

AGRITOURISM

Creating closer links between producers and the tourism industry

INTERVIEW

Robert Oliver discusses how cuisine can be a tool for development in the Pacific

HYDROPONICS

An eco-friendly and climate-smart approach to water management

N°181 | June-August 2016

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A new look for Spore

Michael Hailu, director - CTA



Spore has undergone a complete makeover. With a revamped website and more in-depth publication, we aim to attract a wider audience, especially women and young people, as well as readers from civil society and the private sector, amongst others.

The new-look, quarterly *Spore* magazine provides a global perspective on agribusiness and

agricultural development. In particular, we focus on innovations that are transforming smallholder agriculture for food security, nutrition and inclusive economic growth. Also featured are a mix of interviews and case studies, giving a voice to those working to meet challenges posed by climate change, postharvest losses, poor market access and other constraints to agricultural transformation.

With a fresh and eye-catching layout, the printed magazine offers new topics of interest, including a more thorough dossier bringing complex topics to life, with field reports, photos and infographics, and a new section dedicated to agribusiness – featuring small and medium enterprises, trade, finance and value chains. New developments in the blue economy, and nutrition and health are also included, amongst other thematic articles, from across the ACP regions.

The new *Spore* website encourages sharing of different opinions and insights, exchange of information from the field, and enables readers to participate fully in the debate, suggest topics and express their own views. In the new blogs section, experts give their view on important issues. There is now scope for you – the *Spore* reader – to post your own blog on an upcoming topic, or for suggesting one that you would like us to address. You are also encouraged to comment on articles, publications and blogs.

The addition of new regional pages to the website makes it possible to focus on news and developments that affect readers' own countries and regions, or to investigate how people are tackling similar challenges in other parts of the ACP. A press review offers an international round-up of the latest relevant agribusiness articles, many of them from ACP publications.

This makeover is the starting point for *Spore* to better reflect realities on the ground, promote greater private sector engagement, share success stories of what really works, as well as capture innovations in climate-smart and nutrition-sensitive agriculture and evidence-based policies. *Spore* strives to further develop its content through new partnerships with other media, development organisations and key stakeholders, including our readers.

✦ Visit *Spore's* new website: www.spore.cta.int

AGRITOURISM

Creating links

In Caribbean and Pacific island states - where over 90% of food is imported - agritourism is encouraging the development of local markets and creating closer links between producers and the tourism industry.

Susanna Cartmell-Thorp

Well established in developed countries as 'farm vacations', agritourism has traditionally involved tourists paying to stay on farms, participating in farming activities and interacting with rural communities. This type of tourism is now taking off in other regions. South Africa's agritourism, for example, is booming. Farm holidays and wine tours, amongst other activities, are a valuable means of generating income for South Africa's farmers in a challenging agricultural and economic environment. Agritourism is now the fastest growing sector in the country's ecotourism industry.

A more nuanced approach to agritourism - particularly in the Caribbean and Pacific - is linking agriculture to tourism by stimulating entrepreneurship, agribusiness and local markets. Local cuisine is an essential component in this new development trend; adding value to domestic and regional agricultural products also improves island food and nutrition security.

In the Caribbean, agricultural productivity is often constrained by inade-

quate agricultural practices, high post-harvest losses, poor access to improved agricultural inputs and credit, as well as limited water resources and vulnerability to climate change. As a result of these and other factors, the Caribbean is a major importer of fresh and processed foods with imports having increased from €1.75 billion in 2000 to €3.75 billion in 2013. With significant financial, food security and health-related problems, the region is under pressure from a public-debt-to-GDP ratio estimated at 80% in 2014 and a rising prevalence of non-communicable diseases (NCD).

Across the Pacific, 70% of agricultural areas are dependent on seasonal rainfall and many islands are at risk from rising sea levels, coastal erosion and seawater inundation. Agricultural production and productivity have stagnated, investment has been limited and producer and exporter organisations are weak. Traditional foods have increasingly been replaced by imported, highly refined foods and, with rapidly rising obesity rates, NCDs (including diabetes, heart disease and cancer) account

for about 70% of all deaths across the Pacific region. Where sufficient land is available, linking agriculture and tourism provides a promising opportunity to stimulate inclusive economic growth in islands states. However, to serve the tourism market, local producers need to find profitable and competitive ways to sustain local sourcing in terms of volume and regularity, and meet quality demands as well as food safety requirements.

Agritourism for sustainable economic growth

While agriculture, for most countries across the Caribbean and Pacific, remains the main livelihood source for the majority of the population, its contribution to added economic value has declined over the last decade. In contrast, the tourism sector has seen significant growth and is the 'lifeblood' for many fragile island economies. Combining agriculture and tourism therefore offers opportunities for sustainable economic growth and is a promising avenue for diversification and increased trade.



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Tourists visit a cocoa plantation in the Caribbean

Hotels, lodges and resorts require high quality, nutritious and healthy food every day of the year. Yet the tourist industry spends surprisingly little within the region, even when local supplies are readily available. Shifting food-sourcing to local farmers, fisherfolk and small-scale agribusinesses is not without its challenges. However agritourism linkages are evolving; across the Caribbean and Pacific, tourism is stimulating demand in the local agriculture sector, promoting healthy and nutritious food, as well as celebrating traditional cuisine and culture. “It is in this context that CTA and partners have launched the Chefs for Development initiative to stimulate sharing of best practices and promote the role of chefs as economic drivers and game changers,” says Isolina Boto, manager of the CTA Brussels Office and project leader on regional trade.

In 2013, according to the Caribbean Tourism Organisation, 25 million tourists visited the Caribbean region spending approximately €24.8 billion. With luxury hotels, all-inclusive resorts and cruise ship tours, the Caribbean has, for

A leading light

A champion for the development of Caribbean agritourism is the Inter-American Institute for Cooperation on Agriculture (IICA). Since 2002, IICA has promoted sustainability and competitiveness in rural communities by producing food and craft goods, and establishing community-based tourism sites.

Supporting rural communities is key to IICA’s work. Since 2012, IICA has worked with CTA on developing agritourism initiatives and recently has partnered with CTA and other regional organisations to develop a Culinary Alliance of the Caribbean. This is part of a regional Food Tourism Strategy and a vision that ‘where the cuisine goes, agriculture follows’. Collaboration with Pacific partners is allowing the sharing of agritourism best practice and supporting the Chefs for Development platform (see p. 16 ‘Cooking local, stimulating business’).

many years, secured its position on the tourism map. According to the World Travel and Tourism Council, in 2012, the contribution of tourism to GDP in Jamaica was 27%, Barbados 39%, The Bahamas 48%, and as high as 77% in Antigua and Barbuda.

Linking cuisine to agriculture

Global trends, including climate change and green economies, nutrition, health and heritage conservation, are all driving agritourism growth. Current market research indicates that tourists increasingly prefer authentic products and experiences linked to local foods, culture and heritage. Importantly, tourists are willing to pro-actively select and pay a premium for such products and experiences. Top dining trends also show that internationally recognised hotels and restaurants, as well as world-renowned chefs, are investing in local agricultural and food as part of their response to climate change and rising import costs. Chefs are increasingly experimenting with the flavours and colours of island cuisine. ▶

➤ An example of the private sector investing in agriculture is the Farmers Programme initiated and supported by the Sandals Group, a resort chain with properties across seven Caribbean island states. Established in 1996 with the Rural Agricultural Development Authority, the programme creates demand for local products among staff and customers and supports local farmers to deliver the quality and quantity of produce required. “Our group buys nearly €350 million of farmers’ produce a year. As a policy, we do not import agricultural supplies unless they are not locally available,” states Keith Collister, director of special projects for the Sandals Group.

Larry Rogers, owner of Cin Cin Restaurant in Barbados agrees with this approach, “As restaurateurs and chefs, we need to keep building our relationships with local farmers and fisherfolk. Our farmers have become more efficient in dealing with restaurant demands. Shawn, my purchaser, will visit four or

five different farms in a day, plus the fish market, because if the produce doesn’t have to travel for days before it arrives in my kitchen, the fresher it will be.”

Dane Saddler, founder of Villa Chefs, a private dining service for villas and businesses in Barbados, is another strong believer in showcasing local produce for a luxury market. However, by promoting Caribbean cuisine, he is optimistic that that it will have a wider impact: “I would like to see more menus featuring local ingredients to encourage people to use these ingredients at home, ultimately creating a more sustainable food industry.”

“Culinary tourism is hot,” says Ena Harvey of the Inter-American Institute

***“As restaurateurs and chefs,
we need to keep building our relationships
with local farmers and fisherfolk.”***

for Cooperation on Agriculture (see p. 3 ‘A leading light’). “In Barbados, we are seeing more and more chefs linking with organic farmers, local fisherfolk and small producers to produce fine dining and farm-to-table events.” She continues, “Encouragingly, we are also now seeing more institutional support for agritourism initiatives. One exciting development includes the Barbados Hotel and Tourism Association receiving a €3.5 million grant from the Multilateral Investment Fund of the Inter-American Development Bank Group in early 2015. Linking hotels with micro, medium

Culinary tourism is growing in the Caribbean where lodges and resorts require high quality food

© J. RICHTER



and small enterprises, the initiative is, for example, supporting a new group of small producers. Known as the ‘Emerging Brands of Barbados’, their products include fudge made from sheep and goat’s milk, local salad dressings, beverages and a range of handcrafted items.” At least 150 small businesses and 30 hotels and restaurants across the island are expected to participate in the 4 year project.

Promoting and sharing best practice

Whilst the desire and demand to promote local products is evident, farmers need support to overcome barriers and gain the skills and technology to cultivate better quality goods. Targeting 10,000 farmers across Antigua and Barbuda, Barbados, Grenada, Jamaica, St Lucia, and St Vincent and the Grenadines, a new initiative implemented by the Caribbean Farmers Network, and funded by CTA and the Sandals Foundation, is working to build profitable value chains to attract more lucrative markets, including the tourism industry, for key crops such as roots and tubers, fruits and vegetables across the region. “This Caribbean value chain alliance will leverage private sector partners to create growth in the agricultural sector,” says Juan Cheaz of CTA. “As we work, we will learn what works best and we will share this knowledge with others to promote agribusiness across the region.”

Sharing knowledge across regions and exchanging experiences is the approach of CTA and partners as lessons transferred from Caribbean initiatives to the Pacific is very much in demand. “Tourists walk past fields in the islands full of crops struggling for export while their evening meal is being made with ingredients imported in shipping containers. We can use this situation to the advantage of all by changing demand for local nutritious produce,” says Chris Addison, regional coordinator for the Pacific at CTA. In Fiji in July 2015, the 1st Agribusiness Forum, organised by Pacific Island Private Sector Organisation, CTA and the Secretariat for the Pacific Community,

“Pacific island chefs are playing a unique role in linking agriculture and tourism through their knowledge of local foods.”

Agritourism policy setting in the Pacific

To support national campaigns for nutritious and healthy food, Vanuatu is bringing together its ministries for agriculture, trade, tourism and health. The country is leading the way in designing the first agritourism policy framework in the Pacific. Traditionally, agriculture (including fisheries), trade, health, environment and tourism policies across Pacific island states have been developed in isolation from each other and very few linkages have been identified or pursued. However, as the result of the 1st Pacific Agribusiness Forum in 2015, Vanuatu was selected to be the first pilot initiative to promote sustainable use of local food through strengthened multi-sectoral policies for agritourism. Championed by the Ministry of Agriculture, Trade and Tourism in close collaboration with other ministries, regional and international partners (PIPSO, SPC, CTA and IICA), relevant stakeholders participated in a 2-day workshop in Barbados in late 2015 to meet and learn from Caribbean counterparts where agritourism policies are in place. An agritourism taskforce has since been set up representing the relevant ministries and private sector to prepare for the first national agritourism week in June 2016.

✦ For more information: <http://tinyurl.com/zthtjm>

highlighted agritourism successes in the Caribbean and Pacific. However, a need to develop agritourism policies to facilitate linkages between agriculture and tourism at national and regional levels was identified as a key issue.

The forum recommended that the first policy pilot be launched in Vanuatu (see above ‘Agritourism policy setting in the Pacific’). “The Agribusiness Forum in 2015 served as a major catalyst for new beginnings and change in the Pacific, and more so for us in Vanuatu,” stated Howard Aru, director general of Agriculture of Vanuatu, at the opening of workshop in Barbados to share experiences. “We are eager to link, learn and to help transform the Pacific region,” he continued.

As in the Caribbean, Pacific islands chefs are playing a unique role in linking agriculture and tourism through their knowledge of local foods, and abilities to innovate with local cuisine and connect producers to consumers. Jesse Lee, chef and owner of Palusami Restaurant and Bar on the waterfront in Apia, Samoa,

says “We want our local people to know that the little garden patch next to their house is good enough to be served at our restaurant.”

Samoan NGO, Women in Business Development Inc (WIBDI), works with around 1,000 family farms, a significant proportion of Samoa’s farming population. Around 600 of them have been certified organic by the National Association of Sustainable Agriculture in Australia. However, over time, WIBDI’s focus has moved from predominantly organic compliance, to a focus on the farm-to-restaurant supply chain, and the NGO now works in close collaboration with New Zealand chef, Robert Oliver. Tourism industry critiques, however, can be harsh so WIBDI has implemented robust systems, education and capacity building for farmers about the commercial realities of supplying the tourism industry. “It’s one thing to have the produce but if menus don’t include that produce, then we can’t actually get it into the restaurants. The cuisine is definitely an important piece of the story,” says Faumuina Tafuna’i, WIBDI media and communication officer. “It has been a learning curve but we believe that the farm-to-table programme can become a model for other Pacific nations.” ■



Young people at a Transform Africa Youth event. The use of government land for farming has increased employment for youth in Rwanda

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LAND

Attracting young people to farming

Across sub-Saharan Africa, free or affordably-leased government land is enabling young people to take up agricultural production.

Otoyinka Alawode

According to 2011 World Bank research, sub-Saharan Africa has about 1 billion ha of agricultural land, but a small proportion of this is being used by young people. Outright land purchase is often an investment beyond the reach of most would-be farmers so free or affordably leased government land is becoming an attractive opportunity for young people who wish to engage in agriculture.

Emmanuel Habumuremyi, adviser to Rwanda’s Minister of Youth and ICTs, says “The use of government land for farming has increased employment for young people in the country.” Data from



YOUNG FARMERS

In sub-Saharan Africa 67% of the agrarian population is under 35 years old.

the Integrated Household Living Conditions Survey reveals that about 67% of the agrarian population is under 35 years old, meaning at least 6.3 million young people are engaged in agriculture. According to Habumuremyi, one of the reasons for the high involvement of youth is down to the National Employment Programme increasing young people’s access to government land for farming. “Youth willing to practice farming in a modern way are encouraged to form cooperatives,” Habumuremyi adds. “Local governments lend them land and provide technical support through the Ministry of Agriculture.” The land is usually allocated to youth groups and there is no time limit on usage. Each farmer in the group then plants whatever they want based on market demands and what soil conditions allow.

Nchanji Eileen Bogweh, a PhD student from Göttingen University in Germany, has worked with young people in Tamale, northern Ghana who are using government land for dry season vegetable cultivation. “Many youths are involved in farming on government land because they have inherited it from their parents who are now too old to farm,” Bogweh explains. “This land is used as a source of income for taking care of basic needs.” Currently, more than 60 youths are farming on government land that belongs to the Kamina Barracks in

Tamale. Farmers have no formal contracts with the government, so the land is free of charge as long as the government is not using it.

In Nigeria, at least 1 million ha of federal government-owned farmland has been made available for farming in remote villages under the River Basin Development Authority scheme, which exists in about 10 regions. These farm plots cost about €10 per ha for a period of 8 months. Subsidised irrigation facilities can also be rented on some land. Africanfarmer Mogaji, chief executive of Xray Farms Consulting, is one who has benefited from this opportunity. “These lands can be utilised by anyone – whether foreigners or Nigerians – because they are not being used,” Mogaji reveals. “Payment is through a ‘Pay As You Go’ system, like using telephone recharge cards.” This means that farmers only pay for the number of ha they want to use and there is no limit on the period of usage. A farmer can use the land for 100 years or more, but if it is not farmed for more than 1 year, the land is taken back.

