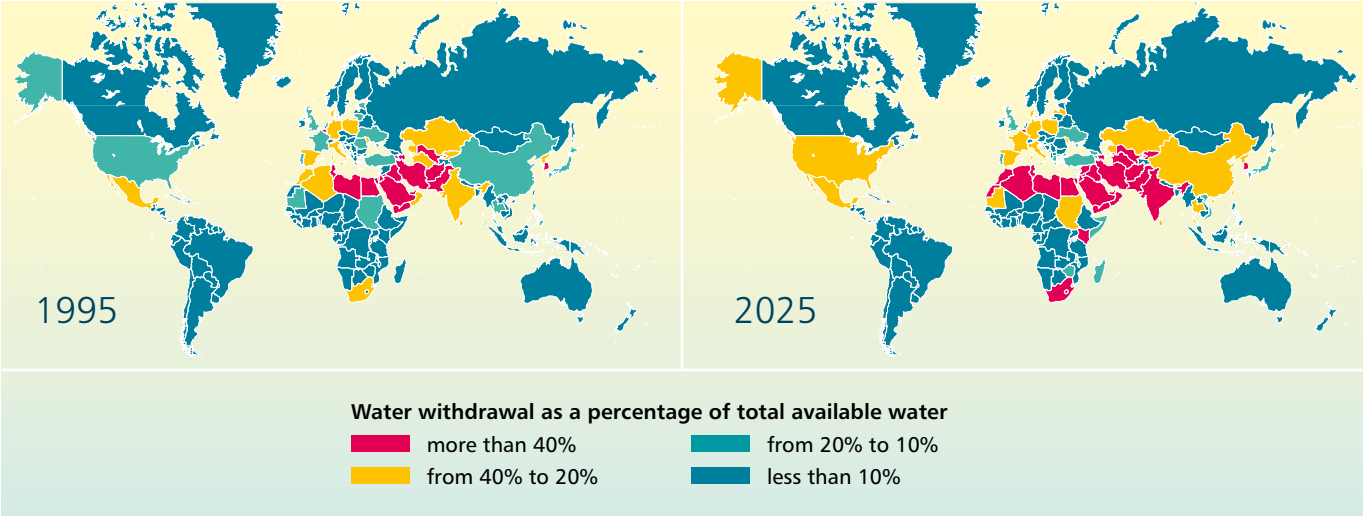
Water is also used in agriculture for growing crops, providing drinking water and feed for animals, and for cleaning animal housing. Agriculture is the largest user of the world's freshwater in most countries, accounting for 70% of total world consumption.

Farming also affects water quality. While fertilisers improve crop growth, and pesticides and medicines protect crops and livestock, these chemicals often enter groundwater or watercourses, damaging aquatic ecosystems. The need for better water management is becoming increasingly urgent.

Freshwater scarcity

Only around 3% of the world's water is freshwater and only 1% is readily available for use. Distribution does not match population, leaving many areas of water scarcity that are home to large numbers of people. These include the Middle East, North Africa, Mexico, Pakistan, South Africa and large parts of China and India.

Around a third of countries are already defined by the UN as 'water-stressed' and this is predicted to rise strongly by 2025. An area is 'water stressed' if more than 40% of total available water is withdrawn for human use.



EIGER map of global water scarcity.

Source: UNEP (2008), Vital Water Graphics - An Overview of the State of the World's Fresh and Marine Waters. 2nd Edition. UNEP, Nairobi, Kenya. ISBN: 92-807-2236-0

Threats to water supplies and agriculture

There is already unprecedented pressure on the world's water resources due to:

- increasing demand from a growing global population
- increasing standards of living (rising per capita water consumption)
- changing supply due to climate change and changing weather patterns.

For Unilever, this means that using sustainable agricultural practices will be vital in securing sufficient water for future food production (see page 9).

Growing population and rising standards of living

Over the past century the world's population has tripled and water use per person has doubled. Global population will continue to rise from 6.7 billion to nearly 9 billion by 2050.

In addition, people's diets are becoming richer and more varied: they are consuming more fruits, vegetables, sugar and livestock products, which are more water intensive than most staples. It takes 15,000 litres of water to produce 1kg of beef, compared with just 1,500 litres for 1kg of corn. This change means that even if population growth was to stop completely, demand for food and water would still rise.

The Aral sea which lies between Kazakhstan and Uzbekistan has been steadily shrinking since the 1960s, mostly due to increasing population and heavy agricultural use.

