QUALITY ROOTS

Quality is a new concept for farmers in many developing countries. But the need to integrate quality in their production and business processes is becoming harder to ignore. Alicia Dimas investigates how quality can help boost agriculture around the globe

When you go to a supermarket you expect to buy quality products. You take it for granted that the supermarket chain – and prior to that, the producer – assures that any fruit, vegetable or animal products it sells are fit for consumption.

In developed countries, quality is seen as an acquired right. People expect quality products and services, and companies integrate quality in their daily processes. However, in developing countries quality can mean the difference between economic development or starvation. ➤

Although the application of quality processes and procedures to agricultural production can help developing countries to improve their agricultural industry and enter the international markets, quality is still overlooked by some producers.

Quality is more than just improving agricultural products and maximising production; it's about ensuring the produce is fit for national and international consumption. It's about getting it right the first time and every time, improving processes and avoiding unnecessary actions and costs. So why isn't every farmer in the world wearing a quality badge?

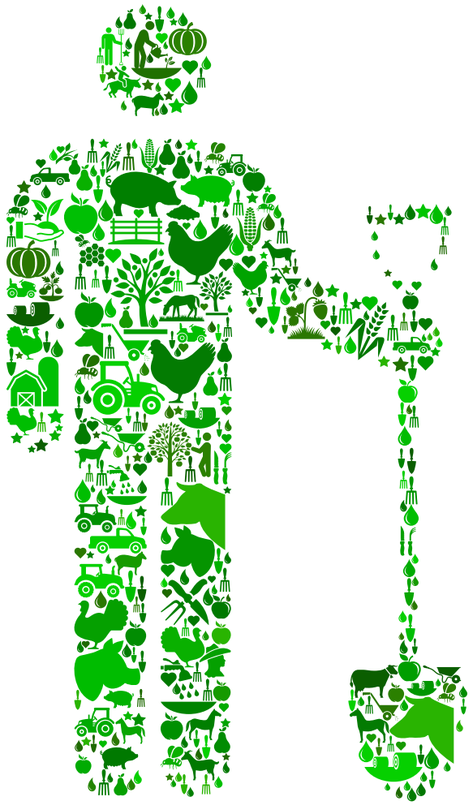
Yemi Shodipo, Quality and Food Safety Management Systems Consultant, Auditor and Director at Charis Management Systems, a CQI/IRCA Approved Training Partner, tells *QW* that the main challenges for the agricultural industry in developing countries are the different regulations and absence of mutual recognition by the developed world, the low penetration of international standards, quality infrastructure challenges, and a low development of supply chains and related know-how.

"I am aware, through my membership of the Nigerian British Chamber of Commerce, that black-eyed peas from Nigeria are subject to a ban. This is due to the presence of pesticides banned by the European Union (EU) that are still legal in the country of production," Shodipo says. He believes that the solution for situations like this is for developing countries to align their legislation with the EU market.

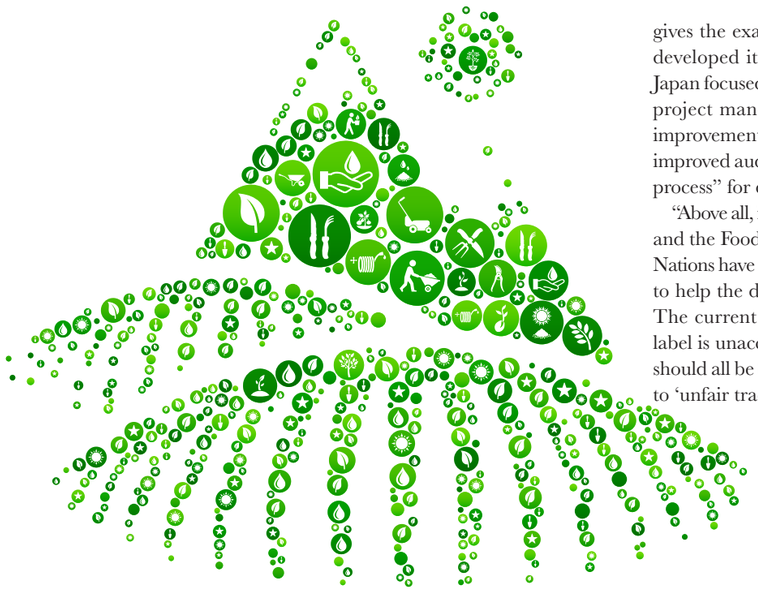
Another factor holding back the agricultural industry in developing countries is the low compliance rate to international standards. The industry is sometimes solely focused on the internal market, which does not demand compliance to international standards. Shodipo believes this is a 'chicken and egg situation' as the industry doesn't follow international standards because the number of international commercial transactions is low. However this number could be higher, if the industry complied with international regulations.

Some developing economies are also lacking basic quality infrastructure, like an accreditation regulatory framework or an independent certification body. Farmers face challenges like lack of guidance, information and support on quality processes, testing and calibration. Shodipo says there is also an overall lack of technical and quality professional knowledge, increasing costs and imposing additional barriers to agricultural companies in these countries.