In Nigeria, at least 1 million ha of federal government-owned farmland has been made available for farming in remote villages.

Though federal government land is not particularly targeted at young people, greater numbers of youth have been utilising this resource in the last 5 years because it is an affordable way to start farming. The flexibility of the ‘Pay As You Go’ system is particularly attractive for young professionals, enabling them to get a return on their investment (if they have to relocate or get a more demanding job). These young people generally grow short duration crops such as vegetables, maize and rice depending on soil conditions and access to water. According to Nigeria’s National Bureau of Statistics, about 65% of the population was aged between 16–40 in 2015, and of these 37% (about 42 million people) were engaged in agriculture. ■

TRAINING

New centre for AfricaRice

Vocational training for rice value chain actors is the focus for a new centre established in Senegal.

Susanna Cartmell-Thorp

To enhance performance in production, processing and marketing, and overcome the severe lack of capacity across the African rice value chain, AfricaRice has established a new training centre in St Louis, Senegal, to help strengthen the technical capacity of value chain actors. In addition to thematic courses on rice production, specialised modules that promote entrepreneurship and agribusiness will be offered. The training modules will focus on a range of professions, ranging from technical advisory and extension service to mechanical service for agricultural equipment, rice processing and marketing, seed production and quality control, and management of rice-related enterprises.

Equipped with modern computer facilities and accommodation to host 25 participants at any one time, the centre will greatly benefit from its proximity to the laboratories and experimental fields of the AfricaRice Sahel regional station. The station’s team of international rice experts, along with experts from partner organisations, will serve as resource persons in the training courses. ■



Inauguration of the AfricaRice Training Centre

RENEWABLE ENERGY

Solar potential for rural Africa

Renewable energy projects are harnessing solar power at various scales, from households and small businesses to industrial levels.

James Karuga

Across sub-Saharan Africa, rural communities are turning to solar power to meet their energy needs for agriculture, both during farming seasons and after harvest to reduce postharvest losses. One of the ways to reduce losses is through solar drying of fruits and vegetables to increase their shelf life.

In Kenya, Kiburi Food Processors solar dry their bananas, plantains, tomatoes, pumpkin leaves, mangoes and pineapples before packing them, to drain them of water. For mangoes, the fleshy juicy part of the fruit is removed and then solar dried. According to Njoki Wainana, owner of Kiburi Food Processors, solar dried mangoes have a shelf life of at least 1 year. Though dried, they retain the nutrients, flavour and taste of the fresh produce. “We also do solar drying for hygienic purposes as traditional drying processes often lead to contamination with dust or insects,” says Wainana. “It’s also faster, and there is no loss of food colour, which is good for presentation,” she adds.

During farming seasons in the semi-arid Nyando District in western Kenya, subsistence farmers use solar-powered water kits to pump water from rivers, wells or boreholes. The pumped water is stored in a tank connected to a drip irrigation kit for irrigating horticultural farms. Before being distributed through drip irrigation pipes to the crops, the stored water has fertiliser added to it, thereby improving precision application of water and nutrients to the crop and reducing waste. According to Sun Culture, the providers of the solar irrigation kit in Kenya, a farmer can save up to Ksh 20,000 (€180) a month compared to using petrol-powered water pumps. The kit also reduces labour costs from drawing water from a well or river.

Value addition is also spurring the use of solar power. To extract shea butter from nuts, members of Ojoba Women’s Shea Butter Cooperative in Ghana used to roast them in



© PRI

Over 14,000 people are using solar panels in Kenya and Uganda

MANGOES
which are solar dried
can last
at least 1 year.

a drum over a fire. However after trialling solar cookers, the women found the quality of butter extracted to be high and are using the cookers to extract small amounts of shea butter while still using the drums to roast for larger orders.

Across market villages in Kenya and Uganda, solar plants are breathing new life and benefitting over 14,000 people. Using mini-grids, solar plants are powering schools, health centres and businesses ensuring services like refrigeration, lighting, and phone battery charging are available. Kitonyoni, an eastern Kenyan market village in Makeni County, has a 13.5 kWp solar plant that provides electricity to 3,000 locals connected to its mini-grid. Businesses there use solar power for lighting and refrigeration. The solar plants also harvest rainwater for use within the facilities, with the excess being sold to communities.

Adoption of modern renewable sources is rising in Africa and is expected to more than quadruple by 2030 (from 5% in 2013 to 22%), while also helping reduce carbon dioxide emissions by 310 megatonnes, according to the International Renewable Energy Agency (IRENA). IRENA estimates that African solar photovoltaic energy projects will contribute 245 gigawatts by 2030. ■

HORTICULTURE

Lake Naivasha under threat

Kenya's horticultural industry is flourishing, but this success comes at a price. Around Lake Naivasha, where much of the production is carried out, water is scarce and biodiversity is at risk.

Magali Reinert

Kenya is the world's third-largest horticulture exporter, accounting for one-third of all flowers imported into Europe. This booming industry is having a positive impact on the country's economy and supports more than 500,000 jobs. Yet its impact on the environment is another matter entirely. The industry's effects are being felt particularly acutely in the Lake Naivasha region, the source of most of Kenya's floriculture production.

NGOs and environmental agencies have long expressed concern about the impact of irrigated flower crops on water resources. The region is home to some 2,000 ha of flowers, mostly in greenhouses, with producers taking water from Lake Naivasha and local groundwater reserves. As a result, the lake's water level has dropped by several metres. In response, the industry has taken steps to try to protect this vital resource.

Some companies have introduced rain-water collection and water recycling mechanisms, driven in part by the addition of sustainable water management criteria to certification systems. A prime example is Milieu Programma Sierteelt, a certification programme introduced by the Dutch horticultural industry as part of efforts to mitigate its environmental impact. Despite this, many farms remain outside these certification systems and there is limited capacity to perform audits and inspections of certified farms.

Cultivation of land has led to the destruction of wetlands – home to many notable species. The lake is protected under the Convention on Wetlands (known as the Ramsar Convention), which seeks to preserve wetlands of international importance. According to the Lake Naivasha Riparian Association, a local environmental NGO, the rapid intensification of horticulture since the 1990s has caused many species to disappear entirely from the area. Intensive pesticide use is also leading to chemicals entering the lake, which is affecting water quality and posing a threat to biodiversity.

Despite a range of initiatives to protect the ecosystem, mitigation efforts have failed to limit the impact of this flourishing industry on dwindling local resources. The Lake Naivasha Riparian Association has made this threat patently clear by issuing an ominous warning: "The very delicate balance of this ecosystem will soon reach a tipping point where the lake will no longer be able to meet demand for water." ■



Despite its positive economic impact, the horticulture industry is jeopardising Lake Naivasha's ecosystem

Climate change Educating Malawi's schoolchildren

MALAWI'S MINISTRY of Education Science and Technology (MoEST) is implementing climate change education in schools. MoEST coordinator for climate change learning, Jennings Kayira, states that posters and source books with illustrated examples of adaptation and mitigation actions that could be taken by pupils have been piloted in 5,300 primary schools throughout the country. Climate change has also been incorporated in secondary schools curricula, and MoEST has produced 25,000 books to be distributed among 4,200 secondary teachers. The aim of the primary source book is to encourage the next generation of young Malawians to implement climate-friendly practices.

Adaptation Precious organic waste

ADAPTATION IS a key component of the long-term global response to climate change. Nandou Tenkeu Müller is a young Cameroonian student with an acute understanding of the fragility of our environment. His answer has been to produce environmentally-friendly coal briquettes from organic waste. While many local authorities struggle to come up with an effective household plant waste management solution, Müller takes waste products such as banana and plantain skins, maize cobs and sugarcane residues and turns them into a usable fuel. The waste is dried over a period of 4 days and then burnt in furnaces made from recycled drums. The process is explained in detail in a video on the student's blog: <http://tinyurl.com/j9caba6>

SOIL MANAGEMENT

Nuclear technologies for climate-smart agriculture

Across Africa and other ACP regions, nuclear research and soil management applications have helped to increase crop yields and irrigation water use.

Munya Makoni and Jessica Summers

The International Atomic Energy Agency (IAEA) and FAO are helping farmers by monitoring how atoms behave in soil, water and fertiliser throughout sub-Saharan Africa. For example in Sudan, thousands of farmers are benefitting from a combination of drip irrigation and isotopic techniques to grow vegetables more effectively.

“There’s a lot happening at the atomic level in the soil, which can be a rich source of important information that can help farmers,” says Lee Heng, head of the soil and water management and crop nutrition section of the Joint FAO/IAEA

MONITORING
how atoms behave in soil, water and fertiliser can help grow vegetables more effectively.

Division of Nuclear Techniques in Food and Agriculture.

In a press release Heng explained that scientists gathered data using a nuclear-sensitive tool known as a soil moisture neutron probe (SMNP) that tracks neutron behaviour to monitor moisture levels in soil. The scientists also tracked the movement of nitrogen fertilisers by monitoring ‘labelled nitrogen-15 stable isotopes’ – which are different forms of the same element with more or less neutrons – in the soil to determine how effectively crops are responding to and taking up the fertiliser.

“Once the studies were complete, the scientists trained the farmers in an easy-to-understand way so they could maintain their crops and the irrigation and fertiliser systems. The farmers don’t need to understand nuclear science to benefit from the project,” explained

Heng. Trials at the Agricultural Research Centre in Sudan using onion plants showed crop yields – in combination with fertilisers and drip irrigation – increased by more than 40% and water use decreased by more than 60%, when compared to the commonly used surface

irrigation approach that distributes water in an uncontrolled way along the soil surface.

In Kenya, the IAEA has worked with the Kenya Agriculture and Livestock Research Organisation (KALRO) to evaluate the efficiency with which pigeon pea is able to use scarcely available water and capture atmospheric nitrogen. The process – using SMNP technology – has created a cropping system that increased pigeon pea’s yields from 2,500 kg per ha to 3,000–3,500 kg per ha. In light of this, KALRO was selected by the IAEA as a centre for excellence to train regional workers on nuclear applications for agriculture. Up to 30 scientists from African countries including Ghana, Tanzania, Uganda and Zambia have now been trained in KALRO laboratories.

Similar techniques in Ghana and Tanzania have been able to reduce cabbage water requirements by as much as 60% through drip irrigation and increase yields by up to 17 times, respectively. ■



Scientists tracked the movement of nitrogen to determine how crops are responding to fertilisers

Livestock

First African research lab

SCIENTISTS AT the International Livestock Research Institute in Kenya have established a state-of-the-art laboratory to collect crucial research data on greenhouse gas emissions from livestock in Africa. The laboratory, which has equipment such as respiration chambers and manure management gadgets, is the first of its kind in Africa. The research will help to determine actual measures of emissions from livestock and manure and then link them to livestock productivity, feed intake, and health to help explore realistic, locally adaptable mitigation strategies.

Biogas

Affordable digesters

BIOGAS IS an energy source that can be easily produced from organic matter in rural areas. It is an excellent alternative to wood – a resource that is becoming increasingly scarce – but digesters cost a minimum of €400 which is often prohibitive. Two community development organisations in Zimbabwe have introduced a scheme to allow members to build their own digester at home. These simple, fixed-dome digesters are made from brick, cement and sand and are installed underground. Each digester consists of an inlet chamber and an expansion chamber. Bacteria break down organic matter via a process of anaerobic digestion. This process produces methane, which accumulates in the chamber.

MAYA NUT

The life-saving tree

French NGO, Biomimicry Europa, selected the Maya nut as the ‘life-saving tree’ for its reforestation programme in Haiti in the aftermath of the devastating 2010 earthquake.

Magali Reinert

Around 100,000 Maya nut trees have been planted over the last 5 years and the first blooms appeared in 2015/16. The Maya nut is a hardy tree that grows well in degraded soil. The majority of the trees have been planted in private gardens where they help to boost water retention in the soil, restore nutrients and enrich the soil through the humus produced by their evergreen leaves.

Daniel Rodary, head of Biomimicry’s Life-Saving Tree programme, was attracted to the species by one particular property. The Maya nut is an oxalogenic tree that absorbs carbon from the air and sequesters it as calcium carbonate (limestone), through a process of bacterial and fungal symbiosis. This property is particularly important as a mitigation strategy against climate change. According to Rodary, ongoing research also indicates that limestone helps to boost soil quality, acting as a natural fertiliser.

As well as boasting restorative properties, the Maya nut is highly prized as a source of food in its native regions (Central America and the Caribbean). Its seeds contain high concentrations of vitamins and minerals, with a nutritional value similar to soya or quinoa. “The seeds are dried in the sun, like coffee beans, and can then be stored for up to 5 years,” explains Rodary. The dried seeds are ground into a flour, which can then be added to traditional Haitian dishes such as sauces, porridge and fried or sweet doughs. Roasted seeds are also used to make a traditional drink. These



Growing well in degraded soil, the Maya nut is highly prized as a source of food

seeds are therefore extremely valuable in a country that has no infrastructure to process or preserve food. In addition, the leaves are an excellent fodder crop for cattle and help to promote milk production.

Biomimicry supplies Maya nut seeds to local partner NGOs in Haiti and to the international NGO Sadhana Forest, which then plant the seeds. Once the seedlings have formed, they are distributed to programme volunteers (between three to five trees per family, on average). The NGOs also provide training sessions, including how to look after saplings and how to use the seeds.

The seeds produced by the trees planted in 2011 have therefore created the very first ‘100% made in Haiti’ seedlings. “For local Haitian populations, these outcomes provide ‘grassroots’ proof that the tree is suited to the local environment.” ■

EL NIÑO

Food security under threat in Africa

Whilst the impact of El Niño on climate and global agriculture has been well covered, its effects on health and nutrition have been less prevalent.

Romain Loury

The latest El Niño event – one of the most severe episodes in the last 50 years – has been in full swing since the middle of 2015. The phenomenon is affecting the food security of 60 million people worldwide, half of whom live in Southern Africa. This event is just a taster of what the developing world can expect in the future, as climate change begins to bite.

Occurring every 2–7 years, El Niño events are characterised by warming of the ocean surface off the coast of South America in the equatorial Pacific. These events have an impact on the climate around the world, although the nature of this impact varies by region. It generally causes droughts in Southern Africa, the Caribbean, India and Indonesia, and flooding on the western coast of South America, and in equatorial Eastern Africa and the southern United States.

According to FAO, agricultural and nutritional consequences of this latest episode are being felt particularly acutely in the Horn of Africa (10.2 million people affected in Ethiopia and 4.7 million people in Somalia) and in Southern Africa (30 million people). Severe impacts have also been observed in the Caribbean, South East Asia and the Pacific islands.

Ethiopia is the most severely affected country, where a record-breaking drought affected around 80% of harvests in 2015. In Zimbabwe, a country once seen as the breadbasket of Africa, some 33,000 children (most aged 1–2 years old) are currently suffering from acute malnutrition as a result of this latest El Niño event. FAO has also identified a number of other ‘high priority’ countries, including



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El Niño is affecting the food security of 60 million people worldwide



**€2.1
BILLION**

Estimated cost of latest El Niño event, with the funding gap currently standing at €1.3 billion.

Botswana, Malawi, Mozambique, Namibia and Zambia. ‘At risk’ countries also include Kenya, Madagascar, South Africa, Sudan and Tanzania. The UN agency estimates that it will cost €2.1 billion to deal with the fallout of this latest El Niño event, with the funding gap currently standing at €1.3 billion.

Although the latest episode has now passed its peak, the corresponding climate impacts are likely to be felt until the end of 2016, and the number of people at risk of famine continues to grow. According to a recent British study, this type of exceptional event may become a more regular occurrence due to climate change. Led by researchers from Oxford University, this work has modelled the effects of climate change on global agriculture and nutritional consequences. The study, published in *The Lancet*, revealed that when compared with a scenario without climate change, rising temperatures are likely to lead to a 3.2% reduction in average calorific intake worldwide, a 4% decrease in availability of fruit and vegetables, and a 0.7% fall in meat supply by 2050.

