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GPS and smartphones improve cocoa production in the Caribbean

Software and cell phone updates support women shea producers in Ghana Websites and barcodes trace the link between producers and consumers

# **Market connections**

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### **ICT Update**



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### Editorial

# Technology promotes trade

As global food prices remain volatile, ACP farmers are trying to stabilise and improve their incomes by exploring new market opportunities or looking for new markets to sell their goods. Specialised markets, requiring fair trade or organic certification, or for export, are potentially more reliable and lucrative supply routes. That often means the products have to meet strict standards, with documentation detailing every step of the value chain. In order to comply with these requirements,

*GIS software helped the farmers meet traceability standards required for export to European, Middle Eastern and regional markets* 

> farmers are using ICTs to learn new cultivation and processing techniques, and to make new market connections.

### Information shared

The Caribbean Fine Cocoa Forum (CFCF) is using GPS receivers to map cocoa farms throughout the region in an effort to help small-scale producers reach the luxury chocolate goods market. The information gathered provides farmers with an accurate overview of the acreage of their land, which helps them estimate the amount of seed, fertiliser and pesticide they need for the coming year. Exact location data assists processing companies to plan efficient transport routes to pick up the raw cocoa beans. These measures reduce cost, save time and make the supply chain more costeffective.

The project trained farmers to use the GPS devices and supplied smartphones with which they could communicate with CFCF offices using closed user groups, a function that allows free calls to others in the group. The smartphones also gave the farmers a chance to post instructional videos, text and photographs taken in the field to social networking sites, such as Facebook. Through this, the team have collected valuable educational material from producers across the region. A similar initiative in Ghana, the Trade and Investment Programme for Competitive Export Economy (TIPCEE) project used GPS to streamline the supply chain for a variety of fruit and vegetable products. Using GIS software to record the progress of goods as they passed from producers to markets helped the farmers meet traceability standards required for export to European and Middle Eastern markets.

In addition, the project worked with extension officers to give farmers information on good agricultural practice, and together with the Ghana Standards Board produced informative posters to promote internationally recognised norms and standards in agricultural production.

### Supply demands

Simply meeting the required market standards, however, is not necessarily enough to ensure that a product will sell; it also has to meet consumer demands. The Fair Tracing research project worked with farmers in India and Chile to assess coffee and wine value chains. The study team examined what customers looked for when they bought fair trade products; many said they wanted to know more about the producers.

Fair Tracing developed a demonstration website to give both the farmers and the customers more information on the processes involved in delivering the products to their final destination. The farmers were able to identify inefficiencies along the route, and adapt their marketing strategies in response to the feedback from customers. Shoppers, meanwhile, could visit the website to view the steps involved in the supply, learn about farmers' lives and watch videos explaining the production process.

A range of ICTs has helped to give farmers greater awareness of the value chains in which they are involved, giving them the chance to improve them and meet the standards required by regional and global markets and by consumers. These, and similar projects have shown that as producers obtain better access to technology, they can be introduced to better trading opportunities, and have more stable incomes to support their families and communities. ◀

### Perspectives



Pierre Traore (pirtraore@datatech.net.ml) is head of database analysis and communication management at OMA and chair of ICT group at RESIMAO (www.resimao.org) Guinea, In April 2010. The project was largely inspired by the experience of OMA (Observatoire du marché agricole) in Mali, which has been particularly active in developing agricultural prospects and business opportunities in West Africa.

RESIMAO already covers 10 of the 16 countries that make up the Economic Community of West African States (ECOWAS), and includes Benin, Burkina Faso, Mali and Nigeria. The network collects information from 390 rural and

## A system for food security

### Market connections

he liberalisation of agricultural markets in West Africa began in the early 1980s, and led to the development of market information systems (MIS) to support the newly privatised market initiatives. Initially, the MIS simply provided the prices of agricultural goods. But as trade grew between countries in the region, there was a greater demand to include more analysis and business data into the systems. The integration of data from a variety of sources helped give context to the information and promote business opportunities across the region. Communication between traders improved, and economic exchange between countries in the area increased. These developments led to the

development of the West-African Market Information Network (RESIMAO) in

Market information systems need to be regularly updated and developed to increase the availability and access to food



Market information systems need to collate information from many sources to be useful to those involved in the agricultural value chains.

urban markets and 39 related subregional markets, with details of grains, vegetables, fish, livestock, inputs and agricultural equipment, tubers and staple food.

However, as information services evolve and compete in the free market, it was clear from the early stages that technology would be needed to computerise and speed up the collection, analysis and dissemination of market information if West African economies were going to compete globally. But the integration of ICTs into market information systems is not easy. Many projects in the past that favoured a purely technological approach have failed because they did not have the support of all stakeholders, or their business models were not financially sustainable.

In light of these experiences, RESIMAO first consulted as many people involved in agricultural markets as possible, in each of the member countries, before developing the system. The project would not be about the technology alone. The system also had to be able to adapt to market realities, and be a valuable addition to existing mechanisms and useful to the businesses and organisations that operated in the various markets. With such broad input the network could meet the needs of users by employing a range of technologies, including GIS, cell phones and radio.

### Sustainable management model

The cell phone has been a particularly useful tool for MIS, as it allows the easy distribution of information, while the cost of calls and messages to and from the system provides a means to generate revenue. In this way, MIS providers are able to cover the costs of communication among mobile operators and establish a sustainable business model for the system. In Niger, for example, RESIMAO signed an agreement with cell phone service provider, Orange, to share information on market prices. Similar arrangements have also been made with network providers in other countries.

The network has always stressed the importance of prospective and retrospective analysis to improve the quality of information on prices. To be able to conduct such analysis the MIS must have a critical mass of information. collected over a number of years and covering areas other than price. Data from other information systems and updates on issues such as weather, available stock, and transportation allow analysts to make predictions and decisions that match the socio-economic situation at the time. It is also important that the MIS can provide the means to compare and contrast information from a number of sources.

Price liberalisation will always be a part of free and competitive markets. And price transparency is necessary to protect consumers and give traders the ability to anticipate and take advantage of the best opportunities the market has to offer. RESIMAO, therefore, continues the search for appropriate solutions that will further strengthen West African markets. One practical step would be to ensure the remaining six ECOWAS countries join the network.

In terms of technology, RESIMAO continually reviews the system and looks at ways of using ICTs to improve collaboration between other regional information systems, supporting existing agricultural market analysis, and integrating the sector with other related fields. In the future, RESIMAO hopes to develop partnerships with the private sector to achieve its goals.