Climate change

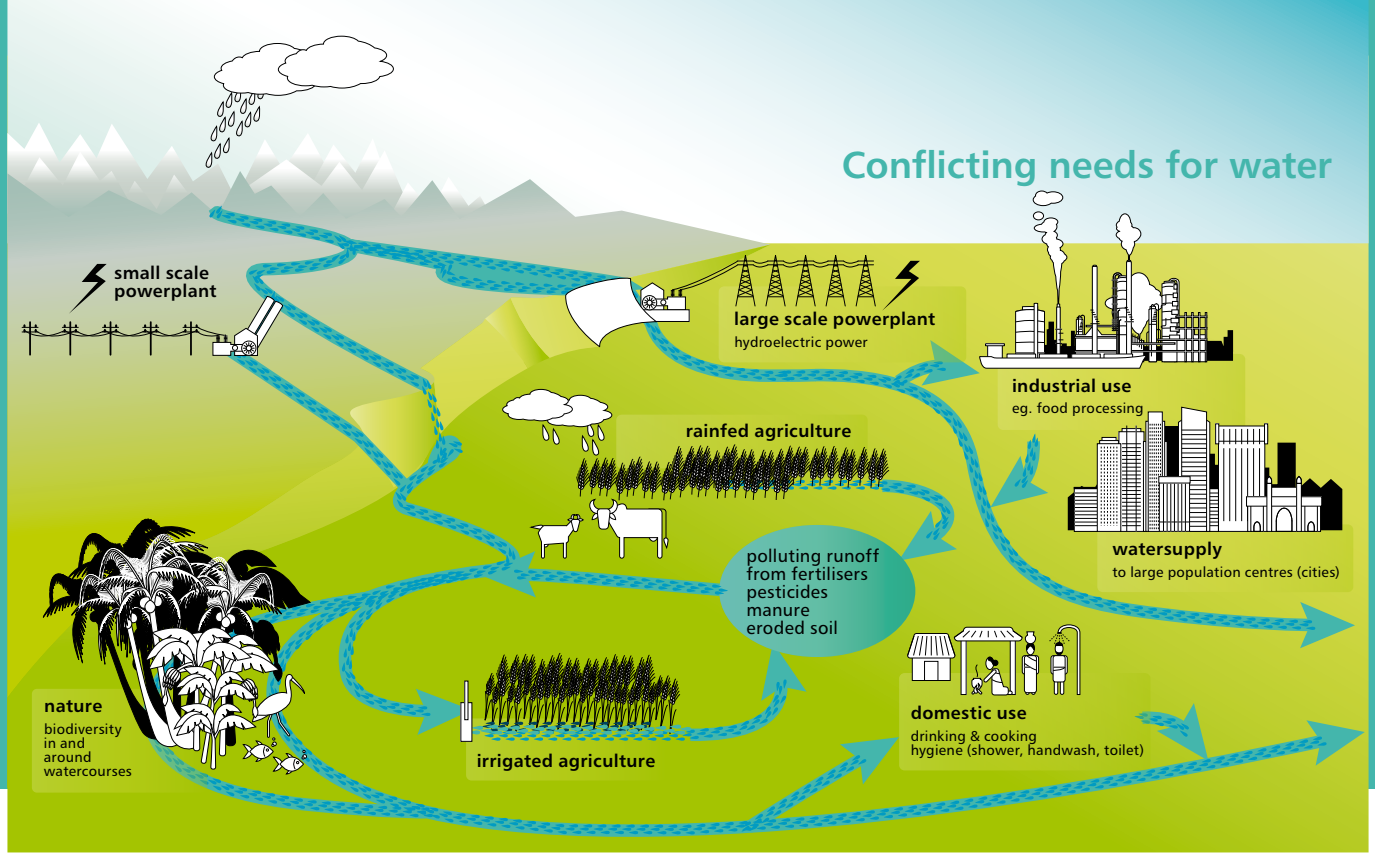
Rainfall patterns are expected to change. According to the UN's Intergovernmental Panel on Climate Change (IPCC), by 2050, the area of land subject to increasing water stress due to climate change is projected to be more than double that with decreasing water stress[1]. Rainfall will concentrate to

1 SOURCE: Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds., 2008: Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, ISBN: 978-92-9169-123-4.

According to the OECD, 44% of the world's population lives in areas of high water stress. A quarter of India's harvest alone could be at risk by 2025 as groundwater is depleted beyond recovery.

fewer but more intense events in many parts of the world, increasing the risk of flooding and drought. Droughts will be more severe, especially in many subtropical and arid areas. In some countries in Africa, yields from rain-fed agriculture could be reduced by up to 50% by 2020.

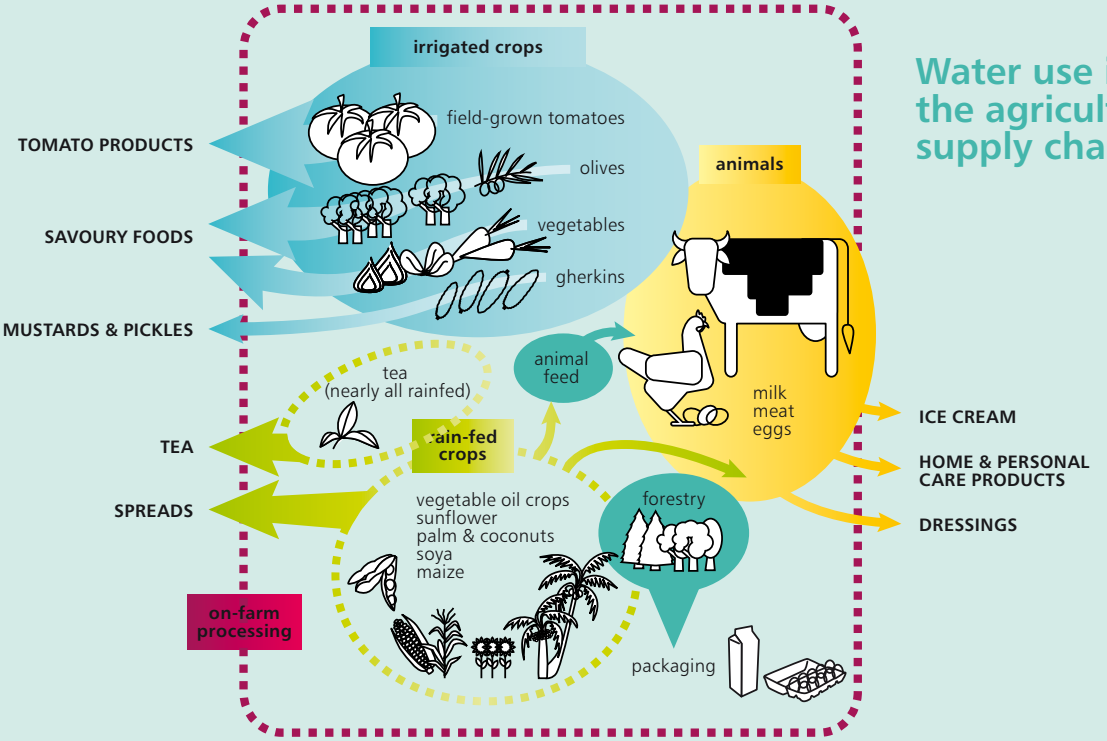
Drought is likely to lead to higher irrigation water use, as well as an expansion to previously rain-fed areas, demanding investment and expertise. Better water management is essential to maintain supplies and help our growers cope with more erratic rainfall.