These impacts are expected to cause an additional 529,000 deaths per year including 266,000 as a result of malnutrition – 49% in Africa and 47% in South East Asia. ■

FOOD PRICE VOLATILITY

Policy tools to support healthy nutrition

Volatile food prices have severe consequences for hunger and malnutrition. A variety of policy tools can better support healthy diets.

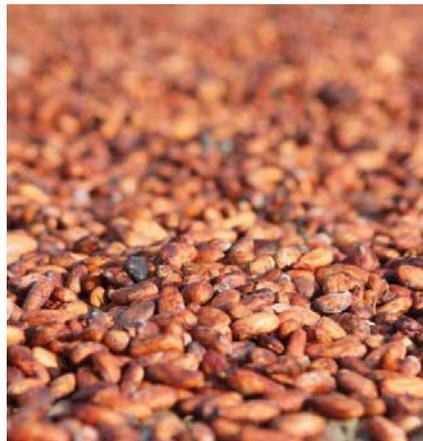
Jessica Summers

Global food systems face growing systemic challenges in providing healthy affordable diets for all. Today 800 million people are hungry and about 2 billion are overweight or obese. Poorest households, who spend around 75% of their income on food, are most affected by rising food prices. Unexpected price declines can lead to a sharp fall in incomes while price rises often reduce the quantity and quality (diversity and nutrient density) of foods consumed. These challenges are often more severe in ACP countries, where long-term threats to food production include water scarcity, soil degradation, environmental impacts of climate change, and competition for productive land due to urban expansion. “High dependence on imported foods has also increased vulnerability to food price shocks. Local stakeholders

must be able to use the tools, monitor changes and influence the policy agenda,” explains Judith Francis, senior programme coordinator at CTA.

“The multiple burdens on health created today for low- and middle-income countries by food-related nutrition problems include persistent undernutrition and stunting, but also widespread vitamin and mineral deficiencies. Poor diets are the number one risk factor for the global disease burden,” cautions Dr Lawrence Haddad, senior research fellow at the International Food Policy Research Institute, Poverty Health and Nutrition Division.

To address growing food price uncertainty, the Global Panel on Agriculture and Food Systems for Nutrition recently brought together agriculture and nutrition experts to discuss available policy tools (<http://tinyurl.com/junr2pv>). Emmy Simmons, a Global Panel member, explained how key policy actions can influence nutritional outcomes: “Policy options, and their prioritisation, are context dependent but can include: promoting long-term growth in agricultural productivity through, for example, the production of diverse commodities that contribute to healthy diets; fostering efficient and stable food markets, through investment in road infrastructure and its upkeep; encouraging the transformation of agricultural commodities into food products that are affordable, safe and nutritious; and providing targeted and flexible food safety nets to ensure access to healthy diets and national nutrition security.” ■



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Threats to food production include water scarcity, soil degradation and climate change impacts

Nutrition

Maternal health app

‘GIFTED MOM’ a mobile health app developed by a young Cameroon engineer, is helping expectant and new mothers in rural communities to access medical and nutrition advice. The service has over 5,000 subscribers and, with increasing sensitisation, numbers accessing the service are increasing. For a fee of less than €1, the women text ‘MOM’ to 8006 to receive a call back, or text a particular health or nutrition question to get a reply from a doctor. Alerts for vaccinations for newborns are free. For illiterate women, the Gifted Mom team are also developing voice technology in four widely spoken traditional languages, which is being supported by the government (<http://tinyurl.com/jtwdy7o>).

Fish

Aquaculture: vital for the future

ACCORDING TO FAO, aquaculture will make an increasingly important contribution to future food security. Since 2013, aquaculture has produced more than 50% of fish consumed worldwide, which will further increase with population growth and unsustainable fishing which is resulting in reduced fish stocks. Even with aquaculture, total fish production levels fall well below global needs. According to recommendations issued by industrialised countries (which are based exclusively on nutritional rather than environmental concerns), each person should consume two portions (246 g) of fish per week. Yet a British study conducted in 2014 estimated that total global fish production (fishing and aquaculture combined) is equivalent to just 161 g per person per week.

DATA

Fishy figures...

A recent study has cast doubts on FAO's fisheries data, indicating that the UN agency regularly underestimates overfishing and resource depletion statistics – an alarming trend.



© G. RAMBALDI/CTA

Whilst FAO figures are based on data reported by member countries, a study has found various forms of fishing 'slip through the net'

Anne Perrin

Fishing is a key aspect of food security for many ACP countries, where fish is the main source of animal protein for rural populations. The long-held belief that the oceans held unlimited fish stocks was debunked in the 1950s. Annual statistical surveys conducted by FAO have revealed declining fish stocks, with catches increasing by 50% between 1950 and 1990. According to FAO, fish catches hit a peak at 86 million t in 1996, with a slight downward trend recorded since this date. However,

these figures are refuted in a study conducted by researchers from the University of British Columbia in Vancouver. According to the report's authors, Daniel Pauly and Dirk Zeller, global fish catches peaked at 130 million t in 1996 and have been declining strongly ever since.

Whilst FAO figures are based on data reported by member countries, Pauly and Zeller included

various forms of fishing that normally 'slip through the net' in official figures. The Canadian team used the so-called 'catch-reconstruction method' (rather than figures 'reported' by states). This method accounts more effectively for fish caught by small-scale and subsistence fisheries, discards and illegal or unreported catches. The study, which took more than 10 years to complete, is published in *Nature Communications* (<http://tinyurl.com/jbkjh3s>). The authors admit that many uncertainties remain. Nevertheless, this study manages to include data that had, until now, simply been ignored. According to Philippe Cury, director of research at the Institute of Research for Development, it is better to have "an accurate approximation than patently false figures." In his view, the FAO fisheries figures are highly approximate at best.

The authors hope the study will allow each country to provide more complete data that will help FAO improve its Code of Conduct for Responsible Fisheries (<http://tinyurl.com/jd2z3ac>). They also encourage the international community to increase financial support to FAO for it to strengthen member countries' capacities for statistical collection and to collaborate more with other institutions.

This debate about fisheries statistics is much more than an academic argument. Behind these figures lie a significant number of challenges. The most pressing concern is food security, with the global population expected to hit 9 billion in the next 15 years. There are also issues surrounding the overexploitation of resources, the destruction of ecosystems and stock management. According to Cury, world-renowned researcher Pauly has demonstrated remarkable courage and tenacity. "We needed someone like Daniel Pauly to step up to the plate

and tackle this issue head-on. I went to Canada myself and saw the staff in action. The study was performed by a full-time team of researchers, working with people on the ground, collecting the data. It's an outstanding piece of work. It's based on very simple ideas, yet it will make a long-standing impact on development research." ■

FISH STOCKS
are declining with
catches increasing
by 50% between 1950
and 1990.

Conservation Community development of fishery bylaws

ALONG LAKE Malawi's shores, the NGO RIPPLE Africa is working with local communities to develop local fish conservation bylaws. These enforce a 4-month closed season to protect fish breeding areas, restrict the length of fishing nets and mesh size, and stop migratory fishers by introducing a local permit system. In each designated area, RIPPLE Africa has set up Fish Conservation Committees which, together with the District Fisheries Department, manage the local permit system and regulate illegal activity. Community theatre is being used to help raise awareness of the project's success as it spreads to new areas.

Rice-fish fishing A key development driver

IN MADAGASCAR, more than 5,000 students from 10 rural schools have received training on rice-fish farming. These students have then passed on their knowledge and training to some 100,000 rural farmers. The combined production of rice and fish plays a vital role in improving local food security. This method can help restore soil fertility and provide easier access to animal protein. Rice yields have increased by 30% and fish protein yields by 250 kg per ha as a result. The project is supported by FAO's SmartFish programme and a second phase is planned in another 100 Malagasy schools.

© SCANIA GROUP



Since 2009, over €200,000 has been invested to better understand and mitigate the impacts of harmful fishing practices in South Africa

PARTNERSHIP

Promotion of responsible practices in South Africa

A new alliance has been created to inform and promote responsible fishing practices in the South African fisheries sector.

Munya Makoni

A partnership between four major fishing corporations and two environmental NGOs (WWF-SA and BirdLife South Africa) has resulted in the creation of the South African Responsible Fisheries Alliance (RFA). Since 2009, over €200,000 has been invested to better understand and mitigate the impacts of harmful fishing practices. "Of this, the lion's share has gone towards conservation projects which seek to better understand and promote responsible fishing practice," says Junaid Francis, RFA co-ordinator.

One of the most important RFA achievements has been the training of more than 1,200 skippers, crew, observers, compliance officers and law enforcement officials with the skills to better comprehend and contribute toward ecosystems-based manage-

ment. The training course has catalysed a greater appreciation for marine life among those operating in the fisheries sector. As an example, Francis states that one RFA project has resulted in 11 South African fishing associations' committing to a responsible fisheries code of conduct in the hake trawl fishery to reduce seabird and bycatch mortalities, which have decreased by 90%. Coupled with these conservation gains, the RFA is also working with the government to see how the Marine Living Resources Act can be amended to promote better fisheries management.

With the success of the RFA's achievements so far, Francis states that in late 2015, an additional €54,000 was committed to fund the partnership and its development activities for a further 2 years. ■

ROBERT OLIVER

Cooking local, stimulating business

Susanna Cartmell-Thorp

Connecting agriculture and tourism using a ‘farm-to table’ approach is a key development tool for Pacific island states. Chef Robert Oliver believes where the cuisine goes, agriculture will follow.

Robert Oliver is a world renowned New Zealand chef and TV presenter. He is author of two award-winning Pacific cook books, which were written with a vision of connecting the Pacific’s agriculture and tourism sectors using a ‘farm-to table’ approach. By stimulating local economies, this approach to local cuisine and agricultural products could become a key development tool for island states.

What inspired you to become a chef and - in particular - develop such a passion for local cuisine?

I was born in New Zealand but was raised in the Pacific Islands where food is not just something to eat but a way of communicating and sharing. I have always loved food and being brought up in a culture that uses food as a way of sustaining communities and relationships really appeals to me. I realised early on that I had an aptitude for cooking so I worked really hard for years to develop my skills. My early career was in New York and I was fortunate enough to work for a woman, Mary Cleaver, who was a real pioneer in the movement for sourcing local food. Her catering com-

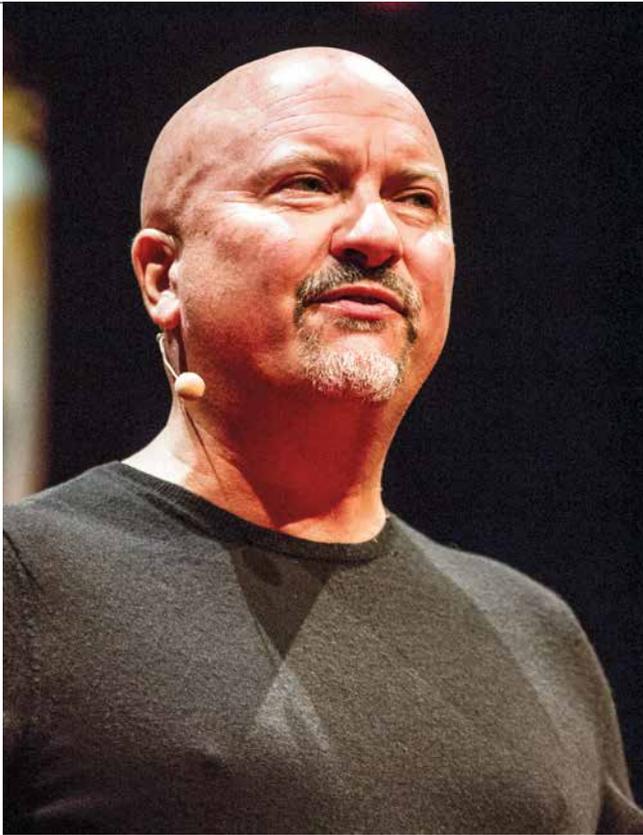
pany only worked with local farmers, often organic, and I quickly came to appreciate the values that are associated with sourcing local food, what it means for local people, economies and the environment. So when I went to the Caribbean to do a consultancy, I applied that systemic way of thinking to the work there and that is where I first really worked on the farm-to-table approach.

Moving from the US to the Caribbean, how was it to work in a completely different environment and address the challenges faced by these island states?

It was challenging but it felt more natural to me to be working in an island state environment. I was also fortunate to be supported by the executive director of a hotel resort group in Barbados and St Lucia who wanted to reduce their dependence on foreign imports and build up local supply. So I managed all the menus at three different resorts and I was given the time to develop relationships with local farmers. And it did take time, we made lots of mistakes, I had to prove the case all the time to both sides – the hotel and the farmers – and there was lots of learning in the process. It was a challenge: getting farmers to show up on time, adhere to all the health and safety regulations about how to manage pesticides and fertiliser applications, to build their trust. But the Ministry of Agriculture was a real supporter in the process, along with IICA – the Inter-American Institute for Cooperation on Agriculture – as what we were doing was part of their mandate, to support farmers and stimulate local agriculture and demand for their produce. And once the farmers trusted me and trusted the system, they started to do well and make money and then other farmers who were sceptical came on board. Seeing someone get a new tractor and seeing someone send their child to school or pay for hospital bills – it was all those little human successes that made the farm-to-table programme work.

So having achieved this success in the Caribbean, what lessons have you been able to take from the Caribbean to transfer to developing a farm-to-table approach in the Pacific?

There are a lot of things that are similar, the frameworks are similar although



Robert Oliver is a New Zealand chef, author and television presenter.

that the Pacific and the Caribbean both romanticise about each other and there is this awesome recipe culture they can share because in the Pacific we have the same crops as in the Caribbean but we cook them in completely different ways. So I am not trying to make the Pacific have the same cuisine as the Caribbean but it is stimulating for chefs to have other ways of using local products, to innovate, and to have more tools in the toolkit is always helpful.

How can the media help play a greater role in supporting this initiative in promoting local cuisine and agritourism in the Pacific and elsewhere?

Media is a powerful development tool and the two that I most use are cookbooks and television. Chefs love cookbooks; cookbooks glamourise and package the cuisine for the chefs to then interpret and do their own spin on. Cookbooks also create a groundswell of pride; for many Pacific people, seeing their food – and often themselves – in our cookbooks was like seeing something they see every day, but for the very first time. So this in turn engenders the development of a ‘food community’. Books are also vital repositories of often-disappearing cuisine culture. Pacific Island traditional food culture is disappearing. As Tongan chef, Uimita Kaloni, said, “The traditional dishes we grew up with are drifting away. If we lose that, we are hopeless.”

Television is also hugely powerful. Not every home in the Pacific has a TV set but it is very much a communal activity and shows with local content are particularly popular. My show, REAL PASIFIK, has travelled across the Pacific creating local food chef ambassadors and this has resulted in terrific traction in the region, with many networks screening the whole series up to 30 times. The show’s success was due to its casting of local chefs in star roles. Also, Pacific Islanders enjoyed learning about the food from neighbouring islands. Many people commented on the pride they felt at seeing their own food culture being portrayed with such high value, and how the chefs were able to innovate and create with very familiar dishes that, up till now, had been considered to be too ‘typical’. To other viewers, the Pacific provides such an appealing food destination – it is 35% ▶

the cultures are different. But the first thing I did that was different was to develop a Pacific cookbook. Our intention was to show the diversity and help glamourise Pacific cuisine but we had no realisation of the impact it would have, of how much awareness it would raise. As the book gained more attention from winning an international cookbook award, Pacific people were able to recognise and appreciate their traditional cuisine and food culture. This is resulting in a huge change in mindset; the rest of the world may be embracing farmers markets and the ‘local is better’ mantra, but for too long the Pacific has remained stuck in its ‘overseas is better’ psyche.