Market information systems need to be regularly updated and developed to meet the needs of farmers. They need to maintain financial and administrative autonomy too. Only then can they help to increase the availability and access to food - two important factors in the fight for food security. ◄

### **Related link**

Observatoire du Marché Agricole (OMA) → www.oma.gov.ml

### Market connections

• ver the past few decades, sugar and bananas were the most common agricultural products grown in the Caribbean. However, with the recent decline in these two sectors and increased market interest in dark and organic chocolate and similar products, cocoa production has received a boost in the region. Cocoa is a prestige product with a high economic value, and there are now several projects across the Caribbean to assist farmers and government departments to raise the position of cocoa in global markets. development of the sector. The organisation's contacts with global cocoa agencies such as the International Cocoa Organization (ICCO) and the Round Table for a Sustainable Cocoa Economy (RSCE), and the development of a CFCF brand, raises the profile of the farmers' product and adds to its market value.

The Forum further supports farmers by providing improved tracking and disease control information. It promotes clean fuel use through gasfired and solar cocoa dryers (instead of farmers used the functions of the GPS receiver to calculate the exact acreage of their farms and pay a fairer price to their workers. A more accurate estimate of land size also helps farmers determine precise amounts of fertiliser and pesticides needed for their crops.

Change agents used the devices to record the exact location of the farmers' gates, and added the coordinates to a central database. In countries such as Belize, Dominica and Jamaica the location information is useful for processing managers who

# **Network support**

CFCF uses GPS technology, smartphones, videos and the web to collect data on cocoa production. The organisation shares the information through a network of farmers, processing businesses and researchers to improve product quality and reach new markets.

Only fifteen countries in the world produce the high grade of cocoa known as 'fine or flavour'. Nine of those countries are in the Caribbean. Farmers throughout the region work hard to grow and prepare the fermented and dried cocoa beans for export to the world's top chocolatiers. Since 2010, the Caribbean Fine Cocoa Forum (CFCF) has represented the interests of the many people and businesses involved in the supply chain to bring the product to market. The main focus of the Forum's work is to support small-scale farmers, cocoa cooperatives and processing businesses to increase the value, and maximise the potential revenue from the crop.

Over the past two years, CFCF has established a broad network, linking a wide range of regional research data and resources to ensure the continued

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Vernon Barrett (vernonbarrett@hotmail.com) is the CEO of International Partnership Initiatives and a director of the CFCF. (www.caribbeanfinecocoaforum.org) oil-fired), and demonstrates ways in which the crop's by-products can be used.

CFCF is developing a quality control and certification process to ensure that farmers consistently deliver a product suitable for market. Initially, the organisation is helping a group of 400 farmers to meet the necessary requirements by providing information on production techniques that can lead to increased crop yield and higher prices for the product. In order to reach so many farmers with limited resources and spread throughout a large region, ICTs have proved invaluable in the gathering and delivery of relevant information.

#### Position

GPS technology, in particular, has been useful for collecting data and ensuring that rural farmers are included in the network, and therefore in the market supply chain. CFCF trained a number of farmers, known as change agents, to use GPS receivers to assist others in their cocoa production businesses. The device proved useful in many areas.

For example, some farmers do not know the exact size of their land, but they often pay labourers according to the amount of land they work. The collect the wet cocoa beans from the farms. The managers can use the database to plan efficient routes for the collection trucks and inform the farmer of pick-up times. The Forum also uses the coordinates to identify farmers in the electronic database, the first such source of data on cocoa farmers in the region and a useful tool to document land resources in the participating countries.

As the change agents travelled to record farm details, they also noted the locations of other places of interest to the farmers, such as the market, the fermentary, the local project office, and where to buy nursery plants, fertiliser or pesticides.

Eventually, the project team expects that the GPS data will play a key role in tracing the market supply route of the cocoa beans, from when and where the crop was harvested, along with details on yield, quality and flavour derived from each location.

### Visual updates

The combination of an ageing population and the migration of young adults to urban centres, or even abroad, means that many of the remaining cocoa farmers in the Caribbean are aged 50 and over.



Fewer farmers are physically able to use traditional farming techniques to get value from their land. But they need to stay up-to-date with new technology and mechanisation if they are to maintain and improve production levels, and remain independent.

Many farmers have had limited educational opportunities, and literacy rates can be low in some areas. Audio-visual productions, therefore, have been useful for demonstrating new farming skills and delivering other relevant information. In one training course in Jamaica, for example, audio-visual material was effective for teaching CFCF change agents and farmers about pruning, cutting techniques, treating cut surfaces, selecting and operating pruning tools, fertilising, preparing of planting holes, planting young trees and pest control methods.

The videos were produced showing farmers working in their fields, providing practical and easy-tofollow advice. The use of mechanised tools for farming has now made it possible for farmers to be more productive and for elderly farmers to be more independent, while the technology has made it possible to capture the aims of the training programme and to duplicate the learning experience. The resulting DVDs will be distributed to the change agents and farmers. CFCF is also developing a printed manual detailing the training programme that government agencies and agricultural extension officers can use along with the DVD.

### Multi-purpose

As the change agent teams travel to the participating farming areas, they have to be able to share information and communicate with other project staff and farmers. CFCF provided them with Blackberry 9000 Bold smartphones, as they have a number of features that can assist the change agents in their work.

One such feature is the closed user group, which is offered by most cell phone service providers. It allows calls, and in some cases SMSs, to be sent to pre-determined groups of people, usually free of charge. The function is especially useful for managers who have to keep regular contact with a large number of people, and is particularly appropriate for non-profit organisations, such as CFCF, as it helps to keep costs low without compromising communication needs.

The device, like many smartphones, has a built-in camera to take photos and make short videos. The images can then be sent via e-mail or the Blackberry messenger system to project staff or others involved with the Forum through social networking websites such as Facebook. E-mail CFCF uses audio-visual material to train farmers in the latest agricultural techniques to improve crop production.

GPS technology has been useful for collecting data and ensuring that rural farmers are included in the market supply chain

communication too, has proved effective for keeping farmers in touch with project leaders, and it gives them the opportunity to contact distant family and friends. The photographs complement the

audio-visual training material, and can also be used to capture images to monitor and combat the spread of disease in cocoa fields in the Caribbean. Short (two- to four-minute) pre-produced videos, which can be viewed at any time, are loaded onto the

### **Related resources**

International Cocoa Organization → www.icco.org

Round Table for a Sustainable World Cocoa Economy → www.roundtablecocoa.org

Old farmers, invisible farmers: Age and agriculture in Jamaica by Cynthia Woodsong. Journal of Cross-Cultural Gerontology, Volume 9, Number 3, 277-299. 1994



phone's memories The videos cover subjects such as how to prune a cocoa tree, proper field maintenance, how to apply fertiliser, pest and disease control techniques, and the use of power tools.

