

# BUSINESS & FOOD SUSTAINABILITY

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## How to feed people and save the planet



Crisis conditions: donors and aid agencies usually dominate the food security debate but the corporate sector has an growing voice

**Sarah Murray**  
on efforts to secure supplies in the face of increased population, climate change and rising prices

**B**arely had the dust settled in the wake of Haiti's worst earthquake in two centuries when international aid agencies began the rush to help. A priority was to feed the devastated Caribbean country's population. Yet added to immediate catastrophes such as Haiti's is the long-term need to secure global food supplies in the face of rising population, climate change and climbing food prices.

While governments, donors and the aid community have traditionally dominated food security discussions, the corporate sector has an increasing voice in the debate.

Of course, when it comes to the food industry, the term "sustainability" refers to more than a secure supply. It encompasses everything from the environmental impact of agriculture and farm-worker labour standards to the private sector's role in producing nutrient-rich products and in fighting rising levels of obesity.

During the recent food crises it was governments that faced protesters' anger at soaring prices, but food companies are unlikely to remain immune to the public's ire if, as seems likely, the cost of food continues to rise.

Meanwhile, food producers and agribusinesses are at the receiving end of criticism of their impact on natural resources, whether that is the pollution caused by the run-off of fertiliser chemicals into the

water supply or emissions of carbon dioxide and methane – a powerful greenhouse gas produced by livestock.

As the world's biggest consumers of water, agriculture companies are under enormous pressure to find ways of reducing waste and conserving supplies. In India, for example, 80 per cent of the country's water demand comes from the agricultural sector as it expands to meet the demands of its citizens, many of whom are now able to afford a more sophisticated diet.

Companies are also at the centre of the controversy over the

use of genetic modification, particularly in Europe, where debates still rage over the safety and suitability of GM seeds and environmentalists say genetic modification threatens biodiversity. At the same time, climate and development specialists believe bio-crops have the potential to push up food yields and, in the case of drought-resistant crops, do so while putting less pressure on water supplies.

Climate change is something global food companies need to take seriously. Severe weather, rising sea levels and drought associated with shifting weather patterns are threatening to affect food production in some parts of the world. Wheat farmers in Australia know this all too well, having lived through a long stretch of poor harvests caused by drought.

Policymakers are looking more closely at how the private sector – from agribusinesses to supermarkets – can help ensure food security. In July last year, when world leaders pledged to devote \$20bn over three years to a "food security initiative", part of the commitment reflected a move away from reliance on aid models to a broader approach that includes fostering the growth of the agricultural sector in developing countries.

This also means encouraging companies to step up their research and development. Many blame the lowering of agricultural yield growth in the past decade on the lack of investment in R&D, particularly in poorer parts of the world where growth in inflation-adjusted spending on agricultural research has slowed more markedly since the 1970s than it has in rich countries.

However, innovation does not necessarily need to emerge from



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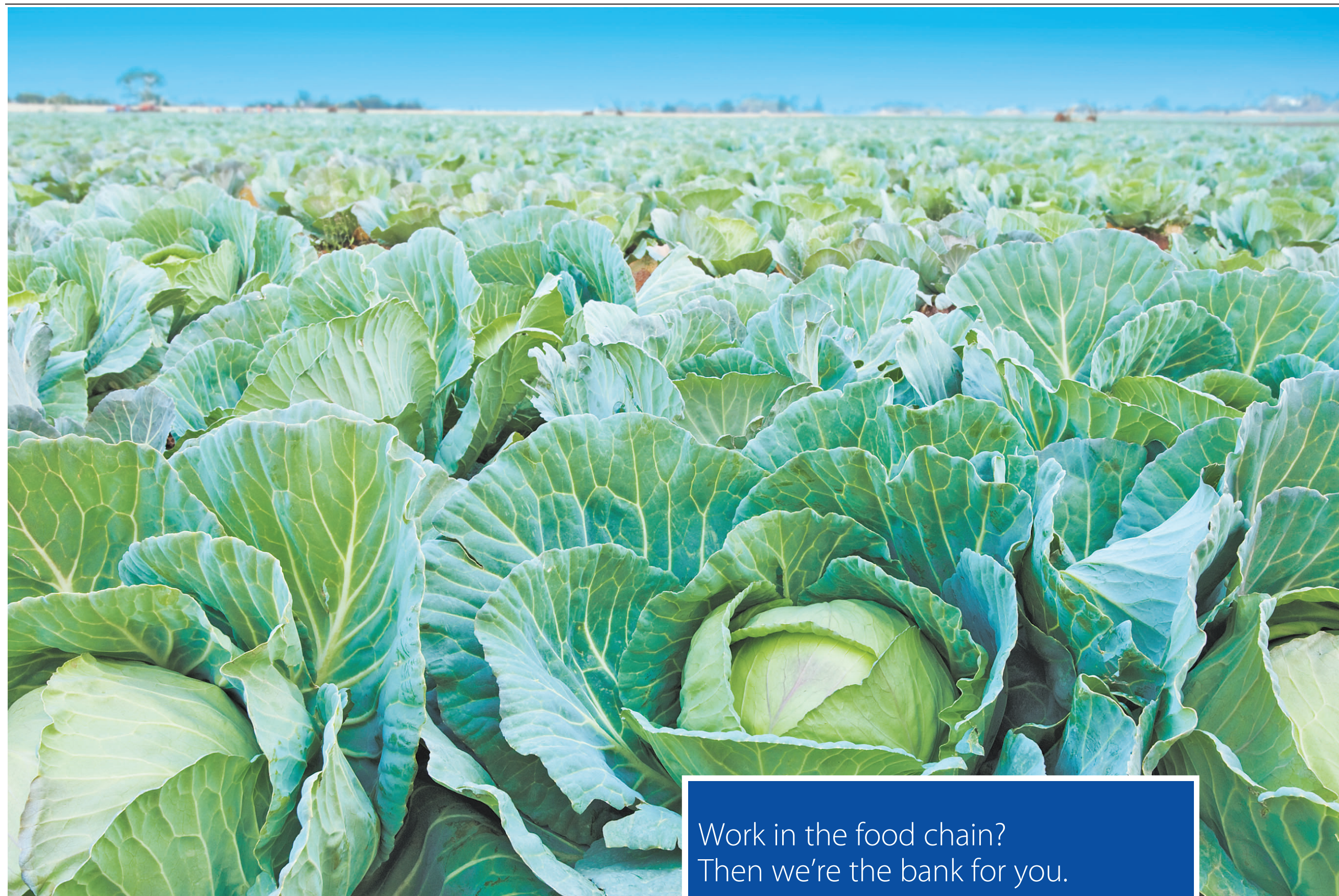
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## Business & Food Sustainability

# 'Islands of best practice in sea of poor to middling ones'

### Ethics

#### Jane Bird reports on the struggle to meet standards

Unilever is proud of the medical care, schooling, clean water and renewable energy it provides for the 20,000 workers and their 80,000 dependents on its tea plantation in Kericho, Kenya. The site sets standards the company aims to replicate worldwide.

With brands such as Lipton and Brooke Bond, Unilever produces about 12 per cent of the world's black tea. This makes it a good place to start implementing Rainforest Alliance certification for sustainable farming, says Miguel Veiga-Pestana, vice president for global external affairs.

"We are trying to put the emphasis on core crops where we have a large footprint in sourcing, so that we can create a bigger shift," he says. The aim is to be fully compliant in tea by 2015, then move on to palm oil.

Organisations such as the Rainforest Alliance, Ethical Trading Initiative (ETI) and Fairtrade, include working conditions in their certification standards. But even a company as big as Unilever struggles to meet these.

Last year it was reported to the Organisation for Economic Co-operation and Development by the International Union of Foodworkers (IUF) for the high proportion of temporary workers at its tea factory in Khanawal, Pakistan. Only 22 employees were on full-time contracts while hundreds were employed on low-paid temporary con-

tracts, despite many having worked there for decades.

Unilever has now agreed to 200 permanent contracts. "We have acknowledged that we were not conscious of this issue and got the balance wrong between permanent and temporary contracts," says Mr Veiga-Pestana.

Factors such as a lack of awareness among senior managers, and the "casualisation" of the workforce, are among the biggest problems affecting working conditions in the food industry, says the ETI's Julia Hawkins. "Whole swathes of migrant workers are being brought in, often to work very long hours harvesting seasonal crops such as grapes or producing turkeys and Brussels sprouts at Christmas," she says.

Fluctuations in labour demand are also caused by retailers wanting to respond

to unpredictable consumer behaviour, such as a surge on burgers and chicken drumsticks for barbecues in a heatwave, she says. "Abuses and exploitation are often to do with responding to these peaks and troughs in demand."

Improvements are being made, partly because of an increased need for supermarkets to identify and audit their sources, and partly because of consumer awareness heightened by incidents such as the deaths of Chinese cockle pickers at Morecambe Bay in north-west England in 2004.

The food industry is under increased pressure to take responsibility for supply chains, including chocolate, coffee, bananas and tea, says Chris Wille, the Rainforest Alliance's chief of sustainable agriculture. "Consumers increasingly expect their food to be from

managed farms where people are treated with respect and given good working conditions," he says. "Companies used often not to know where their products came from, but there is now a rapid and huge transformation to understand this and get workers' rights included in their social and environmental responsibilities."

The change is reflected in rising demand for Fairtrade products, which grew about 20 per cent in 2009 to €3bn. "This may seem low compared with growth of 40 per cent in previous years," says Rob Cameron, chief executive of Fairtrade Labelling Organisations International. "But given the recession and the fact that we are starting from a higher base, it is a strong story."

Certifying bodies use auditors to check that their

standards are being met. Informal processes, such as paying in cash, have to be replaced with formal ones.