Following on from this success, I began to speak at conferences and this is where CTA stepped in as we realised that cuisine could become a real development tool, linking agriculture and tourism. But up until then, there had been a gap in the development process, there was a lot of support for farmers but nothing for chefs. And this is how the ‘Chefs for Development’ initiative came about as I was meeting individual chefs in the Pacific and Caribbean who were realising the value of their role in promot-

Seeing someone send their child to school or pay for hospital bills – it was all those little human successes that made the farm-to-table programme work.

ing local cuisine and traditional culture. So in partnership with CTA, we realised that there was leadership that we could support, promote and grow; it is still in its infancy but we are developing a community that can share their knowledge and experiences and learn from each other. I see awesome chefs emerging whose cuisine identity is locally focused, and that also means working with local farmers. Also, part of what is exciting is



Pacific Islanders enjoyed learning about the food from their neighbouring islands

organic, has dynamic urban and rural markets, vibrant local cuisine and passionate chefs. But the show is as much about changing perceptions as changing diet or menus. Switching this thinking is the key to unlocking the health and economy of these region and destination cultural cookbooks and regional focused food TV and other dynamic digital content are how to do that.

Where next? What new challenges do you hope to embrace?

What has become very pressing for me is the issue of health in island states. 'Food colonisation' along with the landslide emergence of convenience foods has had a shocking impact on Pacific Island health. The South Pacific is in crisis; we have some of the most obese nations in the world but the answer is right there in our backyards: in our farms, villages, and markets and in the traditional dishes that Pacific grandmothers cook. It is this traditional cuisine knowledge based on complex carbohydrates, seafood, lots of green vegetables, all forms of coconut and tropical fruit, which provides the opportunity to combat the daunting diet-related health epidemic that is

The rest of the world may be embracing farmers markets and the 'local is better' mantra, but for too long the Pacific has remained stuck in its 'overseas is better' psyche.

bringing the region to its knees. Local cuisine can put our people on the right side of a healthy future; it is the delicious answer to physical, economic and cultural health. But it's important to realise that this does not just concern the chefs in the kitchen; when they start to source local food from local farmers, that's a model for economic prosperity. ■

Chefs for Development: agents of change

"Where the cuisine goes, agriculture will follow," states Oliver. "The way to connect tourism and agriculture is cuisine because the people who decide what to produce on menus are chefs and they decide whether ingredients are imported or sourced locally." Oliver firmly believes that the 'Chefs for Development' initiative has the potential to reclaim tradition and health, to empower chefs and to stimulate national economies. To understand this growing market, farmers need support. For example, in Samoa, Women in Business (WIBDI) has a 'Farm to Table' programme involving 60 farmers supplying 22 restaurants with organic, high quality produce. They teach the farmers about cash flow and supplying hotels and restaurants on time and WIBDI manage all the health and safety regulations.

✦ **For more information:**
<http://tinyurl.com/pjs2c3w>

SPORE

Dossier

**WATER FOR
AGRICULTURE:
PRODUCING
MORE
WITH LESS**

*Producing more crops with less water,
while ensuring fair and environment-friendly water distribution,
is a major challenge for ACP countries.*

WATER FOR AGRICULTURE

New resource management strategies

To cope with the effects of climate change and increasing water and food consumption, new strategies for agricultural water management are needed.

Anne Perrin

It is common knowledge that a 60% increase in food production will be necessary to feed the world in 2050, and water is essential for agricultural production if it is going to meet rising food needs. In the last century, water was considered an infinite resource, yet water stocks are dwindling. Moreover, water consumption has increased six-fold over the last century, which is twice the population growth rate.

'Agricultural water' can be classified in two main categories: so-called 'blue water' used to irrigate crops (groundwater, lakes, dams), and 'green water' for rainfed farming (soil moisture, which accounts for two-thirds of global water resources). Meanwhile humans use more water for agriculture than any other activity, even though agricultural water consumption varies markedly between countries and regions and between types of farming systems. Currently about 40% of the world's food is produced on nearly 20% of irrigated land (310 million ha worldwide, including 5% in Africa and 35% in Asia). Crop productivity on irri-

gated land is 2.7-fold higher than that of rainfed agriculture, which is nevertheless practiced on 80% of global cropland, mainly in ACP countries.

Family farming is more water-efficient than agribusiness, yet smallholders are often hampered by a lack of access to water. Both types of agriculture must nevertheless coexist. Technical and organisational innovations, tailored public policies and research are jointly needed to enable ACP agriculture to adapt to these new constraints.

Between droughts and floods

Climate change is having variable impacts on the Western African region. Rainfall is, for instance, declining in western Sahel (Senegal, southwestern Mali) while increasing in central Sahel (Burkina Faso, southwestern Niger), in addition to changes to the seasonal monsoon. Clearly many uncertainties remain but, according to scenarios developed by climatologists from the Institut de recherche pour le développement (IRD), the French development research agency,



and their international partners, rising temperatures will reduce the length of crop cycles and increase water stress due to the higher water evaporation rate, thus causing a 16–20% decrease in crop yield in the western Sahel and 5–13% in the eastern part of this region.

Crop yields are already dropping, with livestock farming and fisheries also being affected. Less forage is available for grazing livestock, and changes in streams (drying, modified flow rates and floodlands) have prompted a decrease in fish stocks.



Crop productivity on irrigated land is 2.7-fold higher than that of rainfed agriculture, which is nevertheless practiced on 80% of global cropland

Lake Chad is emblematic of the changing situation in the Sahel. Formerly one of the largest lakes in the world, it is an essential source of water for crop and livestock farmers, and fishers in four countries (Cameroon, Chad, Niger and Nigeria). But the lake has shrunk in size from 20,000 km² to 2,000 km² over the last 50 years. Repeated droughts from 1970 until 1990 resulted in severe drying, affecting the livelihoods of some 20 million rural people living around the lake, who have been forced to adapt to the changes.

Climate change has led to increased pressure on groundwater throughout ACP countries. The decline in aquifers – underground layers of porous and permeable rock bearing free-flowing water – is degrading wild habitats and causing salinisation of irrigated lands worldwide. This phenomenon, accelerated by rising sea levels, is turning previously fertile land into unproductive wasteland in hard hit Caribbean and Pacific island states, as well as in coastal areas of Western Africa, from Mauritania to Nigeria.

Water is a major land issue as land and water grabbing are interlaced. Many investors do not hesitate to take resources away from poor local small-holders. Meeting water needs is one of the main drivers of the global land rush (see Spore 170: Water grabbing – the hidden cost of land acquisition). This is a complicated issue because it is often hard to determine who exactly owns a water source, while water rights, access and uses are wide-ranging and complex.

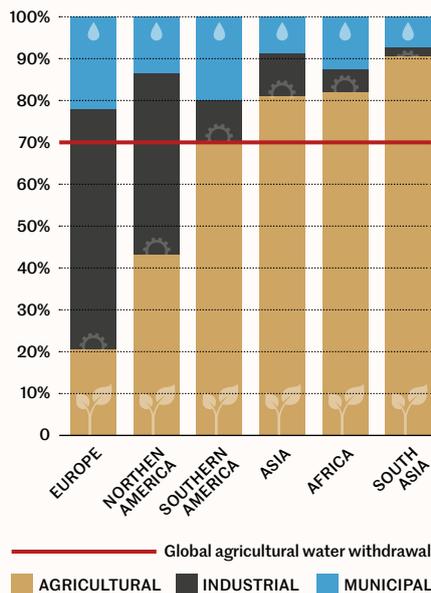
Solutions at the state level

States have addressed water shortage problems head-on by developing strategies to deal with both national and international shortages. Irrigation is one of the main implemented solutions. Irrigated agriculture has contributed to laying the foundations for global food security, but large-scale water projects under way in ACP countries – mainly funded by international donors and development banks – have not always achieved goals initially set out.

According to Jean-Philippe Venot, geographer and senior researcher at IRD, large dams are often designed on the basis of highly optimistic assumptions. Meanwhile populations displaced as a result of these projects are not always allocated land. This is the case for the Kandaji dam in Niger; although construction was launched in 2012, it has yet to be completed and its future is uncertain. In this region, the World Bank is now facing a major problem regarding the resettlement of 38,000 people who had, until recently, been living on the fertile banks of the Niger River. These people have been promised irrigated land and new homes. In Burkina Faso, the Bagré hydroelectric dam, which >

Worldwide water use in agriculture (%)

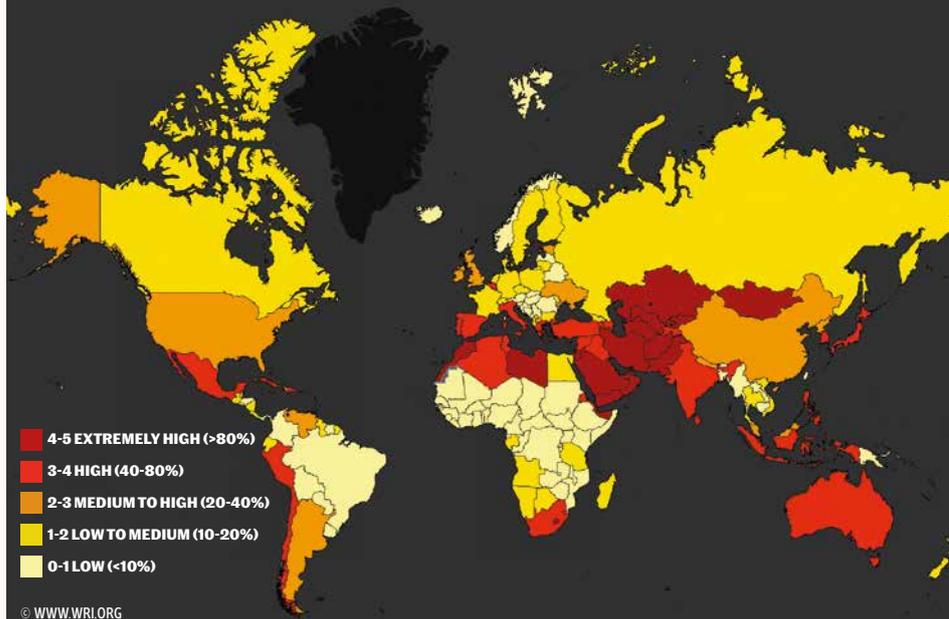
Worldwide, agriculture uses more water than any other sector, well ahead of industrial and domestic consumption.



SOURCE: AQUASTAT 2014

Global water stress map

Water stress is a particularly pressing concern for ACP countries. Water shortages hinder economic growth and can lead to other phenomena such as 'land grabbing' for water access.



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➤ was built some 20 years ago, presently only irrigates 3,000 ha of land, out of the 30,000 initially planned and local people have received 1-2 ha of land per household. Furthermore, fewer agro-investors than expected have responded to the investment call, and so far only 300 ha have been allocated to agribusinesses. In the last 5-6 years, a new project funded by the World Bank, the African Development Bank and the government of Burkina Faso has promoted agro-entrepreneurship in the area. It is expected that displaced family smallholders will also benefit from irrigated plots. However, the areas to be allotted are still small and often below viability thresholds, unless there is very substantial cropping intensification, which remains beyond the means and capacities of many of these farmers.

Some far-reaching projects are striving to overcome these stumbling blocks. The World Bank Irrigation Sahel initiative (see interview, p. 30), for instance,

Irrigation policy must be considered alongside improved markets, institutional and legal transparency, research and development, and ecosystem management.

has avoided large-scale/small-scale development project dichotomy and is seeking to optimise the prevailing situation.

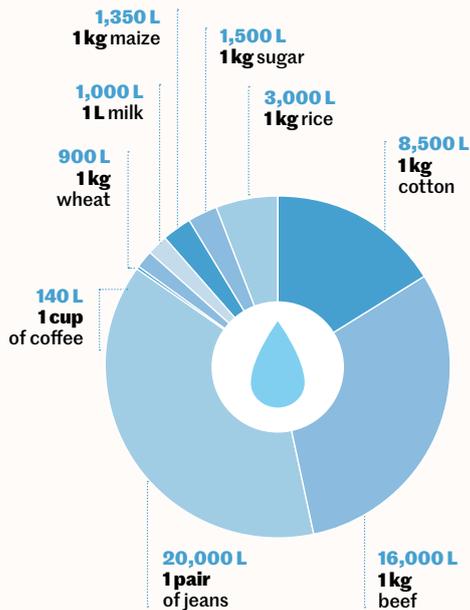
Richard Munang, Africa regional climate change coordinator, United Nations Environment Programme, stated in *The Guardian* that, "Irrigation cannot be understood in isolation: Irrigation policy must be considered alongside other elements including improved markets, institutional and legal transparency, research and development, and ecosystem management."

Farmers adapt

By and large, farmers always adapt to water shortages. Farmers have, for instance, abandoned their rainfed millet croplands along the shores of Lake Chad – which they could no longer rely on as the lake was drying up – and moved to more humid fertile lands to grow food crops (maize, cowpea, rice and sorghum). Many 5-10 m deep locally-built

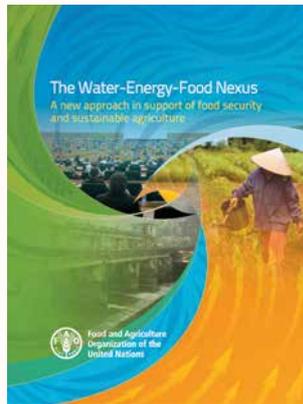
The water footprint of a consumer product

The 'water footprint' reflects the amount of water needed to farm and process a product:



SOURCE: WWF FRANCE

The FAO water-energy-food nexus – guiding policy making



Competition is growing for resources between water, energy, agriculture, fisheries, livestock, forestry, transport and other sectors, with unpredictable impacts on the environment and livelihoods. Large-scale water infrastructure projects, for instance, may impact different sectors, producing hydropower and providing water storage for irrigation and sanitation uses. However, this can occur at the expense of downstream agroecological systems and with social implications, such as resettlements. Similarly, growing bioenergy crops in an irrigated agriculture scheme may help improve energy supply and generate employment opportunities, but may also result in increased

competition for land and water resources, with impacts on food security. This led FAO to develop the so-called 'nexus approach' to assess links between water, energy and food. This approach requires a cross-sectoral analysis – what impacts will occur in different sectors? This informs and guides decision makers, while enabling them to draw up tailored policies that strike a balance between different resource users' goals and interests, while maintaining ecosystems integrity.

✦ For more information: <http://tinyurl.com/ow8m6kp>

wells are found throughout Africa, supplying water for market gardens and rice crops.

Farmers also often grow these crops in lowland areas. In many African countries such as Burkina Faso and Mali, diesel pumps are being increasingly used to tap water from small reservoirs. The environmental impact of this popular practice is, however, in question because of the amount of diesel used.

Farmers have been successfully implementing climate-smart agriculture practices designed to control desertification via soil conservation and management techniques. This includes assisted natural regeneration. In Niger, for example, more than 5 million ha of land has been restored, with over 200 million trees regenerated or planted (see *Spore* Special Issue: Doing business in a time of climate change, p. 19) over a 30 year period. No-tillage and low input conservation agriculture, including agroforestry, reduces water loss by evaporation.

Drought-tolerant seed selection is not exclusive to research. Well preserved millet biodiversity has led to natural and human-driven selection – farmers noticed that the earliest emerging plants were more drought-resistant and thus selected their seeds for planting in subsequent crop seasons.

Water users' associations (WUAs) are being formed in many countries as a means to cope with water shortages by helping farmers use water more efficiently. In Niger, the Ruwanmu (Hausa word meaning 'our water') small-scale irrigation project depends on WUA support to improve water resource appropriation by users to enhance water use, management and protection. In Madagascar, a network of craftspeople who make very simple drip irrigation systems with local materials has been set up. This has enabled family farmers, with very little investment, to irrigate their gardens and produce vegetables for self-consumption or for market.

Mobilised research

Researchers from a broad range of disciplines are actively involved in addressing these crucial issues. Innovative 'big data' initiatives for agriculture were identified in CTA's *ICTUpdate* magazine on the data revolution for agriculture. This includes the AquaCrop crop water productivity model developed and disseminated by FAO since 2009, which has benefitted agricultural researchers and extension agents. This model is designed to improve crop yields under water shortage conditions. Farmers can then be advised – on the basis of the analysis of different parameters – on effective ways and times to irrigate crops to obtain the best possible yields.