Additionally, key project dates are installed in the calendar facility on the phone, along with daily reminders and dates throughout the year when various plants require attention. The device also allows internet browsing, which gives farmers the opportunity to research and learn agricultural techniques and access the whole range of information available on the web.

Another useful feature is the Google Maps mobile application that can easily be installed on the phone. Farmers use the app to view their location on a map, and to estimate distances to other farms, for example, or the nearest market. The satellite view allows farmers to identify features such as rivers, lakes, roads and other landmarks. Some farmers use another app, Google Latitude, to share their location with other farmers and project leaders.

In Jamaica, the organisation, HEADSpace, provided ICT training courses for farmers in local churches and community centres, which are equipped with computers linked to the internet. The resident trainers were given special training to meet the needs of the project, and their efforts now complement the work of the change agents.

### Connections

A number of challenges remain for CFCF, but the project team is already working on likely solutions. For example, the priorities of the cocoa research institutes are not necessarily the same as those of the farmers in the Caribbean. There is also very little sharing of resources and information in the sector.

However, the project team has developed good links with the research divisions of food production ministries, land and marine resource agencies, the University of West Indies Cocoa Research Unit, and the University of Trinidad and Tobago's Department of Entrepreneurship, which is now assisting in assessing and documenting the needs of all concerned parties.

CFCF are constantly adding new members to the network and sharing project and research findings through newsletters, training meetings and an annual conference. These measures will also improve communication and representation of Caribbean cocoa producers at an international level. The under-utilisation of technology is being addressed through the training and development processes ongoing throughout the Caribbean region.

In the near future, CFCF hopes to secure funding to identify superproductive mother trees and tag them with a location-recorded microchip identification system. The stems from these super-productive trees can be grafted onto disease-resistant stock to produce a strong and productive variety of cocoa tree.

Such microchip technology could be used to reduce cases of praedial larceny, where crops are stolen. Crop theft is a serious threat in the Caribbean, especially for banana and plantain farmers. Cocoa farmers also grow these plants between cocoa trees to attract the insect species necessary for pollination. By placing microchips into random bunches of bananas, it could be possible to locate anyone who has stolen the produce. CFCF is still in the process of researching this aspect and would welcome any advice from other projects with relevant experience.

There is increasing emphasis on the production of more value-added goods from the cocoa bean, which most countries in the Caribbean still export as a raw commodity. Producing these new goods, such as teas, alcoholic liquors, dark chocolate, and other confectionery, will mean researching and preparing business models that are appropriate and viable for the smallscale production of other cocoa derivatives.

Moving into new production areas will require more training, the introduction of production processes and the use of new technologies. The concept has already proved a success with the Grenada Chocolate Company, but in the long term, there will have to be greater investment in ICTs to achieve more with the limited resources that are available in these countries. CFCF hopes to be in a position to adapt and meet these future challenges, and help Caribbean cocoa farmers reach their true potential on the world market. ◄

# Shea quality

A Ghanaian network uses cell phones and specialised software to provide training, microfinance and business support to women producers of shea products.

### Market connections

■ together rural women's groups that specialise in harvesting and processing nuts from the shea tree. The network helps more than 3,000 members, spread throughout northeastern Ghana, to produce high quality shea products and obtain premium prices from international markets. The network provides training in improved production techniques, business management and offers associated groups microfinance opportunities.

he Star Shea Network brings

Families traditionally collect the shea nuts in the spring months when income from cultivated crops is low. The lack of available funds often means they have to sell the nuts for low prices early in the season before they are fully dried for processing. Studies have also shown that the women producers and final buyers were losing money to a long list of intermediaries and wholesalers who added little to the value of the product, but increased costs considerably.

To reach as many members as possible, Star Shea Network produced a training video with information to improve harvesting and processing techniques.

With support from the international aid organisation, PlaNet Finance, and software developer, SAP, Star Shea



Heino Kantimm (heino.kantimm@sap.com) is responsible for social sustainability at SAP (www.sap.com) Maxwell Kuunyem (mkuunyem@planetfinance.org) is a project manager at PlaNet Finance, based in Tamale, Ghana (www.planetfinancegroup.org) Network (SSN) set out to make the supply chain more efficient and improve its members' income. By aggregating the shea products from the many groups, the network would be able to benefit from economies of scale, and sell in bulk to local and international buyers.

SAP developed Rural Market Connection, an internet-based order management software that collects and processes orders from buyers and manages the division of large orders down to group level. The system transmits the order details to computers at the offices of local microfinance agencies working with SSN.

The cooperatives that have available product coordinate with their members to meet the order requirements, organise collection and other logistical arrangements, with details sent back through the system. As the details are recorded by the software, including details of the suppliers and the product's progress through the supply chain, the process is now traceable and transparent, a requirement for many export markets. Members also receive updated market prices on their cell phones from Esoko market information service, which helps the women to make informed decisions and obtain the best prices when selling their products.

Additionally, SAP helped Star Shea Network to set up a website to raise the profile of the organisation. Buyers and consumers can now read about the project, its achievements, view products and make direct contact to place orders.

### **Financial success**

PlaNet Finance worked with two partner microcredit organisations in the region, Grameen Ghana and Maata-N-Tudu, to provide financial support to SSN members. Microfinance loans now mean that the women can buy protective gloves and boots to use when collecting the nuts, and invest in processing equipment, such as grinding mills and packaging, to help boost their business.

The two financial organisations are supported by another software package developed by SAP, called Microloan

### **Related link**

Stare Shea Network → www.starshea.com

Management. The programme helps the organisations' rural loan officers working in the field to track who has loans, and provides up-to-date information on repayments and available funding resources.

PlaNet Finance has also worked with major buyers of shea products to determine their needs, which were taken into consideration when developing a training course to help SSN members provide better quality products. A small number of women were trained initially, but to reach as many members as possible, PlaNet Finance produced a video to give information on improved and standardised processing techniques. The aid organisation also held business training courses for SSN members providing information on how to manage their income, organise budgets and coordinate group activities.