Conflict over water resources typically arises between two (or more) parties that depend on the same catchment area (see accompanying diagram).

If demand exceeds supply, prices rise and some users may be denied access to water as a result. The impact on businesses also means that prices rise for consumers.

Water use in the agricultural supply chain



There are three main areas of impact: the use of high volumes of water for irrigation and in animal husbandry, and the effects of farming activities and on-farm processing on water quality.

Implications for Unilever

Two-thirds of Unilever's raw materials come from agriculture. We use a significant share of world crops, including around 12% of black tea, 7% of processed tomatoes and 4% of palm oil.

For Unilever's food products, the majority of water use is upstream in the growing of agricultural raw materials. We also use water in the factories that process agricultural products and manufacture our products, and our consumers use water in the preparation and consumption of both food and home and personal care products.

Unilever's future success will rely on the ability of many of the farmers that supply us to produce agricultural raw materials with higher water efficiency. Scarcity strengthens the business case for water efficiency just as rising oil prices mean companies need to become more energy-efficient. Leading investment bank Goldman Sachs has described water as 'petroleum for the next century' and says its value has been underestimated for years.

Water in the lifecycle of Unilever products

In 1998 we estimated that irrigation accounted for around 90% of the water used throughout the lifecycle of Unilever food products. Although our portfolio of products has changed since then, irrigation still accounts for the vast majority of our products' water use. Unilever is a partner in the Water Footprint Network (www.waterfootprint.org), and will be developing methods, guidelines and criteria with other partners in order to adopting a standard 'water footprint' tool for reporting water use in the future.

Water Footprint

What we do about it: sustainable water use at Unilever

Our approach to water sustainability

Unilever is committed to using water responsibly and sustainably.

As well as longstanding programmes to reduce our direct water use in manufacturing, we also work with others in the supply chain to reduce our indirect impacts.

Many of our Home and Personal Care products, for example, help consumers reduce their water consumption through innovations in their design and formulation. For most Food products, however, the greatest water use occurs in production of the raw materials.

Water management therefore forms a key part of our sustainable agriculture programme. As we aspire to obtain all agricultural raw materials from sustainable sources we ask our suppliers to conform either to our internal standards (Unilever Good Agricultural Practices or GAPs) or to externally-audited standards (eg. Rainforest Alliance for tea). While the programme started with our most important raw materials it is gradually expanding to cover the entire portfolio.

Unilever GAPs

Our Good Agricultural Practices for water require:

- optimal irrigation practices
- soil organic matter management
- erosion prevention
- fertiliser and manure management
- integrated pest management
- catchment conservation and land management
- clean drinking water and sanitation provision for workers.

The major Unilever crops that require irrigation are vegetables and tomatoes. The farms that produce milk for our ice cream are also heavy users of water.

Most conventional commodities we use in high volumes (e.g. maize, soya, palm and other vegetable oils) are rainfed and the water-management issues are more to do with limiting the negative impacts of agriculture on water quality.

Through partnering with certification schemes, Unilever has committed, by 2015 to using only RSPO-certified palm oil and only Rainforest Alliance-certified tea in its Lipton tea bags.

In California we are working in a multi-stakeholder collaboration with other processors to measure and benchmark growers' irrigation water usage on tomato crops. In parallel the group is developing a training programme for farm workers to recognise their skills and ensure consistency in the principles of good irrigation. The partnership is represented by UC Extension, UCDavis, the California Tomato Research Institute, our growers, the resource conservation districts and the USDA.

Supplier training session, California

Our tomato growers check for quality and growing conditions against our GAPs.

How we implement change with suppliers and other partners

Where we have direct relationships with farmers (as with most of our vegetables) we ask for our Good Agricultural Practices to be adopted. Farmers then provide data and updates on how they are progressing and where there are specific difficulties with GAP implementation in order for joint action plans to be developed.

When we do not have such direct relationships, we work in partnership with our suppliers to try to make changes in the supply base.

Unilever also participates in partnerships that aim to address the global water crisis such as the World Business Council on Sustainable Development, which helps companies identify and minimise their water impacts (www.wbcsd.org) and the cross-industry Sustainable Agriculture Initiative Platform (www.saiplatform.org).

For commodities such as palm oil and soy, where Unilever businesses are major buyers on the world market, we work as part of multi-stakeholder groups to develop the Good Practice Codes needed to form the basis for any sustainability certification system.

Pivot irrigation for tomatoes.

Water requirements for growers (Unilever Good Practices)

Our growers must use sufficient water to produce the desired yield and nutritional quality expected of Unilever food products. Crops can be rainfed or irrigated, but water must always be used sustainably, efficiently and in balance with the other users in the catchment. Agricultural practices must aim to minimise the impact on surface and ground water.