Drought-tolerant seeds are also a major issue. Farmers from the Republic of Palau are now growing salt-tolerant taro varieties to cope with flooding in their crop fields (see *Spore* Special Issue: Doing business in a time of climate change, p. 23).

➤ CTA now organises fairs in which plant breeders tell farmers about drought-tolerant seeds, in responsible collaboration with commercial seed producers. One will be held in June 2016 in Mali, and another could take place later in the year in Eastern Africa. These fairs are conducted in partnership with the International Crops Research Institute for the Semi-Arid Tropics and the CGIAR Research Program on Climate Change, Agriculture and Food Security.

Groundwater – another potential source of water for agriculture – is still available in Africa despite increased pressure on this resource. The problem is that groundwater is not necessarily accessible or available at the right places. Karen Villholth, principal researcher at the International Water Management Institute, is coordinating a project to map groundwater resources. She claims that groundwater irrigation could strengthen food security and increase smallholders' income. This, however, requires sig-

Groundwater – another potential source of water for agriculture – is still available in Africa despite increased pressure on this resource but is not always accessible.

nificant investment and tailored policies because groundwater irrigation – although practiced slightly more in sub-Saharan Africa – is not widespread in Africa compared to the rest of the world (1% of cultivated land in Africa compared to 14% in Asia).

Many social science research initiatives are finally focusing on the organisation and collective action dynamics of farmers. According to Venot, these combined actions undoubtedly account for the bulk of the irrigation projects under way, especially in semi-arid Sahelian areas.

A study published in *Environmental Research Letters* in 2016 (<http://tinyurl.com/j4c2ugq>) indicates that global food production could be boosted by 41% if all farmers were to adopt tailored water management methods. These researchers modelled 35 ambitious yet achievable water management strategies and found that improved irrigation could halve the global food gap. ■

Improving soil moisture content

Sustainable farming practices can help to improve soil quality and water retention and therefore contribute to food security.



Residue covers, cover crops and mulching



Conservation agriculture



Knowledge-based precision irrigation



Conservation tillage



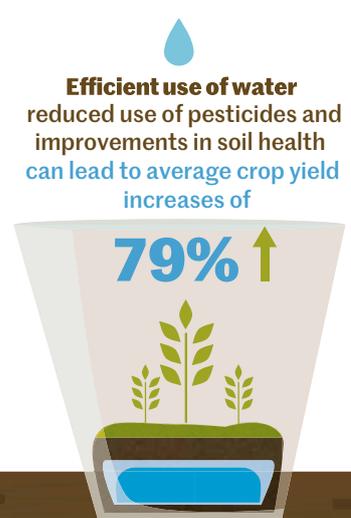
Capture of runoff from adjacent lands



Rainwater harvesting



Zero-tillage



Efficient use of water
reduced use of pesticides and improvements in soil health can lead to average crop yield increases of **79% ↑**

SOURCE: FAO.ORG/SOILS-2015

INTERVIEW

Jean-Pierre Halkin: “Water for agriculture – a focal point for development”

by Joshua Massarenti and Anne Perrin

Jean-Pierre Halkin explains why water for agriculture is an EU development priority¹.

How is water for agriculture a focal point for development policies?

2015 was an exceptional year in terms of commitment worldwide to move towards sustainable development, with two crucial conferences: the Sustainable Development Summit in New York where the sustainable development goals (SDGs) were adopted, and COP21 in Paris. Water for agriculture is at the core of the second SDG, which focuses on hunger and food security; 70% of human water consumption is used for irrigation and 2.5 million people live in countries affected by water stress and have limited access to water. The EU pays specific attention to agriculture and food security in its development policies, which is the primary sector for EU intervention, with nearly 20% of EU official development assistance.

What is the EU doing with regard to water for agriculture in ACP countries?

Water has a central role in achieving our strategic food and nutrition security objectives. All of our priorities revolve around water for agriculture. We talk about water for agriculture in a broad sense – irrigation is of course an issue, but not the only one. Drainage, combating soil erosion and leaching to preserve soil fertility for crops, livestock and aquaculture activities are a few of the many issues upon which the EU focuses. We are constantly asking ourselves the crucial question of how to effectively promote climate change adaptation and mitigation, while also ensuring food and nutrition security for all and creating conditions conducive to agricultural development. EU interventions cover a broad spectrum, from setting up irrigation schemes, in collaboration with civil society, to supporting sectoral policies of different governments via our budget support instrument. We support national policies in the

framework of national indicative programmes, but also regional policies, including the Global Alliance for Resilience and Supporting the Horn of Africa’s Resilience initiatives.

What key results have been achieved by the EU concerning water for agriculture?

In Chad, an EU-supported pastoral water project is under way involving the development of livestock water points. This maintains peace between livestock and crop farmers, while also contributing to the development of one of the most dynamic economic sectors in dryland areas. In Niger, the EU is supporting the 3N (Nigeriens Nourish Nigeriens) Initiative, with one of the key elements being pastoral and rural water management. This support is provided at local (rural communities, farmers’ organisations, NGOs) to national (Niger government) levels. In Mampou in the Democratic Republic of Congo, an agroforestry project is all about sustainable water resource management. The success of this project, launched some 20 years ago, is illustrated by the fact that it was supported by local rural communities at the end of EU funding.

How has the Ambilobe (see Madagascar field report, p.27) project been successful?

Water is now available where previously it was not, giving new impetus to agricultural production and smallholders. We have noticed a reduction in social tensions between smallholders/water users and the sugar industry and all stakeholders are aware of the importance of an irrigation system governance and funding structure. Finally, the different services, operators and associations have collaborated in very positive ways. The project will be continued under the 11th European Development Fund which, which is another sign of success.



Jean-Pierre Halkin is head of Unit for Rural Development, Food and Nutrition Security at the European Commission Directorate-General for International Cooperation and Development (EuropeAid).

¹ A longer version of this interview is available on the Spore website: www.spore.cta.int

MADAGASCAR

Hope rising from the sand

Rehabilitating the irrigation system in the lower Mahavavy River cropping area in Madagascar – abandoned for 30 years – has raised hopes among sugarcane and rice growers in the region.



© ONGEFA

Mamy Andriatiana

His face lit up with joy, Jinoro Tsivery, a farmer from Mantaly, a rural town in northern Madagascar, clearly has renewed hope as he watches a desanding machine in action. “Finally, water – our life – it’s our last hope to revitalise our dwindling crops,” he says. Jinoro is not the only one to rejoice at the rehabilitation of the area’s irrigation system; it will enhance the activities and income of all 73,000 farmers dependent on the lower Mahavavy River area. Claudine Ramarinjanahary, head of the NGO EFA, says: “Besides growing rice and sugarcane, some families have started small farms, while others have planted vegetable and market gardens, and have even sent their children to school.” Many of them produce sugarcane to supply the nearby Sucocoma sugar factory.

In Ambilobe, Diana region – 950 km north of the capital Antananarivo – the lower Mahavavy River area hosts the largest irrigation system in Madagascar. A 19,000 ha area is under irrigation, including 9,000 ha owned by Sucocoma and 10,000 ha cultivated by farmers; 6,000 ha of which is under rice crops. These lands are cultivated by 6,000 farmers. Farmers were left to fend for themselves after the decline of the former sugar factory and the sector’s crisis in the early 2000s. Water became scarce as irrigation canals broke down and two-thirds of the lands dried up. Uprooted sugarcane plants were replaced by drought-resistant crops, such as cassava or sweet potato.

Madagascar was once a sugar exporter, but its production now only meets 10% of domestic market demand, and the country has become the largest sugar importer in Southern Africa. In 2006, following the reform of the common organisation of the sugar market, the country adopted the National Strategy for the Adaptation of the Sugar Sector, in order to benefit from the EU Accompanying Measures for Sugar Protocol (AMSP). Timely rehabilitation work was then undertaken after Madagascar received financial support in 2012. The allocation (€4.7 million for 3 years) aimed to boost income generated by the sugar sector through the improvement of sugarcane production at the Ambilobe site.

Since 2015, water flows regularly year-round, enabling rice growers to harvest their crops twice a year. The flow rate has doubled, and now over 80% of rice and sugarcane growing areas are irrigated. Rice yields have increased from 0.8 to 4–5 t/ha through technical and organisational support of farmers’ organisations. For farmer Kaidy Mosa, drylands are now nothing more than a bad memory. “We were just surviving for 10 years. Families grew larger but the arable land decreased because of the lack of

water,” he recalls. The AMSP project began with the rehabilitation of irrigation infrastructures, consisting of main canals, a sand trap and various structures (bridges, half-buried culverts, spillways, weirs and divertors) for a total cost of €3.5 million. At the same time, water management and infrastructure protection has been supported. Thirty water users’ associations were strengthened. Two farmers’ federations were set up: Mahavavy Tia Fandrosoana, a federation of 75 rice growers’ groups, and a federation of 105 sugarcane growers’ groups. The project technicians are making sure that new cropping techniques are passed on from farmer to farmer: 75 relay farmers have been fitted out with small farming equipment and they can now supervise their peers and undertake exchange visits in other regions. Demonstration plots have also been instigated. Over 3,000 households are benefiting from the project.

To ensure regular infrastructure maintenance, a common platform involves water users, large-scale farmers and the Sucocoma sugar factory. The platform serves as a forum for discussion between stakeholders. Each water user pays a pro rata fee according to the area used. Romuld Ratefiarivony, from the BRL Madagascar consulting office and responsible for technical assistance for the project, says that the platform currently benefits from MGA125 million (€39,000) in maintenance funds. This includes dredging, water policy compensation payments and sewage channel fees. Importantly, farmers maintain the tertiary irrigation canals (around 100 km long). Concerning the authorities’ involvement, the Malagasy Ministry of Agriculture and Rural Development – via the Rural Engineering Directorate – ensures the continuity, quality control and monitoring of activities, with contributions from five municipalities in the vicinity. To ensure sugarcane quality, the Centre malgache de canne et de sucre, a national sugarcane and sugar centre, disseminates improved sugarcane varieties to growers.

The irrigation system rehabilitation and support given to farmers’ organisations is expected to have a major positive impact. Tom Leemans, head of the Rural Development and Food Security Section of the EU Delegation in Madagascar states: “We are counting on increased productivity and income for farmers.” A key challenge is the constant threat of silting in the lower Mahavavy River irrigation system due to the advanced degradation of watersheds in the river basin. Local residents are aware of this risk but are still delighted that water is now flowing through their lands. They regularly applaud the project for, within just 3 years, being able to: ‘wake up the area from a 30-year deep sleep.’ ■

The lower Mahavavy River area hosts the largest irrigation system in Madagascar



HYDROPONICS

An eco-friendly approach to water management

The development of hydroponics is a climate-smart solution, which is water efficient and can be used in rural and urban settings.

Keron Bascombe

Across the Caribbean, farmers are currently struggling with prolonged drought. According to the Caribbean Institute of Meteorology and Hydrology, drought conditions in 2015 resulted in a number of countries experiencing water shortages. In Jamaica alone, drought affected 18,000 farmers in 2015 and cost the agriculture sector over €700,000.

With drought a recurring problem, efficient water management is becoming increasingly crucial for agricultural production on island states. One potential solution is hydroponics, where plants are grown in a mineral nutrient solution rather than soil. Using 97% less water than traditional agriculture, hydroponics uses nutrient solutions specifically designed for each crop's needs. Water is recirculated throughout the system and small losses occur only via evaporation and plant use.

In aquaponics – hydroponics with fish – waste produced by farmed fish supplies the nutrients, while the plant roots filter and purify the water for rearing the fish. Compared to soil planting, sowing to harvesting time in hydroponic/aquaponic systems is typically 45 days, with the produce benefiting from high nutrient quality and longer shelf-life. Furthermore, these systems produce high yields and require very little land, water or fertiliser. The systems can also be integrated into urban development, turning abandoned warehouses, storage spaces, and even car parks into food producing systems.

Acquiring access to information

Potential for the technologies has yet to be fulfilled regionally due predominantly to a lack of training or demonstration sites to teach farmers how to adapt hydroponic/aquaponics systems to the

Caribbean. However, one entrepreneur successfully used the internet to carry out his own research. Gathering literature and watching YouTube videos on the topic, former DJ, Guido La Fond Bassgang, emailed professionals and asked questions on forums before building and testing his own system to learn how aquaponics worked in practice.

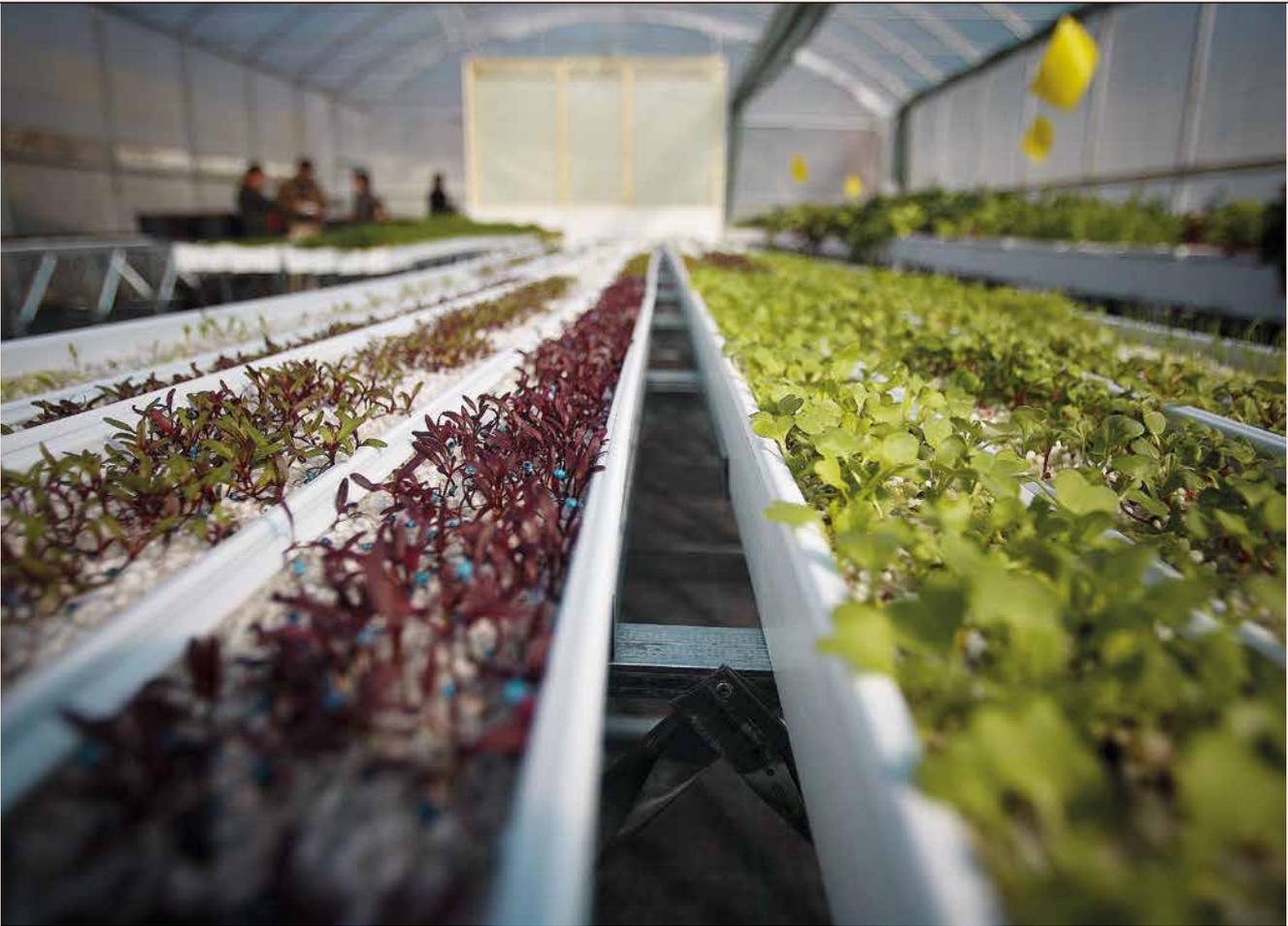
Bassgang set up AquapondsTT, in Tobago in 2013 and his 510 m² system currently produces 50,000 lettuces per month. By utilising vertical towers, he is also planning to produce additional crops with the same space, including cucumbers, aubergine, mint and carrots. As an aquaponics system, AquapondsTT also farms tilapia and catfish. As well as selling produce through various local markets, Bassgang supplies supermarkets, food outlets and fast food chains across the island.