A recent study by Stanford University showed that some SSN members had increased their income by up to 82%, and PlaNet Finance has recently secured funding to extend the project to reach another 1,500 women. Improvements to efficiency and increased production have made SSN a competitive operator in the Ghanaian shea market.

As the network continues to expand and produce high quality shea products it is likely to attract more buyers, especially in niche shea butter markets. Depending on market demand, SSN seeks certification to show that its products meet organically-produced standards. The Stanford study notes that, with the progress made so far, SSN can 'make a difference in shea women's lives' and could go on to become a financially independent business if it continues to improve and meet the market challenges. ◄



# The added value of technology

A project using GPS data connected Ghanaian farmers to new buyers and export markets, and improved the value chain for a range of commodities in the country.

Market connections

**G** hanaian agricultural businesses have many of the key requirements to compete in the global marketplace. The country has a stable government, a favourable growing climate, and good logistical connections – with two accessible seaports and a direct air service to nearby European and Middle Eastern markets. But to compete globally, exporting businesses need to have a precise understanding of their supply bases if they are to deliver the right amount of produce, on time, at the right volume and be able to trace their goods all the way back to their source.

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Although agriculture accounts for 35% of the country's gross domestic product, poorly integrated value chains limited Ghana's export growth. The sector lacked competitiveness. There was minimal investment in technology and little modernisation of the supply processes. Fewer buyers on the market increased supplier competition, and tougher rules on food quality and safety put extra pressure on producers.

Most of Ghana's agricultural produce is grown by a large number of smallholder farmers, which makes it difficult to trace the entire line of supply back to the original producer. These small-scale farmers are often far removed from the final marketplace and the consumers, and can lack knowledge of processes and people involved in the value chain. This makes exporters wary of dealing with smallholder farmers, seeing them as unreliable, their produce unsafe and of varying quality.

In an effort to promote growth by increasing productivity, the Trade and Investment Programme for a Competitive Export Economy (TIPCEE) focused on developing stronger links between producers and markets. Between 2004 and 2009, TIPCEE and its partners used GPS technology and GIS software to establish the locations of these smallholder farms, and gather data on their crops in order to integrate them into the supply chain and improve precision and traceability.

The project was set up to support farmers, export businesses, government departments and related agencies to document, manage and monitor distributed production systems. The results were used to develop an objective standard for traceability systems and guide production planning, harvesting, post-harvest treatment and export programmes. This would help farmers meet the global good agricultural practice (GlobalGAP) standards necessary to enter the lucrative European Union and West Africa regional supermarket supply chains.

TIPCEE trained field officers, mostly agricultural extension officers, to use GPS receivers in the course of their routine work. When they visited farms, they noted the exact coordinates of the crops, along with the size of the farms and other relevant details. The team recorded data from more than 3,500 farms growing crops such as pineapple, mango, cashew, citrus, and papaya. They then produced maps to display the concentration of farms, their sizes, and the total acreage under cultivation. The status of crops and their locations were also used for planning, monitoring and scouting purposes, as well as for informing industry and buyers about potential sources of supply.

The whole process initially required the setting up of computer hardware and software, and the training of extension officers and others to efficiently capture, update, analyse and present the data. Along with the farm location data, the traceability system needed information on crops, associated climate and soil data and pest and pathology details, all of which could be incorporated into a single database. Industry and agricultural extension services could also use this information to monitor the volume of crop production under specific sets of inputs and farming methods, crop yields, and areas under cultivation. Agricultural associations could also use the data for managing memberships.

#### Integration

GPS coordinates act like an address for the farmers, and show buyers, exporters, and certification bodies exactly where farms and farmers associations are located - literally putting farmers on the world trade map. The GIS information reveals exactly how much land they are cultivating, and provides the farmers with information to calculate the correct amount of seeds to buy, the number of labourers they need to hire, per-acre or per-plot costs, and even the projected harvest. Such precise data promotes transparency and confidence in the farmers, and provides important information to bank and microfinance institutions when considering loan applications.

The project looked at who was already growing which crop, what university studies or other research existed on it, which companies could use the produce, and whether the market was expanding or changing. Some crops would face well-established competitors, while others could replace imports from neighbouring countries. The team looked for specific commodities that could fill market demand and areas where Ghanaian products could have a competitive advantage.

In the end, the project focused on six export commodities and five products for domestic and regional markets. Each value chain was different, and not all were at the same stage of development. This meant examining each link in a chain and identifying the best ways to strengthen it. All activities were geared towards improving the competitiveness of both smallholders and associated businesses and integrating them within value chains.

TIPCEE worked with farmers in selected subsectors, educating them about each link of their commodity's value chain, starting with their choice of seed and ending with the domestic or foreign consumer. The project trained more than 100,000 farmers in cultivation techniques designed to enhance their particular crop and its marketability.

These improved practices spanned the entire production cycle, including seed selection, site preparation, nursery development, planting, integrated pest management and pesticide handling, fertiliser application, weed control, pruning (tree crops), harvesting, packaging, transportation, and shortterm storage. After receiving training, lead farmers conducted field days, explaining their successful practices and showing demonstration plots to neighbouring farmers.

#### Standardisation

TIPCEE also worked with the Ghana Standards Board to develop norms and standards for three varieties of pineapple and mango, two varieties of papaya, two types of medicinal plant, cashew, orange, and okra. The project produced posters to illustrate the required standards, distributed them to farmers and posted them at warehouses and other common meeting points.

For example, TIPCEE worked with the Integrated Tamale Fruit Company, an organic mango exporter that works with more than 1,300 farmers from the Organic Mango Outgrowers Association, to establish and disseminate appropriate production practices. The company adopted GIS technology for monitoring and traceability with technical assistance from TIPCEE, and now manages its own platform and database.

To improve standards for all Ghanaian mangoes, the company worked with TIPCEE and the Ghana Standards Board to sponsor the printing of mango 'norms and standards' posters. The team also helped the company prepare training materials for fair trade organic production, as one of the buyers needed fruit with that certification.

By introducing GIS to the agricultural sector in Ghana and mapping farms, TIPCEE gave producers increased visibility to dealers in farm inputs and credit services, and provided valuable information for infrastructure development. Government departments can use the data when considering road building, cell phone network development and irrigation system installation.

After five years, project evaluations show that the selected value chains are stronger, farmers are more knowledgeable about the markets, and the legal and regulatory environment for agriculture is more open to the needs of the private sector.