To simplify processes for producers who want to supply a number of companies, competitors such as Unilever, Nestlé and Kraft, are collaborating to standardise the data their auditors require. Auditing is not a foolproof way to ensure good labour conditions, admits Mr Wille. It is relatively easy to see if the water is clean and schooling is adequate, he says, but much more difficult to know whether a workplace is really free from sexual harassment, for example. "It would be foolhardy to claim that there was never a child working on a farm and that everyone has their full complement of rights, but we can usually detect if there are systemic faults." The ETI estimates 9m

workers are covered by its 50 corporate members which include Tesco, Asda and Sainsbury's. The Rainforest Alliance has also chalked up some big name signatories in coffee roasting, with Kraft, Nestlé and Sara Lee.

But it acknowledges that less than 10 per cent of coffee farmers are covered by this type of programme. The alliance has made good progress in the cocoa industry, where the many cases of child labour in west Africa are finally being dealt with, and Mars has been signed up.

Once products reach ports or beyond, good practice depends more on the importing companies and local labour conditions. Throughout the food value chain, says Ms Hawkins, "there are islands of good practice in a sea of poor to middling ones".



'Consumers expect their food to be from farms where people are treated with respect'

Chris Wille, Rainforest Alliance



Tractor factor: GPS signals combined with a farm base station can steer a tractor within a margin of 2cm, avoiding overlapping applications of seeds and saving fuel

Alamy

## Standards set to protect reputations

### Food safety

#### Traceability in global food supply chains has come a long way, writes Ross Tieman

A glance at the annual report of Europe's Rapid Alert System for Food and Feed provides a fascinating insight into the difficulties of ensuring food safety in an era of global supply chains.

The 2008 report, published in July last year, lists about 7,000 notifications concerning potentially risky food or animal feed issued via the RASFF system maintained by the European Commission.

The good news is that, while the number of notifications was stable, the number of alerts sent to national governments of the 27 members of the European Union and partner countries, including Norway and Iceland, halved, to 528 alerts, as regulators focused on the cases in which there was deemed to be a real risk to health.

Just a few incidents can trigger hundreds of notifications, as news about sunflower oil from Ukraine contaminated with mineral oil, melamine in food from China or dioxins in Irish pork is spread through EU supply chains.

Many problems are forestalled by health inspectors long before foods reach the table.

More than 40 per cent of notifications concerned imports that were tested at EU borders and then rejected, with warnings sent to the country of origin.

Overall, official inspections triggered 83 per cent of notifications, company checks picked up 6 per cent more, and consumer complaints generated 4 per cent. Only 1 per cent arose from cases of food poisoning.

Indeed, when problems are identified, companies, anxious to protect their reputations, seem to act fast to tackle the consequences.

During December last year, the Canadian Food Inspection Agency issued only seven "high risk alerts" involving food product recalls.

No illness was recorded in any of the incidents, the recalls were voluntary, and the agency was able to provide serial numbers for the products and pinpoint where and when they were sold.

Food safety and traceability has come a long way.

Mella Frewen, director general of the Confederation of Food and Drink Industries of the EU (CIAA) says regulators and manufacturers have "made an enormous improvement in the last couple of decades", which have seen the EU food safety regime become one of the toughest in the world. But the desire of consumers to buy the same products all year round has increased imports of fresh fruit and vegetables to developed countries, while foods once deemed exotic have become commonplace.

"Compliance checks on safety becomes a tough one in that context, because the source may be further away and there is an increased likelihood of finding producers with different analysis and control procedures," she says.

Frank Janssens, Belgium-based Europe food operations manager at SGS Group, the international inspection, veri-

fication, testing and certification company, agrees that globalisation adds to the legal and physical complexity of monitoring food safety in supply chains.

"Traceability is very important if there is a problem," he says. "We need to trace and locate food wherever it is in the supply chain."

This requires companies to maintain computer systems that track food products from the farm to the retailer.

Retailers and manufacturers often use third-party certification - with audits carried out by companies such as SGS - to ensure not only regulatory compliance, but also to minimise risks of a food safety incident.

Big retailers take food supply chain safety very seriously, because their reputations, and therefore sales, are at stake.

Back in 1998, the British Retail Consortium, a trade body, launched its BRC Global Standard for Food Safety to provide a standard for due diligence and supplier approval.

No matter where the product originates, or where the supplier is based, companies supplying food to UK retailers are unlikely to win or retain business unless they comply.

That has contributed to the



'[Manufacturers have] made an enormous improvement in the last couple of decades'

Mella Frewen, Director-general, CIAA

adoption of the voluntary BRC Global Standard around the world.

As alerts and notifications on both sides of the Atlantic show, the system works.

When a problem becomes known, the food affected can be tracked from farm to store, and destroyed - though publicity is still needed to alert consumers if unsafe food has reached the home.

Today, traceability still hinges on batch numbers, barcodes and the corporate databases that record them.

But technology can underpin further improvements. Radio Frequency Identification (RFID) tags on crates of fresh produce have the potential to trigger alerts to retailers and manufacturers if food is nearing its sell-by date unsold, or is left out of the fridge for too long, and becomes a risk.

Furthermore, retailers have begun using data from their loyalty cards to write to customers notifying them of product recalls.

Some are experimenting with more sophisticated alerts. In the future, opt-in schemes to warn consumers of product recalls by text message or e-mail may become widespread.

But recalls are a last resort. Standards, laboratory tests and supply chain controls remain the most effective, and most desirable tools to ensure food safety.

# Rewards of precision farming

### Food science

#### Clive Cookson reports on a promising alternative to genetic modification

The technological battle to raise agricultural productivity while reducing the environmental impact of farming is taking place across a broad front.

Genetic engineering of crops receives the most publicity, as much because it is so controversial as because it has the most to offer, but there are many other promising approaches.

Precision farming - the use of information technology to monitor crops and guide the application of seeds and agricultural chemicals - is turning individual farmers into expert agronomists.

The most straightforward form of precision farming is to use satellite navigation to guide a tractor. When signals from GPS satellites are combined with a farm base station, the tractor can drive itself with an accuracy of 2cm - better than the most skilled human operator - avoiding overlapping applications of seeds, for example, and saving fuel.

Precision farming becomes more interesting and rewarding when it takes account of variability within fields, to apply fertilisers and other inputs automatically at the rates best suited to the crop and soil conditions.

Images from Earth observation satellites are being used increasingly to monitor individual fields and adjust agricultural inputs accordingly.

The radiation reflected from crops into space will reveal their health (or otherwise), levels of moisture and essential

nutrients, soil properties and likely yields.

Simon Parrington, head of the UK precision farming company SOYL, believes that these overviews from space will replace the tractor-based sensors that many farmers use today.

Images from remote sensing satellites are steadily improving, he says. Within five years, SOYL will be able to use them to tell farmers exactly when to fertilise their crops and how much to spread through the automatic system.

There will be particular environmental benefits in reducing the amount of nitrogen fertilisers used through more precise application.

Precision farming equipment is not expensive compared with top-line agricultural machinery - adding perhaps \$20,000, or 10 per cent, to the cost of a fully equipped new tractor.

Not surprisingly, the investment pays off much more quickly on larger farms.

A recent study by the UK Agriculture and Horticulture Development Board estimated that the net benefit over cost of investing in a precision farming system on a typical arable farm was about \$6 a hectare on a 300-hectare farm, \$10 a hectare on a 500-hectare farm and \$19 a hectare on a 750-hectare farm.

In countries such as the US and UK, where uptake of precision agriculture is most advanced, the technology is already used on up to half of large arable farms.

A different approach improves crop productivity through chem-

icals that enable crops to make better use of nutrients and reduce the stress on the plants.

An example of a specialist company developing such technologies is Plant Impact, based in Preston in the north of England.

Since its foundation in 2003, Plant Impact has come up with a broad product portfolio.

Its PiNT technology releases nitrogen in a controlled way as an amine (a nitrogen compound), which reduces wastage and pollution through leaching into the soil.

There will be benefits in reducing the amount of nitrogen fertilisers through precise application

CaT technology helps plants absorb calcium more efficiently, which can alleviate environmental stress (heat, cold, drought).

A third technology, called Alethea, aims to protect plants more broadly against stress, with a new molecule that helps to strengthen cell walls under prolonged adverse conditions.

"We started rolling out our technologies to the high-value horticulture markets but we will move on to arable crops such as wheat," says Peter Bleazard, Plant Impact chief executive.

Of course genetic engineering also promises new strains of crops that resist environmental

### Contributors

Sarah Murray  
FT Contributor

Clive Cookson  
Science Editor

Fiona Harvey  
Environment Correspondent

Jenny Wiggins  
Consumer Industries  
Correspondent

Andrew England  
Abu Dhabi Bureau Chief

Ross Tieman,  
Rowenna Davis, Jane Bird  
FT Contributors

Stephanie Gray  
Commissioning Editor

Steven Bird  
Designer

Andy Mears  
Picture Editor

For advertising details,  
contact:

Liam Sweeney on:  
+44 (0) 20 7873 4148;  
e-mail: liam.sweeney@ft.com  
or your usual representative



# Self-interest drives new attitudes to agriculture

## Multinationals

Rowenna Davis reports on a shift in the balance of power

Global agribusiness companies are waking up to smallholder farmers. Long used to buying their produce through intermediaries, companies are now meeting farmers in the fields. Cadbury is committed to making its leading Dairy Milk brand Fairtrade by supporting small cocoa farmers in Ghana. Unilever is offering 5,000 small farmers guaranteed markets, access to finance and technical assistance to grow black soybeans in Indonesia. Blue Skies – a business supplying processed tropical fruits to Europe – is training workers to meet international accreditation standards, increasing exports from Ghana.