Despite the problems Bassgang faced in acquiring information, training is becoming more widely available. In Antigua, Indies Greens Ltd, which uses aquaponics technology to produce organic tilapia and vegetables, has created a training centre to provide week-long face-to-face training and owner Damon Francis and his brother are working to get aquaponics included on the school curriculum. “We would like to see this technology spread regionally,” says Francis. “Demand for organic lettuce is high and the fish really sell themselves so we believe in this technology for producing good quality local produce.” Science lecturer and hydroponics specialist at the Clarence Fitzroy Bryant College in St Kitts, Stuart LaPlace, also provides training on his climate-smart hydroponic system developed in 2012 which uses a shade house system to carefully control the environment.

Adaptation is key

LaPlace has spent the last 10 years working on hydroponic systems; adapting them to the Caribbean and simplifying them to ensure that anyone can use them. “With my specially designed system, water efficiency is even higher,” LaPlace explains. “There is no evaporation from the system and the water is delivered under pressure and constantly re-circulated.”

Farmers practising hydroponics generally use transplanted seedlings. How-



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Using 97% less water than traditional agriculture, hydroponics uses nutrient solutions specifically designed for each crop's needs

ever, with LaPlace's system, seeds are directly planted into mesh cups filled with 'hydroton' clay pebbles – the growing medium. A wide variety of crops have been grown using the system since 2011, with LaPlace developing specific nutrient formulae for the different crops and growth stages. In two weeks, LaPlace can produce 110 kg of tomatoes from a 6 x 12 m system.

However, as with any agricultural activity, things can go wrong. "The three main risks are power failure, chemical imbalances and water contamination, and natural disasters such as hurricanes or floods," Bassgang explains. To cope with these challenges, AquapondsTT has a generator and battery back up in case of power failure and uses digital pH meters and test kits to daily monitor and correct any pH imbalances.

To significantly increase uptake in these technologies across the Caribbean,

With drought a recurring problem, efficient water management is becoming increasingly crucial for agricultural production on island states.

a more structured training approach needs to be provided. However the cost of sourcing equipment and materials is also a factor in determining uptake of these technologies. LaPlace's highly customised system – while designed with longevity, practicality and functionality in mind – is relatively costly at €3,900.

Bassgang, on the other hand, used the internet to find the most economical and sustainable sources to build his system. For example, most of his system has been built using basic materials such as wood, PVC piping, pumps and netting that is locally available. The initial investment may be a consideration but the potential to supply organic local produce of a wide range of horticultural crops and make a good profit is attractive. One St Kitts farmer, who has adopted LaPlace's system, is now earning €660 per month supplying vegetables to a few homes and a restaurant, while also continuing with a full-time job. And for hotels and restaurants across the Caribbean, there may also be potential to follow in the footsteps of the Cuisin Art resort in Anguilla, which is first to set up its own hydroponic farm to reduce imported goods costs, conserve water and provide organic fruits, vegetables and herbs for its restaurants. ■

INTERVIEW

François Onimus: **“Optimising existing irrigation systems”**

by Anne Perrin

The regional-scale Sahel Irrigation Initiative Support Project¹, funded by the World Bank and implemented by the Permanent Interstate Committee for Drought Control in the Sahel, aims to improve the performance of irrigation systems and mobilise public and private investment to expand irrigated areas in the Sahel. This 6-year project, launched in 2016, has a budget of €150 million and was designed to optimise existing solutions, contrary to conventional strategies which foster large- versus small-scale irrigation projects.

What are the specific objectives of the Sahel Irrigation Initiative? How does it differ from other large irrigation projects implemented in the Sahel?

The initiative is not a large-scale irrigation project. The programme involves six countries and is geared towards improving irrigation in the Sahel, while accelerating development to enhance systems resilience to climate shocks and boost agricultural competitiveness. The initiative will come up with irrigation solutions tailored to conditions in the Sahel, and then disseminate them, raise funding and strengthen the capacity of countries and stakeholders to implement them.

Does this initiative target a specific type of agriculture (agribusiness or family farming) and if so why?

One of the initiative’s basic principles was to promote the diversity of irrigation systems – and associated solutions – from lowland systems with controlled recession to large-scale public or private irrigation systems, while also including small-scale private and village irrigation systems. One of the aims is to enhance investment planning processes by taking better account of the range of possible solutions, as part of a collaborative planning process with

stakeholders. Small-scale irrigation has the most development potential. Solutions involving agribusiness stakeholders are also considered since they can bring added value in terms of socioeconomic impacts on local communities. For such solutions, the initiative fosters public-private partnership approaches, in which private investors must comply with a set of guidelines to maximise positive socioeconomic impacts on local populations (e.g. by developing contract agriculture solutions).

In the context of climate change, are large-scale irrigation projects more efficient/recommended than small-scale irrigation initiatives? Why?

First we must distinguish between so-called ‘large-scale irrigation projects’ and ‘large-scale irrigation’. Some large-scale projects (or rather programmes) may finance autonomous small-scale systems. Small-scale irrigation currently prevails in the Sahel and this situation should continue. Small-scale irrigation solutions – since they are adapted to local conditions and often owned by beneficiaries – should be promoted where feasible. With large-scale irrigation, however, water control could be introduced in areas via basic infrastructures while facilitating the development of agricultural growth centres and sectoral structuring. All of the different types of irrigation are complementary, with a role to play in harmonious and sustainable planning of water and soil resource use. Improving existing systems is a priority of the initiative.



*François Onimus,
senior water
resources specialist,
World Bank*

¹ The project involves six countries: Burkina Faso, Chad, Mali, Mauritania, Niger and Senegal. Regionally, the initiative is also under the auspices of bodies such as the Comprehensive Africa Agriculture Development Programme, the Partnership for Agricultural Water for Africa, and the Global Water Coalition for the Sahel.

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TRANSPORT

Overcoming logistical challenges

Transport is one of the weakest links in agricultural value chains, although efforts to help farmers get their produce to market are finally gaining momentum.

Helen Castell

Transportation is a significant challenge – but also an untapped opportunity – for agricultural supply chains in Africa. Poor interior roads, regulatory failings, unsuitable vehicles and security concerns are among the constraints that farmers’ face in order to get produce safely and quickly to market, and that inflate haulage costs and limit export opportunities.

Freight logistic costs per km are over 50% higher in Eastern Africa than Europe or the US, states Frank Matsaert, CEO of TradeMark East Africa (TMEA), a non-profit focused on trade issues. He blames a logistics gap caused by a lack of infrastructure, technology and expertise in everything from road networks to payment systems and warehousing facilities.

Transit times are high. The 1,600 km journey from Mombasa to Kigali takes about 422 hours (nearly 18 days) compared with 1 day for similar distances in Europe, according to TMEA. “Trucks must stop at two border posts and are likely to encounter 45 road blocks, each of which involves delays and costs, as well as potentially damaging the goods being transited,” says Matsaert.

Although hard data from the rest of Africa are difficult to come by, freight costs and transit times are challenging across the continent, especially in

40%

of total livestock trading costs can be made up of transportation costs

Western Africa. The outlook, however, is improving. Initiatives by farmer associations, governments, private companies and development agencies are helping upgrade infrastructure, transform logistics with low-cost ICT solutions, and develop ways to preserve produce on the road. Transport and logistics also represent big opportunities for the private sector. “From mobile phone solutions and training programmes to fruit-preserving vehicles, this is a land beaming with profitable opportunities for the willing,” enthuses Louis Matheka, sales manager at Mangos from Kenya (MFK).

Logistics

One area where progress in transport has been rapid is logistics. This is driven by ICTs, which have the potential to play a ‘transformative role’ in agricultural trade, explains Matsaert, noting that tapping private-sector expertise is key.

Text or smartphone-based mobile applications give even small-scale pro-

ducers access to information related to trade, transport and global markets. Real-time tracking software and electronic payment systems also speed the release of agricultural produce by customs and other regulatory agencies.

TMEA’s Trade Logistics Information Pipeline initiative is an ICT-based supply chain solution designed to ensure information required by all players in the movement of cargo along the trade supply chain is available before goods arrive. This gives players ample time to perform administrative or operational tasks. Reducing cargo lead times “will be a huge benefit to perishable goods exporters from Eastern Africa,” acknowledges Matsaert.

Economies of scale mean transit costs per unit can be cut drastically if producers’ marketing activities are coordinated so output can be pooled for transport. MFK has introduced an SMS system that alerts its suppliers when to pick mangoes, as well as when and where to deliver them for collection by Nairobi-bound trucks.

Middlemen

However, bad roads and long distances involved in agricultural transport mean there are many middlemen, which erodes producer profits, states Inter-



Reducing cargo transport times will benefit perishable goods exporters from Eastern Africa

national Livestock Research Institute research technician, Francis Wanyoike.

According to Naitos Golden Inspirations, livestock producers in Kenya's Wajir county, for example, earn a net return on investment of just 5%, compared with 30-40% for other market intermediaries. Transportation represents up to 40% of total livestock trading costs. The Accelerated Livestock Value Chain Project, a USAID-funded initiative involving ILRI, is working to cut the number of middlemen in northern Kenya's livestock markets by encouraging direct sourcing of animals by traders from major markets like Nairobi.

Red tape and taxes

Weaknesses in many countries' policy and regulatory frameworks present further obstacles for efficient agricultural transport and trade. Few governments in Africa effectively regulate major modes of transport. This means that issues of poor quality and safety are unchecked; this discourages competitive practices and private sector investment. Many

regulations are onerous or inappropriate while reasonable regulations are weakly enforced.

Taxation is also a significant cost, especially for long-distance transport. A separate tax, for example, is often levied by local governments in each county or region through which produce is transported. To persuade governments to cut these costs, farmer associations and private firms need to work together, states Matheka.

Non-tariff barriers, such as excessive bureaucracy and corruption, can be hurdles where responsibility lies firmly with governments. Requiring livestock traders to obtain animal movement permits, for example, is a standard practice that helps reduce the spread of disease. However, it can open an opportunity for corrupt police to harass traders and transporters seeking bribes. High crime rates along some transit routes also put traders at risk of attack. Livestock traders often have to hire costly security escorts to protect them from cattle rustlers, notes Wanyoike. Kenya's government has tried

to solve the problem of banditry by banning the movement of animals at night, but the need for stopovers has raised traders' costs.

Preservation and packing

A shortage of electricity supply in rural areas means many farmers have no access to refrigeration points for perishable produce, which forces them to use the first means of transport available, including public transport, which risks damaging produce. In response, many governments in the region are now making grid connection a priority.

In the meantime, MFK is testing the use of charcoal technology to preserve fruits and the company reports that it is working well. Another alternative introduced by a Gates Foundation-funded project in Kenya, is the use of plastic Mazzi cans that are cheaper and lighter than metallic containers but just as efficient for transporting and keeping milk fresh. Packing produce at the farm and transporting directly to airports or seaports for export removes an additional link in the transport chain. MFK has invested in packaging facilities at 'mini-central' points shared by neighbouring farms and has trialled farm-gate packing for smaller orders of up to 3 t, with "impressive" results, says Matheka. ■

“The 1,600 km journey from Mombasa to Kigali takes 422 hours (nearly 18 days) compared with 1 day for similar distances in Europe.”

STRUCTURED TRADING

Online platforms enhance regional grain trade

Across Africa, online platforms are tools that can boost regional trade and reduce postharvest losses to increase farmer incomes and decrease dependency on imports.

James Karuga

Grain yields in Africa are low, resulting in shortages across the continent, but a lack of regional trade is also a problem. In Eastern Africa, an online grain trading platform, G-Soko, has been designed to overcome problems associated with informal grain trading and increase farmer incomes. Launched in July 2015, the platform has over 1,000 farmers registered in the pilot phase and will, in time, be available to over 5 million farmer members of the Eastern Africa Grain Council (EAGC). According to Gerald Masila, EAGC executive director, poor postharvest practices affect the quality and safety of grains. Smallholder farmers are also not exposed to wider

112 million

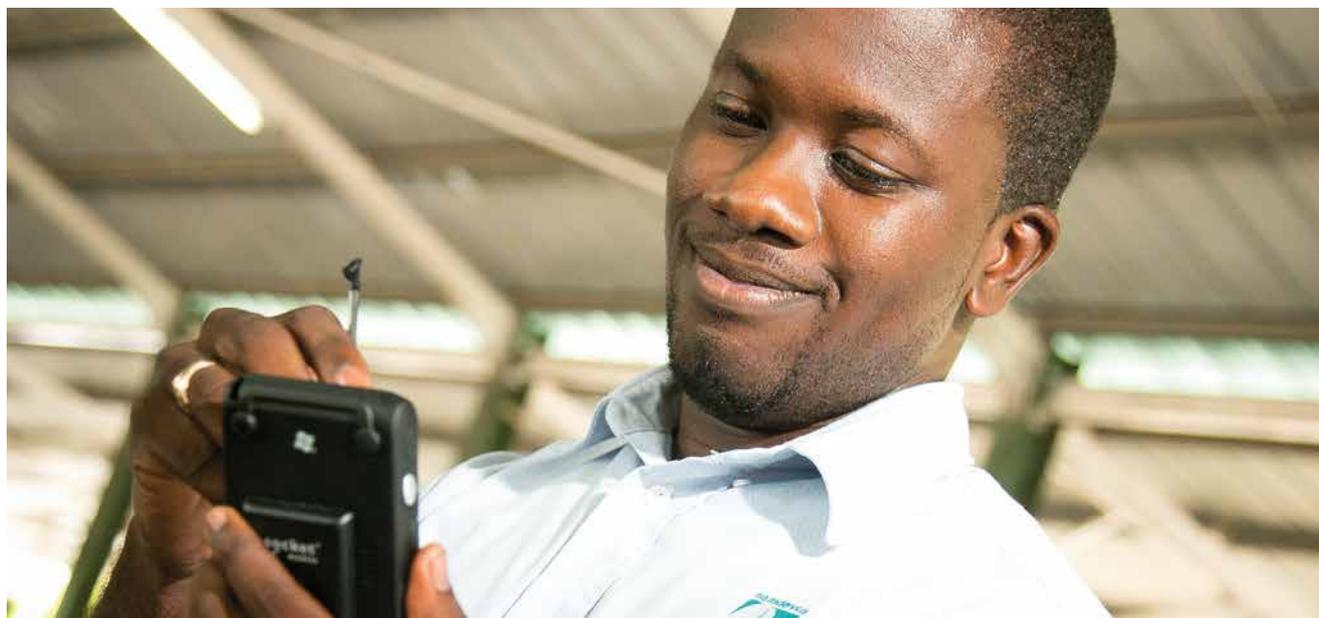
tonnes of grain is produced
by sub-Saharan Africa
each year

70%

of household incomes in
sub-Saharan Africa are made
up of crop production, with grain
contributing 37%

markets and are affected by low prices by selling their grain after harvest when supply is high. “They are forced to sell at any price and it becomes a buyer’s market,” says Masila.