Through improving communications along the value chain, small-scale farmers saw that they could substantially increase yields to earn more money or even produce for export, and recognised the part they had to play in the development of the country's agro-industry. Processors and exporters meanwhile were persuaded that they could trust farmers to meet their needs. Those producers and businesses that participated in the project are now confident that Ghanaian agricultural products can compete in international and regional markets. ◄

The GIS data can help farmers develop a work plan and calculate costs, which allows them to be more competitive in the market.



## What the customer wants

The Fair Tracing project used the web and barcode technology to link coffee and wine producer associations in India and Chile with their customers in Europe.

### Market connections

or farmers who want to expand their business and look for new market opportunities it is useful to find out what customers expect from their product, and then adapt their production processes to meet those demands. It can be difficult, however, for producers to gather such specific details especially if they export their goods, as the consumers live far away.

Researchers from four UK universities (Universities of Bradford, Royal Holloway, Sheffield Hallam, and the Oxford Internet Institute) worked with coffee and wine producers in India and Chile, respectively, to help them target their production and marketing to European customers who want to buy fair trade products. The producers wanted to know what kind of information customers looked for when buying coffee or wine.

Using a barcode reader installed on a smartphone, customers can find out more about the producers of a product before they buy it. After initial participatory research with the producers, the Fair Tracing team conducted consumer research, accompanying customers as they visited supermarkets to discover what they looked for when they bought fair trade coffee or wine. Their results showed that while people were concerned with



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'The basic idea behind the project was to give consumers and producers a better idea of the value chains in which they operate,' says Dr Dorothea Kleine of Royal Holloway, University of London, the project manager and one of the researchers working on Fair Tracing.

The first task for the project team was to research the entire supply chain of the products, and make the information available to producers and consumers by publishing the details on the internet. The team worked with the producers to develop short photo stories explaining the production processes to consumers, which were also added to the website. With the farmers in Chile, they made a series of videos about the main Chilean wine grape, carménère; one showed how they used the fair trade social premium in the community, and another on how to taste and appreciate wine to try to give consumers a range of information about their particular product.

### Smart choice

We had to develop an interface that would be easy for consumers to use, and which could also be available on cell phones,' says Kleine. The project developed sites to show how the system would work. From the internet, people type in the product's barcode number and then view, on Google Maps, all the places where the product has travelled. The web page could also provide information on the product's fair trade or organic certification, score on ethical rating schemes, plus links to photos and videos.

Using a smartphone with a barcode reader application installed, the phone's camera can scan the code and automatically direct the consumer to the online site. The idea being that customers could check the product in the supermarket to make an informed decision about what they buy.

### **Related link**

### Fair Tracing

The blog gives more information on the farmers' associations, and shows how the system would work. → www.fairtracing.org

For the farmers, being able to communicate with customers, even if it is only online, is a good first step in starting to build a brand, support brand recognition and help consumers develop a sense of relationship with the product. The farmers also get a good idea of their typical customer and what that person would want to associate with a brand or see on the label of a wine bottle that would encourage them to buy it.

The technology gives farmers the chance to present themselves too, says Kleine. 'The fair trade producers want to be recognised as professionals, not as aid beneficiaries. But in order to do their job professionally, there is a certain amount of information that they need. And this kind of communication system can go a long way to help producers build a relationship with their consumers – a relationship that is about fair forms of trade, not about aid.'

Although the project officially ended in 2009, the team has maintained a blog that has put all results in the public domain and helped to promote the work and connect with other people involved in similar initiatives or who are interested in using the technology. This has resulted in a conference and a series of online meetings with related projects, many of them not-for-profits, discussing how Fair Tracing and similar projects could be further developed. One idea being considered to make the system commercially viable, would be to work with the UK's Ethical Consumer magazine's subscription-based 'ethiscore' ranking service. Customers could then use an app while in the supermarket to find out more about the people producing the products they buy.

### **Bookmark**

# Guide to good traceability practice

Small-scale farmers and agricultural cooperatives who want to expand and enter new markets often have to be able to provide documentation that traces their produce through every step of the supply chain, back to the original producer. Traceability, as it is known, is essential for exporting goods to foreign markets, or for selling produce with fair trade or organic certification.

Market connections

For consumers, the ability to trace food back through each stage of the production, processing and distribution chain, also allows them to see how, when and where their food is produced. They can use the information to judge and control what they buy, and learn more about the people who grow the produce.

The TraceFood Wiki provides guidance to producers on how to design and implement a traceability system for food supply chains. Small-scale farmers and their associations can use the wiki to set up a system for tracking food production, processing and transportation. The wiki gives step-by-step advice and guidance on designing and using electronic forms for the whole supply chain, or just the parts relevant for producers.

### **Getting started**

A wiki is a type of online database where contributors can easily add new information or edit existing articles. The TraceFood Wiki grew out of the European Commission's TraceFish and SeaFoodPlus projects, but anyone can send a request to become a registered user, to contribute information or join the online discussions to find out more about traceability or setting up a food tracing system.

Visit the site at www.tracefood.org. The main page opens to show the latest changes made to the wiki, the e-mail address to register as a new user, and an explanation of the rationale and funding behind the initiative, along with navigation tips to get started. On the left side of the page, five vertical menus and a search box direct the visitor to specific thematic pages.

### Definitions

For those new to traceability, the wiki provides definitions and background information. On the main page, click on the 'Fundamentals' link in the left-hand column under the 'navigation' menu box. The page lists the main concepts and



some general details related to traceability. Click through the links listed to learn more about the basic principles of unique identification, for example, or documenting transformation. The section on 'Actor or Traceability actor' explains who is normally responsible for traceability in an organisation, while the link 'Traceability' provides a definition and overview of the subject.

Another section of the wiki, named 'Actor viewpoints' (the fourth vertical menu box on the left) provides more in-depth practical answers to questions regarding traceability. Each page in this section describes the roles, responsibilities and prerequisites for each specific actor associated with traceability. It explains how traceability is useful for consumers, for example, and outlines what they expect from it. The 'Operational' link details traceability from an operational perspective, setting out exactly what kind of data needs to be tracked. Meanwhile, the 'Supply chain' view shows how traceability can improve supply chain management. More advice and views on quality assurance, food safety and ICT systems related to traceability are accessible via the 'Actor viewpoint' link menu.

