ACOMMERCIAL FEATURE

THE SUSTAINABILITY SERIES: FOOD SECURITY

Researched, written and co-ordinated by:
Carole Knight – 021 855 2982
or e-mail whiterock@worldonline.co.za

Will you have enough to eat tomorrow?

CAN you imagine a world in which chicken nuggets are grown without the chicken and cultured meat is grown in large sheets on thin membranes with the tissue being "exercised" and stretched so that it has the texture and appeal of real meat? Can you imagine having a meat-maker sitting next to the bread-maker on your kitchen counter and being able to control the flavour, nutrients and fat content of your cultured beef, chicken, pork, lamb or fish according to your individual taste?

This science fiction scenario is not as far-fetched as it at first seems, as experiments for NASA space missions have shown that small amounts of edible meat can be created in a laboratory and although perhaps aesthetically abhorrent to us now, scientists believe that tissue engineering could have significant benefits in terms of a people-abundant, but food-scarce and environmentally fragile world of the future.

As a result of domestic production and the ability to generate sufficient foreign exchange from exports to enable us to import shortfalls or products that we do not produce locally, South Africa is food secure at a national level. However, we cannot afford to be complacent about this situation because, as in all SADC countries, at a local level there are severe shortages of food among some communities, with mainly rural people being vulnerable to malnutrition and hunger.

Also, growing balance of payments problems in which the value of imports far outstrips the value of exports, together with a cornucopia of serious issues for commercial, emerging small-scale and subsistence farmers to contend with, could tip the balance towards food insecurity, with a gap widening between food production and imports and food needs turning us at best into a nation of food importers and, at worst, into dependents on food aid as millions of southern African men, women and children already are.

Climate change and food production

With a carbon dioxide level at 379 parts in a million and rising, which is the highest concentration in our atmosphere in 420 000 years, we are entering a "heat age" as evidenced by hotter temperatures, rising sea levels, shrinking polar ice caps, melting glaciers and the die-outs of species unable to adapt.

According to the Intergovernmental Panel on Climate Change, an increase in global air temperature of between 1.4 and 5.8°C is predicted by 2100. If this doesn't seem like too big a jump it should be remembered that the difference between a warm temperate interglacial, such as we are living in right now, and an ice age is only three to 5°C and an average of just 9°C separates the mean temperature of today from the very coldest points of both the last ice age and the penultimate ice age, making the cumulative effects of this warm-up extremely serious.

In terms of food production, a marked increase of carbon dioxide in the atmosphere, with a resultant increase in global temperatures, would mean that some crops would pass through their stages of growth more quickly than normal. Another response to an increased carbon dioxide atmospheric concentration would be the growth of larger leaves in some plant species which would mean fewer plants a hectare, with smaller crop yields.

From a distribution perspective, as climatic zones shifted in response to changing weather patterns, bringing more rain to some areas of the globe and less rain to others, farm belts would change location with agriculture thriving in some parts of the world while declining in others. Some important food-producing regions would be lost while others would be gained. This would mean that global food supplies would be even more unevenly distributed than at present, which could have serious social, economic and political implications as the balance of world power shifted in relation to food surpluses and shortages.

Global warming in Africa

According to a report from a coalition of UK aid agencies and environmental groups, the African continent has experienced an average temperature rise of 0.5°C over the past 100 years, with temperatures in some areas such as a part of Kenya, which has become 3.5°C hotter in the past 20 years, having risen much higher.

This increased average temperature has seen arid or semi-arid areas in northern, western, eastern and parts of southern Africa becoming drier, while equatorial Africa and other parts of southern Africa, such as Mozambique, becoming wetter, making many of the problems that Africa is already facing much worse.

Although climates across Africa have always been erratic, scientific research conducted for the report indicates "new and dangerous extremes", with climate change being labelled an "unprecedented threat to food security", with increased average temperatures, freak storms, altered wind patterns, increased wind and water erosion problems, changed patterns of humidity and rainfall and decreased access to water causing "possibly cataclysmic change".

The Western Cape is an important stone fruit-growing area which produces nectarines, plums, peaches and apricots, and it is estimated that during this century annual rainfall could decrease by between 15 and 25%, with temperatures increasing by two to 6°C.