Connecting grain farmers and traders in Kenya, Tanzania and Uganda, G-Soko provides information on market opportunities, and improves grain handling standards. Farmers trading their maize, rice, beans, sorghum, millet and soya on the platform are clustered into groups of about 30 members. After harvest they bulk their grain at village aggregation centres. From there the bulked grain, which must adhere to EAGC developed regulations, is transferred to a certified



© G. RAMBALDI/CTA

The G-Soko platform has over 1,000 farmers registered in the pilot phase and will be available to over 5 million farmer members of the Eastern Africa Grain Council

Buy local: made in Rwanda

The Rwandan government has introduced a new campaign under the 'Made in Rwanda' banner. Its aim is to encourage people to buy local products as part of efforts to boost the country's manufacturing sector and address Rwanda's trade deficit. The initiative was formally launched by senior government officials in March 2016, including a recommendation to "put in place mechanisms to promote locally-made products to make them more competitive on the local and international market." According to François Kanimba, Rwanda's Minister of Trade and Industry, the purpose of the campaign is to "support self-reliance, create more jobs for Rwandans and change the misconception that foreign products are better than local ones." The campaign was officially launched at a trade exhibition in Kigali. The initiative is proving extremely popular among local producers. "The government is supporting us, and that's a good thing explains Pascal Murasira, co-founder of potato crisp manufacturing firm Hollanda Fairfoods Ltd. His company sources its potatoes from around 1,200 Rwandan producers. However, Murasira also feels that the government should be taking more practical steps to support the process. "It also needs to support small- and medium-sized businesses, to ensure they are able to access public contracts and finance," he adds. "This can be done by reducing the punitive interest rates on loans, which stand at around 18%."

According to the Minister of Trade, the 'Made in Rwanda' campaign should help the country save more than €210 million each year on imported goods.

Fulgence Niyonagize

warehouse run by farmers groups or private businesses. The warehouse suitability to store grain in hygienic and pest-free conditions is determined by EAGC and certificates are provided to those that meet certain standards to ensure both the quantity and the quality of the grains that are offered for sale.

Farmer groups who deposit their grain at certified warehouses are given a 'certificate of deposit' – known as a grain note (G-Note) or warehouse receipt – which enables the grain to be traded virtually. When farmers decide to sell their grain, the G-Note is activated using a mobile phone and the grain is listed on G-Soko. G-Note ownership is transferred to a trader as soon the grain is purchased, enabling them to collect the grain from the warehouse at their own convenience. By organising and regulating trading and financial arrangements, this 'structured' trading system ensures that grain is traded without buyer inspection, thereby reducing transaction costs. The G-Note may also be used as collateral to obtain loans from financial institutions, like banks, even before the grains are sold on the platform. To determine the value of the loan, financial institutions are able to use data from the Regional Agricultural Trade Intelligence Network – EAGC's online market information system

Knowledge is power

The EC-supported African Post Harvest Losses Information System (APHLIS) is another platform, aiming to reduce postharvest losses. In 2011, research carried out by FAO and the World Bank

valued annual postharvest grain losses in sub-Saharan Africa at €3.5 billion; enough grain to meet the caloric needs of at least 48 million people annually. By providing estimated postharvest losses for each sub-Saharan Africa country, the APHLIS platform enables agricultural experts to plan interventions in advance to reduce losses. Farmers are becoming increasingly knowledgeable about the grain value chain. In 2015, over 8,000 Kenyan farmers were trained on standards (e.g. grain moisture levels) and food safety by the Eastern Africa Grain Institute. Grain moisture meters were also supplied to about 900 farmers in 22 farmer groups. The 8,000 trained farmers were able to win supply contracts from the UN's World Food Programme, to supply approximately 700 t of maize in Kenya.

In Kenya, EAGC is also lobbying the government to abandon policies detrimental to grain trading and farm production. For example, Masila explains that the government sets prices it will purchase grain for, without considering prevailing market prices. This practice forces private traders, like millers, to buy grain at higher prices resulting in more expensive processed goods for consumers.

Looking forward

Sub-Saharan Africa produces 112 million t of grain each year. According to a 2011 FAO study, crop production in SSA accounts for 70% of household incomes, with grain contributing 37%. However a 2012 World Bank study revealed that only 5% of Africa's cereal imports are sourced from within the continent.

Across SSA, maize is the most important crop, consumed by 50% of the population. But according to the International Institute for Agriculture, 28% of maize has to be imported to meet a shortfall in demand. Masila is hopeful that initiatives like G-Soko will boost regional trade and reduce postharvest losses. "The region produces more than enough and doesn't need to import grain, but it doesn't trade enough among itself," Masila explains. "There are instances where grains are needlessly imported into the Eastern African region when there is harvested grain rotting in storage." To expand G-Soko's impact, EAGC aims to further expand the platform across the region to Burundi, the Democratic Republic of Congo, Ethiopia, Malawi, Rwanda, South Sudan and Zambia. ■

✦ **For more information:**
<http://tinyurl.com/jcs63ts>

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In Africa, many small and medium enterprises have real potential for creating jobs and increasing a country's GDP, but they lack financing to expand

IMPACT INVESTMENT

Supporting agricultural SMEs in Africa

Bamboo Finance and Louis Dreyfus Commodities are launching a €46 million investment fund, NISABA, to support agriculture in Africa.

Anne Perrin

'Nisaba' is the name of the Sumerian goddess of the harvest and means "The lady who distributes the grains." The NISABA fund is designed to promote development and private investment in Africa's agribusiness sector.

The initiative came from Louis Dreyfus Commodities, one of the leading global merchandisers of agricultural goods, and Bamboo Finance, a Swiss private equity firm specialising in investments benefiting low-income communities in developing countries. In October 2015, the two companies announced their partnership to build and run an impact investment fund. Impact-investing strategies aim to develop positive social, societal and



ecological effects with financial returns.

According to Pierrick Paindavoine, NISABA's director, the project addresses a gap: "In Africa, many small and medium enterprises (SMEs) have real potential for creating jobs and increasing a country's GDP, but they lack financing to expand." The 10-year fund is based on Louis Dreyfus' knowledge of African agriculture and Bamboo Finance's expertise in investing in SMEs, and intends to help SMEs along sub-Saharan Africa's agricultural value chain to expand and attract funding.

NISABA will have a balanced portfolio in terms of geographical coverage, activities and products, and will invest in emerging markets where there's a financing gap in the agricultural value chain. Focus will be on small businesses that combine social, ecological and financial goals, by improving access to data, training, innovative technologies, and finance and risk management. Market access will also be enhanced by linking producers to end consumers. Finally, the fund will strengthen local technical capacities in postharvest management, value-added processing and packaging.

Jean-Philippe de Schrevel, CEO of Bamboo Finance, and Margarita Louis-Dreyfus, chairwoman of Louis Dreyfus Holding, believe that this pioneering partnership will address the challenges faced by an agricultural production sector that barely meets the needs of its growing population. ■

BLENDED FINANCE

A new approach for funding agricultural value chains?

A new EC initiative for blended finance is stimulating interest among finance institutions and will be an interesting test to determine how well this approach can be applied to agriculture.

Helen Castell

The EC's new Agriculture Finance Initiative (AgriFI) could prove a game changer in attracting private finance to agricultural value chains. But, while the concept of blended finance – using grant finance to lower risk to encourage private finance – has many proponents, the model is relatively unproved in agriculture. The challenge for AgriFI will be ensuring that it truly leverages, rather than displaces, commercial finance.

Bank funding for agriculture is typically limited to big, well-established players, and while microfinance initiatives support small and medium enterprises, interest rates are often unsustainably high. Grant funding meanwhile is plentiful but rarely scalable. These financing gaps are evidence that AgriFI is needed, states Roberto Ridolfi, director for sustainable growth and development at the EC's Directorate-General for International Cooperation and Development.

AgriFI will target finance gaps in two ways: direct funding for companies, probably starting with SMEs; and indirect funding to intermediaries like development banks, local finance institutions and microfinance networks, which will distribute money along the value chain. The initiative has already attracted huge interest from an association of 15 bilateral institutions, European Development Finance Institutions (EDFI), says Ridolfi. Led by the Dutch development bank, FMO, EDFI is setting up a fund management company to deploy capital dedicated to AgriFI and similar initiatives. To ensure its blended finance model works,

AgriFI will seek to de-risk private investors' capital by employing financial engineering tools like subordinated debt or quasi-equity structures, explains Ridolfi. It will also use impact analysis to ensure added value is distributed efficiently along value chains. In addition, AgriFI will focus on financing projects that make value chains more bankable, help-

500 PROPOSALS

have been attracted by the AgriFI's call for NGO/private company partnerships

ing them graduate to pure private sector finance. For example, technical assistance projects will be funded to improve agricultural practices or build infrastructure, such as storage, to give farmers better access to markets. Encouragingly, AgriFI's call for proposals in February 2016 for NGO/private company partnerships looking to invest in technical support attracted more than 500 proposals covering 80 countries.

Valuable lessons

AgriFI will also benefit from lessons learned in ElectriFI, an EC initiative using blended finance to invest in rural electrification projects in developing countries. Agriculture and energy share many challenges and opportunities, with both

involving complex, under-funded value chains, says FMO fund manager Frederick Jan van den Bosch, who is responsible for the EDFI fund management company coordinating ElectriFI's financing mechanism and is keen to support AgriFI too. ElectriFI has just issued its first call for private financing proposals, so will have experience to share once AgriFI reaches the same stage in 9 to 12 months, explains van den Bosch. He continues that the success of any blended finance initiative hinges on how the concept is interpreted. While it is often defined as the parallel provision of grants and commercial funding, he says, "To me, that's not really blended, but two products at the same time. It gets much better when you mix them, and even better when you put it in the oven."

Although it is essential that funders are remunerated properly, true blended finance is more flexible than standard bank finance, and involves an element of risk sharing, says van den Bosch. Repayments could, for example, be linked to performance or be offered in local currency. In the longer term, AgriFI must also concentrate on countries' main value chains, rather than piecemeal projects, Ridolfi emphasises. "At a certain stage, it wouldn't make sense just to work in strawberries in Côte D'Ivoire and not in cocoa." Ridolfi concludes that demonstrating that AgriFI can mobilise and leverage private sector involvement in agriculture will be key to influencing public policy to create a more supportive environment for commercial investors and financiers. ■

INTERVIEW

The lasting impact of malnutrition

Roger Thurow, journalist and author of *The First 1,000 Days*, outlines why it is time to take greater action to combat malnutrition.

Susanna Cartmell-Thorp

One in four children are stunted due to undernutrition. This is one in four youngsters that are unable to fulfil their potential. This global burden can no longer be ignored as Roger Thurow, senior fellow at the Chicago Council of Global Affairs explains.

According to the World Health Organisation and FAO, around half of the world's population is malnourished. What impact does this have - not just for individuals - but for communities and countries?

The impact is enormous. Under the global Scaling Up Nutrition initiative (<http://scalingupnutrition.org/>), many of these countries are beginning to do cost analysis of stunted children and 20-40% of children are found to be malnourished and in some regions, 50% or more. This costs economies between 5% to 15-16% GDP annual equivalent in countries like Ethiopia that is lost from malnutrition. So it is like throwing a pebble into a pond; it starts with the stunted child and the ripples go out and engulf the rest of the world. Ongoing cognitive studies show us that the stunted child will spend less time at school, learn less and probably leave early. Stunted children become stunted adults, earning capacity is reduced - studies show that it is 20-40% lower - and they will have a greater propensity for chronic illnesses.



Roger Thurow, journalist and author

This burden spreads to the family and makes the family's climb out of poverty even more challenging. Where there is one stunted child, there are undoubtedly others in the community and when we look at the final ripple - globally, then estimates are several percent of global GDP equivalent due to lower productivity and lower economic activity. What might a child have contributed were they not stunted? The cost is immeasurable; it is the lost opportunity of a horizon not explored, a cure not discovered, a technology not invented.

So people are now waking up to the importance of nutrition. But it is a complex challenge and raising healthy people is not just about the results of one set of policies or interventions?

It is a tremendous challenge when less than 1% of basic healthcare spending has been on nutrition. But the growing realisation that one in four children in the world under five are stunted means that addressing this issue not only becomes the right thing to do but the smart thing to do. But it is not just nutrition education, although that is a great enough challenge in itself; we have to put nutrition in the context of the social and economic environment for families and that raises other issues: water, sanitation, healthcare infrastructure, and so on. We have to move forward simultaneously on all these development aspects, whether in the developing or developed world.

Fortified crops are one example of growing more nutritious food. What difference is it making to communities, particularly mothers and children, where these are being grown?

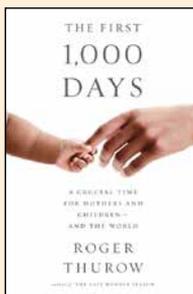
It's really quite fascinating as the mums, the dads, the communities talk about the differences. In Uganda, for example, with communities growing vitamin A sweet potato and new iron-



At least 10.2 million people need food aid in Ethiopia, a figure the UN has warned could double within months, casting a fifth of the population into hunger

The First 1,000 Days

Essential nutrition for mothers and children



This inspiring book follows the experiences of four mothers and their children in America, Guatemala, India and Uganda. Clearly describing the challenges faced by these mothers including poverty, lack of sanitation, and education, Thurow highlights the hope that good nutrition can provide: “Your child can achieve great things.” This is the message conveyed to the pregnant women that, with proper nutrition in the first 2 years of life (1,000 days from conception), their children can lead a healthy and prosperous life. A senior fellow in food and agriculture at the Chicago Council on Global Affairs, Thurow is also

a journalist and this is evident in his writing. The narrative is clear, the stories are impactful and the reader is left in no doubt as to the changes that can be brought about if holistic action is taken. It is not just about better nutrition and healthcare, improved education, or cleaner water – it is about all these things. Beautifully written and supported by anecdotes and observations, this publication should challenge all who read it to consider what is lost to the world when one in four children under the age of five worldwide remains stunted due to malnutrition?

★ For a video on the book and this topic see: <http://tinyurl.com/jrjovya>

The First 1,000 Days: A Crucial Time for Mothers and Children and the World
Public Affairs, 2016, 304 pp. ISBN: 978-16-103-9585-4, US\$ 26.99
PublicAffairs, 250 W. 57th Street, 15th Floor, New York, NY 10107, USA
<http://tinyurl.com/zmvf3dt>

rich bean varieties, women are reporting that they are more energetic, less tired, less dizzy throughout pregnancy. And then the mums notice that this latest child is walking earlier, is more curious, and does not get sick so often. We obviously need time to track these impacts, we need studies to see if these children do better in school, have less chronic diseases but the anecdotes are fabulous. I sometimes wonder are these apocryphal stories or not? But then you hear them repeated in different forms from different people, and we have to know that something good is going on here.

So what do you believe are the next steps for policymakers to help future generations be healthy and productive?

Political will – is the commitment of policymakers – is so important because they control budgets, have leadership capabilities, and can set agendas for a lot of things. And the same with development agencies, we need to move from ‘pet’ causes in development to common cause. If we really want to work towards the sustainable development goals, this requires commitment to intensify and solidify the investments and commitments made to significantly reduce malnutrition and stunting and to make a difference in the first critical 1,000 days of human life. ■



Young villagers transplanting the first SRI field in the village of Kouin, Mopti, Mali

INNOVATIVE TECHNOLOGY

System of Rice Intensification: global spread and impact

A less labour intensive technique to increase rice yields which uses no chemical inputs is also now being adopted with other crops

Mike Davison

When Fr. Henri de Laulanié published an article in *Tropicultura* in 1993 outlining his System of Rice Intensification (SRI), developed in collaboration with Malagasy farmers, it provoked huge scepticism and was mostly ignored. How could you reduce rice plant populations by 80–90% and yet increase rice yields by 100% or more? How could farmers succeed on ‘poor’ soils without using chemical fertilisers, and without flooding their fields?

Obtaining such radical methods outside of Madagascar took several years. But thanks to dedicated NGO workers and enterprising farmers, and some independent-thinking researchers, the methodology did begin spreading, first

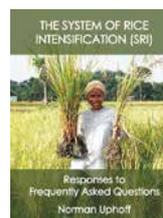
in China and Indonesia, and then to Cambodia, Cuba, India, the Gambia, the Philippines, Sri Lanka and Sierra Leone.

According to SRI author Professor Norman Uphoff, SRI is among the most significant and beneficial farming innovation to have emerged in recent decades, yet misconceptions and misinformation continue. For example, early research in Madagascar suggested that the method demanded increased labour inputs. This, says Uphoff, reflected the fact that rice production in Madagascar was labour-intensive, with correspondingly low yields. Any improvement would require some additional labour. However, once farmers gained skills and confidence in the methods they found

they could reduce labour inputs using SRI.