This trend is recognised by some of the most senior authorities in the field. Oscar Chemerinski is director of global agribusiness at the International Finance Corporation (IFC), the

investment arm of the World Bank. "There is an increased realisation by global agribusiness that their success or failure in the medium and long term is tied to the success of the small farmer, both financially and environmentally," he says. "The balance of power may be shifting in favour of the producer." The challenges facing smallholder farmers, however, remain high. There are an estimated 1.5bn of them on the planet, but only a tiny proportion are involved in the global food supply chain. Many farmers complain about poor credit access, the burden of risk and international trading standards that they cannot understand or afford to implement. Increasingly, farmers are migrating to urban areas in pursuit of higher wages, letting their farms fall into disarray.

Agribusinesses are worried about this trend. Companies that were originally interested in their producers to improve their reputations are now motivated by a need to safeguard supplies. Nestlé the Swiss multinational is a good example. Having consistently refused to take up Fairtrade standards, the company announced in Decem-

ber that all of the cocoa used in its flagship Kit Kat bars in the UK would be sourced from certified producers. José Lopez, Nestlé's chief operating officer, says he hopes to secure further increases in Fairtrade before his tenure is out. "Everybody changes in the face of reality," he says. "Employees in the company today are facing a real risk as the population rises and con-

'There is an increased realisation by global agribusiness that their success or failure is tied to the success of the small farmer'

sumptive habits change to demand more calories. If there is not an improvement in productivity then the whole system becomes unsustainable."

However, Mr Lopez believes solutions are relatively simple. Nestlé has a network of nearly 800 agronomists working with the 600,000 smallholder farmers. The solutions they offer are low cost and high impact, he says.

In Pakistan, they are teaching female smallholders – the main suppliers of milk in the region – how to collect milk safely to avoid contamination and meet global trading standards.

In China, they are helping farmers to turn fermented gas from cows into a local energy supply.

In India, Nestlé has invested in local refrigeration hubs, allowing hundreds of dairy farmers to add their small contributions to the store at reduced transport costs.

Each year, the company offers farmers almost \$30m of micro-credit to fund installations that improve the efficiency and quality of production on the ground.

Unilever, the Anglo-Dutch multinational, is also taking steps to improve its relationship with smallholders.

By offering guaranteed markets for black soya beans at between 10 and 15 per cent above trader-set prices in Indonesia, it has secured a supply chain for its soy sauce, which is popular among locals.

"We are trying to simplify our supply chains by moving more trade to primary processors who have a direct relationship with farmers," says Jan Kees Vis,

Unilever's director of sustainable agriculture. "Working with smallholders is a good way to stimulate economic growth in poor rural areas, which in turn will boost economic growth in general. In that sense, it contributes to sustainability."

Although Mr Vis says that the company has no plans to go down the Fairtrade route, it does say that sustainability is one of its top priorities. Already the programme in Indonesia has been extended to 5,000 farmers.

Bill Vorley, head of sustainable markets at the International Institute for Environment and Development, believes that these changes are set to continue. Much more than token efforts, he believes corporate concerns about sustainability are marking an important turning point in the history of agricultural production.

"Over the last 10 years, the whole dialogue of the industry has changed. Businesses know that they need a healthier underpinning to their supply chains. It's a really interesting example of how self-interest has moved businesses from a *laissez faire* approach to a more engaged sustainability strategy."



Fairtrade future: Cadbury is supporting Ghanaian smallholders

## Congo coffee on shelves near you soon

### Case Study J Sainsbury, Twin & Frich

Rowenna Davis describes a joint project for growers

Violent civil conflict has reduced farmers in the Democratic Republic of Congo to smugglers. On the eastern border of the country, hundreds of smallholders package up their produce and risk their lives crossing Lake Kivu to Rwanda where they barter their hard-earned crops for soap, animals and basic household goods. Official figures show 20 farmers a week lose their lives crossing to Rwanda.

A new partnership project is giving more than 2,000 of these farmers a better option. If everything goes to plan between the UK's Department of International Development (DFID), retailing company J Sainsbury and non-governmental organisation, Twin, these farmers will have their coffee branded and sold on supermarket shelves by the



'This isn't about charity. It's business to business'

Liz Jardine, J Sainsbury

end of the year, earning them double what they are used to. DFID hopes that other companies will move in to take advantage of regenerated supply routes.

"We're putting everything together from scratch – pulling in farmers with a hectare or half a hectare each; financing agronomists to help them rehabilitate the coffee farms, putting processing infrastructure in place and working with farmers to meet quality control standards," says Richard Hyde, a senior coffee manager at Twin who is overseeing the project. "There's a huge appetite to get production off the ground again."

The funding comes from the Food Retail Industry Challenge Fund (Frich), a branch of DFID that helps British food businesses sell more African produce. Launched last June, the fund was given £2.9m (\$4.7m) to pilot six projects. More than 30 companies bid for up to £250,000, and

had to match the grant by at least 50 per cent and have a retailer on board. When Liz Jarman, Sainsbury's head of product technology and development, heard about the project, she was only too keen to get involved: "We take our sourcing out of Africa very seriously, and we want to leverage our knowledge and experience of the supply chain to help farmers," she says. "If we find products that meet the needs of our customers and help the disadvantaged, that's a great opportunity for everyone."

Sainsbury is the biggest UK retailer of Fairtrade products. In September, it switched all its own roasted and ground coffee products to Fairtrade, and there are plans to do the same with tea. According to Ms Jarman, it took 18 months to find enough qualified farmers to produce certified crops, so any initiatives to expand the range of Fairtrade suppliers is more than welcome. "This isn't about charity," says Ms Jarman, "it's business-to-business".

If the business incentives for smallholders and supermarkets to work together are so high for both sides, why do these partnerships need public sector support? The answer is simple – risk. Sainsbury may want Congolese products on shelves, but it does not want to pay until the product has been delivered and checked for quality. Similarly, farmers may want to invest but lack the capital. They also worry their crops may not meet quality standards – particularly when produce may be damaged by political or climatic events beyond their control.

The Frich project solves this problem by reducing risk for both sides. The funding it provides can be used in farm regeneration, crop processing and training to ensure all produce meets corporate trading standards.

The importing branch of Twin – Twin Trading – also helps by sending 60 per cent of the contract value to farmers in advance. The project started with 284 farmers – now more than 2,000 are involved, and many more would like to be.

Sainsbury's executives say they would still like to buy more produce from smallholder farms in Congo, but they are hampered by bigger challenges of infrastructure, investment and political instability.

Until these problems are solved, Congolese farmers will continue to live with some of the best climates and richest soils the world has to offer, and barely manage to subsist.

Advertisement

## FT Special Report

# Business and food security: Creating Shared Value for Global Development

By Peter Brabeck-Letmathe, Chairman, Nestlé S.A.

Global Food Security will be one of the defining issues of the first half of this century. As a result, it will take concerted action (see box lower right) of multiple sectors to avoid a serious crisis in food availability. Businesses need to think about what is best both for society and for shareholders in addressing this fundamental problem. This is why Nestlé has chosen three areas of focus: nutrition, water, and rural development, where we can have greatest impact for "Creating Shared Value" both for the people in the countries where we are present and for our shareholders.

### The Issue

More than one billion people worldwide go to bed hungry every night. 200 million more people experienced malnutrition since the mid 1990s. This represents a reversal of nearly 30 years of progress. Every day the global demand for food increases while growth in our agricultural productivity per hectare goes down. The result is that growth in food production is not keeping up with population growth and demand. The declining availability of water is a fundamental factor in the food security dilemma. The goal we must achieve, feeding the population of the world, is becoming more and more difficult to attain.

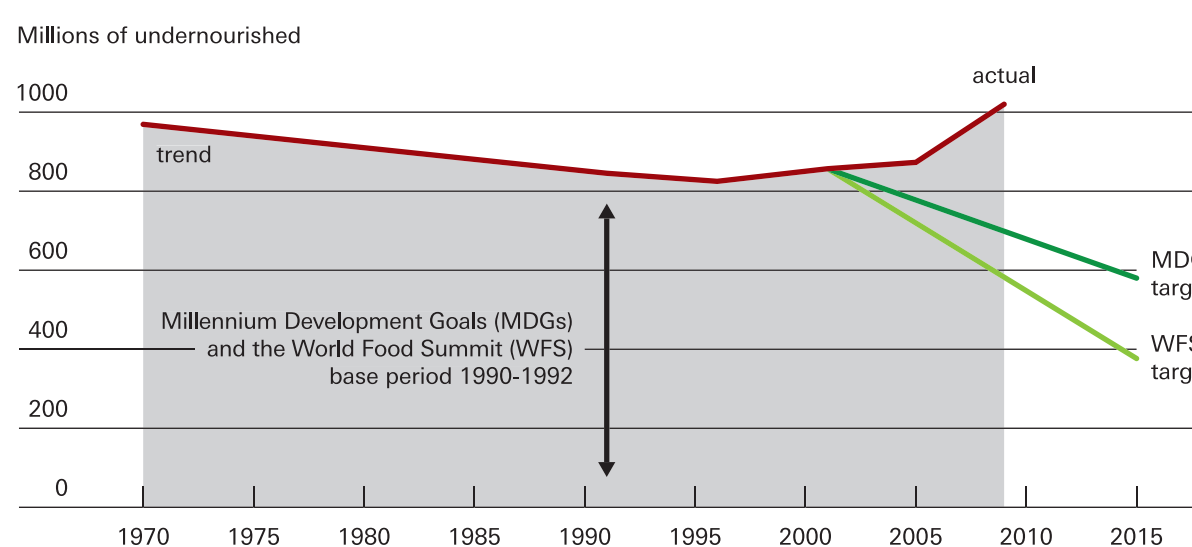
### Growing Demand

Some 200 000 people are added to the world's population every day. And an increasing number of them are able to afford more than just a daily bowl of rice. The food productivity successes of the past 50 years and the resultant increase in caloric intake have made life expectancy grow significantly. The result: by the year 2050, we will have to feed 9 billion people on this earth, an increase of 34% above our current 6.7 billion.