Less rainfall and warmer temperatures could impact negatively on fruit production in the area, with abnormal flower bud development, delayed foliation, fruit drop and poor fruit set affecting the canning, drying and fresh fruit consumption industries. A pattern of high winter temperatures could result in poor chill accumulation for certain commercial deciduous fruit cultivars which have a medium to high chilling requirement resulting in crop losses.

This trend would mean financial hardship for both large-scale commercial and emerging small-scale farmers alike, as well as less sustainability of the deciduous fruit-growing industry and related agribusiness of the region. This would, in turn, create loss of jobs with attendant socio-economic problems. It would also affect foreign exchange earnings.

Land competition and emerging industries

On the African continent, more than 350 million people are on a collision course with nature as they depend directly on the environment for their livelihood and, with a staggering 73% of agricultural drylands on the continent thought to be degraded, food crisis is a very real threat. While land degradation results from natural factors, such as climatic variations which cause flooding and drought, factors such as the overgrazing of livestock contribute in a major way to lost productivity of land.

With only 13.5% of South Africa's land surface being suitable for food production, topsoil is a resource of immense importance, yet every year more than 460 million tons of topsoil is lost from poorly managed agricultural lands by wind and rain. An estimated 34 000 hectares of productive land is also lost to agriculture every year for purposes other than farming. Spreading informal settlements, housing developments, industrial landscapes, office parks, shopping malls, recreational facilities, landfill sites, road works, quarries and mines render huge tracts of ground unavailable for food production. By the middle of this century, this could mean that there will be only 0.2 hectares a person available on which to produce food in South Africa, which is far below international norms.

Compounding the competition for available land and the edible crops it is able to produce is the emergence of industries such as the biofuels industry, which converts maize, soya, canola and other oil seed crops into bioethanol and biodiesel. Projected to achieve 75% of the country's renewable energy target of more than a billion litres of biofuels by 2013, through a 4.5% biofuels market penetration of petrol and diesel, they are nevertheless controversial.

From a positive perspective, biofuels could help to reduce carbon emissions and dependence on imported crude oil. They are also likely to create a larger market for grain and oil seed producers, especially emerging farmers. However, by diverting land from food to energy crops and by changing the dynamics of supply, the biofuels industry could become a threat to future food security because, as maize and other oil seed crop hectares are increased due to a demand for biofuels, areas planted with food crops could decrease, reducing biodiversity while causing the price of maize and other food crops to rise steeply, making traditionally staple foods such as maize unavailable to, or unaffordable for, many South Africans.

Equally controversial in terms of food security are genetically modified (GM) crops.

Supporters of GM technology believe that it is the answer to food insecurity through greater yields and superior, introduced traits such as insect and herbicide resistance, while detractors hold the viewpoint that because the translocation of genes between unrelated species is still an inexact science, genetic engineering raises legitimate concerns with regard to important issues that include ethics, human health and the emergence of new plant diseases and virulent insect pests.

The sea as sustainable provider

Located at the confluence of three great oceans, the Indian, Atlantic and Southern Oceans, South Africa's coastal waters, with their warm Agulhas and cold Benguela currents, are an exceptionally rich marine environment, with a great diversity of ecosystems and marine species constituting an enormously valuable national resource.

Historically, South Africa's fisheries have been well managed, with the result that, comparatively, we have one of the healthiest fisheries in the world with record catches of some fish species such as pilchards, a small pelagic (top) fish used for canning and fish meal, producing an average of more than 200 000 tons of fish a year over a number of years.

Worldwide, however, fish stocks are declining with more than 76% of harvested fish stocks being fished at maximum levels or overfished and with many local fish stocks, including high-value line fish species such as seventy-four, kabeljou and red steenbras, having been severely depleted. South Africa is following this trend despite exponentially increased effort and the technological sophistication of GPS positioning and echo sounding equipment.

As a key source of protein, South Africa's fisheries contribute significantly to our food supply, economy and national health, and for many fishing communities they are a major source of income and employment. However, fisheries are dynamic with fluctuations occurring as a result of complex and diverse factors ranging from human pressures brought about by illegal and unregulated fishing and "technological creep" to environmental factors such as sea temperature changes from El Niño and other climatic events.