In Asia, where 90% of the world’s rice is produced, using labour-intensive methods, SRI allows farmers to increase productivity with reduced labour requirements even in the first season. The system also offers savings in water, fuel and expenditure, and reduces net emissions of greenhouse gases from rice paddies. SRI principles are now being extended and extrapolated to a range of other crops, including finger millet, sugarcane and wheat, as reported in a CTA-sponsored publication on the *System of Crop Intensification* (<http://tinyurl.com/zrbvyud>)

The Q&A format adopted in Uphoff’s book is for anyone with curiosity about the technology. It is not a ‘how-to’ manual for farmers but a summation of the experiences of farmers, field technicians and development organisations from around the world. Well illustrated, with pictures from over 35 countries, it will enable anyone with an interest in advancing agricultural productivity – including donors and policymakers – to better understand de Laulanié’s innovative work. For maximum accessibility, it can be downloaded for free as a pdf file (see below). Translations, including Spanish and Chinese, as well as Bahasa Indonesia, are in the pipe-line. ■



The System of Rice Intensification: Responses to Frequently Asked Questions

By N Uphoff

N Uphoff, 2016; 212 pp

ISBN: 978-15-150-2205-3

SRI-Rice, Cornell University, New York, 14853, USA

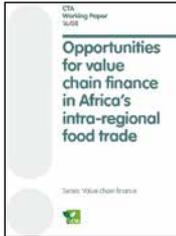
<http://sri.ciifad.cornell.edu/>

Downloadable as a PDF file from:

<http://tinyurl.com/hh572tg>

Value chain finance

Innovations for intra-regional food trade



If Africa's potential for increased food production is to be realised, farmers must be able to sell to its rapidly-growing cities. But this depends on achieving huge improvements in

intra-regional trade. Trade between African countries is often constrained by high costs (e.g. transport) and lack of finance for short-distance value chains (e.g. farm-to-city). Yet most bankers are unfamiliar with value chain funding mechanisms, have negative perceptions of the risks of agricultural funding and appear blind to the commercial opportunities offered by farm-to-city value chains.

To put those opportunities into perspective, by 2030 it is estimated that African horticultural production will be worth €430 billion per year, compared with €165 billion for traditional cash crops. Further encouragement for bankers lies in existing value chain improvements (e.g. through supermarket expansion) and increasing formality, even in informal trade, in response to consumer demand for better quality produce. Innovations such as mobile money transfer and new trade corridors, combined with strengthening of regional trade-supporting institutions and promotion of credit-risk management facilities (e.g. insurance) can stimulate a boom in Africa's intra-regional trade, reducing its dependence on imported foods and tackling rural poverty. ■

Opportunities for Value-chain Finance in Africa's Intra-regional Food Trade

By CTA

CTA, 2016; 54 pp.

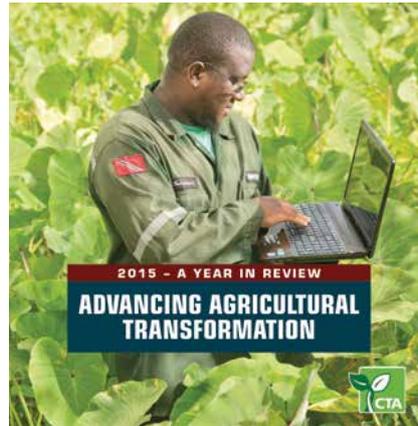
CTA no. 1891



Downloadable as a PDF file from:
<http://tinyurl.com/gr7zh9v>

Reviewing & reflecting

CTA's achievements and impact in 2015



2015 was a busy year for CTA, both in setting up new ventures and in realising impacts from its work to date. This summary of highlights provides ample evidence of both, giving readers a 42-page guide to how the organisation, often in partnership, has promoted the transformation of smallholder agriculture in African, Caribbean and Pacific regions.

In terms of potential impact, the 2015 Durban Hackathon offers some excellent examples, with CTA making open data sets directly available to the young 'techie' at this national event. One team developed a prize-winning app to help farmers match crop choice to climate conditions; a second app links vegetable growers with customers. It will be exciting to see the impact these apps have in the years to come.

Improving ICT4Ag is another key CTA focus, with five projects awarded up to €100,000 to develop and test ICT solutions to smallholder farming challenges. A Sudanese project, for example, has used satellite technology to measure nine soil and crop parameters which are combined with weather forecasts to provide irrigation advice to 44 farmers via mobile phone and web portal. A former Minister of Agriculture and Irrigation has since suggested the system be rolled out more widely.

Building support from policymakers in this way is a key focus for CTA, reflected in the numerous conferences and workshops that it has attended and organised during 2015. At the COP21 summit in Paris, for example, CTA

co-organised a technical session to discuss specific climate-smart solutions that can help smallholder farmers adapt to climate change. Technology is often a key component, and 2015 also saw the launch of a €4.6 million project, overseen by a CTA-led consortium, that over the next 3 years will use satellite technology to benefit 350,000 farmers in Uganda, boosting their crop yields by 25% and incomes by 20%.

As well as such major initiatives, the book also celebrates smaller case studies of success and innovation. CTA's book donation scheme, set up in 2009 and now serving over 150 libraries, is a notable example: since receiving their allocation of 200 books from CTA's publications list, many libraries have reported an increase in the number of visitors and greater satisfaction with the information they receive. *Embracing Web 2.0 and Social Media: a Life Changing Pathway for Agricultural Development Actors*, published by CTA in 2015, may already be available under the scheme. It is described as being "not so much a book about technology, as a celebration of the individuals who have embraced Web 2.0 and social media to improve their lives." Celebrating success is important, and something that readers of this annual report will be able to enjoy in full measure. ■

2015 A Year in Review: Advancing Agricultural Transformation

By C. Pye-Smith

CTA, 2016; 42 pp.

ISBN: 978-92-9081-605-8

CTA no. 1828



Downloadable as a PDF file from:
<http://tinyurl.com/hv9d977>

Sustainability

New opportunities for entrepreneurship



According to Professor Gurib-Fakim, Africa has the human capital to transform its agricultural sector, with growth in urban markets providing new opportunities for enterprise development.

However for these to be properly exploited, investments in science, technology, engineering and maths education must be increased and bold policies implemented to promote public-private collaboration and support research and development. Such an approach will forge stronger links between producers private sector companies, academic institutions and research centres and enable technological solutions for sustainable agri-food development.

In transforming Africa's food-based industries, Gurib-Fakim highlights the importance of agri-food clusters. Local, national and regional authorities must consider where such clusters may prove most successful, and make clear plans for their development, taking a holistic approach with regard to the role of public, private and regulatory institutions. The private sector, for example, must be willing to transfer knowledge and make funding and personnel available during early stages of cluster development. Governments must also provide enabling policies, supportive regulatory frameworks and strong governance structures. ■

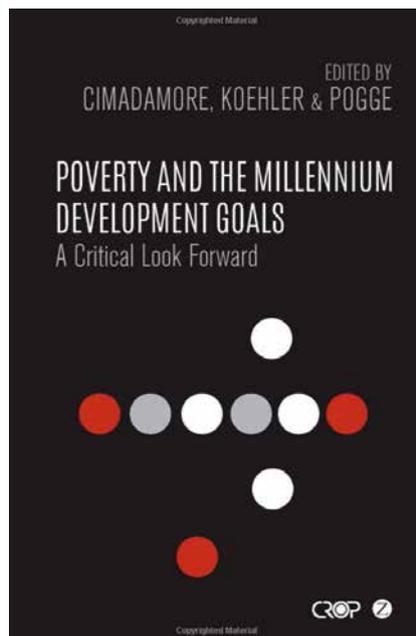
Innovation, Entrepreneurship and Governance for Sustainable Development of Africa's Agri-food System
By A Gurib-Fakim
CTA, 2015; 14 pp.
CTA no. 1890



Downloadable as a PDF file from:
<http://tinyurl.com/zlj6brn>

Critical analysis

The global poverty challenge



Globally, the number of people living in extreme poverty has dropped in recent decades. Sound good? What if you knew that this was primarily due to one nation's efforts: China? Unfortunately researchers have found that in the rest of the world, levels of extreme poverty are not much different from what they were in 1981, despite decades of economic growth. To delve into this in more detail, this original and readable book looks at the Millennium Development Goals (MDGs) and how well they did with regards to poverty. Cimadamore *et al.* argue (convincingly) that, "The MDG approach concentrated on lifting a certain proportion of people out of poverty while retaining a model of development that continues to produce poverty and tolerate massive violations of human, social and economic rights."

Poverty and the Millennium Development Goals – whilst probably not the endorsement the UN would hope for – is a timely analysis, as the international community transitions from the MDGs to the Sustainable Development Goals (SDGs). Chapters bring together leading experts to provide critiques of whether the MDGs made any meaningful change. In short, an anecdote to the

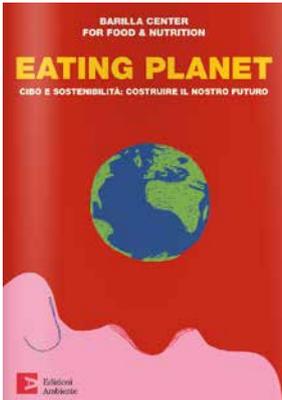
triumphalism of those who proclaim MDG success. It is clear that poverty has been at the centre of development discourse for several decades. Despite this, high- and middle-income countries have witnessed an unprecedented accumulation of wealth, and developing countries saw skewed welfare and human development outcomes disadvantaging poor and socially excluded communities.

The book's three parts address the global poverty challenge, the devising and refining of development goals, and policy and societal alternatives. One of the most interesting aspects of this book is its challenge to neoliberal economic growth development models which presume more wealth comes from less state involvement in markets and economy, which equals 'more opportunity' and less poverty. Another interesting topic is the question of how development indicators are measured. Clearly poverty indicators can be manipulated and misleading, avoiding ugly truths. Food for thought as the SDGs kick off. ■

Poverty and the Millennium Development Goals
Edited by A Cimadamore, G Koehler & T Pogge
Zed Books, 2016; 268 pp.
ISBN: 978-17-836-0618-4
£24.99
Zed Books Ltd
The Foundry, 17 Oval Way, London SE11 5RR
www.zedbooks.co.uk

Food systems

The way forward for a healthier future



“No subject today is perhaps so rich and deep and complex in its reality, and yet so poor and narrow and simplistic in its common portrayal, as is our food.” No-one can disagree that ensuring global food systems’ sustainability is a worldwide challenge. But to reach it means dealing with an extremely complex system with multiple dimensions related to nutrition, health, culture, employment, development, equity and the environment: it is not simple or straightforward. Still in the development sector, in media and

even in policy and business, narrow, simplistic and often damaging metrics – such as calories per person or t per ha – are used. “The main challenge of agriculture is still being widely discussed in terms of land availability to feed 9 or 10 billion by 2050. Such characterisations are both misleading and demeaning. They are in fact part of the problem of an inadequately understood and largely mis-managed eco-agri-food systems complex that is at the heart of all of the most important dimensions of our life on this planet’s surface.”

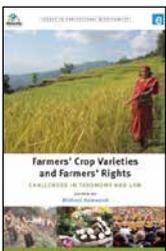
This thought-provoking and comprehensive book, which includes contributions from influential people, including interviews and think-

pieces from Vandana Shiva, Pavan Sukhdev, Carlo Petrini and Danielle Nierenberg, is an enjoyable read. Important take-away messages are suggested priority initiatives that decision makers, economic players and citizens should (and in some cases, can) implement, for example dietary recommendations for health and nutrition. Another example is an urgent call for global actors to value small-scale farmers in developing countries and their crucial role in food security, biodiversity and producing nutritious food. The only issue with this book is its idealism and the practicality of its ‘solutions’ in varying urban and rural contexts in ACP countries. This is not to knock their worth or value, but to question ways forward. The book nevertheless offers a fresh perspective compared to countless other papers that look at food systems from an agricultural production lens only. Definitely a book worth reading. ■

Eating Planet – Food and Sustainability: Building our Future
Barilla Center for Food & Nutrition
Edizioni Ambiente, 2016; 304 pp.
ISBN: 978-88-662-7188-8
€25
Via Natale Battaglia 10
20127 Milano, Italy
www.edizioniambiente.it

Crop diversity

Protecting farmers’ crop varieties



Farmers play an important role in protecting crop genetic diversity worldwide. This technical yet accessible book is about so-called ‘farmers’ varieties’ and the history, rationale and criticisms of seed and plant variety protection laws, including for example, in Benin and Zambia. “Over the course of the last 50 years there has been a growing apprecia-

tion [from] different stakeholders including biologists, activists and policymakers of the important role that farmers play in the development and conservation of crop genetic diversity and the contribution of that diversity to agro-ecosystem resilience and food security”, says Michael Halewood, head of Bioversity International’s policy unit, and editor of the book.

Two interlinked questions frame discussions in *Farmers Crop Varieties and Farmers Rights*: firstly, ‘How do farmer management practices – along with other factors such as the environment and the breeding systems of plants – affect the evolution and maintenance of farmers’ varieties?’ Secondly, ‘How can policies that depend on being able to identify discrete plant varieties accommodate the agro-cultural realities associated with the generation, use and maintenance of farmers’ varieties?’ Interestingly, there are no fixed, internally-recognised taxonomic or

legal definitions of farmers’ varieties. So this is a challenge for policies that involve giving legal rights or privileges to specific farmers’ varieties. Putting farmers’ rights at the centre of policy initiatives is crucial for agricultural biodiversity in ACP countries. This book is a valuable contribution to the complex yet worthwhile project to conserve farmers’ diverse crop varieties. ■

Farmers Crop Varieties and Farmers Rights: Challenges in Taxonomy and Law
Edited by M Halewood
Routledge, 2016; 405 pp.
ISBN 978-1-84407-891-2
£24.99
Routledge,
2 Park Square, Milton Park, Abingdon,
Oxon, OX14 4RN, UK
www.routledge.com

In the next issue

182 September-November 2016

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Recent developments in ACP countries are transforming agriculture

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SPORE is the quarterly magazine of the Technical Centre for Agricultural and Rural Cooperation (CTA). CTA operates under the Cotonou Agreement between the countries of the Africa, Caribbean and Pacific (ACP) group and the European Union and is financed by the EU. • CTA • Postbus 380 • 6700 AJ Wageningen, The Netherlands • Tel: +31 317 467 100 • Fax: +31 317 460 067 • Email: cta@cta.int • Website: www.cta.int • **PUBLISHER:** Michael Hailu • **CHAIRMAN OF THE EDITORIAL BOARD:** Stéphane Gambier • **COORDINATION OF THE EDITORIAL BOARD:** Anne Legroscolard • **EDITORIAL BOARD:** Krishan Bheenick, Isolina Boto, Juan Cheaz, Thierry Doudet, Vincent Fautrel, Philippe Lhoste, Andrew Shepherd • **EDITORIAL STAFF:** Co-Executive editors: Anne Perrin and Ottavia Spaggiari, Vita Società Editoriale S.p.A., Via dei Missaglia, 20142 Milan, Italy • Editor of English version: Susanna Cartmell-Thorp, WRENmedia Ltd, Fressingfield, Eye, Suffolk, IP21 5SA, UK • Editor of French version: Anne Perrin, 18 rue de Bercy 34000 Montpellier, France • **CORRESPONDENTS:** The following contributed to this issue: N Ackbarally (Mauritius), O Alawode (Nigeria), M Andriatiana (Madagascar), K Bascombe (Trinidad and Tobago), H Castell (UK), M Davison (UK), J Karuga (Kenya), R Lory (France), M Makoni (South Africa), C Mkoka (Malawi), F Niyonagize (Rwanda), E Ntungwe (Cameroon), M Reinert (France), J Saisonou (Benin), J Summers (UK) • **OTHER CONTRIBUTORS:** ISO Translation & Publishing, D Juchault, D Manley, M Protz, L Rutten, Y Zewdie • **DESIGN:** A Mola, M Riva - Vita, Italy • **LAYOUT:** Vita, Italy • **PRINTER:** Latimer Trend & Company, UK • CTA 2016 - ISSN 1011-0054



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