### Setting up a system

Once you have explored the conceptual framework of a traceability system, and are ready to start building your own system, click on 'Good Traceability

Practice (GTP)' in the left-hand menu, then click 'Guide to implementing internal traceability' under the heading 'Generic GTP'. This provides an overview of the guides available, such as 'Guide to data recording stages', 'Guide to data recording' and 'Guide to traceability friendly production'. Click on the first guide in the list, 'TraceFood traceability implementation process steps' to view details of the eight 'process steps' to implementing a traceability system: basis.

You can find specific examples and complementary information on each of these implementation process steps on the 'Internal traceability' page by clicking the link on the left-hand column. The listed links and their related contents provide details on, for example, how to plan the production process, tag goods with a unique identification label, adapt the steps to meet specific needs and how to document each stage of the supply process.

To read more on the subject, the links under the heading 'Traceability references', again in the left column, lead to external sources of information that complement the data in the wiki. The 'Literature' link, in particular, offers a bibliography of science-based articles and documents on traceability, while the 'Standards' link directs users to standardisation organisations and legal traceability frameworks and standards that will help small-scale producers find new opportunities for their businesses. ◄

### Resources

### **Documents**

ICT applications for distribution and supply chain management in sub-Saharan African agriculture

Market connections



This briefing paper on ICT applications that support distribution and supply chain management is one of a series of papers to help USAID missions and implementing partners in sub-Saharan Africa use ICT more successfully to improve the impact of agriculture-related development projects. Using ICT to manage distribution and supply chains can increase efficiency and predictability and reduce waste in value chains and have positive impacts on all market actors.

→ http://goo.gl/XEo2Z

#### Information Technology for Food Safety and Traceability

The avian influenza (bird flu) outbreak in Thailand in the past two years caused severe socioeconomic damage to the country. The Thai government, through the Department of Livestock Development (DLD), formulated a policy to control the outbreak. The policy included the development of a management information system using GIS software, thereby introducing information management tools for traceability in the livestock industry. → http://goo.gl/aePvA

### Quality - A Prerequisite for Exports

A recent issue of International Trade Forum (03/2010), the quarterly magazine of the International Trade Centre, discusses the difficulties farmers from developing countries face when exporting their products to 'western' markets. Small-scale farmers and cooperatives often have difficulties when trying to comply to new standards, which can change regularly. To simplify market access and product compliance, the authors recommend that large agri-businesses and related institutions from developing countries play a more active role in the development of international standards.

→ http://goo.gl/Rhqlr

### Web resources

### Value Chains for Development Portal

The portal provides access to free, full-text electronic documents on value chains, especially where related to poverty alleviation. The resource collects information from newsletters, discussion groups, websites, bibliographic databases, directories of organisations and projects related to the topic. The target audience is the global community of professionals, including researchers, policy makers and students involved in value chain development in developing countries. It is especially intended for professionals in the South.

→ http://goo.gl/CMrGJ

#### **CBI Export Tools**



The Centre for the Promotion of Imports from Developing Countries (CBI) has developed several online tools to help suppliers comply with European market regulations. This includes the export readiness checker and the code of conduct builder. These allow exporters to quickly check the position of their operations for supplying European markets and to develop a set of standards of good practice to comply with international standards. In addition, the organisation provides details on training courses to help suppliers develop marketing plans, meet market access requirements and e-commerce. → http://goo.gl/1MhDt

### Trade for Sustainable Development

The International Trade Centre's (ITC) T4SD project provides producers, exporters and their support institutions in developing countries with information on how to engage in sustainable production and trade practices. The project has produced a Standards Map which centralises, organises and disseminates information on private standards and related research results to strengthen the capacity of producers, exporters and buyers to participate in more sustainable production and trade. www.standardsmap.org

### **Projects**

### EDES



EU regulations on food safety have undergone important changes in recent years, and require importers to establish control systems that meet European standards. The EDES programme has been designed to assist ACP countries in adjusting to this and strengthening their national systems to increase access to EU and other international markets. The overall objective of EDES, an ACP-EU Programme. is to contribute to poverty alleviation through the integration of food products from ACP regions into international, and particularly European, supply chains. → http://goo.gl/mprHN

### **Application For Agricultural** Methodological Analysis

AFAMA is an internet-based system for managing the agricultural production process. Using internet-enabled mobile phones, farmers can easily input records about farm activities directly from the field. In order to identify individual products in the distribution process more efficiently, the goods are given radio frequency identification (RFID) tags, each with a unique number. During the distribution process, workers can read the tags using RFID readers, and transit records of the products are inputted to a database.

→ http://goo.gl/koucn

#### African Agricultural Markets Programme

AAMP provides policy makers with up-to-date research regarding staple food markets in eastern and southern Africa, as well as offering training courses in methods for analyzing agricultural markets. IFPRI has launched a website to disseminate presentations, background papers and training materials. This documentation aims to enhance regional capacity, policy dialogue and coordination of agricultural markets in the region.

→ http://aamp.ifpri.info





Market

connections

Technology can help

farmers reach more

negotiate a fairer deal,

and improve market

potential buyers,

transparency.

Patrice Annequin (pannequin@ifdc.org) is a marketing and market information specialist at IFDC (www.ifdc.org) increases a farmer's ability to reach potential buyers, but it does not guarantee that the farmer will get a good deal.

### Can market information systems help farmers get that good deal?

→ We have to be careful when we introduce a market information system (MIS), to tell people that it will not be the solution to all marketing problems. Farmers also need training, access to transport and, in many rural areas, improved infrastructure.

There are systems that deliver a whole range of information for a single product, following a single value chain. Such systems work well for premium markets, such as fair trade or organic produce. Companies such as the cotton trader, Dunavant, have developed systems that track and monitor the farmers that supply them throughout the growing season. They provide information on when to plant, the types of seed to use, how to plant and protect the crops until harvest, and eventually what the payment will be and when the truck will

## The value of market information

### How can technology help farmers find new markets?

→ Cell phones allow you to contact almost anyone in the world; that already extends a farmer's market reach. And rural farmers are conducting their own market research when they call their relatives in the city to find out the price of a particular commodity.

But access to information is only one thing. Farmers need to know how to take advantage of that information. They might receive an SMS that says the price for a particular commodity is higher in the city than where they live, but it does not tell them where to find a transporter, what those costs will be, or even who the buyer is. Price information is just one piece of the puzzle. Knowing the price helps you to negotiate a fairer deal, but the information only provides a comparison, it does not set the price. And often farmers merely learn that the person who normally bought their product was cheating them.