Growers using irrigation must ensure that:

- timing and amount of irrigation is tailored to crop requirements
- application techniques are appropriate to the amount of water available and selected according to local conditions
- soil water capacity is not exceeded, to minimise water waste and water pollution
- irrigation water quality is monitored and managed to avoid damaging or contaminating crops and soil
- irrigation managers, supervisors and operators are sufficiently trained
- accurate records are kept.

Growers must not use streams and rivers as a waste dump, particularly for the disposal of pesticides, pesticide washings, fertilisers, veterinary medicines, agrochemical containers, plastic waste, manure or untreated sewage.

Caring Dairy – coping with sandy soils

Producing the milk for Ben and Jerry's ice cream uses water in several ways: for the cows to drink, to grow the grass they eat, and to clean animals and milking equipment.

Overall, there is no shortage of water in the Netherlands, the home of Ben & Jerry's Caring Dairy programme. However, most of the country has sandy soils that easily become dehydrated, so we provide Caring Dairy farmers with guidance on sustainable water use in the dairy and around the farm. For example, they can collect the water used for the first rinse of their milking equipment and feed it to the calves. We also hold grassland management workshops and teach farmers how to improve the water holding capacity of their soils

What's more, producing more grass on-farm means farmers need to import less from elsewhere and this can reduce water use in other regions.

Caring Dairy cows and the Caring Dairy project farmers, Netherlands

Using less water

Growing crops

Choosing the right location

Ideally, we would grow crops in areas where rainfall is sufficient for their needs. This is not always possible however, and many of our crops need to be irrigated to improve yield and quality. Even so, it may not make sense for particularly 'thirsty' crops to be grown in water-scarce regions, and may be better for farmers to switch to more drought-tolerant crops. We try to optimise both farmers' livelihoods and water use, recognising that it is not always best or possible to grow in areas that have enough rainfall. Wherever we grow we try to minimise water use.

Water harvesting and storage

One of the most efficient ways to water crops is to use rain water that has been collected and stored. Good soils, containing relatively high amounts of organic matter, act as excellent short-term water stores. For longer term storage, relatively inexpensive earth ponds can be built on-farm to collect rainwater or small dams built to retain river water for use during the dry season.

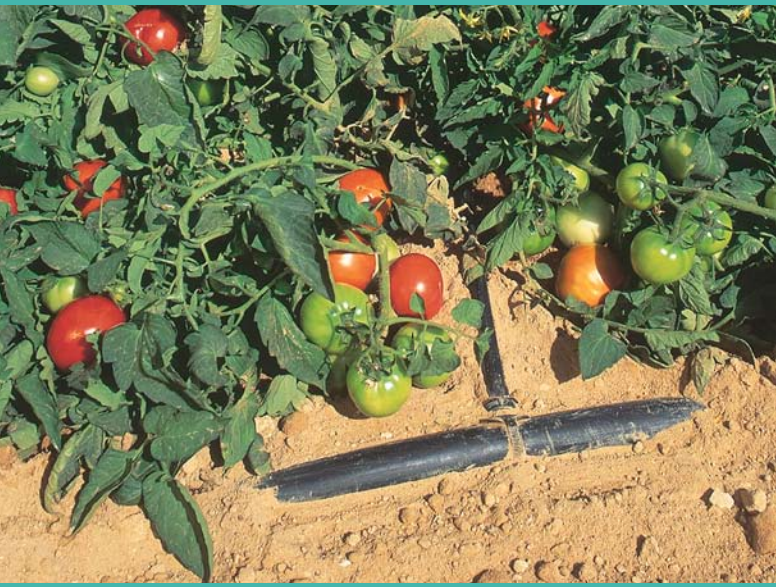
On our Tanzanian tea estates, all irrigation water is harvested within the farm during the rainy season and stored in reservoirs onsite, for use during the dry season.

Our Brazilian tomato growers collect river water in dams to use for irrigation later in the year. A legal quota system – based on the amount of water in the broader catchment area – allows growers to use a specified amount of irrigation water per year.

Managing irrigation for efficiency

Whichever irrigation system is used, good planning and management are important if water is to be used efficiently.

Irrigation scheduling should be used, to ensure that the right amount of water is applied at the right time, depending on the weather (rain, sun and wind) and stage of crop growth. Scheduling can be done, as by our tomato growers in Brazil, by estimating how much water the crop is taking up and hence how much is needed to replenish the soil. More accurate systems involve taking direct measurements of moisture levels in the soil and calculating how much water needs to be applied. Farmers are then alerted to the need for irrigation and how much water is required.



Water is fed directly to the base of the plant stem and roots.

The type of irrigation system used affects water use efficiency, and the costs and benefits of each type differ between crops and locations. Using low-pressure irrigation on our Italian spinach crops, for example, helps avoid over-watering, and requires 45% less fuel to power the pumps.

One of the best ways to save water is by using drip irrigation. Drip systems work by applying small amounts of water (and sometimes pesticides and nutrients) to crops at frequent intervals, through a network of tubes. In many cases, it saves water, improves yields and reduces fertiliser and pesticide use. However, drip irrigation is relatively expensive and because it becomes a semi-permanent feature, it is not suitable in all circumstances. Introduction of drip systems also changes the farm's cropping pattern and means growers need to learn a new regime.

We continue to evaluate the benefits of different types of irrigation by crop and region, to help our growers make better-informed decisions on water management. We carry out trials at our experimental farms, where recent results suggest that drip irrigation can have the following benefits:

- Tomatoes: using drip irrigation in Brazilian tomato crops cut water use by 30% and boosted yields
- Gherkins: a drip irrigation trial in India produced a water saving of 40% and also cut chemical inputs

- Tea: trials of drip irrigation found a 10% water saving compared to existing irrigation techniques, with no loss of yield in Tanzania. This is equivalent to saving 70 litres of water for every kilogram of black tea produced (see case study p. 19).

