

Where, exactly, is your farm?

Syecom's eFARMS farm-mapping service in Ghana



The project

Project holder Syecom Ghana Ltd, www.agricinghana.com, www.syecom.com

Application eFARMS (farm mapping)

CTA project Geospatial technology and agroclimatic information services for smallholder farmers in Ghana

Location Volta, Central and Eastern Regions of Ghana

Clients Smallholder and commercial farmers, agro-input dealers, agribusinesses, and NGOs in Ghana

Topic Mapping farms and developing location-based information services for smallholder farmers

Project description Syecom developed a service that uses handheld GPS devices to produce accurate maps of smallholders' farms. These maps have a wide range of uses for farmers, cooperatives and service providers. Syecom developed the software, demonstrated it in the field, and trained people how to use it.

OF COURSE LOUIS Abban knows where his farm is: he has lived there all his life. And of course he knows how big it is – he hand-hoes all two hectares of it.

But that is not precise enough for the agency that Louis has approached to certify his pineapples as organic. This agency has strict rules on traceability: not only does it check that Louis has not sprayed pesticides or used artificial fertilisers; it also needs the precise geographical coordinates of his farm, its exact size, and a map.

It is worthwhile for Louis to provide this information: he will earn a lot more if he can sell certified fruit to an exporter. And the information about his farm will be useful when he approaches a bank to get a loan for the inputs he needs: pineapple suckers to plant, plastic sheeting to use as mulch, and tools for planting and harvesting. But how can Louis get the information the agency and the bank require?

Syecom has the solution. This company offers a mapping service in Ghana for smallholder farmers like Louis. Farmers (or their organisations) call Syecom, which puts them in touch with the local extension agent or a local lead farmer. This person visits the farm and walks around it with a hand-held global positioning device, recording the farm boundaries, individual fields, and the locations of features such as boreholes, streams,

buildings and roads. He or she also notes the farmer's name and contact details, and the types and varieties of crops grown.

The data are then emailed to Syecomp's office in Accra, where specialists process them and create the maps. The software automatically calculates the area of the farm. Softcopies of the maps are emailed back to the agent within a couple of hours. A hardcopy follows by courier.

eFARMS

Syecomp's mapping is the basis for a range of other location-based services. With CTA support, the company has developed a prototype service called eFARMS. For a small fee, the farmer can download the farm map at any time to a mobile phone. The map is updated, showing crops and fallow in different seasons.

The app overlays the map onto the latest satellite imagery so the farmer can see the current state of the vegetation. It tells the farmer whether the crop is healthy or needs attention. Crop insurance is not yet common in Ghana, but the app opens up the possibility for farmers to claim compensation if there is a drought in their area: they can show the satellite imagery and the farm map to the insurance agent as evidence.

Syecomp can produce maps of individual farms or clusters of farms. The maps show individual fields so farmers can analyse production and plan for the next season. They can also use the maps when dealing with the authorities, for example if disputes over ownership arise or if they need to support their claims to tenure. Larger farmers can check the area of land that each worker has cleared or planted, and pay them accordingly.

Clients

Syecomp's clients include both smallholders and commercial farmers. Most of the smallholders are members of cooperatives or farmer associations. They grow cocoa, maize, rice, mangoes and vegetables, but tend to have outmoded practices and limited finances. Other intended users include agro-input dealers, exporters, produce aggregators, researchers and the government.

eFARMS links the farmers to nearby input suppliers; it has registered 3,400 such dealers across Ghana. The farmers can use a simple text message or make a phone call to order supplies from the dealer. Precise information also promises to help farmers plan their farms better and determine how many inputs they need. That in turn should boost their productivity and income.

A farmer using a global positioning handset to work out how much to pay farm workers based on the area each has cleared and planted



Promoting the service

The CTA grant also helped Syecomp promote the farm-mapping service. Company staff visited villages, met with members of cooperatives and took part in farmer field days. The company produced promotional materials and guides. It made the global positioning devices available to smallholder cooperatives and extension staff and trained them on how to use them. It used blogs to keep in touch with potential clients: these informed readers about agricultural policies, market linkages, the use of computers and mobile phones to increase farm productivity, as well as the company's services.