Better access to information improves transparency in the market. And technology



Training is especially important because farmers have to know exactly what to do with the information they receive. For example, many farmers are used to selling their produce by the bag, or in the case of goods like plantain or cassava, by the bunch. They do not always get a price according to weight. When they receive the market prices, it is usually the price per kilo, so farmers have to learn exactly what that means for them. They have to work out how much a bag, or a bunch weighs, and calculate exactly how much it is worth according to the kilo price.

One other thing an MIS cannot easily do is assess quality. The prices provided are usually for standard grade commodities, so the farmers still do not know the price if they produce a high quality product, or if their product is below par.

It is important to note too, that MISes are quite useless for those farmers struggling to produce enough to feed themselves and their families. What they need is information that will help deliver food security. An MIS is, therefore, primarily useful to improve the businesses of farmers that produce specifically for selling, or who produce a marketable surplus.

# Can an MIS provide farmers with all the information necessary to secure a good deal?

→ This is what most market information systems try to do, but it is actually very difficult to gather all that data in a single place. Farmers have to consider information from a wide range of sources before they can make the best decision. Market data is only one aspect. Traders, buyers, friends and family can all influence a farmer's final decision. It is not possible for an MIS to provide all the information for every commodity that a farmer might produce. arrive to pick up the goods. They deliver all this information directly to the farmers' cell phones. Such companies soon recoup the cost of developing the system through improved efficiency in the supply chain.

### How will market information be delivered to farmers in the future?

→ The cell phone is certainly the most important device for obtaining market information in ACP countries. There are many systems providing information using SMS and voice. I am confident that more farmers will use cell phones to access market data from the internet in the near future as the prices of smartphones and other internet-ready phones decrease, and connections become affordable. Developers too, are increasingly producing websites suited for viewing on cell phones, and particularly smartphones, and are creating apps in some of the major African languages, such as Swahili.

What we have to remember is that price information has been available for a long time; it did not just arise as a result of technology. Technology is just a channel to deliver the content that already exists, but that channel brings the information closer to the first link in the value chain, the farmer.

### **Related links**

Agricultural Input Market Information and Transparency System for Eastern and Southern Africa → www.amitsa.org

- AfricaFertlizer.org
- → www.africafertilizer.org

### Dispatches



### Internet under the sun

Computer Aid International, a UK charity, is now expanding beyond its usual business of supplying high-quality refurbished computers to agricultural, health and educational projects in developing countries. The organisation has designed a solar-powered internet cafe built into a twenty-foot shipping container, which can be placed in a village without access to grid electricity. It is fitted with 11 computer monitors linked in a single PC using a thin client network. The main computer can connect to the internet via a cell phone network, WiFi or satellite connection.

The ZubaBox as it is known (a name crowdsourced from the organisation's Twitter followers) is easy to set up and cost-effective to run. The solar panels require little or no maintenance and can power a ceiling light and ventilation, as well as the computer network, for up to 12 hours a day. The box is also fitted with ten sockets for recharging cell phones.

A fully-fitted ZubaBox costs around €25,000, and Computer Aid is currently seeking businesses and organisations to sponsor the costs. Three have already been shipped to communities in Kenya and Zambia. The organisation stresses the importance of internet access for rural communities. According to the website, 'Access to local weather forecasts allows farmers to adjust the planting and harvesting times of their crops, increasing agricultural productivity and food security. Additionally, learning IT skills at school means children will be able to gain better paid employment in the future'.

→ Visit the website for more information: http://goo.gl/Egb4S

### An independent network

Although cell phone networks are expanding rapidly around the world, many rural parts of ACP countries still do not have coverage in their area. The network providers say that there are too few people in remote areas to justify investing in the necessary infrastructure. Researchers from the Technology and Infrastructure for Emerging Regions (TIER) group at the University of California at Berkeley, however, have come up with one solution that could bring cell phone coverage to rural areas.

The Village Base Station (VBTS) is basically a mini, independent cell phone network that can be set up anywhere. It consists of a computer with software to run a radio that can send and receive cell phone signals. The system uses very little power (around 20W) which means it does not need to be connected to the main electricity grid, or even require a diesel generator. A solar or wind-powered system would be sufficient, which helps to keep costs low.

VBTS can provide a voice and data service locally or, with some adaptation, connect to established cell phone

#### Including the user

ICT initiatives aimed at using ICTs to reduce poverty in sub-Saharan Africa are prone to neglect the role of the people who actually use the technology, according to a discussion paper published by VTT Technical Research Centre of Finland. The report, 'From ICT towards information society', notes that while users might not initially have the skills or information to make informed choices about available technological solutions, their inclusion at the early stages of any ICT strategy is critical to its success. The author, Hannes Toivanen, points out that many policies are developed based on the technology available, rather than what is needed by the final beneficiaries. 'Application and implementation of ICT in the reduction of poverty requires careful consideration of local conditions and demand' says Toivanen. When applied as part of broader coordinated planning, he adds, locally adapted ICT initiatives can be more effective in reducing poverty in the targeted community.

→ View the full report here: http://goo.gl/Oen3g



networks using a long-distance WiFi link. Although it is illegal in many countries to operate in cellular radio bands, the researchers note that a local network could be very useful for delivering educational and agricultural information to a community. The system is still in the early stages of development, but the TIER team hope that VBTS can be further developed to bring cell phone services to the millions of people in under-served areas.

→ For more details, download the Village Base Station proposal paper: http://goo.gl/nV4w0

### **Telecentre sustainability**



'Telecentres are not "Sustainable": Get Over It!' is the provocative title of a talk given by Michael Gurstein at a recent ITU-sponsored workshop on telecentre sustainability in Bangkok. Gurstein is the executive director of the Centre for Community Informatics Research, Development and Training based in Canada and

South Africa. His main argument is that, since telecentres are set up in places where most of the population is poor, it is unlikely that the cost of the initial investment – in hardware, software and connectivity – will ever be recovered. The challenge, he adds, is to develop a telecentre model for communities that cannot otherwise access the valuable information such centres can provide. → Read Michael Gunstein's notes in full: http://goo.al/1lugv

→ Further reading on telecentre sustainability: Finding the role

of telecentres by Sulah Ndaula: http://goo.gl/70hvy

→ TelecentresAfrica Discussion Groups: http://goo.gl/zt56E

### Predicting potential problems



While aid agencies working in the Horn of Africa have warned of severe food shortages in the region for months, many experts are now calling for greater access to longer-term meteorological information. Government ministers, aid agencies and NGO representatives gathered at FAO headquarters in

Rome for an emergency meeting to discuss how to deal with the drought and provide help to the estimated 10 million people at risk in parts of Somalia, Ethiopia and Kenya.