All our tomato growers in Greece now use drip irrigation (see case study p. 21) as do around 40% of our Californian growers. Most of our Brazilian growers use centre pivot irrigation but 710 hectares (13% of the total) have been converted to drip systems, as a result of Unilever giving technical and financial support to Brazilian tomato growers wanting to convert. We also work in partnership with the Ministry of Agriculture and academic institutions in India to find ways to fund drip irrigation systems in gherkin crops.

Training

Farmers will not implement better management practices unless they understand how change can improve their business, and have the necessary technical skills. Our GAPs stress the importance of training for irrigation managers who need to be able to maintain and test their equipment to ensure it is working as efficiently as possible. Those responsible for planning and making decisions on investments in new systems also need to be trained in the importance of sustainable water use and the advantages and disadvantages of the different irrigation and scheduling systems available.

As well as our project in California, we are developing training programmes around best practice with experts

Drip irrigation system in tomato growing, Brazil

in India and Italy on water efficiency advice for tomatoes, gherkins and spinach.

We also chair the Water Working Group in the Sustainable Agriculture Initiative (SAI Platform), an organisation created by the food industry to support the development of sustainable agriculture. This facilitates best practice implementation and identifies training opportunities for growers and suppliers to member companies.

The resource required for training is enormous, and this is against a backdrop of a reduction in government spending on extension services, particularly in the developing world (World Development Report, World Bank 2008). Unilever alone cannot resource, or manage, all the training required. We are always seeking other like-minded businesses and organisations to partner with, to share this responsibility.

Suppliers learn sustainable farm practices by participating in on-farm training sessions.

Growing tea in times of drought

Unilever Tea Tanzania (UTT) is taking action to overcome the problem of an annual six-month dry season.

UTT irrigates during the dry season, by pumping 7 million m^3 of water each year, at a cost of US$1 million. The company is working with local and international researchers to find the most efficient irrigation techniques. Trials indicate that using drip irrigation instead of sprinklers, where the terrain is suitable, can save 70 litres of water per kilogram of made tea.

UTT are also testing different tea clones and hybrids to identify those that are tolerant of dry conditions, yet still produce relatively high yields of good quality tea. The company keeps its smallholder tea suppliers up to date with new varieties so that any poorly-performing crops can be replaced with drought-resistant ones.

Conserving rainforest within the Tanzanian Estates (over 50% of the land area managed by the company) is vital to ensure that the catchment characteristics and local weather patterns are maintained. UTT's Biodiversity Action Plan set a target to raise 150,000 indigenous trees by 2010. So far they have planted 20,000 trees on their own estates and donated 30,000 trees to communities in the local catchment for reafforestation and to conserve water resources.

Researchers at Unilever Tea Tanzania prepare tea clones and hybrids.

Using forecasting and scheduling systems to save water

Tomatoes are a thirsty crop, often grown in hot, dry places, and need to be well irrigated. Water is also needed for diluting and applying pesticides. In variable climates however, it can be difficult to determine how much water and chemicals need to be applied.

Our Brazilian tomato growers have halved their water use (from 800mm/ha to 400mm/ha) by making irrigation and chemical applications more efficient, largely using information from online weather data systems. Following our guidance on ways of reducing water use, growers now:

- check and examine irrigation equipment before the start of the growing season. They repair or recalibrate any faulty equipment to ensure it delivers the correct amount of water
- consult an online system for advice on the quantity of irrigation water needed. The system provides guidance based on temperature, rainfall, moisture, dew and solar radiation data, collected from weather stations across the cropping area every 15 minutes
- use a computer programme to help decide whether or not to apply fungicides. The programme uses climate data to detect if the weather is favourable for the development of late blight and *Alternaria* fungi. Growers only apply chemicals when the risk is high, reducing water and chemical inputs, and saving money.

Computer systems enable accurate monitoring and regulation of water use.

Furrow is less efficient than drip irrigation due to evaporation from the water surface.

Moving from furrow to 100% drip (Greek tomatoes)

In Greece, several years of drought in the 1990s led to water shortages, and our tomato growers and their crops suffered as a result. Even the large reservoir in the Peleponese was not enough to meet their needs.

The solution was to reduce their requirements, by moving from traditional furrow irrigation to more efficient drip methods. The new system enabled growers to apply water in minimal quantities, perfectly suited to plants' needs. As an added extra, growers found that drip irrigation gave them better control over plants' development and health. They achieve better yields, taste and colour, and uniform ripening, by using the system to apply appropriate fertilisers for each stage of growth.

These benefits mean that our growers have now switched to 100% drip irrigation on Greek tomato farms. They have begun to trial lower drip rates as a way of saving even more water.

In Brazil numerous natural lakes offer a plentiful source of water for irrigation as required. The maintenance of in-field dams and reservoirs is part of sustainable water management.

Drinking water is provided from the Jamji pump house at Unilever Tea Kenya.

Opportunities

Some growers have already managed to improve water efficiency by implementing our sustainable agriculture practices. The challenge lies in increasing the number of growers making such improvements, to ensure that our raw material demands can be met sustainably in times of water scarcity.

It will be increasingly important to locate crops in areas with sufficient water resources. More than ever, we must ensure that our processes do not remove the water available to local people for drinking and hygiene. This will help us avoid conflict and support local communities, while continuing to succeed as a business.

Link between rainfall and oil palm yield: water-efficient palm oil production

With an inadequate water supply, oil palm leaves fail to open and bunches don't develop properly. If drought persists, bunches may not develop at all. The problem is not immediately solved when it rains: dry conditions promote the growth of male flowers over female ones, and so fewer fruit are produced two years later.