### Declining Growth in Productivity

Productivity growth has declined for several reasons. One is the degradation of soil, which has been significant over the last 20 years and could reduce global food production potential by up to 12% over the next 25. There has been a general rise in farming costs, as well as resistance in some parts of the world (notably Europe) to new technologies, such as genetically modified seeds. There are clearly differing opinions on the merits of using new technologies to solve food supply problems. The question is should the well-fed be deciding on whether to use them to feed the starving? Finally, what should be done about the worldwide shortage of water? As currently projected, this will cause shortfalls in cereal production by 30% over the next five years. Clearly, if these trends are not reversed, the consequences will be catastrophic.

## Number of undernourished people in the developing world



source: FAO

Creating Shared Value | Nutrition | Water | Rural Development



For more on Nestlé's commitment to sustainable rural development visit: [www.creatingsharedvalue.org](http://www.creatingsharedvalue.org)



Improving food security and rural development: a Nestlé project in Ghana, Nigeria and Côte d'Ivoire to reduce mycotoxin contamination in Maize

### Learning from Past Success

Over the past 60 years, beginning with the "Green Revolution" in 1945, agricultural productivity has consistently grown, and peaked in 2008, when more food was produced than ever before. Food prices, indexed to wages, fell by 75% between 1950 and 1990, reducing the proportion of the population starving globally. Life expectancy has risen, partly due to increases in adequate average calorie intake globally.

We were on the right track but did not fully understand the challenges ahead of us. Now, we need to draw on our experience and use it to inform our efforts to meet them.

### Creating Shared Value and food security

Trends in food production and population growth pose serious problems. But if there are tough times ahead for food suppliers, there are also opportunities.

Nestlé believes that for a business to be successful in the long term, it must create value not only for its shareholders but also for society, including farmers who supply raw materials, employees, consumers and local communities. Nestlé calls this Creating Shared Value and focuses efforts in three key areas: nutrition, water and rural development.

Nestlé does not own agricultural land, but we have one of the largest private efforts to help farmers be more productive and climb out of poverty. We provide nearly 600 000 farmers, many of whom are women, with free advice, technical assistance, and over £18 million in micro-credit. This is to help them produce greater yields of higher quality crops while conserving precious water, benefiting the environment and increasing their income. As the result of this and our 460 factories, whole regions in rural areas gain from wider employment and economic development opportunities. And consumers know the products they buy are safe, of high quality and produced using sustainable agricultural practices.

Nestlé is just one stakeholder among many in the area of food security, and we seek to work with other major stakeholders - governments, NGOs, FAO, agricultural institutes and farmers' organisations - in addressing what we believe to be the most serious and basic problem facing us today: how to feed the world.

For more on Nestlé's commitment to sustainable rural development visit: [www.creatingsharedvalue.org](http://www.creatingsharedvalue.org)

### The 5 Critical Actions to Assure Food Security:

1. Producing necessary quantities of basic calories and proteins sustainably, given the limitations on water, arable land, etc.
2. Generating reliable incomes for farmers
3. Making food affordable for low-income consumers
4. Ensuring high quality, safe food
5. Safeguarding access (food at the right time, in the right form, at the right place)



## Business & Food Sustainability

# The importance of a local connection

### Entrepreneurs

**Sarah Murray** reports on a wave of development that has nothing to do with aid

Traditionally, the task of feeding the world's poorest people and raising incomes for small-scale farmers has been seen as the preserve of multilateral institutions and development banks. But in recent years, a new wave of social entrepreneurs has entered this arena. Many are coming up with products and systems to serve poor communities through everything from the production of nutritional foods to systems that improve milk yields from cows.

Social entrepreneurs use a variety of business models. Some might be for-profit groups with a social mission. Others could be non-profit organisations embracing a revenue model, while many are hybrids, in some instances with support from governments. However, they are united in their aim

to use market drivers to tackle social and economic problems.

Often, too, they are locally based. When it comes to issues of food and agriculture, this is critical. Many of the places where food is scarce lie in areas outside the reach of bigger national companies or multinationals that might otherwise provide access to technology or act as buyers. "In that context they are cut off," says Bruce McNamer, chief executive and president of Technoserve, a US-based non-profit organisation that provides business advice and access to markets and capital to entrepreneurs in developing countries. "So what are the alternatives? It's local entrepreneurs, farmer groups or innovators playing their part."

Because technologies that can improve farm yields and increase profitability are often unaffordable, this is one area of focus for social entrepreneurs. In Pakistan, for example Jassar Farms, a dairy farming business, is coming up with affordable ways of improving milk yields. Milk is one of the country's most important agricultural com-

modities, yet 75 per cent of Pakistan's livestock farmers own fewer than four cows and their animals are less productive than those in the west – with six required to produce the same amount of milk yielded by a single cow in Europe or the US.

The high-quality imported semen needed to improve livestock breeding is too expensive for most of these farmers, so Jassar Farms is developing a local semen production facility to lower the cost of artificial insemination.

Irrigation systems are also too expensive for most poor farmers. Here too, entrepreneurs in India and Africa are stepping in. In Africa, the MoneyMaker pumps sold by KickStart – a US-based non-profit group that develops and markets technologies – have helped almost 90,000 families start new small farm businesses.

KickStart says the pumps should not be given away for free. For a start, the small profit it makes on each sale helps support the organisation's operations. Moreover, KickStart argues that, because purchasing the pump requires a commitment, more than 80 per

cent of those it sells are used to create a business, compared with less than 30 per cent of donated pumps.

Often it is not technology that is new about initiatives – it is the sales and distribution model and the fact that farmers can see a return on their investment.

"There is a role for donors in subsidising the initial applied research and to catalyse markets where

Often it is the sales and distribution model and the fact that farmers can see a return on their investment

the cost of entry is too high," says Mr McNamer. "But unless the application of these technologies long term is commercially viable they won't continue to be applied."

Often, the innovation is organisational rather than technical. Contract farming, for example, is a way of giving smallholder farmers better access to markets higher-quality inputs and training on

how to use those inputs.

Monitor Group, a US consultancy that last year produced a report called Emerging Markets, Emerging Models found examples of individual entrepreneurs starting contract farming schemes for everything from a cassava processing plant in Africa to gherkin producers and poultry farmers in India.

Mike Kubzansky, co-author of the report, says that contract farming schemes lend themselves to the participation of social entrepreneurs. "You just need someone who can understand the quality, sorting, grading and volume requirements of larger buyers but you don't need to be a large company yourself," he says.

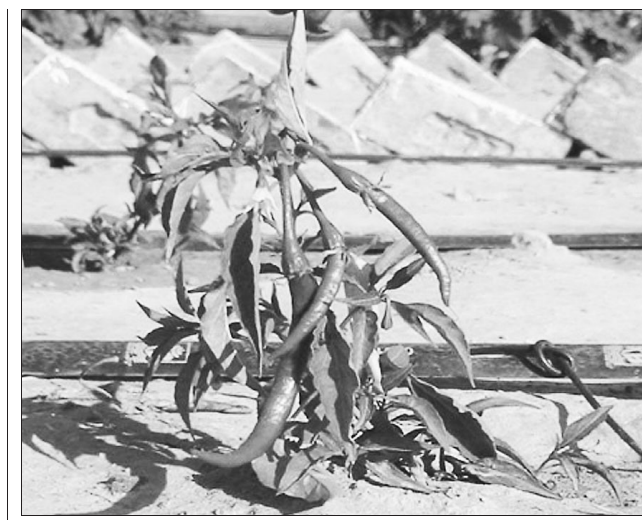
As well as helping farmers boost their incomes, entrepreneurs are looking at ways of providing poor communities with access to low-cost nutritious food products. In Nicaragua Yamin Gonzalez and her husband run a small enterprise called Fábrica Pochi, which produces and distributes purified water, carbonated water, juices, and traditional and frozen treats. The company is working

with Agora Partnerships, a non-profit group that provides support to entrepreneurs.

In Kenya, a company called Insta Products is developing a porridge product that is both cheap and rich in the micronutrients that much of the population lacks. However, while Mr Kubzansky believes social entrepreneurs can play a significant role in both enhancing food security and increasing returns for smallholder farmers, he has a word of warning: "You should do one or the other, but not both."

This is because to sell food to the poorest communities, the objective is to create products with the lowest possible prices. The aim when it comes to small-scale farming is to maximise profitability.

"Most of the things we saw that tried to both provide a customer goods and provide livelihoods by building local distribution or local production, ended up pricing themselves out of their market," says Mr Kubzansky. "It's conceivable that someone has cracked the code on how to do both but it's not obvious how to do that."



GEWP system has raised farmers' incomes by \$400 a year

## Some rubber tubing and a foot pump

### Technology

**Sarah Murray** on the advantages of small-scale irrigation systems

Increasing poor farmers' access to yield-enhancing technology does not always mean transplanting expensive systems from the rich world into developing countries.

Often, social entrepreneurs on the ground are able to devise products and systems that are simple and affordable, yet make a big impact on yields and small-holder incomes.

Global Easy Water Products (GEWP) has done this in India for farmers who operate plots of between one and four acres, often in places where water is increasingly scarce.

"We know farmers whose fathers never had a problem with their bore wells and now they're finding they don't have enough water to take care of their fields," says Katie Hill, the Hyderabad-based India portfolio manager at Acumen Fund, the social venture fund that has invested in GEWP's technology. The company has developed a drip irrigation system that consists of a bicycle-tire inner tube and requires no electricity for the pumping mechanism but instead has a foot-pedal pump.