Researchers from the Tropical Applications of Meteorology Using Satellite (TAMSAT) group, based at the University of Reading in the UK, hope to contribute to better rainfall forecasts throughout Africa by making satellite data from the past 30 years widely available.

TAMSAT researcher, David Grimes, told SciDev.Net recently that the data 'can tell us whether the rainfall and the climate in particular areas, at particular times of year or seasons, have been changing in the past 30 years. If the climate models say the same thing as our data sets, that would give us much more confidence in their future predictions!

➡ For more details visit the TAMSAT website: http://goo.gl/PbI3U

### Why ICTs can fail

A recent discussion paper from the organisation, Research Into Use, considers the role of ICTs in communicating results and developments from research work, and how the findings are eventually put into use. The authors, V Rasheed Sulaiman, Andy Hall, N J Kalaivani, Kumuda Dorai and T S Vamsidhar Reddy, looked specifically at the use of communication technology to deliver information on agricultural and rural development, focusing on experiences in south Asia.

Entitled, 'Necessary but not sufficient: Information and communication technology and its role in putting research into use', the paper notes the influence of technology in introducing concepts associated with the Green Revolution. In the 1970s and 1980s, print media, radio and television played a major part in informing farmers of new techniques to increase productivity. Many recent initiatives, however, using newer technology such as cell phones, internet and personal computers, have failed to meet expectations.

In a summary of the main findings, the authors note that, 'ICTs in general have not contributed effectively to the challenge of putting new knowledge into use'. Instead, technology is being used to merely deliver information, while the process of communication consists of much more: developing connections and relationships and allowing input from more than one source.

The authors go on to suggest reasons why ICTs fail to meet their potential. They say that in many projects it could be due to 'a lack of appreciation of the real nature of the communication-intermediation tasks required for innovation'. Also, the ability of intermediaries to introduce innovation can be underestimated, while many communities lack the necessary networks to make the best of the information provided.

→ Download the full document from the Research Into Use website: http://goo.gl/IDSjy



**300** satellites to be launched into Space for Galileo, Europe's global navigation system, to attain full operational capability. http://goo.gl/5GBZ2

**300** applications out of the 107 submitted for the World Bank's Apps for Development competition came from Africa. Two became winners. http://goo.gl/4xL4r **300** telecentres currently exist in Zambia with an average of 800 users each, complementing traditional ways of spreading information. http://goo.gl/hfb4t

### **Tech Talk**

# A balance of information

### Websites:

I have been working with ICTs in my professional life for more than 20 years. I have been a manager, trainer, and researcher in information and communication for agricultural and general development. I am now running a new consulting firm, so I have a broad range of interests and try to stay up to date on as many relevant subjects as possible.

My favourite websites are those with many links, and which use a variety of formats to present the content: text, video, audio and online. Sometimes I almost get 'carried away' following links, so I need to be very focused. One way to help me do that is to subscribe to e-mail newsletters. When I see an interesting article in the newsletter, I can click on the link to visit the web page directly, rather than having to explore the whole site..

The CARDI (Caribbean Agricultural and Research and Development Institute) website was my default web page for many years and still provides content and links to Caribbean agricultural and development research. I also regularly visit the Caribbean Farmers Network (CaFAN) website, while the Commonwealth of Learning (CoL) provides good examples of using ICT to train farmers.

- → CARDI: www.cardi.org
- → CaFAN: www.caribbeanfarmers.org
  → CoL: www.col.org

I follow activities on media and agriculture

at the Association of Caribbean Media Workers website, which gives updates on the work of a joint project with

organisations such as CTA, CARDI and Inter-America Institute for Cooperation on Agriculture (IICA). The Caribbean Community Secretariat (CARICOM) site gives a good overview of key Caribbean policies, events and projects, and their ICT portal is extensive.

- → CanaNews: www.cananews.net
- → IICA: www.iica.int
- → Caricom: www.caricom.org
- → Caricom ICT portal: www.caricomict4d.org

For my business, I find Business in a Box useful for downloading document templates – contracts and invoices, for example. The Trinidad and Tobago Foresight and Innovation Network (TTFI) provides good ideas and practical experiences for businesses. I also follow websites on ICT development such as the UNESCO information and communication site and ClO.

→ Business in a Box:
 www.business-in-a-box.com
 → TTFI network: www.ttfi.net
 → UNESCO C&I:

- http://portal.unesco.org/ci/en/
- → CIO: www.cio.com

### Web tools:

I go straight to Gmail when I switch on my computer. I have several e-mail accounts, but use my Gmail account most frequently. Since I use Google as my main search engine, I find it convenient to use other Google applications too, such as the Google Calendar with its e-mail reminders and colour coding for events. Google Maps helps me to see where my clients live and although not all their locations are mapped, it's good for giving the general direction.

I use Skype for both business and personal long distance calls, either phone to Skype or Skype to Skype. I use it mainly for one-to-one talks or small group discussions, especially when the other people are in different countries. I sometimes use the video call feature with my laptop's built-in webcam, and I use the chat function in both Skype and Google to send quick greetings. For larger regional or international meetings and webinars (web seminars) I use www.gotomeeting.com.



Claudette de Freitas (cdefreitas@ceedltd.com) is chief executive officer of consultancy firm, CEED Ltd

### **Devices**:

I use a desktop computer, laptop, cell phone, iPod and iPad. The iPad gives a feeling of 'freedom' that a laptop does not give, mainly because of the long battery life, or maybe because I use it more for entertainment; music, photo slide shows and a few games. I also like the look and feel of the 'notes app' and the way the contacts and calendar are presented. The touch technology is wonderful, and the iPad fits neatly into my handbag!

I also have a large-capacity external storage device. I am very careful about making multiple backups of my work and personal items by sending e-mails to myself, on Google Docs, or saving documents on devices and memory sticks.

### Future:

It is becoming a bit much to keep track of all these devices, content, applications and still live a balanced life. I am striving for consistency, to live and manage one life and have one persona in both the virtual and natural worlds. So it would be great to have just one device where I can input and access content through either text or voice. It would have to be very portable and user friendly, with universal standards.

I really identify with the Caribbean Nobel Laureate (Economics, 1979) Sir Arthur Lewis who recognized so long ago that 'the fundamental cure for poverty is not money, but knowledge'. I am excited to continue to explore how I can make appropriate use of technology and knowledge to improve lives and transform organisations, especially in my new business venture. ◄

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