Fluctuations in pelagic or surface fisheries, such as anchovies, are immediately noticeable with a fast recovery rate of two to three years which can be built up through stringent regulation. However, a decline in demersal or bottom fisheries such as hake, sole and prawns takes longer to be noticeable with recovery taking as long as five to 12 years. Some long-lived species such as red Roman and red stumpnose take decades to recover from unsustainable yields and, if exploited beyond their regenerative capacity, some fisheries such as the North Atlantic cod never recover. In a bid to keep fish stocks at a sustainable level and the industry viable, authorities have reduced the total allowable catch for many commercial species and drastically cut overall fishing quotas.

Almost a third of all fish harvested is dumped as by-catch each year, which is a staggering waste of marine life. Because demersal trawling of the seabed is an indiscriminate method of fishing, high levels of by-catch may be caught along with the targeted species.

In this way, for every ton of prawns caught on the Tugela Banks up to four tons of fish are dumped, and a trawl in an inappropriate place such as a shallow rocky reef could result in finfish, sharks, rays, squid and octopuses being caught and discarded as by-catch, which is adversely affecting the biodiversity of our oceans.

Although aquaculture has been the fastest-growing food production system over the past decade, providing 50% of the world's fish, which has filled the gap between the worldwide demand for fish which has grown due to the increased human population and fish stocks that have seriously declined, it is not a quick-fix solution to providing a sustainable protein resource for the majority of South Africa's people.

As an emerging industry, aquaculture, with its specialised marine offshoot, mariculture, currently produces high-value species such as abalone and oysters, which are too expensive for wide-scale domestic consumption, and although research and development is underway to produce a wider array of high-value marine species such as kabeljou, white steenbras and yellowtail, production methods are still in the commercial pilot stage. In the meantime, we will have to look to the sea with its wild fish stocks to be a sustainable provider.

Food security affects us all, for enough food now could well be too little food tomorrow. Besides taking greater care of the land and sea, South Africa's war on hunger will be waged in our hearts and minds. Already much is being done in terms of agricultural sustainability to mitigate the effects of carbon-induced climate change with, for example, new fruit cultivars that have a lower chilling requirement being developed and new ways of stretching essential freshwater supplies being sought. However, we each have a part to play and there is much that we can do to influence our household and national food security situations.

Sustainability is the most relevant and promising construct yet devised to take us further into the 21st century. Hopefully, it will pave the way for enough food for everyone in South Africa in the future.

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The Enviropaedia
The Southern African Sustainable Seafood Initiative, *Know your Seafood? Think twice…* www.wwf.org.za/sassi

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What you can do

- Join or support an environmental organisation. There are a host of organisations to choose from according to your particular interest. Their newsletters and magazines will keep you updated while your membership will increase their lobbying power;
- Become involved in your local community with projects such as food-growing initiatives in communal food gardens. Look for opportunities to provide assistance, share knowledge and contribute resources;
- Buy gardening and other supplies, such as seeds, from NGO resource centres so that your spending power can help to educate and train others;
- If possible, buy in bulk to reduce packaging and lobby companies to package their products in environmentally-friendly, recyclable packaging;
- Support pick-up points for paper, glass and other recyclable packaging materials;
- Plant fruit trees in your garden for year-round fruit harvesting;
- Invest in a rainwater tank and install some bird-nesting logs;
- Cut out chemicals and recycle your biodegradable garbage into compost for soil regeneration;
- Use recycled animal manure, such as pig manure, as a form of high-quality plant fertiliser;
- Become an informed, concerned and active consumer. When eating out or buying seafood make sure that your choices come from sustainable fisheries. Ask where the fish is from, what it is and how it was caught. If you see illegal species, such as white musselcracker or white steenbras, on a fish restaurant menu or in a fish market, alert the restaurant or fish market manager about the illegality of buying or selling these species;
- Exercise your consumer rights by inquiring as to the origins of products, such as frozen pork, which may have been imported from other countries that do not adhere to the stringent health regulations that South African Pork Producers subscribe to;
- Shop ethically. Only buy goods, products and services that contribute to environmental and social good;
- Boycott unethical companies and products;
- In terms of labelling use your consumer power to lobby supermarkets for GM food labelling and look out for fish products with the international Marine Stewardship Council (MSC) label which means that the species has been certified as a sustainable catch; and
- Only buy imported goods if these types of products are not produced in South Africa.

The next title in this series is *The Energy Revolution*. Contact Carole Knight on the details supplied above for further information.

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