He adds that problems extend throughout the agricultural supply chain as a general lack of expertise compromises the quality of transportation, shipping, clearance and other supply chain operations. "Quality is right at the centre of overcoming these significant barriers to trade that keep the developing world a negligible part of the overall world trade," Shodipo states. He gives the example of Japan and how the country exponentially developed its agricultural sector after the Second World War. Japan focused on quality to improve its supply chain management, project management and product development, among other improvements. Shodipo stresses that international standards and improved auditing procedures can "help jumpstart and hasten this process" for developing economies.



"Above all, interested parties such as the World Trade Organization and the Food and Agriculture Organization (FAO) of the United Nations have a role to play in implementing a positive discrimination to help the developing world get a fair share of the world trade. The current tokenism of a dedicated aisle with the 'Fairtrade' label is unacceptable. This should be flipped over and our goods should all be fairly traded so that we would have an aisle dedicated to 'unfair trade'." ➤



The Nagricoin Project

NagriCoin is a project of an international biotechnology company, NagriTech LTD, which is helping to increase yields and improve the quality of crops with Nagri-HL

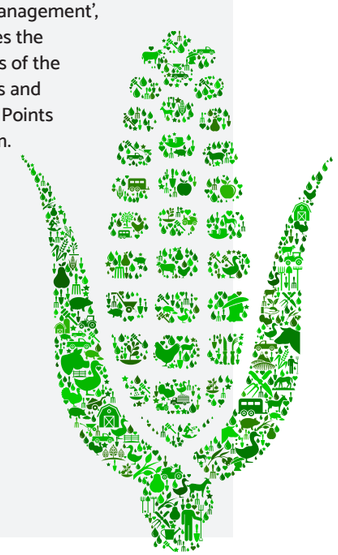
Established in 2011 by a team of scientists and businessmen from various countries around the world, NagriCoin has helped to produce Nagri-HL, an organic fertiliser that consists of microelements and antioxidants that stimulate plant growth, to increase yields and improve the quality of crops. The fertilier cuts the concentration of nitrates in the crop (due to a more intensive metabolism), and decreases side effects (for instance, the fertiliser does not stimulate the growth of weeds).

Evgeniy Kozarenko, CEO of NagriCoin, explains that the project started as a way to fight the declining quality of agricultural crops, particularly in developing countries.

Over the past decade, the demand for food and fodder crops has increased by 1.5-2.5 times, depending on the plant's species. This is due to the rise in population and the improvement of quality of life, which directly affect the volume of consumption.

Kozarenko says that this led to aggressive methods of stimulation being used in the cultivation process, such as the application of nitrogen fertilisers, the use of chemical growth stimulants, and the widespread application of pesticides and herbicides, to suppress undesirable effects from fertilisers and stimulants. "This leads to the reduction in the overall quality level of agricultural crops," he says. "At the same time, there is a constant increase in the requirements for the quality of products, both from the population and the public authorities. Consequently, improvement of the quality of crops is the key to sustainable sales."

The NagriCoin project team picked Brazil as the first agricultural market to distribute Nagri-HL because of the importance of the agricultural industry in the South American country. Brazil is considered the third largest agricultural market in the world, making it an attractive market for manufacturers of fertilisers and agricultural machinery. Although the project is still in its infancy, Kozarenko says they have successfully passed field and safety tests, and are now planning to implement ISO 9001:2015 'Quality Management System' and ISO 14001:2015 'Environmental Management' standards, as well as voluntarily adhere to ISO 22000 'Food Safety Management', which integrates the seven principles of the Hazard Analysis and Critical Control Points (HACCP) system.



Embracing technologies for agricultural productivity

Some international organisations are already helping independent farmers in developing countries to get a fair share by providing them access to training, technology and the tools to build resilience to unexpected yield losses caused by diseases or extreme weather scenarios.

In Nicaragua, Abelino and his family have been growing coffee for 27 years, but in the past two years they have lost their entire coffee crop to coffee rust, a plant disease that thrives in rising temperatures.

Together with his wife Martha, Abelino participated in a training session run by the charity Christian Aid and its partner Soppexcca. With the information gained, they decided to plant cocoa instead, as it would prove better suited for their climate and soil characteristics.

The session was part of the Christian Aid sponsored project Adapta Nicaragua, which helps small and medium-sized cocoa and honey producers become more resilient to unpredictable weather and increase the productivity of their crops, through access to high-quality climatic information (detailed and complete data on climate changes). The Adapta Nicaragua project contributes to the climate change adaptation agenda by testing innovative business models and information technologies for efficient use of water, such as water harvesting and recycling. The project also aligns with the Inter-American Development Bank's plan for Nicaragua, which aims to support small producers to adopt innovative technologies that help generate income but are also environmentally sustainable.

Now, Abelino collects information daily on air and soil temperature and humidity, which he then reports by SMS to a research institute. The data the institute accumulates from Abelino's and other farmers' text messages are analysed and compiled, and the conclusions help Abelino and his family make an informed decision on the type of crops they will plant.