"It's labour intensive but the one thing poor farmers often do have at their disposal is labour," says Ms Hill.

According to Acumen Fund, the system has raised the income of smallholder farmers by an average of \$400 a year, increases crop yields by 30 to 70 per cent and delivers water savings of between 30 and 50 per cent.

Unlike the micro-irrigation systems designed for larger farms by companies such as Jain Irrigation Systems, a large Indian irrigation supplier, GEWP's system has no expensive emitters or other components.

Affordability is critical to smallholder farmers. India has about 100m of them living on less than a dollar a day who, along with their families, represent more than 30 per cent of the world's extreme poor.

Managing cashflow is their biggest challenge.

Most of them work in horticulture because it requires smaller up-front investments and the crop turn-around period is three or four months – rather than the longer period needed by many crops for which the turnaround is up to a year.

"A big principle of the design is that the products are infinitely expandable," says Ms Hill. "Farmers may only be able to purchase enough for a quarter of an acre and will want to test it out first. So this does not necessarily require a huge initial investment but it's infinitely expandable."

If pricing is an important component of the system, smallholder farmers need flexibility in other ways, too. Some may have only one acre but might be cultivating four crops.

"So you might not want an irrigation system that's going to sit there in the same location for a year, but one that you can move around with flexible tubing," explains Ms Hill. Originally developed by a non-profit organisation called International Development Enterprises India, GEWP was incubated within the non-profit group from 2005 until it had developed a robust market and sufficiently strong profit margins, at which point, by the end of 2007, it was spun out as a stand-alone for-profit enterprise.

Affordability is critical to India's 100m smallholder farmers who live on less than a dollar a day

Moreover, unlike some of the larger companies that now produce low-cost irrigation systems, and receive government subsidies to do so, GEWP decided not to apply for state funding.

A number of considerations lie behind this decision. First, government subsidies are only available for products that comply with ISO standards, which would have made them unaffordable for small-scale farmers.

Second, in India subsidised manufacturers may wait up to six months to get paid for any product and therefore require a large working capital budget.

"Then there's a big concern around corruption and bureaucracy," says Ms Hill. "And instead of listening to customers and designing for customers, you're listening to what government dictates."

Finally, while market demand is what sustains for-profit products, subsidised ones rely on policies that continue to back them – something that may cease with a change of government. "Then you've created a whole business around depending on that subsidy," points out Ms Hill. "And in India, given the politics, it's quite unpredictable."

# Corporate sector backtracks on fat facts

### Obesity

**Jenny Wiggins** explains why companies are trying, belatedly, to make a difference

When policymakers realised a few years just how fast obesity rates were rising, food companies were caught off guard.

Criticised for producing too much junk food, makers of fizzy drinks, chocolate and crisps claimed the obesity epidemic was not their fault. Lack of exercise, not diets, was the problem, food companies said.

But early attempts to dodge responsibility backfired as the extent of the obesity problem became clear.

The World Health Organisation considers obesity an epidemic. Adult obesity is now more common globally than under-nutrition and is the third biggest cause of premature death and disability in the affluent world after smoking and high blood pressure, according to the International Association for the Study of Obesity (IASO).

Meanwhile, a green paper on public health launched by the UK's Conservative Party this month said Britain had the highest obesity rates in Europe, with a quarter of adults and a sixth of children now considered obese.

Alarmed at how fast obesity rates were rising, governments put pressure on food companies to cut back on fats, salts and sugars.

PepsiCo today claims its European business has "dramatically" changed the ingredients that go into its food products, with its

Walkers crisp brand containing 70 per cent less saturated fat and up to 55 per cent less salt than it did five years ago.

The snacks and soft drinks group says it is introducing a range of dry roasted nuts in the Netherlands with 30 per cent less fat and investing €20m in a new European research and development centre to invent healthier snacks.

Kraft, the US food group, says it has reformulated or launched more than 5,000 "healthier choices" since 2005, including reducing salt levels in its UK DairyLea cheese range by 30 per cent since 2002.

Companies have also voluntarily cut back on the marketing of junk foods to children following government pressure.

In the UK, the Conservatives' green paper is calling for the food industry's self regulatory marketing code to be extended across all media – including online – and an "an agreed form of robust evaluation".

Food companies are today more willing than they used to be to admit they need to share responsibility for tackling the obesity problem.

Mella Frewen, the director general of the Confederation of the Food and Drink Industries of the European Union, says: "There's no silver bullet...we're aware we have an important role to play."

Despite concerns the recession would encourage companies to backtrack on commitments to provide healthier foods to save money, companies say they remain committed to removing fats, salts and sugars and developing healthier products – even as some continue to argue their products are not at fault.

Kellogg's claims breakfast cereals – which it says contain less sugar than a slice of buttered



Measuring up: companies have voluntarily cut back on marketing junk food to children

Getty

toast and jam – reduce weight.

"People who eat breakfast cereals, regardless of sugar content, are slimmer than those who don't," says Tim Mobsby, president of Kellogg Europe.

Many food companies are promoting programmes that encourage healthier lifestyles in schools.

Early attempts to dodge responsibility backfired as the extent of the obesity problem became clear

Nestlé, Mars and Ferrero have been supporting a French programme called EPODE (Ensemble prévenons l'obésité des enfants or Together let's prevent childhood obesity) that is being extended from France to Spain, Belgium and Greece.

The programme, which involves four European universities as well as the European Commission, claims to be "behaviour centred" and gets families involved in discussions with dietitians over the food that children are being fed.

Still, obesity specialists say the food industry's efforts at reformulating products and reducing portion sizes are not enough to bring obesity rates down.

Neville Rigby, an independent consultant on obesity and health policy, says: "The food industry has failed to make healthier products the mainstream offering...it must do more."

Mr Rigby criticises confectionery and snack foods makers for continuing to promote their products, such as offering three for the price of two, as well as introducing processed foods into emerging markets where people have traditionally had a healthier diet due to the absence of manufactured foods.

Tim Lobstein, policy director for the IASO, argues that companies need to make fewer processed foods and switch to products made from fresh fruits, legumes and other vegetables.

"There's a fundamental contraction in the commercial world which is trying to sell us more food while the message should be to eat less," Mr Lobstein adds.

Obesity activists are, however, getting support from unexpected quarters.

As makers of bottled water have come under attack for contributing to environmental problems by selling water packaged in plastic, they have fought back by arguing that water is a healthy alternative to soft drinks.

Swiss food group Nestlé, which owns bottled water brands such as Perrier and Poland Spring, says: "Our product is probably the healthiest beverage when you consider the growing concern of obesity."

# Exploring a market-based approach to malnutrition

### Case study Insta Products

**Sarah Murray** reports on efforts to address 'hidden hunger'

Soon, low-income families in Kenya will be able to add to their diet a pre-cooked porridge product that is rich in proteins and vitamins and supplies the nine essential amino acids required by the human body. The porridge will not be

delivered under the auspices of an aid agency or a government-funded programme.

Most families will buy it as part of a revenue-based approach to attacking malnutrition.

The market-based approach to malnutrition is something being explored by large companies such as Unilever, PepsiCo and Danone, as awareness grows of the need to address malnutrition – something that affects not only the poorest communities but also higher income populations – and the potential of doing so through for-profit

products. However, some believe that there is a role for smaller entrepreneurs in coming up with hybrid models that can address what is often known as "hidden hunger".

It is for this reason that Acumen Fund – a New York-based social venture fund that provides financing to enterprises using market-based approaches to addressing poverty – has invested in Insta Products, a Kenya-based private company that supplies organisations such as the World Food Programme and Unicef with emergency relief food.

"The majority of their revenue is going to come from the big aid contracts," says Omer Imtiazuddin, health portfolio manager at Acumen Fund, which is working on these types of food products with the Geneva-based Global Alliance for Improved Nutrition, a non-profit group that promotes public-private partnerships to fight malnutrition. "But for Insta this could be a significant source of revenue."

The food product Insta is developing – known locally as uji – is particularly well suited to Kenyan tastes, as



'If you don't get the right nutrients at two years, 90 per cent of the battle is lost'

Omer Imtiazuddin, Acumen Fund

the porridge is eaten by 80 to 90 per cent of the local population across all age groups and income segments.

The fortified version is badly needed. Many women in Kenya suffer from low micronutrient intake during pregnancy, making it hard to gain the necessary weight for the development of their babies.

Moreover, children who do not have sufficient micronutrients in their diet before the age of two years may suffer loss of IQ or stunting – a condition that is alarmingly common among Kenyan infants.

"Most of the research shows if you don't get the right nutrients at that point, 90 per cent of the battle is lost," says Mr Imtiazuddin.

Acumen Fund's investment will, over the next six years, allow Insta to establish a local factory to produce and distribute up to 12,600 tonnes of the porridge a year.

It will also help pay for product launches and marketing campaigns.

The porridge will be priced so that it is affordable for low-income families, with 25 US cents buying a 100-gramme packet that provides

a nutritional meal for four.

Mr Imtiazuddin believes consumers are often suspicious when big western corporations enter a market with products that address health and nutrition. A smaller company such as Insta will meet less resistance.

"Our hope is to take that product and start trying to sell it into kiosks and lower-income slum areas where the need is much greater," he says.

"The only way to solve this is by continuously educating the population, as well as ensuring there is access to the products."



# Plenty of guilt and a very heavy footprint

## Food waste

**Fiona Harvey** reports on the need to alter behaviour

One of the more uncomfortable byproducts of modern, globalised western economies is the scale on which food is wasted.