We conserve water on our oil palm plantations in Ghana by building contour terraces on steep slopes before planting. This traps rain water, helps prevent soil erosion and makes harvesting easier. Empty fruit bunches from the palm oil mill, and fronds cut from the palms when the bunches are harvested, are placed on the ground between the palms to help conserve the soil and improve its water holding capacity.

Processing palm oil at our Benso plantation in Ghana uses around 1.21 tonnes of water for every tonne of fruit. The main source of processing water used to be the river that flows along the southern boundary of the estate, which also serves communities downstream. During prolonged dry seasons a number of boreholes were used in supporting the watering operations at the palm seedling nursery.
We built a 50,000m^3 reservoir to store water in the rainy season for use in the dry season. This now provides 100% of our water requirements. We stock the reservoir with fish to eat the mosquito larvae that can inhabit it.

Oil palm fruit bunches ready for drying.

Terraced oil palm planting, Ghana

Tilapia fish ready for stocking, Ghana

Watering native tree and tea saplings in the UTK nursery.

Meeting community needs in Kenya

Unilever Tea Kenya (UTK) relies on rainfall to grow its tea, and on river water, to clean its factories and offices, and for domestic purposes in workers' villages. The company maintains paths for people to access streams on the farm so they can draw water and water their animals. Local people have water supplied to their homes and communal areas are available for clothes washing. By discouraging people from using the river for laundry, the water quality for downstream users is protected.

The company is developing a public-private partnership to provide water (from springs that rise on the company land) to 5,000 households in neighbouring villages. The initiative will work to protect the catchment by pumping water from the springs to six reservoirs from which villagers can tap water.

UTK is also setting up 'water kiosks' and establishing low-water toilet facilities in local markets.

Protecting water quality

The use of fertilisers, manures and pesticides to boost yields and protect crops can pollute water supplies. Water can also be polluted by sediment if fields suffer from soil erosion.

Sustainable agriculture minimises water pollution by optimising inputs, choosing chemicals less likely to become polluting (for example, pesticides that degrade quickly), taking measures to prevent erosion, and protecting vulnerable areas such as springs and riverbanks from agricultural runoff.

Impacts of agriculture on water quality

Pesticides

Few pesticides are so specific that they affect only the pests or weeds they are intended to kill, and pesticides can therefore impact organisms living in nearby water. Obsolete stocks of crop protection products, and poor storage are also problems. Farmers (particularly in developing countries) are often unable to dispose of unwanted stocks safely,

so they remain in sheds and warehouses for many years. The chemicals' packaging degrades over time, increasing the risk that pesticide might leach into the environment.

How we reduce pesticide pollution

The most obvious way to reduce impacts of pesticides on water is to limit their use. Our Good Agricultural practices require growers to use Integrated Pest Management (IPM). IPM aims firstly to prevent the pest or disease affecting the crop, then to monitor the crop carefully if pests do occur, then to use mechanical and biological control methods in preference to chemicals. The result is an overall reduction in pesticides used (see Indian gherkin case study on p. 27).

IPM methods can be applied to insect pests, plant diseases, and also to weeds. Our spinach growers, for example, prevent weeds appearing by carefully controlling weeds in nearby fields and using herbicide before the spinach emerges. If weeds do appear in the crop they are first removed mechanically, and if post-emergence herbicides are needed, growers consult us on the least damaging chemical to use.

Pheromone traps confuse male moths and disrupt mating.

Nutrients

One of farming's greatest impacts on water quality is eutrophication – a process where water bodies receive excess nutrients that stimulate plant and algal growth. This can occur when phosphorus and nitrogen (both major components of synthetic and organic fertilisers) enter water courses by leaching or run-off – either because too much fertiliser is applied or there are unexpected rains soon after application. It can also be exacerbated by ploughing or road-making. Eutrophication can cause excessive growth of single-celled algae (algal blooms) which deplete the oxygen in the water and cause aquatic plants and animals to suffocate; blue-green algae also produce toxins that can kill animals and poison fresh water supplies. Eutrophication also encourages the growth of certain plants such as water hyacinth that can block waterways and devastate fisheries in some parts of the world.

Choosing the least damaging chemical

We use a tool called PRoMPT – Pesticide Risk Management and Profiling Tool (see www.growingforthefuture.com) – to evaluate the environmental and human health risks of different pesticides. When farmers do use chemicals, they should choose ones that are least damaging to the environment and human health, apply the correct amount and use careful timing and application techniques. PRoMPT helps us make an informed choice on pest control options and to track our progress towards more sustainable use of crop protection products.

Drip irrigation

As well as saving water, drip irrigation enables relatively small amounts of chemicals to be applied directly to plants' roots, which reduces leaching and runoff and also does not raise air humidity (which encourages fungal growth). Trials at our experimental tomato farm in Brazil show that drip irrigation can reduce inputs of insecticide by 25% and fungicide by 50%.

Safe use and storage

Leaking or poorly adjusted spraying equipment is one of the routes by which pesticides can pollute surface water. Our Good Agricultural practices require growers to check their sprayers regularly to make sure they are properly calibrated.

Gherkins are cultivated by smallholders in southern India as part of crop rotation.

IPM in Indian gherkins

Our gherkin growers in southern India use integrated pest management to deal with three main crop pests: the gherkin fruit borer, melon fruit fly and downy mildew fungus.

Our field team provides growers with a guide on IPM, written in the local language and containing explanatory photographs and graphics for those unable to read. They also communicate the guide's key messages through a Bollywood-style film which is shown at village meetings.