In fact, new technologies are proving to have a positive impact on developing agriculture around the globe. For instance, the mobile app VetAfrica, developed by Cojengo in Scotland, in partnership with Microsoft, is enabling veterinarians and farmers in East Africa to accurately diagnose livestock illnesses and find the most effective drugs for treatment. With more than 100 million farmers in East Africa, the developers predict massive growth of mobile and cloud tech solutions in the area.

Evgeniy Kozarenko, CEO of NagriCoin, a project of an international biotechnology company that produces organic fertilisers for developing countries, believes robotic automation and processing of big data will have a huge impact on the sector in the near future. "These two trends can solve the main problems of agriculture: an abundance of manual labour, inaccurate forecasts, and calculations on weather and fertilisation. Modern technologies, such as blockchain, will help this industry save money and time, currently taken away by bureaucracy," he says.

Beyond technological changes, political changes and economic advancements could also bring new opportunities for growing markets in the near future. As developing countries make political and economic advancements, their infrastructure will evolve and this will help farmers to meet international market requirements and quality standards. Quality culture is taking root in developing countries and consequently their agricultural industry will develop and become more competitive. ■

Photo: Christian Aid/Alex Ciucu

Abelino collects information on air and soil temperature and humidity, which he then reports by SMS to a research institute. The data is analysed and the conclusions help Abelino and his family make an informed decision on the type of crops they will plant

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Agriculture in developed economies

Quality challenges in the agricultural industry are not limited to developing economies; sustainability and food quality are some of the main concerns for producers in developed economies, such as the European Union and North America

In 2017, the European Academies Science Advisory Council (EASAC) published *Opportunities and challenges for research on food and nutrition security and agriculture in Europe*, a report that explores how the current scientific evidence can shape understanding of challenges faced by the agricultural sector in Europe. Dr Robin Fears, Biosciences Programme Director at EASAC, shares the report's findings and the role of quality in developing the agricultural sector in Europe.

What were the quality findings in the report?

Quality in agriculture, like quality in any other sector, depends on the quality of the scientific evidence and the quality of the data. So, the report discusses a number of general issues for producing excellent science and relevant, large, useable data sets. For example, standardising these data sets makes it easier to verify and share them as part of the quality agenda.

I guess that quality, in the context of quality improvement, very much depends on innovation. The report discusses and gives a number of examples in agriculture, where innovation is important in order to enable and support high quality agriculture. Actually, one of the aspects of quality and innovation, which we emphasise, is the need for the European regulatory framework to focus on product quality.

What are the European agricultural industry's main quality objectives?

The main objectives are to produce sustainable and healthy diets, so quality in agriculture has to be associated with these new objectives. There are also concerns for environmental, societal and economic sustainability. These objectives also encompass reducing the waste of food. Waste during harvesting, food processing and consumption. All of these issues relate back to agricultural productivity because, of course, the less we waste, the less we have to increase production by.

What role can quality play in guaranteeing food safety?

Maintaining food quality links with issues of food safety, food processing, analysis in food science and technology, and the issue of the authentication of food composition and origin. That traces back to agriculture if, for example, the variety of meats that consumers believe they are eating is not right. If those meats are being substituted for poorer quality meats, or an entirely different animal origin, that raises issues of food safety, food authentication, labelling and communication.

How are new technologies changing the sector?

New technologies brought precision agriculture. There's no good definition of precision agriculture but, essentially, it's related to improving the efficiency of agriculture, reducing inputs of pesticides, herbicides, fertilisers, and the use of water in agriculture, to increase the efficiency and quality of production systems.

However, this raises many questions: What are the methodologies? How can the uptake by farmers be encouraged? What are the potential consequences for the environment, for the homogeneity of agricultural production systems and for improving efficiency in quality?

What role does regulation play in ensuring quality in agriculture?

I think there is a regulatory dimension, particularly in Europe, regarding the regulatory frameworks for plant and animal breeding quality. The regulation of plant breeding is imposed according to the methodology used to breed that new variety. So, if you are using a genetic modification technology, then that's regulated under the Genetically Modified Organism (GMO) regulations.

What we need is a common standard in regulation that focuses on the nature of the product, and the quality of that product, rather than the process by which it is produced. We can argue that Europe should move to a system that focuses more on product quality than it does on the process. This is quite unusual in agriculture.

Let's look at other industry sectors, for example, pharmaceuticals. Pharmaceutical regulation is broadly according to the product quality, the efficacy and safety, not on how it's being produced.

What does the future hold for agriculture?

Data processing and research advancements will impact the sector. For example, large linked data sets will be used for the precise application of fertilisers by farmers. To decide on which crops to grow, farmers will have combined data from market and commodity prices.

All of this will be important in order to respond to challenges such as climate change, population growth, and alternative uses of land.

Read it!

Download the EASAC's report *Opportunities and challenges for research on food and nutrition security and agriculture in Europe* at **https://bit.ly/2x2bmNB**

Photos: Leopoldina Academy/Marcus Scholz