For decades, increasing agricultural productivity and prosperity in the developed world have meant food prices have generally fallen, especially as a proportion of income.

Cheap food, changing lifestyles and farming and retail practices have encouraged waste on an increasing scale.

In the UK, for instance, at least 8.3m tonnes of food is thrown out every year, of which 5m tonnes is perfectly edible. About a third of all the food the average British household buys is thrown away uneaten, a level of waste that costs households several billion pounds a year, but which often goes unnoticed.

In the US, disposing of food waste costs upwards of \$1bn a year, according to the Environmental Protection Agency.

The problems of wasting food are economic, ethical and environmental.

As well as representing a waste of resources, and contributing to shortages and higher food prices in developing countries, food generates a high proportion of greenhouse gases – food production and consumption represents about a third of the UK's carbon footprint, a figure likely to be similar for other developed economies, according to a report from the WWF, the green campaigning group.

Mark Driscoll, of the WWF, says: "The full impact of our diets on climate change is astonishingly high. We must stop chewing over some of the issues and start making change happen – both in terms of technology and behaviour."

Tara Garnett, head of the Food Climate Research Network, adds: "We now know enough to conclude that the food system contributes very



Bin sin: in the UK, at least 8.3m tonnes of food is thrown out every year, of which 5m tonnes is perfectly edible. In the US, disposing of food waste costs \$1bn a year

Ben Stansall

substantially to the problem of climate change. We also know enough about where and how the impacts arise to start doing something about them. Business as usual – and even business-as-usual-lite – is no longer an option."

The two most important ways of reducing food waste are to change business and consumer behaviour so that less food is thrown away in the first place. For instance, retailers have long

tempted customers with special offers, such as enticements to "buy one, get one free", encouraging customers to buy more food that goes uneaten before its sell-by date.

Some retailers are trying a new approach. Tesco, the supermarket chain, this month introduced deals for shoppers to "buy one, get one free later", whereby they can return another day to claim the free half of the offer.

Lucy Neville-Rolfe, executive

director, says the move will cut waste: "Feedback shows smaller households sometimes can't use the free product before its use-by date. Now we're giving customers flexibility by claiming their free product the following week instead."

Other habits may be harder to break. In his book *Waste*, Tristram Stuart catalogued the extraordinary waste in the food production industry that comes from retailers rejecting the large

amounts of food that falls below its exacting aesthetic standards, and from systematically over-ordering food to keep on presenting consumers with full shelves.

Consumers can also be induced to change the way they eat, encouraging the thrifty use of leftovers and more realistic buying habits. But some food waste is unavoidable, and so they can also be asked to recycle it. Part of the large carbon

footprint of the food industry comes from the disposal of waste food in landfill, where it rots and generates quantities of methane.

Re-using food is sometimes controversial – the European Union changed some of its regulations on using leftovers as animal feed following the outbreak of foot-and-mouth disease in 2001 that devastated the UK's farming industry.

The outbreak was traced to a farmer who had failed to follow good practices in making swill from leftovers, which turned out to contain infective material from imported meat.

This cut off one of the most traditional ways of reusing food waste. But there are alternatives.

Waste oil can be used directly as a fuel. Argent Energy in Scotland is one of the world's first plants turning waste cooking oil into a diesel vehicle fuel substitute. McDonald's, Tesco and others are also re-using waste oil as a fuel for their delivery vans.

Anaerobic digestion is a way to turn solid food waste into fuel. This can be done in centralised waste depots, or on farms, where slurry or manure can be used as a fuel.

In Germany, there are an estimated 4,000 anaerobic digesters on farms, producing gas that can be burned to generate electricity, and heat that can be used to warm local buildings.

At present, most anaerobic digesters are intended for large installations, costing between £750,000 and £1m.

Payback can be achieved within a few years, however, with annual savings running to £200,000-£300,000, according to the UK National Farmers' Union. Smaller units are under development.

Compost is another use for recycled food – though not just in the familiar compost heaps used by gardeners.

Giant composting units are springing up across developed countries, where food is taken into huge vessels to be mulched down.

The resulting compost can be returned to farms, though in some countries it must be subject to safety tests before being used on food crops.

Retailers reject food that falls below aesthetic standards and over-order so as to present consumers with full shelves



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## Business & Food Sustainability

# Plan for the future from fork to farm

### Supply chains

Many initiatives have been launched to ensure a robust system, says **Ross Tieman**

Building sustainable supply chains is not just about counting carbon emissions, says Professor Mohan Munasinghe, director general of the Sustainable Consumption Institute at Manchester University in the UK. Rather, it is about choosing development and production patterns that can still function "in 50 years' time".

The professor, who first unveiled his "Sustainability" framework at the Rio Earth Summit 18 years ago, identifies four "core principles" that any food manufacturer or retailer needs to keep in mind for a sustainable supply chain.

Development, he says, needs to become sustaina-

ble, whether it is growing tea in Sri Lanka or beef in Brandenburg. Second, the three "key dimensions" of sustainable development – economic, social and environmental – must have equal priority.

He is emphatic about this. Farmers in much of the world need higher incomes, he says. Food production regimes that degrade soil or water resources, or that lead to social breakdown, merely stock up problems for the future. But if farmers can husband resources and earn enough to pay for water, electricity, health-care and schooling, those services will come to them.

Third, humans need to acquire "sustainable values". The shift in thinking needs to run from farmers right through the supply chain to consumers.

Finally, retailers and manufacturers need integrated tools to make a full life-cycle analysis of their products. This must span, he says, "from growing tea to picking, to shipping, to retailing, to brewing the tea

to disposal of the tea-bag". That is a pretty sweeping list, but the professor is an optimist. "It's not rocket science," he says. "These are not intractable problems. We can do it."

In the past couple of years, an awful lot of people in the food industry have come round to Prof Munasinghe's way of thinking.

Mella Frewen, director general of the Confederation of Food and Drink Industries of the EU (CIAA) says: "Sustainability is about a lot more than just carbon and carbon footprinting." The CIAA, she says, is working "with the entire supply chain from fork to farm", tackling economic, environmental and sourcing issues.

Countless initiatives have been launched, often embracing international and government agencies and non-governmental organisations, such as the European Food Sustainable Consumption and Production Round Table, chaired by Pascal Grévarath, director of environmental

sustainability at Nestlé. Food retailers, too, have begun serious efforts to develop environmentally sustainable supply chains. Altruism may play a part, but David North, consumer and government director at Tesco, a UK-based international supermarket group, insists there is also a strong commercial reason to

A study found that fruit and vegetables, meat and dairy were the biggest sources of carbon emissions

develop sustainable supply chains. "The supply chain is the big prize," he says. "We think that in the future many of our customers are going to care about this: we think this will be an area of competitive advantage."

Last year, Tesco started looking both upstream and downstream in its supply

chain. The company had achieved big environmental improvements in its own distribution activity. Yet studies suggested the environmental impact of suppliers was about 10 times greater than that of its "in-house" activities, while the impact after goods were purchased was 100 times greater.

It is now looking for a 30 per cent reduction in carbon emissions among suppliers by 2020, while aiming to help consumers halve emissions arising from their purchases by the same date.

Data about upstream carbon emissions is lacking. Nonetheless, by the end of next month Tesco aims to have established the carbon footprint of 500 of its products. Details will be added to the product label. Consumer choices will be closely watched.

Mr North reckons CO<sub>2</sub> emissions and cost are generally synonymous. "We can reduce costs by stripping out CO<sub>2</sub>," he says, and making supply chains more resource-efficient should

make them more resilient. A study for Tesco found that foodstuffs were the biggest sources of carbon emissions, headed by fruit and vegetables, processed foods, meat and dairy, and beverages. Consumer goods were a long way down the table.

Euan Murray, head of carbon footprinting at the Carbon Trust, a not-for-profit group whose PAS 2050 standard has been adopted by many companies, says big retailers and food manufacturers are engaging with suppliers and farmers around the world.

He says: "A farmer can't tell you what his carbon footprint is, but he knows all about stocking density, the feed he grows, and so on. He has the necessary data points."

Fragmentation of suppliers means thousands of farmers and suppliers have to be drawn into dialogue.

Today, the biggest challenge for development of sustainable supply chains is gathering information. Communication, and then action, will be the logical next steps.

# Burping cow is just part of the problem

### Livestock

Reducing ruminant emissions will be a complex task, writes **Ross Tieman**

Few consumers feel a stir of conscience about global warming when they drink a glass of milk, eat chocolate, or chew a lamb chop. Yet greenhouse gas emissions from livestock exceed those generated by transport.

Concern over the contribution of livestock to global warming was crystallised in 2006 by a report from the United Nations Food and Agriculture Organisation, Livestock's Long Shadow: Environmental Issues and Options, which concluded that livestock generate 14-18 per cent of greenhouse gases.

And it is not just carbon. Ruminants such as cows digest grass, which we cannot, releasing methane from the process by burping. Also their urine adds to nitrates (urea) in the soil.

Animals produce 37 per cent of all human-induced methane (23 times more warming than CO<sub>2</sub>) and 64 per cent of ammonia, which contributes significantly to acid rain. Add in the effect of clearing forests to supply the world's growing appetite for meat and dairy produce, and animals' consumption and pollution of water, and livestock emerges as a big part of the climate change problem.

Retailers, food producers, farmers and researchers have launched a slew of initiatives designed to confront the problem, mitigate emissions, and seek a long-term solution. The International Dairy Federation, with its Global Dairy Agenda for Action on Climate Change, launched last year, aims to spread research findings and best-practice. Retailers such as Sainsbury and manufacturers such as Cadbury, the UK chocolate maker, have started working with farmers, discovering in the process that relatively simple changes in herd management can trim emissions of CO<sub>2</sub> gases.