With the help of the guide, growers are limiting pest outbreaks by:

- growing pest-tolerant varieties
- introducing pheromones to disrupt mating and sticky traps to catch flying insects
- using crop rotations that avoid growing gherkins during the monsoon season, when pest outbreaks are most common
- irrigating using channels (instead of flood irrigation) that reduce humidity and the need for fungicides.

Growers can only apply pesticides upon recommendation from the local field officer. We sponsor good practice demonstrations to make sure growers know how to apply and store pesticides safely, minimising the threat to humans, animals and the environment.

Since implementing IPM our gherkin growers have doubled yields and are using 78% less fungicide. Growers benefit from a guaranteed crop and cash flow and, in return, we are ensured a sustainable supply of higher quality gherkins.

Chemicals must be stored safely and securely on-farm, in designated warehouses or sheds. It is important that chemicals are not over-stocked, to minimise the risk of them becoming obsolete. In some areas, suppliers deliver pesticides and fertilisers directly to farmers directly before application and in prescribed quantities. This helps farmers adhere to application rates and timings as well as reducing the risks associated with storing chemicals on-farm. Together with the chemical company Dupont we have built a model chemical store at our experimental farm in Brazil to demonstrate safe storage of agrochemicals to farmers.

Regular water quality testing at Unilever Tea Kenya.

How we reduce nutrient pollution

Improving fertiliser efficiency

Soil surveys and sample testing help growers understand which parts of their fields require nutrients and how much they need. In Brazil, our tomato growers reduce the need for high phosphorus inputs by applying organic fertilisers containing micro-organisms that enhance natural phosphorus availability in soil.

Unilever Tea Kenya's growers have 'whole farm nutrient management plans' that examine the crop and the soil to determine how best to manage nutrient inputs. We refine the management plans according to the latest findings from local research organisations. Fertiliser is usually the most expensive input on tea farms, so efficiency is important for profitability. It also helps ensure clean drinking water for the UTK workforce, many of whom live downstream. The rivers running through the farm drain into Lake Victoria, which suffers from serious eutrophication, making it particularly important for us not to contribute further to problem.

Making use of organic waste – palm oil

Processing palm oil uses a lot of water to steam the fruit and extract the oil. Once used, the waste water is full of organic matter which can seriously pollute water courses unless managed carefully.

One sustainable solution to this problem is to spread the nutrient rich liquid waste on the plantation. This saves on applications of fertiliser and irrigation water to some extent. The effluent seeps into the soil, which filters it to produce clean ground water. Palms treated in this way produce high yields.

One problem is the smell of the effluent, which can reach local villages. It is reduced by treating the effluent in lagoons before application or by applying only in more remote areas. The solid waste produced during processing, including empty oil palm fruit bunches can be applied to fields to improve the organic matter content.

We are also experimenting with co-composting the effluent with empty fruit bunches near the palm oil mill. The compost – which does not smell unpleasant – can then be used to fertilise the land in areas where using effluent is impractical.

How we reduce sediment impacts from soil erosion

Whenever bare soil is exposed, especially on steep slopes and at times of high rainfall, eroded soil can be washed or blown into water courses. This increases rivers' sediment

Spreading oil palm waste returns nutrients to the soil.

Reducing pollution – Caring Dairy

The grass grown to feed Ben and Jerry's dairy cows needs nutrients (especially nitrogen and phosphate) to grow well. However, if farmers apply too much fertiliser, surplus nutrients can pollute water courses.

Dairy farming in the Netherlands is intensive and groundwater is commonly contaminated with nitrogen, phosphate and pesticides. Our Good Practice guidelines aim to ensure that Caring Dairy farms don't pollute water resources. We measure their nitrogen and phosphate surplus, as well as groundwater and surface water quality, to keep track of farmers' performance.

Manure management workshops will be held to advise farmers how to reduce water pollution further by:

- farming less intensively: reducing the number of animals needed by keeping older cows (which produce more milk over their lifetime)
- developing a more efficient strategy for fertilising grassland
- arranging for cows' manure to be supplied to local maize farmers who need the nutrients, and then produce food for the cows in the form of silage, so "closing" the nutrient cycle.

content and can raise phosphate levels due to fertiliser residues and natural phosphate deposits in the soil.

Erosion can be reduced by controlling the movement of water and wind across field surfaces, for example by ploughing and planting along contours, designing drainage systems well, using wind breaks, using conservation tillage or planting cover crops whenever the soil is bare, for example, after harvesting or when plants are young. Our Good Agricultural Practices advocate the use of riparian buffer strips to reduce pollution, preferably planted with native vegetation for its biodiversity value.

Livestock impacts are alleviated by fencing off erosion-prone areas and excluding cattle from river banks.

How we measure progress

We are collecting data that will enable us to monitor the amount of water used for irrigation per hectare or tonne of product and to estimate leaching and runoff of pesticides and fertiliser to surface and ground water.

High density planting pattern (top)

Tea bush microcatchments (bottom)

Soil Erosion control in UTK

Tea grows best in the acidic soils of the wet tropics. Established plantations and smallholder farms generally have a lot of ground cover and minimal erosion problems, but there is a serious risk of erosion in the first couple of years after planting before the soil is covered. Unilever Tea Kenya uses preventive measures to reduce erosion, including:

- growing plants on terraces, with ridges to prevent water flow and erosion
- planting tea bushes at high densities, to give a greater yield and extra soil protection
- designing drains and planning, managing and monitoring water movement to limit erosion
- digging microcatchments – small pits between freshly-planted tea bushes – to collect excess run-off.
- planting oats as cover crops between newly-planted tea bushes on vulnerable slopes.