Revenues and impact

During the pilot stage, the CTA grant made it possible to subsidise services to test procedures and assess demand. Syecomp did not charge members of smallholder cooperatives for the initial mapping. But clients paid between GHS 20 (US\$5) and GHS 65 (\$17) for a printout of a finished map, and they are also charged for subsequent updates, for example for information on vegetation changes based on new satellite imagery. The company offers subscription rates for members of farmer associations and cooperatives. It plans to charge a nominal fee if the farmer uses the map to get an export certification.

As a result of the project, 440 producers have had their farms mapped and have obtained organic certificates. That has enabled them

to expand their production, sales and income, which in turn has created jobs for unemployed women and young people in the village.

Extension officers now also have a new service they can offer to farmers and an additional source of income.

New services for new markets

With the eFARMS app and training manuals on farm mapping, Syecomp is now in an excellent position to further develop location-based services for the farming sector in Ghana. The project has raised awareness and interest; additional demand has spurred the company to expand its staff and range of services.

Business model

Syecomp provides farm mapping and other location-based services ① to farmers and cooperatives ② so they can qualify for organic certification and bank loans. It maintains relationships with these customers through face-to-face training, text messages and the Syecomp website ③. It provides its services to clients through face-to-face interactions in the field, as well as via emails, WhatsApp messages and phone calls ④. The key activities needed to provide the service include geospatial analysis through on-farm mapping, supplemented with the analysis of satellite images and research findings ⑤. It uses a range of resources to do this, including GPS equipment, satellite data and specialist staff ⑥. Important business services and partners include extension officers and cooperative staff who enrol the farmers ⑦. Syecomp provides the mapping service for free, but clients must pay for a printout and for additional services. Much of the funding has come from research consultancies, bespoke training and development projects ⑧. The costs are mainly for staff, transport, communication and promotion ⑨.

⑦ Business services and partners	⑤ Key activities	① Product or service	③ Customer relationships	② Clients
Extension officers Cooperatives Exporters Government Ministry of Food and Agriculture Commercial farms International organizations	Geospatial analysis Satellite image analysis Agricultural research E-farms platform	Farm survey and mapping Satellite image analysis Agricultural research Blogging	Training SMS Website Blog	Commercial farms Smallholder farms Cooperatives (certification, bank requirement) Researchers Exporters NGOs
	⑥ Key resources		④ Channels	
	Advanced global positioning system gadgets Satellite data Specialist staff Computers, printers, stationery Vehicle		On-field Emails WhatsApp Phone calls	
⑨ Costs		⑧ Income		
Staff (co-financed) Transport Communication Promotion		Free mapping, fees for printouts and additional services Research consultancies Bespoke training International development projects		

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Location-based services are still in their infancy in Ghana. But the potential is there. This project has shown that farmers are prepared to pay for services that they find valuable. Organic certification is one such service since it can significantly boost a farmer's income. And accurate maps are an indispensable part of the certification process.

Cooperatives are another potential market. Knowing where their members' farms are and what crops they are growing will help them manage input purchases, loan applications, product marketing and traceability, and membership. A spatial overview also gives them insights when dealing with input suppliers, produce buyers and finance institutions.

Syecom is adding to its services the use of remote sensing to provide vegetation monitoring and to generate historical and forecast data for crop yields, water availability and weather modelling. This will enable the company to serve both commercial farmers and smallholder cooperatives. It hopes this service will generate enough revenues to make it possible to continue to offer customised mapping services for smallholder clients.

Inspired by Syecom's experiences, the government of Ghana is drafting a policy on geospatial data infrastructure. This will also incorporate policies around geo-intelligence, land surveying and geo-smart infrastructure guidelines.

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