A study by Cadbury in collaboration with the Carbon Trust, a UK government sponsored organisation to help build a low-carbon economy, found that for every litre of milk, we produce 900g of carbon. Cadbury's recommendations for better husbandry, circulated as part of its work with supply-chain farmers, show that mitiga-

tion efforts can make a difference. Improving animal health and ensuring a lower fibre diet, with more starch, can improve milk yields per gramme of CO<sub>2</sub> while manure can be collected and processed to extract methane that can be fed into gas distribution grids or used for power generation.

But Tom MacMillan, executive director of Britain's Food Ethics Council, questions whether "abatement" alone is the answer. "We haven't focused enough on the consumption side," he says. "Do we need to change the amount and type of meat and dairy products we eat?"

For best practice will not achieve the kind of reductions the world needs. In New Zealand, which exports more than half of its food production, supplying 35 per cent of the world's traded dairy goods, economic and climate incentives have prompted a big research drive.

Andrew West, chief executive of AgResearch, the country's largest state research body, says that today, after a decade of research, best practice can

'Do we need to change the amount and type of meat and dairy products we eat?'

only achieve gains of "a few per cent".

But teams at his new greenhouse gas mitigation research centre aim to find ways to cut livestock emissions by "at least 50 per cent" within a decade.

Every aspect of ruminant emissions is being studied. Already, it is clear that grazing cows on pasture with high-tannin plants can cut methane output by 15 per cent.

But the most crucial research is designed to stop methane production in the animal's rumen, either by feeding it molecules that disrupt certain enzymes, or through a vaccine that boosts the production of saliva, which acts as a buffer.

Mr West does not underplay the ethical or scientific challenges.

"The rumen evolved over millions of years and we are attempting to permanently manipulate its methane output over a very short period of time," he says. "The same goes for nitrous oxide emissions from soil; the microbiology is equally complex and evolving."

# Inputs that place huge pressure on the land

### Agricultural pollution

Fiona Harvey reports on the need to target the use of fertiliser and pesticides more carefully

Intensive agriculture has enabled the production of cheap food around the world, and the massive population expansion of the past six decades. The growth of "agribusinesses" that have consolidated the raising of livestock from small farms into huge centralised units, and transformed cropland from a patchwork quilt of fields into vast acreages of monoculture crops, has led to efficiencies, yield increases and economies of scale unthinkable before.

But the benefits of this intensive form of farming have been accompanied by new forms of pollution and put strains on natural resources such as soil quality and water supplies.

Fertiliser, pesticides and animal manure can all cause serious problems when they enter water supplies, and intensive extraction of groundwater to feed crops and livestock can lead to salinisation and shortages.

Under the influence of toughened regulation in the developed world, farmers have made increasing efforts to contain this pollution, with some success.

"Historically, you had lots of problems with gross pollution incidents," says Michael Payne, an environmental consultant and adviser to the UK's National Farmers' Union.

These were often occasions when catastrophic quantities of slurry or chemicals were allowed to enter waterways owing to carelessness on the part of farmers.

Such releases could lead to the rapid death of fish and other marine and bird life, and to dangers to human health.

But much has been done to help prevent such incidents, Mr Payne reports, such as reinforced stores for slurry that are much less likely to overflow or break, and more effective ways of managing chemicals.

Today, a larger problem – at least in developed regions such as Europe – is that of diffuse pollution, by which substances gradually seep out of storage or are washed out of the soil.

These include the residues of pesticides and fertilisers, which can seep into waterways and groundwater and find their way into human drinking supplies.

The application of inorganic nitrogen fertilisers worldwide has risen more than ninefold in the past 50 years, according to the World Resources Institute, dramatically increasing the amount of nitrogen entering soils, freshwater and marine ecosystems.

Drinking water standards have been raised in many rich countries, forcing water companies and farmers to address these concerns. Farmers have a much wider range of pesticides and fertilisers available to them now, tailored to be less harmful to the environment, but still detectable and potentially problematic.

Diffuse pollution is hard to contain, however. "[Agricultural chemicals] are diffused through the environment and you can't pretend there will be no effect," says Mr Payne. "But we can do our best to minimise the effects."

One way of doing so is to target the application of fertilisers and pesticides to the areas of cropland where it is most needed and most effective, and to use basic methods such as checking weather forecasts to guard against applica-



Sprayed out: fertiliser and pesticides can all cause serious problems when they enter water supplies

Getty

tions of chemicals being washed away by the rain, and having to be repeated.

These might seem like common-sense but in the past farmers have been under less pressure to adopt such measures.

Farmers can be encouraged to use them by the lure of saving

The application of inorganic nitrogen fertilisers has risen more than ninefold in the past 50 years

money. "High precision techniques are key way to minimise resources," says Mr Payne.

Another method is "integrated pest management" (IPM), which borrows some principles from organic farming, but allows pesticides to be used, sparingly. For instance, physical barriers can be set up against some insects and weeds, and traps can be set.

Introducing natural predators can remove some pests, and planting certain crops together can discourage weeds, while other plants act as natural fertilisers. Rather than spraying for all weeds, some can be mechanically extracted.

Monitoring of the environment is essential, as some outbreaks of insects only occur when a certain temperature is reached – and thus farmers can predict with great accuracy when their spraying will be most effective.

These techniques are harder to employ than simple spraying, but they save money. The WRI reports: "In a number of cases, IPM has proven not only better for health but more economical than pest control based solely on agrochemicals."

In Brazil, about 40 per cent of commercial soybean farmers have switched to IPM since the 1970s, saving more than \$200m a year as the result of the reduced use of insecticides, labour, machinery, and fuel. They have moved from spraying five times a season to once or twice a year, cutting pes-

ticide use by 80 to 90 per cent.

However, worldwide only a relatively small proportion of farmers are using such techniques. The WRI says promoting a switch to IPM "will require more education and training at the farm level, along with continuing research and...adjusting those subsidies and policies that encourage extensive pesticide use".

Even where pesticide and fertiliser use has been minimised, however, environmental groups say much needs to be done to remove the dangers from agricultural pollution. "The pesticides problem has not gone away," says Sandra Bell, food campaigner at Friends of the Earth. "It's still a serious concern."

One alternative that could lead to lower fertiliser and pesticide use is growing genetically modified crops, which their proponents say can give better yields and are resistant to some pests. However, the extent of these benefits is disputed, and many consumers – chiefly in Europe – remain unconvinced of GM's safety.

# A fresh perspective on tracking supermarket produce

### ID tags

A shared supply chain may be the answer, says **Ross Tieman**

Does an electronic tag costing just 10 centimes of a euro hold the key to developing the more sustainable supply chains we will need in the future?

Radio Frequency Identification (RFID) tags have failed to achieve the widespread adoption that many were forecasting almost a decade ago. But a two-year pilot project in the Netherlands using RFID tags to track the flow of fresh vegetables from farm to super-

market has shown fascinating cost and environmental benefits.

Creating an efficient supply chain to stock supermarkets with fresh produce matters more than you might imagine. Fresh fruit and vegetables sourced from a variety of countries are a staple of our diets. Because they decay fast, we buy them every few days.

They arrive at big retailers by the tonne and are often displayed at the entrance to the store. So ensuring they are at the peak of freshness is critical to retailers, consumers and the environment alike: a wilted lettuce or brown bananas thrown away are a waste of human effort and money. In environmental terms, they represent

carbon needlessly produced.

Getting the right amount of fruit and vegetables to the store, in perfect condition, with a minimum of carbon released during transport, is the ultimate low-carbon supply chain challenge, with lessons for distribution of other goods.

Tomorrow's supply chains are likely to look increasingly different from those we use today. A report from the Global Commerce Initiative, a manufacturer-retailer alliance to promote better supply chains, warns that many changes are on the way.

The study, 2018 Future Value Chain, highlights consumer trends and pressure to reduce carbon footprints as two of the biggest drivers of change. In emerg-

ing countries, consumers are still discovering supermarket shopping. In developing countries, home delivery is on the rise, and everywhere, online shopping attracts new customers. That is changing distribution demands, at a time when retailers and manufacturers are seeking to cut their carbon footprints and their costs.

One way to solve this conundrum, the report concludes, is a shift to shared supply chains. Shared logistics could improve efficiency of transport, and reduce the number of half-empty trucks and vans congesting cities. But goods travelling in shared loads need to be instantly distinguishable and traceable. RFID tags can provide the



'RFID systems require close co-operation... between partners'

Ard Jan Vethman, Capgemini

information that would enable delivery driver, distributor and retailer to track the goods and ensure the right product reaches the right customer, and minimise the carbon footprint.

So what are the lessons from the use of RFID tags to track the humble lettuce? The Vers Schakel project was a collaboration between seven interested parties, embracing a supermarket, its suppliers, and technology specialists and the Wageningen University.

Its mission was to discover whether there were benefits from putting lettuces into RFID-tagged crates at the packing shed, and tracking them through the supply chain until the contents were sold and the crates returned. It sounds

simple, but unlikely problems had to be overcome. Finding a glue to stop the tags falling off the crates proved difficult, and iron ions in some green vegetables made first-generation tags unreadable.

But Ard Jan Vethman, global RFID leader at Capgemini, one of the participants, says that knowledge of where each crate was all the time yielded clear benefits. In-store quality improved, because the system could send automatic text or e-mail alerts if a crate was left out of the fridge too long.

The quantity of vegetables thrown away was reduced, because staff could easily get them from the retailer's fridge in date order, but also because eve-

ryone knew how much stock was in the supply chain, and where. Improved information "enabled the retailer to ensure nothing went out-of-date", Mr Vethman says. The producer got a surprise bonus: fewer rush orders meant less overtime paid. Across the system, the investment payback proved to be 2.7 years.