Catchment protection partnership - the 'water and trees project'

Unilever Bestfoods Brazil which produces tomatoes for the Knorr and Cica brands, is working in partnership with its contract growers, Bayer CropScience Ltd and the Federal University of Goiás to protect and conserve surface water bodies.

The project enables growers to re-establish a 50m strip of natural vegetation on each side of streams, rivers and lakes. This prevents run-off, sediments and chemical spray-drift from entering the water, and boosts biodiversity. It also helps farmers fulfil their legal obligation to have 20% of their land area as natural vegetation.

Protecting catchments

A catchment is the area of land from which water drains into rivers and lakes. While it is important to start work on farms, the greater challenge is meeting the water needs of the complete catchment. Upstream water extraction for irrigation or manufacturing takes it away from other users downstream affecting both people and ecosystems. Already, one in 10 of the world's major rivers no longer reaches the sea because so much water has been extracted.

Upstream agricultural activities can also cause downstream flooding. This happens, for example, when farmers drain their land to boost crop productivity. Agricultural drainage also lowers the water table and reduces a catchment's ability to buffer itself against floods.

Whether it is the reduction in flow, the magnitude and frequency of flooding or deleterious effects on water quality, catchment communities and ecosystems often suffer from poor water management by upstream farming activities.

Helping smallholders plant the right trees

Kenya produces 9% of the world's tea. Most of it is grown by small-scale, rural farmers, overseen by the Kenya Tea Development Agency (KTDA). Demand for firewood and timber means many of these farmers plant fast-growing trees, such as *Eucalyptus*, on their land instead of leaving strips of natural forest along riverbanks as required by Kenyan law. *Eucalyptus* trees can do more harm than good: they are very 'thirsty' and deplete wetlands and rivers of water.

Together with the KTDA, we have run a joint project using the Farmer Field School approach to help small-scale tea farmers better understand how to grow tea profitably and sustainably. This includes teaching them about the dangers of growing water-demanding trees and the ability of indigenous varieties to protect their water courses.

Unilever Tea Kenya planted 300,000 native trees on its estates between 2000 and 2007, and donated a further 320,000 to local communities.

Native tree planting ceremony.

Fuel wood demonstration.

How we help

Where we own land ourselves, we try to manage it sustainably to ensure minimal impact on the catchment. Our GAPs inform our suppliers and their growers how our crops should be grown. However, some growers also sell to other buyers the crops grown elsewhere on their land or as part of a rotation with our crops. Although we have little power over how farmers grow crops or rear animals for others, we do encourage them to use sustainable agriculture practices throughout the farm to maximise the benefits for their catchment and community.

To manage community water initiatives, we promote the use of integrated catchment management (ICM). ICM involves gathering information about all current and potential uses of water in a catchment and the factors that influence them.

Our ICM principles state that:

(i) water development and management should involve users, planners, policy makers and other stakeholders, taking account of social and cultural diversity

(ii) freshwater is a finite but infinitely renewable and vulnerable resource, essential to sustain life, development and the environment

(iii) water has an economic, social and environmental value in all its competing uses.

Protecting the Mau forest catchment

Unilever Tea Kenya's estates are fed with water from the Mau forest catchment, an area of high biodiversity value that is the source of at least 12 rivers. The area is also home to 2 million people, who rely on water from rivers and streams for cooking, drinking and washing.

In recent years, deforestation has destroyed nearly a quarter of the forest. What remains must be conserved if the catchment is to be protected and water supplies for local communities and tea estates maintained.

Guidelines on planting and managing native trees are included in the UTK company manual and every year each employee plants two trees on company land. These measures ensure that more than 10% of UTK land is occupied by forest. UTK supports a local group committed to protecting the Mau catchment and pays the salary and transport costs of one forest officer. In the future we plan to form a partnership with local indigenous groups to learn about traditional forest management techniques. This will include planting native herbs, lianas and flowering plants.

Visitors to UTK plant trees to compensate for their flight's carbon emissions.

Lessons learned – summary

In Unilever, we strive to understand and reduce the impact of our products on water, from the production of raw materials to consumer use. We pursue this work with passion and determination, as it is of great importance to the long term success and integrity of our business.

We have worked on water management with more than ten pilot projects in 15 countries since 1997. As a result, our sustainable agriculture programme has become a remarkable centre of expertise. While some of our projects have had positive impacts and been more fruitful than others, all of them have helped us to learn. We are confident that our work on water management will be a core pillar in our efforts to buy all our crops from certified sustainable sources in future.

After two decades of moving our suppliers in the direction of greater water sustainability there are still huge opportunities for us to share sustainable management practices more widely. Where our crops are rain-fed we focus on minimising the risks of water pollution from farming, and improving farming practices to enhance catchments conservation. Where crops are irrigated or animal husbandry is involved, the sustainability and quality of water sources and best irrigation management practice become important, too.

Sustainable processes are important for cost reduction and risk management. We advocate a range of good practices, where appropriate, for improving water use efficiency or water quality. Part of this work involves helping suppliers to understand how sustainable water management can benefit their businesses, as well as helping retailers understand how to meet consumers' expectations on this challenging issue.

Instigating change where viewed as high cost or superfluous in the short term is a difficult task. However, through dedicated research and ongoing effort to educate our supply chain base, we are continuing to find effective ways to communicate our message and remove the barriers to change.

A river on the Dewata Estate- one of our Indonesian tea suppliers.

‘In these uncertain economic times, our core values and commitment to sustainability must remain unchanged. Indeed, now more than ever, this agenda holds the potential for long-term and sustainable success of our business and our brands.’

Paul Polman, Chief Executive Officer