The cost and environmental benefits were clear. But to reap them, information had to be shared. "One of the biggest challenges of RFID systems," says Mr Vethman, "is that they require close co-operation and agreements between partners along the entire supply chain". That, rather than the 10 centimes a tag, may prove the bigger barrier to greener products.



Poor cow: research is set to stop its production of methane



# Slowdown in Gulf states' dash for farmland

## Mideast supplies

Andrew England reports on diminished sense of urgency as food crisis eases

Eighteen months ago, food was the hot topic in the Arab Gulf and the cause of much angst. Soaring prices of staples such as rice and wheat were helping drive inflation to record highs, a phenomenon that threatened to tarnish the benefit of the region's oil boom. Then, as the global food crisis took hold, exporting countries such as India restricted exports.

These trends sparked a wave of concern in the import-dependent states of the Gulf – just how could the desert nations secure food resources for their growing populations? Their reaction was to look abroad with a rush of announcements about planned farming projects overseas.

Details of such schemes started emerging from Saudi Arabia, the United Arab Emirates, Kuwait and Qatar, with the Gulf states planning to deploy their petrodollar wealth to acquire or lease land overseas, harvest rice, wheat, soya beans and corn, and then export the produce back to their home markets.

The most active was Saudi Arabia, by far the Gulf's most populous state and the region's main agricultural producer. But

shortly before the food crisis struck, Riyadh had decided to phase out domestic wheat production by 2016 after realising that its wheat-growing programme – set up in the late 1970s – was no longer sustainable given the country's finite water resources.

Saudi Arabia had been producing 2.5m tons of wheat a year before it began phasing out the crop, and is now set to become a big wheat importer.

In a bid to seek out suitable lands for the kingdom's overseas projects, Saudi officials have visited a number of countries, in Africa, Asia and eastern Europe, with a goal that the minimum size of a plantation would be about 50,000 hectares.

Riyadh hopes the private sector will lead the overseas projects, with the government playing a supportive, facilitating role. Last year it announced it was setting up an \$800m company to back the projects.

The UAE has also talked about possible projects in Kazakhstan and Sudan, while Qatar established Hassad Food, which is an arm of its sovereign wealth fund, to look at acquiring stakes in agricultural companies.



Where's the wheat? Saudi Arabia has started phasing out the crop and is seeking suitable land overseas

Alamy

In November, Doha also announced it was setting up a national food security programme to research technologies that could bolster the prospects of domestic agricultural production.

Yet there is a general sense that the urgency among Gulf states to pursue

their programmes has diminished as food prices have dropped, with few projects actually beginning on the ground. Another reason for the decreased attention is likely to be a result of the controversy the plans sparked, with concerns about the image of oil-

wealthy Arab nations shipping crops away from impoverished countries such as Ethiopia and Sudan that suffer from perennial food shortages.

There are also questions about the ability of the Gulf states to move forward with their projects.

"If they are serious, there is still a lack of capacity and experience that needs to be overcome," says Eckart Woertz at the Gulf Research Centre. He says Gulf states would be better off adding investments in existing agricultural businesses in established mar-

kets than focusing on setting up new projects in countries that have poor infrastructure.

Still, Saudi Arabia is pushing ahead with its plans, officials say, albeit at a slow pace. "There is some progress. There's no doubt it [the initiative] will go ahead," says Abdullah al-Obaid, the deputy agriculture minister. "Now we are finalising the holding company and doing a study of our strategic reserves for stable goods."

He says the government is also working on bilateral agreements with potential host countries, and an important issue is to avoid the stigma of being seen as a land-grabber.

"We are looking for the benefit of the whole world and would like to increase international production," Mr Obaid says. "We are willing to leave some of the produce for the local market – we want to ensure benefits for all stakeholders."

Countries the kingdom is considering include Ethiopia, Sudan, Ukraine, Cambodia, Vietnam, the Philippines, Turkey and Egypt. A number of Saudi agricul-

tural companies have also expressed interest in the overseas projects, with some beginning pilot schemes in Egypt, Sudan and Ethiopia. However, analysts say the extent of the private sector participation is likely to be dependent on the level of government support they receive.

Experts say if properly managed and carried out in full co-ordination with host countries, the schemes could bring benefits, such as jobs and much-needed investment, in poorer countries. But like other Gulf states, the kingdom will face big difficulties if its plans are to be implemented.

"They are not going as fast as maybe there were portraying, or at least as they were expecting, and the reaction from some of the private sector has been sceptical ... but they do not have a lot of options," says John Sfakianakis, chief economist at Banque Saudi Fransi. "One thing is identifying the location, another thing is actually exporting. ... They are at the embryonic stage and it will take some years to get results from this."

## Feeding people and saving planet

Continued from Page 1

within the walls of large well-funded corporations. In India and Africa, for example, the low-cost drip irrigation systems developed by social entrepreneurs and non-governmental organisations (NGOs) have improved yields and reduced water and energy use for smallholder farmers, raising their incomes in the process.

The private sector can also have a positive impact on poor farmers – simultaneously enhancing food security by bringing them into procurement systems, a strategy that has the added advantage of giving corporate buyers a more diverse and therefore secure supply chain.

In parts of Africa, one project – a public-private initiative bringing together Unilever, the Anglo-Dutch consumer products group, and a range of NGOs – is helping local farmers develop seeds from the allenblackia tree into a new crop that will provide oil supplies for Unilever products such as soap and margarine.

The company is also working with Oxfam, the UK-based charity, to connect smallholder farmers in rural Azerbaijan and Tanzania to Unilever's global supply chain.

In Africa, Diageo, the drinks company, has shifted procurement for its breweries from imported barley to grain grown by local farmers through a project to help smallholders cultivate a variety of sorghum that can be used in beer. As a result, Nigerian farmers have reported a 35 to 50 per cent increase in their yields and Diageo's breweries in Nigeria now source 95 per cent of the grain they need locally, supporting about 27,000 jobs.

For food companies entering emerging markets, business opportunities lie not only in bringing smallholder farmers into their supply chains but also in feeding the appetites of consumers with rising incomes. In cities such as Beijing and Shanghai, affluent shoppers enjoy everything from Belgian chocolates and French cheeses to Italian olive oil and Japanese noodles.

But with business opportunities come responsibilities, and many companies are recognising the potential to use their products' increased access to vitamins and minerals and address a widespread condition known as "hidden hunger", thought to affect 2bn people worldwide and in infants causes loss of IQ and stunting.

Companies such as Tetra Pak, the world's biggest packaging company, Groupe Danone, the French

food company, Unilever, and DSM, the Dutch life and material sciences group, are experimenting with different models of food fortification – many of them working with the Global Alliance for Improved Nutrition, a non-profit organisation that promotes public-private partnerships to fight malnutrition.

Meanwhile in developed markets, business opportunities exist in feeding consumer appetites for Fairtrade and ethically sourced foods that also meet high environmental standards.

In the UK, this trend even seems to be defying the downturn, according to the Co-operative Group, which this month reported that sales of Fairtrade wines grew by 36 per cent, with sales of Fairtrade confectionery rising by 26 per cent.

In recent years, British retailer Marks and Spencer has demonstrated the power of the ethical shopper with its Look Behind the Label campaign, which uses transparency on environmental and labour standards to appeal to the country's increasingly ethically minded shoppers.

When it comes to tackling obesity, consumer power has combined with pressure on the part of health authorities to push food companies into action. Regulatory measures have helped. In New York, for example, fast food chains must now post calorie counts alongside prices on their menus.

However, companies have also been driven as much by the carrot as by the stick, as they look to serve health-conscious consumers while also demonstrating their corporate responsibility credentials by, for example, taking measures to lower the consumption by children and teenagers of sugary sodas and junk food.

The risks and opportunities for today's food industry are manifold.

Producing sustainable supplies of food is not only critical to the world's rising population, but also provides opportunities in developing countries as well as in mature markets, where a growing band of ethical and health-driven shoppers are shaping food companies' product development strategies.

At the same time, companies need to address risks, particularly those associated with their impact on natural resources. This is being driven not only by the desire to quell the anger of environmental activists but also – with evidence that climate change will affect their ability to cultivate food commodities – to guarantee the sustainability, in every sense of the word, of their profitability.

# Our secret formula for innovation? Sustainability.

Coca-Cola and our bottling partners around the globe have a unique ability to help make a meaningful difference in our changing world. Our supply chains extend around the world and our products reach more than a billion people every day. Thus we are committed to developing sustainability-driven innovations to build a better tomorrow.

## Product Innovation

In 2009, we continued to expand our product portfolio to include even more options for managing energy intake, and we committed to front-of-pack energy labeling worldwide. Of the more than 3,000 beverages we offer today, more than 750 are either no- or low-calorie. We've also started to introduce reduced-calorie beverages using rebiana, a new sweetener from the stevia plant that provides a clean, sweet taste without calories or carbs.

## Packaging Innovation

PlantBottle™ packaging, our PET plastic bottle made with up to 30% plant-based material, is one of our most recent packaging achievements. It's 100% recyclable, like our existing PET plastic bottles. It's also one of the most important parts of our commitment to sustainable packaging, which includes utilizing packaging materials more efficiently, recycling more and advancing the use of recycled and renewable content in our bottles and cans.

## Refrigeration Innovation

By the end of 2010, we expect to improve our equipment's energy efficiency by at least 40%. And by 2015, we anticipate that 100% of our new vending machines and coolers will be HFC-free, reducing carbon emissions by 52.5 million metric tons over the life of our refrigeration equipment globally.

What's good for the planet is good for our business. Working in partnership, we can innovate our way to a greener future. To learn more about what we're doing and why we're doing it, join us at [www.sustainability.thecoca-colacompany.com](http://www.sustainability.thecoca-colacompany.com)

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